HOW TO USE VERSION 2 OF EMERALD ECO-LABEL: NAPA'S EPD TOOL

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March 22, 2022

Goals of this Webinar

OVERALL: Be able to make an EPD using the Emerald Eco-Label tool at AsphaltEPD.com

1. Outline the data gathering step

2. Walk through using the tool, from initial account creation to defining a mix and making an EPD

3. Identify common mistakes and answer questions

What is an EPD?

- Environmental Product Declarations (EPDs) are ISO14044 certified labels for the environmental impacts of a manufactured products
- The rules governing asphalt EPDs were created by a panel of scientists and industry representatives over several years, and revised in 2022

Who can make EPDs?

- Each Organization has a Primary Contact
  - Can create plants, mixes, and EPDs
  - Can approve others to join their Organization
  - Can allow other to create plants, mixes, & EPDs

Primary contact is the technical lead and must go through the EPD Tool training…

….like you are right now

What data is needed?

Three main types of data:

1. Plants
   - Electricity, fuel, water, production volume
2. Ingredients
   - Aggregate, Binder, & Additives
3. Mixes
   - Amounts of agg, binder, and additives in each mix
   - Distances travelled for each mix ingredient

What data is needed?

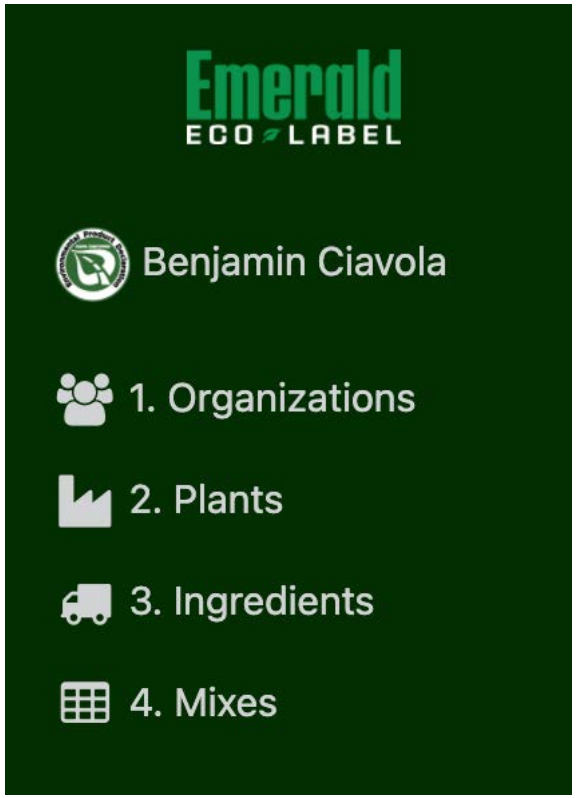
Handy document: “EPD Data Gathering rev3.xlsx”

- Print & gather data offline or enter into excel
- Lists exactly what data is needed
- Sheet has two mix definition options: Aggregate by Total %, or by Aggregate %
  - Created to help you get your mix % into the same format as the EPD Tool
  - Data entry to EcoLabel is always by total mix % mass

Is my Company's data safe?

- **YES.** The only people who can see your data are employees of Trisight. We are under an NDA to never reveal your data.
- A Trisight data auditor may see parts of your data during a spot check to ensure your EPDs meet ISO14044 data quality standards.
- The software employs the credit card industry standard for encryption.

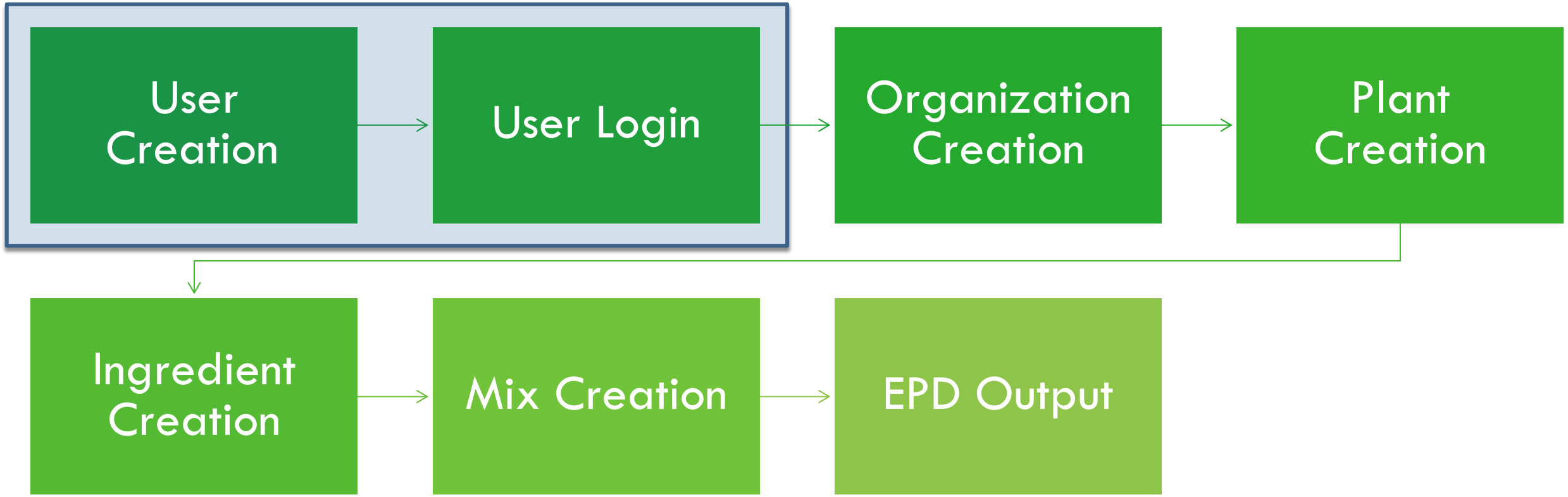
EPD Tool Workflow



Order of Operations

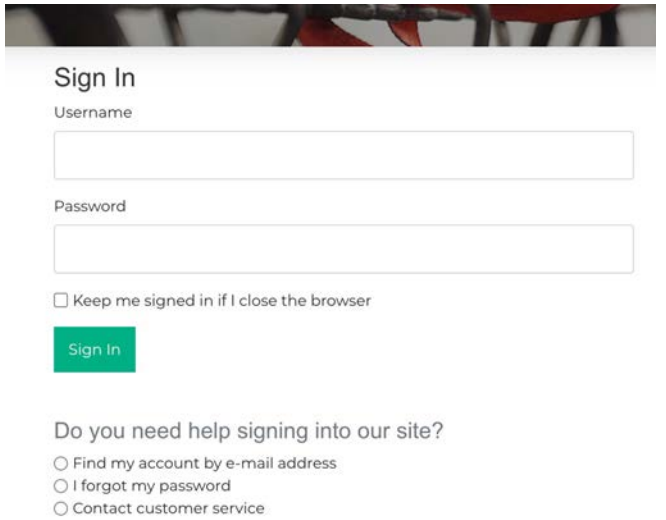
The sidebar of the site is organized to guide the workflow

EPD Tool Workflow



How to create an EcoLabel account

- Establish a NAPA user account
- Navigate to https://asphaltepd.org
- Click “Sign in”
- Sign in with your NAPA account



1. Organizations
2. Plants
3. Ingredients
4. Mixes

Published EPDs
Product Category Rules
About EcoLabel

About the Tool
Changelog

End-User License Agreement for Emerald Eco-Label, Environmental Product Declaration Tool

This End-User License Agreement (EULA) is a legal agreement between you (either an individual or a single entity), the author (Trisight) of this Software, and the Software Owner (NAPA) for the software product identified above, which includes computer software and may include associated media, printed materials, and “online” or electronic documentation (“SOFTWARE PRODUCT”).

By using the SOFTWARE PRODUCT, you have reviewed and agreed to be bound by the terms of this EULA. If you do not agree to the terms of this EULA, do not use the SOFTWARE PRODUCT.

1. GRANT OF LICENSE.

This EULA grants you a limited, non-exclusive nontransferable (including via sublicense) license to use the SOFTWARE PRODUCT for the sole purpose of developing an Environmental Product Declaration for asphalt mixtures. An unlimited number of users may use the Software Product on unlimited devices.

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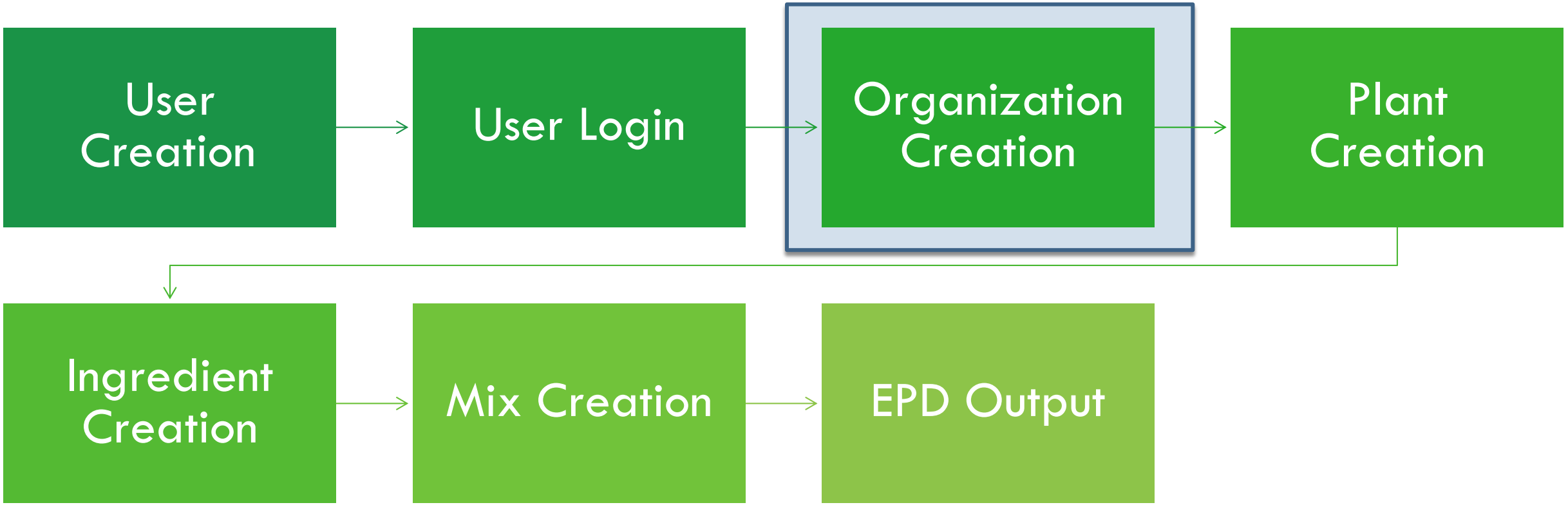
EPD Tool Workflow




Emerald
ECO LABEL
Logout
Benjamin Ciavola
1. Organizations
2. Plants
3. Ingredients
4. Mixes
Published EPDs
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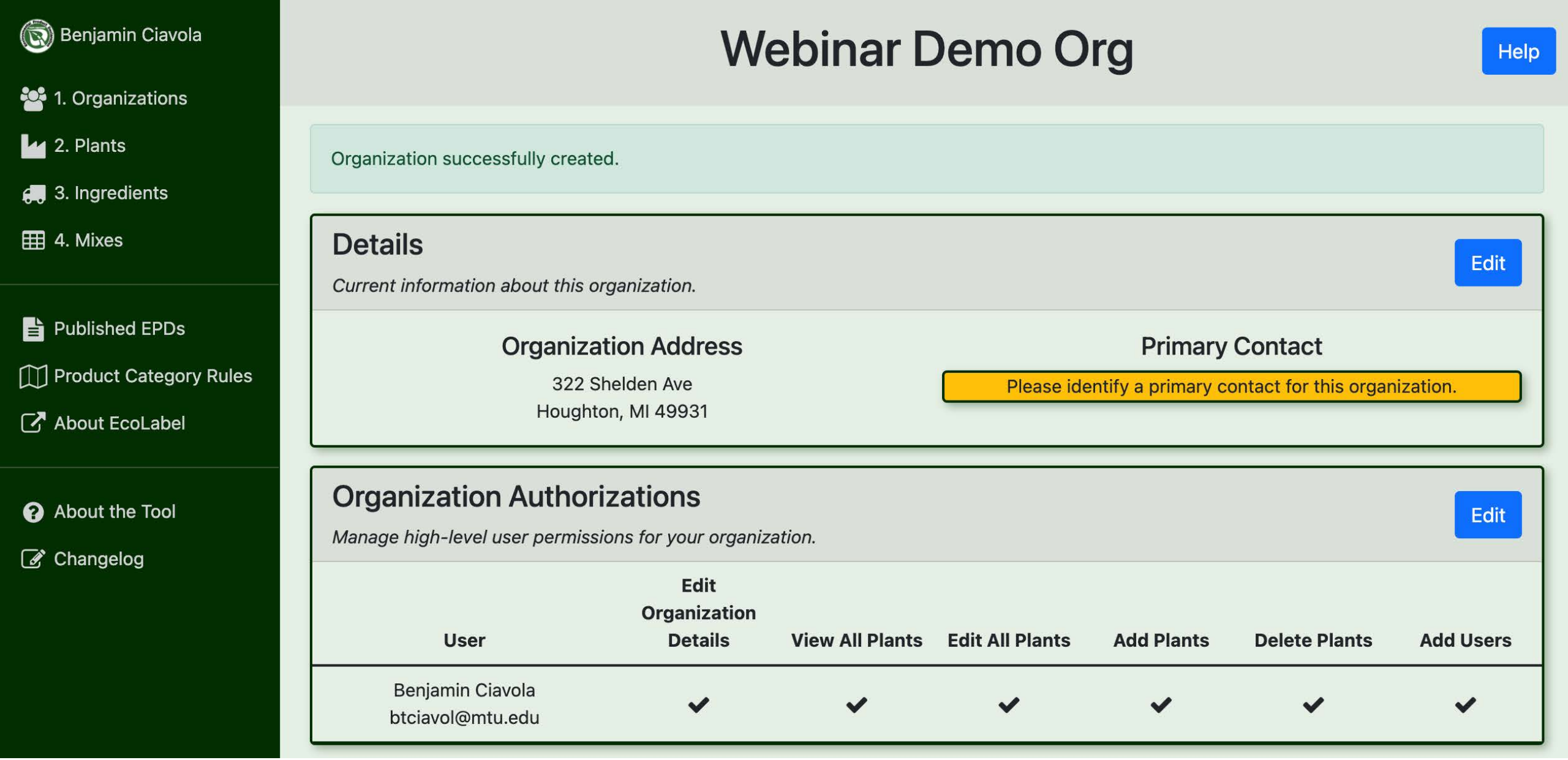
About EcoLabel
About the Tool
Changelog
New Organization
Company Name*
Webinar Demo Org
Url*
http://asphaltepd.org
Company Logo
Choose File
TriSight_logo600px.png
Address Line 1*
322 Shelden Ave
Address Line 2


Benjamin Ciavola
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Webinar Demo Org
Help
Organization successfully created.
Details
Current information about this organization.
Edit
Organization Address
322 Shelden Ave
Houghton, MI 49931
Primary Contact
Please identify a primary contact for this organization.
Organization Authorizations
Manage high-level user permissions for your organization.
Edit
User
Edit Organization Details
View All Plants
Edit All Plants
Add Plants
Delete Plants
Add Users
Benjamin Ciavola
btciavol@mtu.edu

Manage users for Webinar
Demo Org

User Email *	Can view org	Can edit org	Can view all plants	Can edit all plants	Can add plants	Can delete plants	Can add users	Has been trained	Delete
btciavol@mtu.e	☑	☑	☑	☑	☑	☑	☑	☐	☐
jshacat@asphal	☑	☑	☑	☑	☑	☑	☑	☐	☐
	☐	☐	☐	☐	☐	☐	☐	☐	☐

Save Changes

Organization Authorizations

Manage high-level user permissions for your organization.

Edit

User	Edit Organization Details	View All Plants	Edit All Plants	Add Plants	Delete Plants	Add Users
Benjamin Ciavola btciavol@mtu.edu	✔	✔	✔	✔	✔	✔
Joseph Shacat jshacat@asphaltpavement.org	✔	✔	✔	✔	✔	✔

Plant Authorizations

Manage plant-level user permissions for your organization.

Edit

Plant	User	View Plant	Edit Plant Details	Edit Primary Data	Edit Mixes	Edit Sources	Add Users

Plant Authorizations

Manage plant-level user permissions for your organization.

Edit

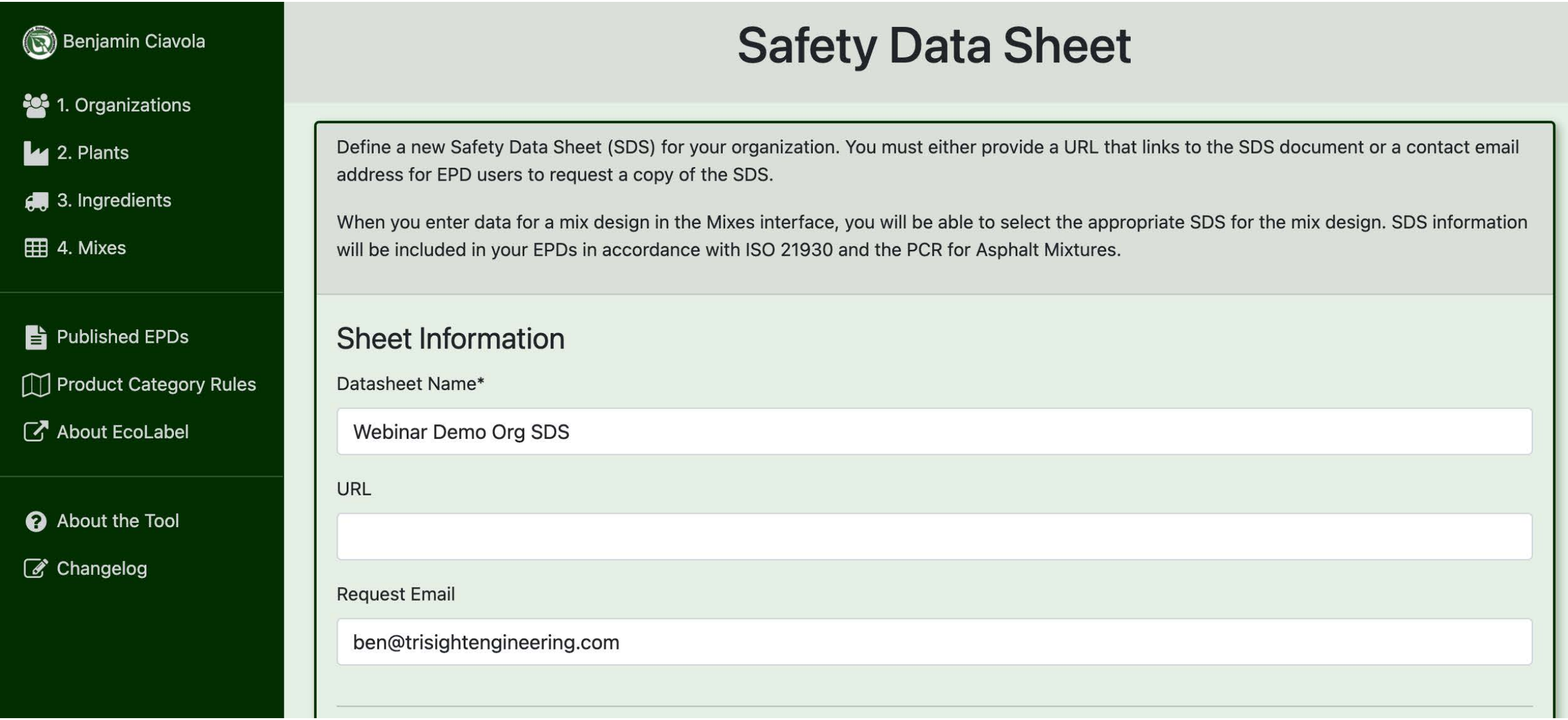
Plant	User	View Plant	Edit Plant Details	Edit Primary Data	Edit Mixes	Edit Sources	Add Users

Safety Data Sheets

Manage safety data sheets for your organization's products.

Add

No safety data sheets defined


Benjamin Ciavola
1. Organizations
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4. Mixes
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Safety Data Sheet
Define a new Safety Data Sheet (SDS) for your organization. You must either provide a URL that links to the SDS document or a contact email address for EPD users to request a copy of the SDS.
When you enter data for a mix design in the Mixes interface, you will be able to select the appropriate SDS for the mix design. SDS information will be included in your EPDs in accordance with ISO 21930 and the PCR for Asphalt Mixtures.
Sheet Information
Datasheet Name*
Webinar Demo Org SDS
URL
Request Email
ben@trisightengineering.com

Ingredients

Name*	CAS*	Min	Actual	Max	
Aggregate	Various	90.0		95.0	remove
Asphalt Cement	8052-42-4			10.0	remove
Additives	Various			1.0	remove
					remove

add another

save

You can provide a minimum value, maximum value, minimum and maximum, or actual value for an arbitrary number of ingredients.

Joseph Shacat jshacat@asphaltpavement.org	✔	✔	✔	✔	✔	✔

Plant Authorizations

Manage plant-level user permissions for your organization.

Edit

Plant	User	View Plant	Edit Plant Details	Edit Primary Data	Edit Mixes	Edit Sources	Add Users

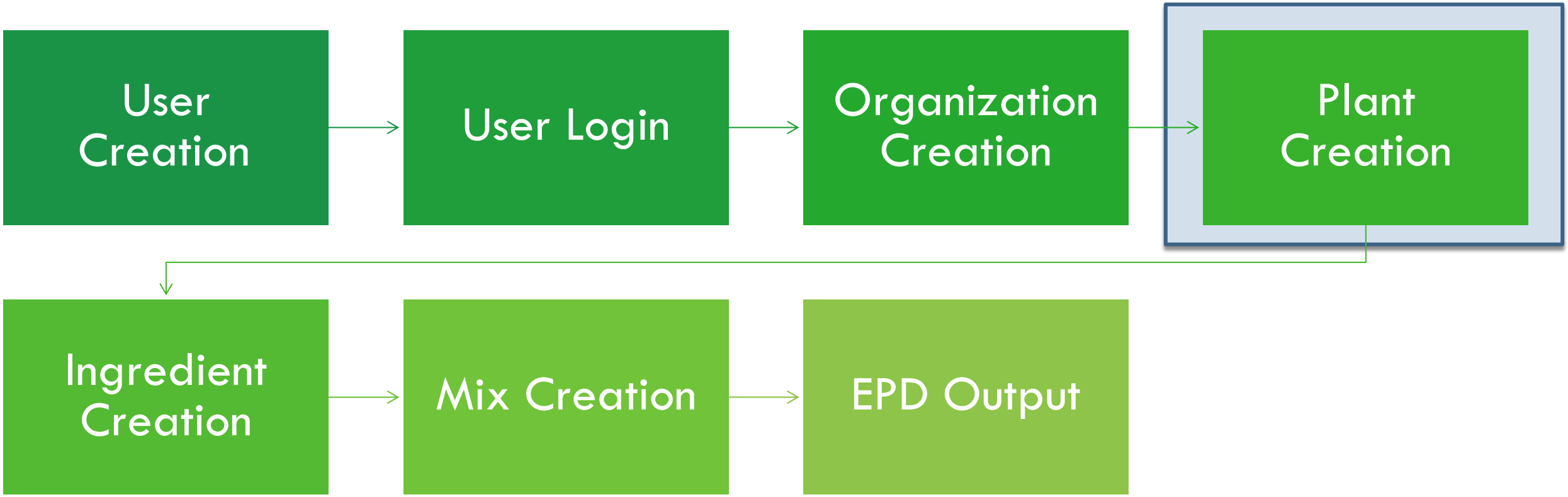
Safety Data Sheets

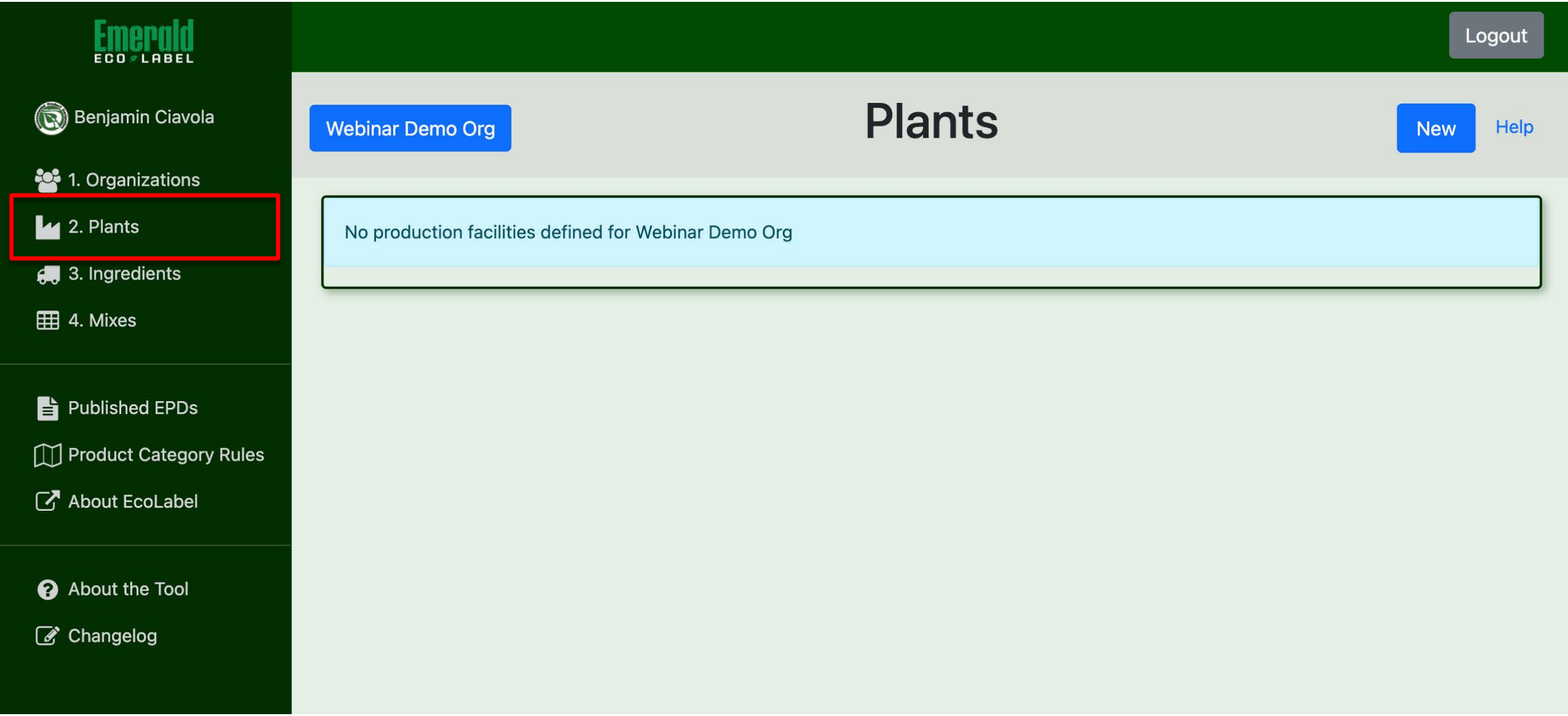
Manage safety data sheets for your organization's products.

Add

Datasheet	Ingredients	Last Modified	Edit
Webinar Demo Org SDS	Aggregate Asphalt Cement Additives	March 21, 2022, 11:18 p.m.	Edit

EPD Tool Workflow




Emerald
ECO LABEL
Logout
Benjamin Ciavola
Webinar Demo Org
Plants
New
Help
1. Organizations
2. Plants
3. Ingredients
4. Mixes
No production facilities defined for Webinar Demo Org
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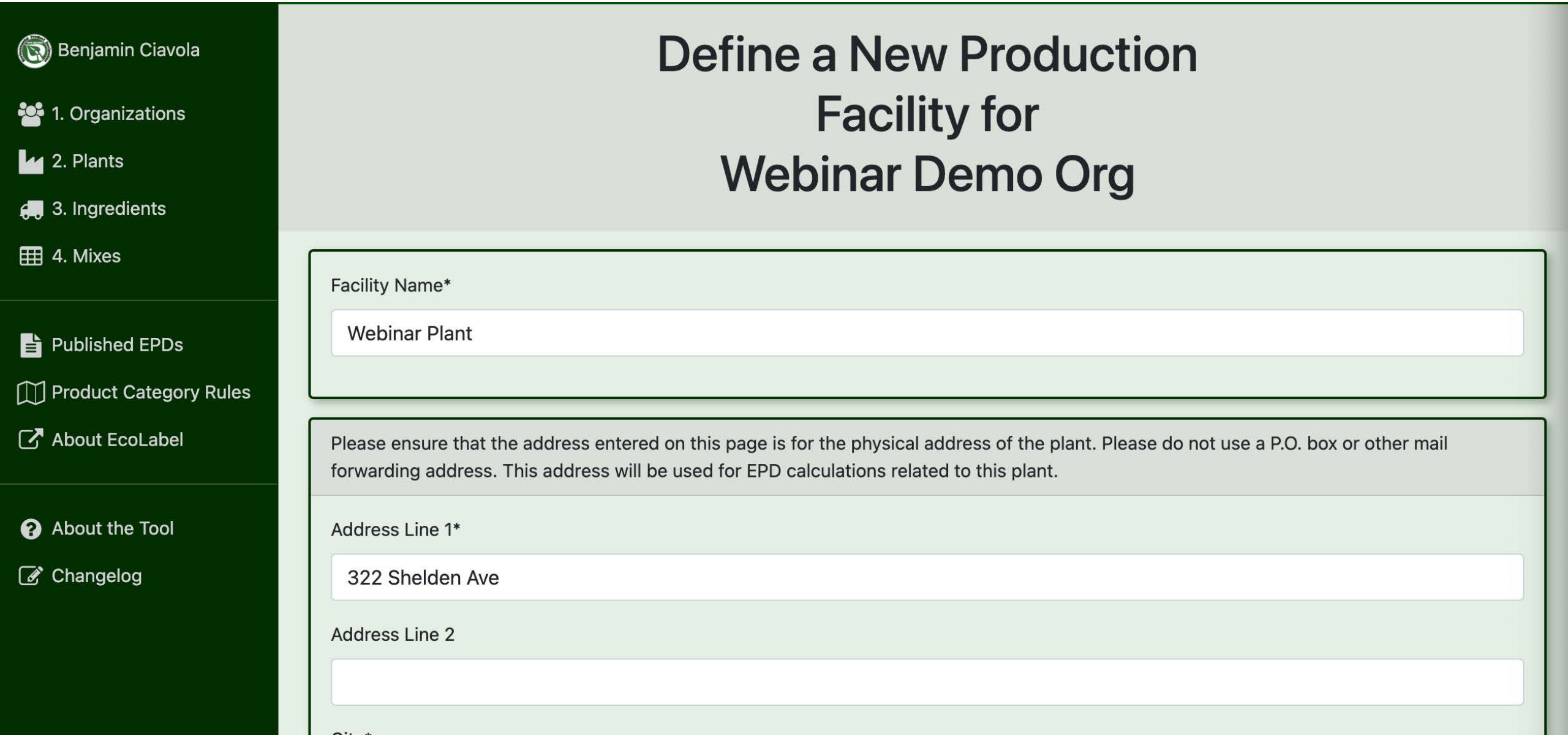
Benjamin Ciavola
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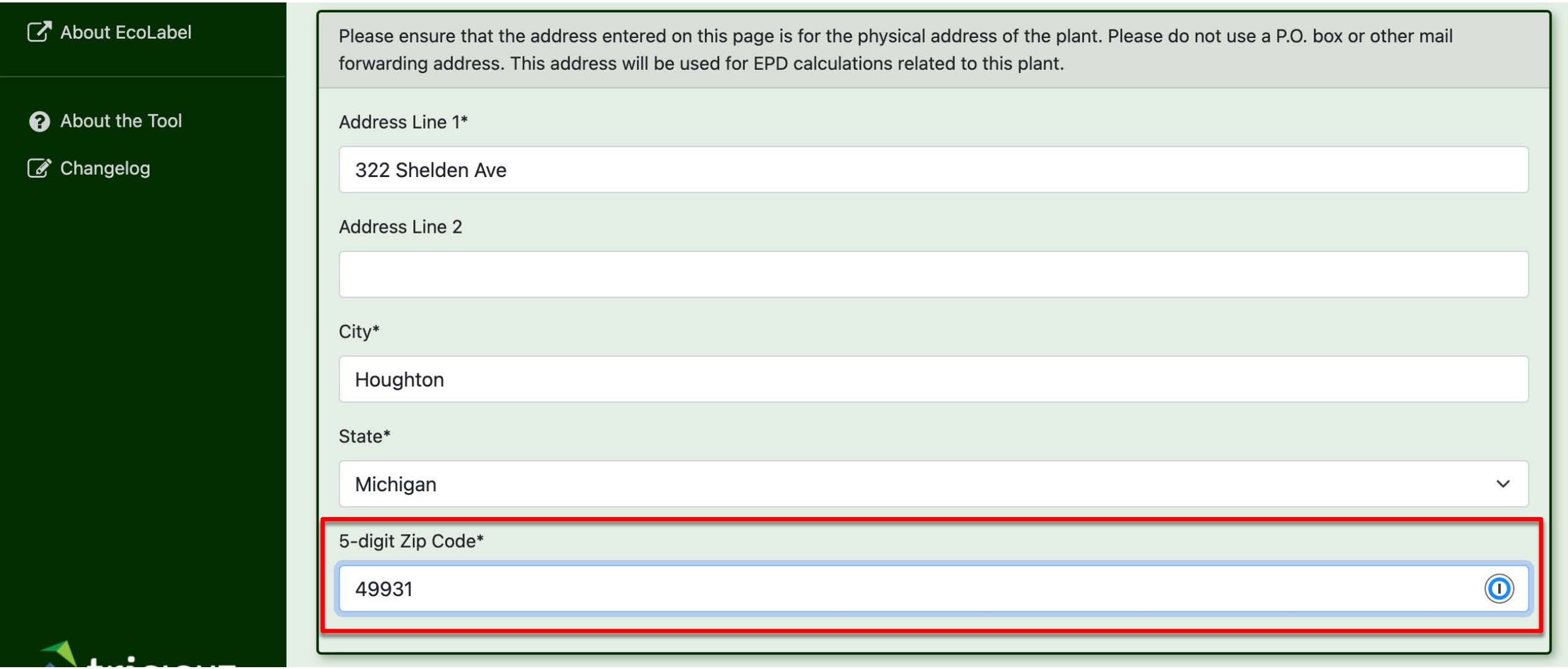
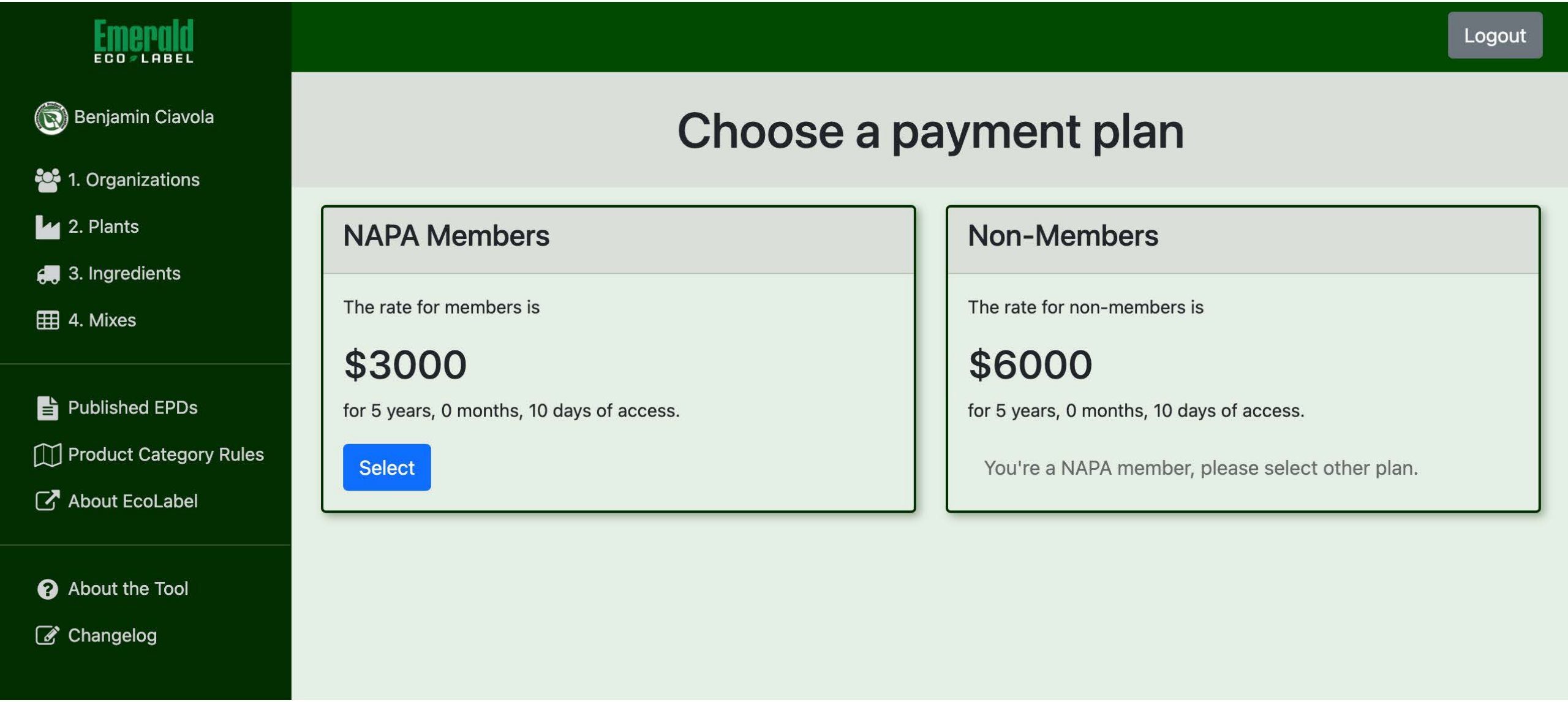
Define a New Production Facility for Webinar Demo Org
Facility Name*
Webinar Plant
Please ensure that the address entered on this page is for the physical address of the plant. Please do not use a P.O. box or other mail forwarding address. This address will be used for EPD calculations related to this plant.
Address Line 1*
322 Shelden Ave
Address Line 2



Plant zipcode is used to identify your electricity provider: make sure you get it correct!


Emerald
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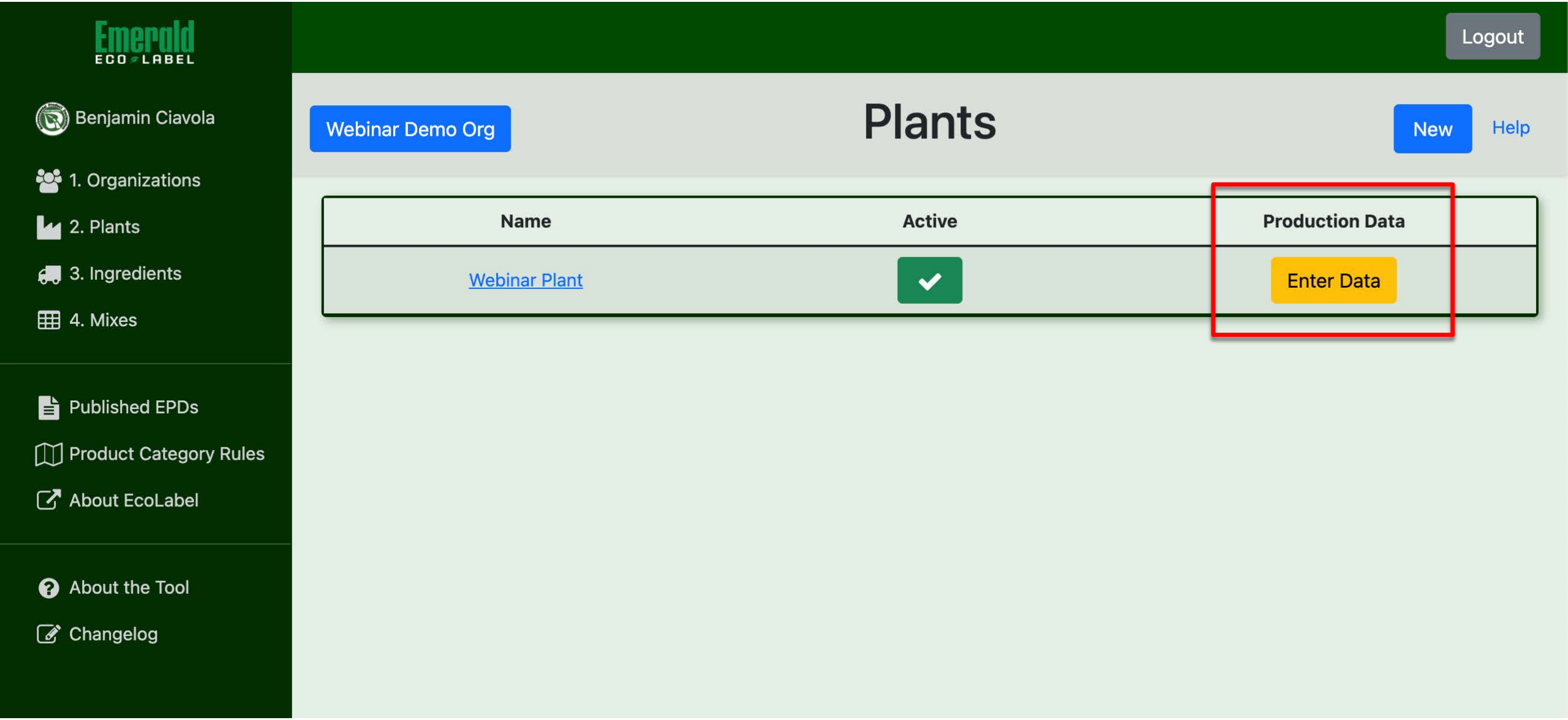
Choose a payment plan
NAPA Members
The rate for members is
$3000
for 5 years, 0 months, 10 days of access.
Select
Non-Members
The rate for non-members is
$6000
for 5 years, 0 months, 10 days of access.
You're a NAPA member, please select other plan.

Prices

- Depends on when you enter the system (# of years the EPDs are valid)
- Rate is per plant; Unlimited EPDs per plant

Year	NAPA Members	Non-members
2022 (up to 5 years)	$3000	$6000
2023 (up to 4 years)	$3000	$6000
2024 (up to 3 years)	$2750	$5500
2025 (up to 2 years)	$2500	$5000
2026 (up to 1 year)	$2250	$4500


Emerald
ECO LABEL
Logout
Benjamin Ciavola
Webinar Demo Org
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Active
Production Data
Webinar Plant
Enter Data
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Webinar Plant Primary Data

Benjamin Ciavola

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Changelog

Total Yearly Production

Data collection start date*

03/22/2021

Data collection period must have started between 03/23/2017 and 03/22/2021.

Quantities reported on this page refer to a 12 month period that began within the last five years. Please state the start date of the twelve month period during which the data was recorded.

All subsequent entries must have been recorded over this 12 month period.

Total Asphalt Mix Sold

100000 U.S. Short Tons

Please state the total tonnage of asphalt (including all mix types) produced at your plant and placed at a job over the chosen 12 month period.

Asphalt sold shtn document

Choose File No file chosen

Total Water

0

Enter the total quantity of water consumed durnig the 12-month data
trol, aspshalt binder
andscaping), slurry

Best practice: Upload documentation for all data

Key Data Categories

- Production quantity
- Water use
- Waste (baghouse fines, wet scrubber fines, etc.)
- Electricity consumption
- Onsite generator fuel
- Burner fuel
- Oil heater fuel
- Equipment fuel (loaders, trucks, etc.)

Scenario:
Plant only tracks total diesel use.

Solution:
Enter all diesel use as burner fuel.

Emerald ECO LABEL

Welcome to the EPD Tool data gathering sheet. It is meant to be used in conjuction with the EPD Tool Instructions (pdf).

It is provided to help you gather the relevant data needed to create your first EPD using the Asphalt EPD tool.
The data can be divided into three categories:

1. Organizational information
2. Plant data
3. Suppliers and ingredients
4. Mix iinformation (Mix Form A and Mix Form B)

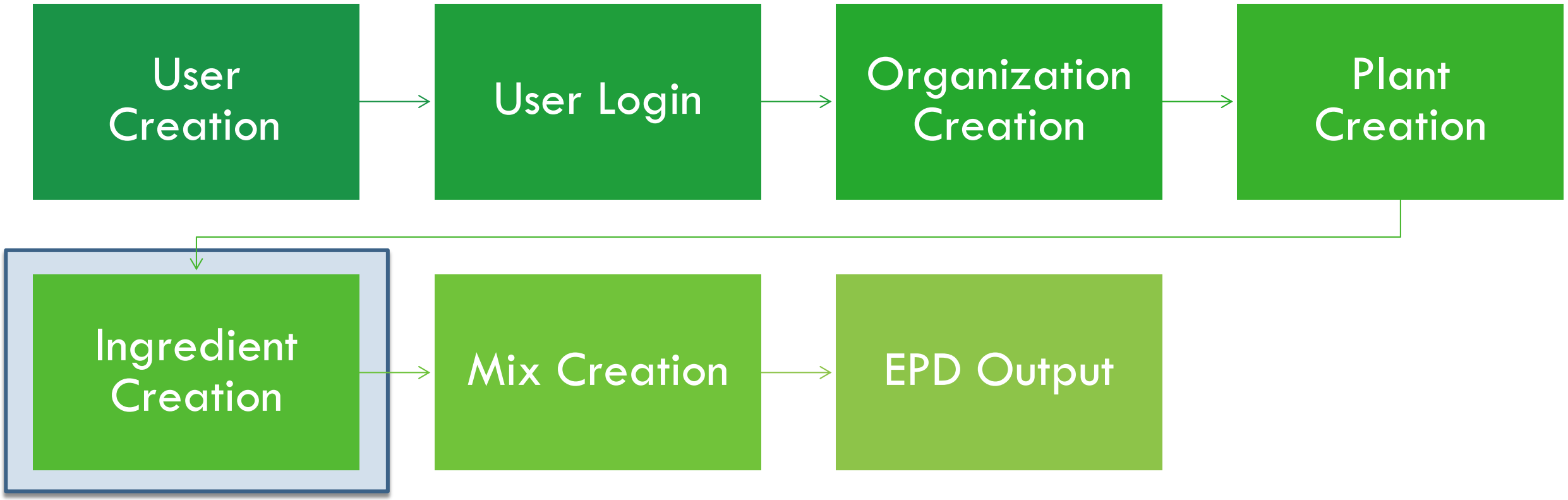
There is a separate worksheet for each category to align with the data entry sections of the EPD Tool.

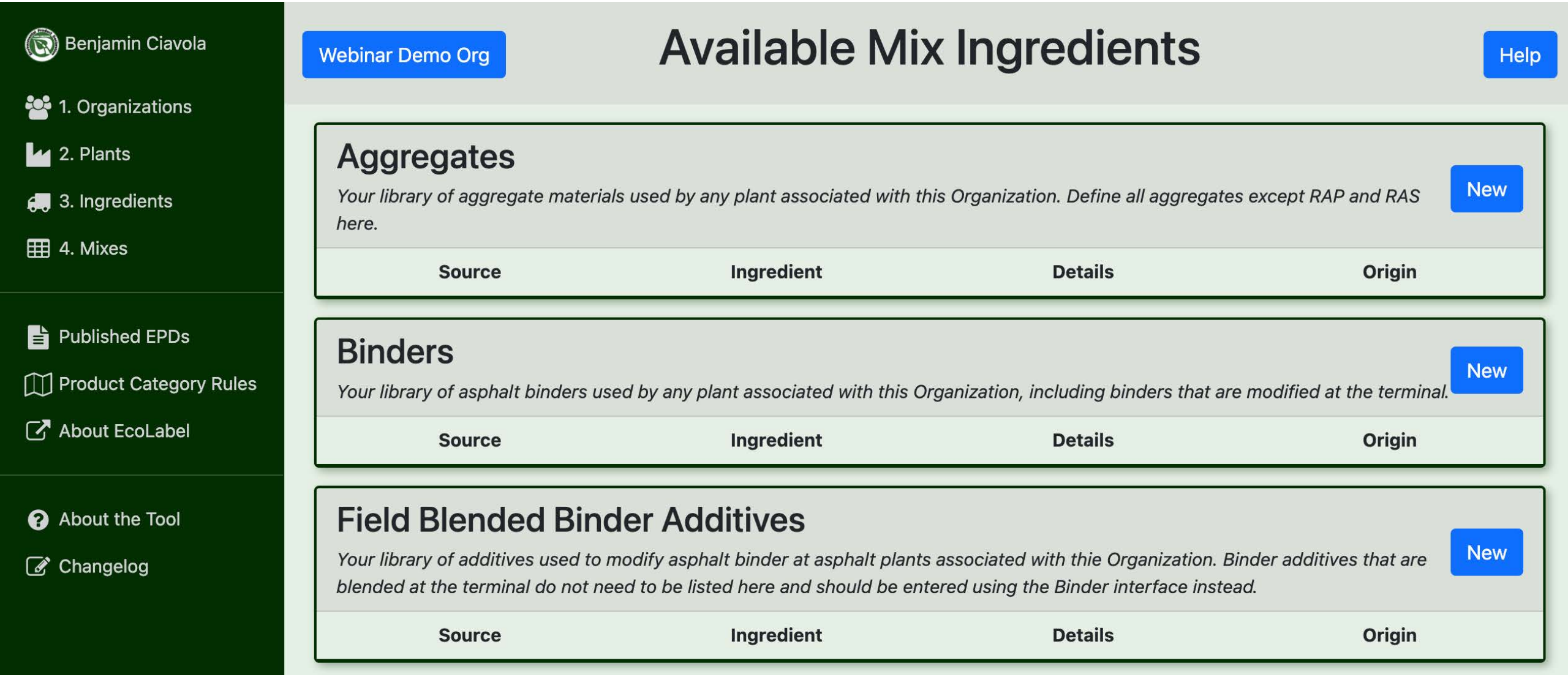
All data entered into the EPD tool is confidential. Only the downsteam environmental impacts will appear in the final EPD. No sensitive data about mix design or energy usage will be revealed in the EPD.

triSIGHT

EPD Data Gathering Sheet.
Created by Lianna Miller and Joseph Shacat
Version 3, March 21, 2022

EPD Tool Workflow




Benjamin Ciavola
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Webinar Demo Org
Available Mix Ingredients
Help
Aggregates
Your library of aggregate materials used by any plant associated with this Organization. Define all aggregates except RAP and RAS here.
New
Source
Ingredient
Details
Origin
Binders
Your library of asphalt binders used by any plant associated with this Organization, including binders that are modified at the terminal.
New
Source
Ingredient
Details
Origin
Field Blended Binder Additives
Your library of additives used to modify asphalt binder at asphalt plants associated with thie Organization. Binder additives that are blended at the terminal do not need to be listed here and should be entered using the Binder interface instead.
New
Source
Ingredient
Details
Origin

Data update required

Due to updates to the Emerald EcoLabel tool, some of your ingredients require an update to their data. Please check each highlighted ingredient and make sure that it references the correct ingredient type in all dropdowns. These types changed with the version 2.0 update with the addition of new data.

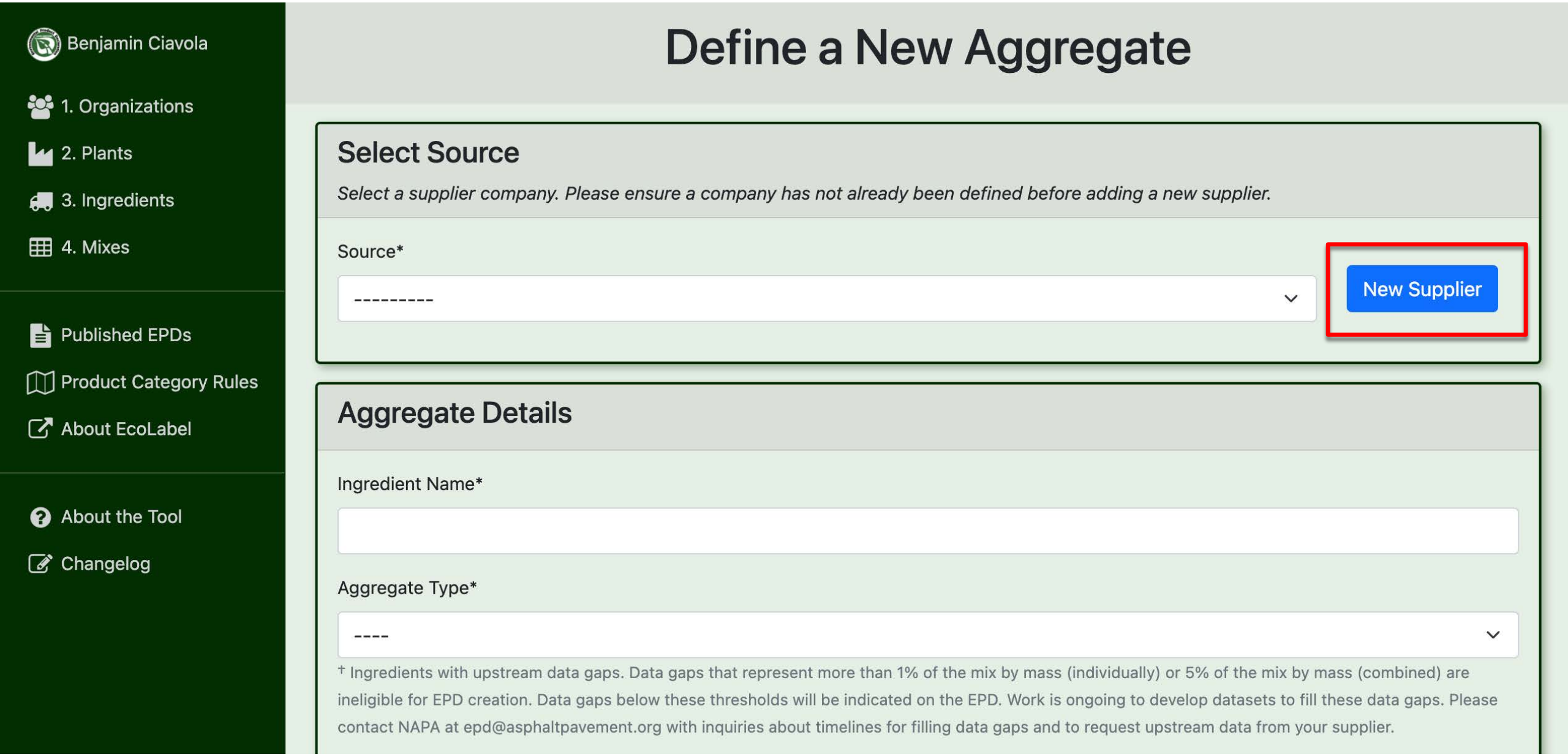
Please contact epd@asphaltpavement.org with any questions.

Aggregates

Your library of aggregate materials used by any plant associated with this Organization. Define all aggregates except RAP and RAS here.

New

Source	Ingredient	Details	Origin
Test Quarry 1	Coarse Grade 1	Update required	11 Quarry St. Test City, GA 11111
Test Quarry 1	Fine Grade 1	Update required	11 Quarry St. Test City, GA 11111
Test Quarry 1	Fine Grade 2	Update required	11 Quarry St. Test City, GA 11111


Benjamin Ciavola
1. Organizations
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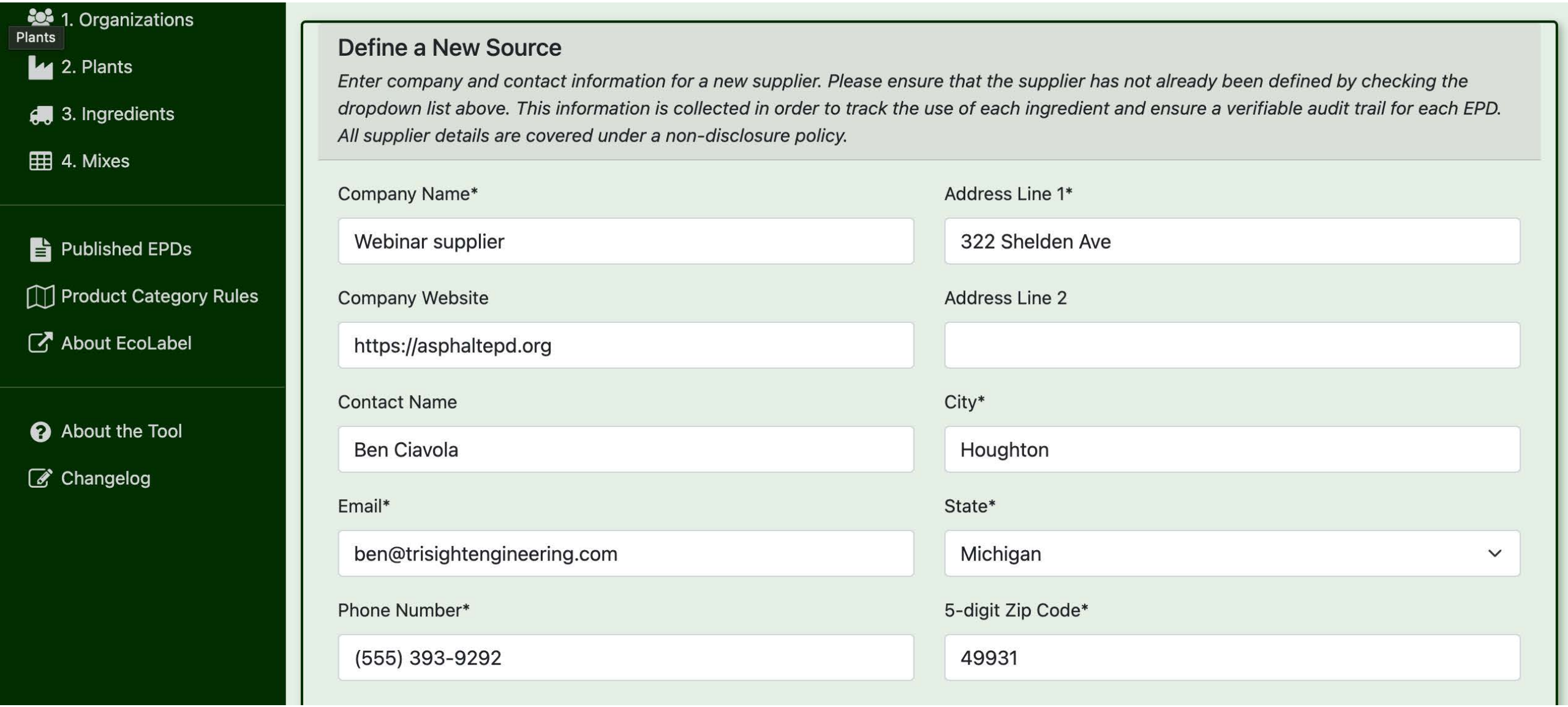
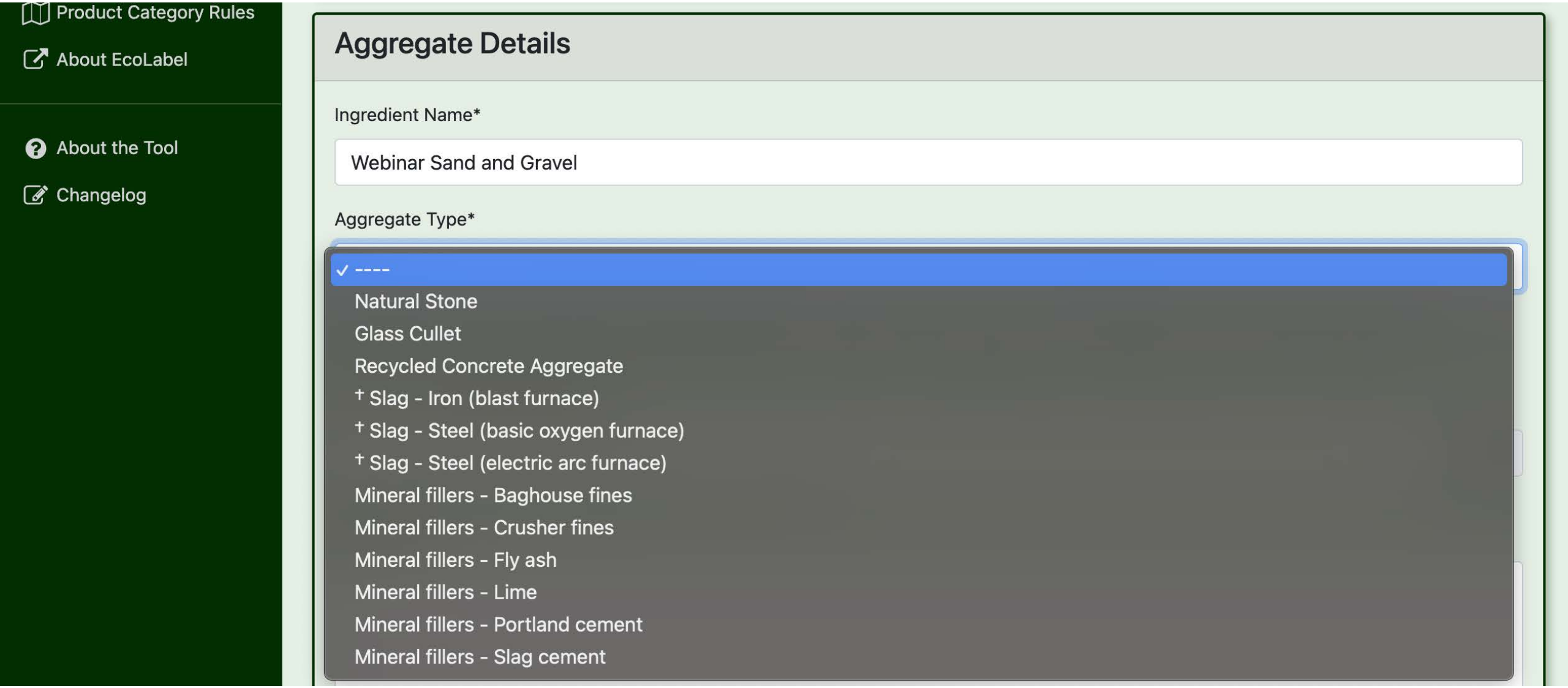
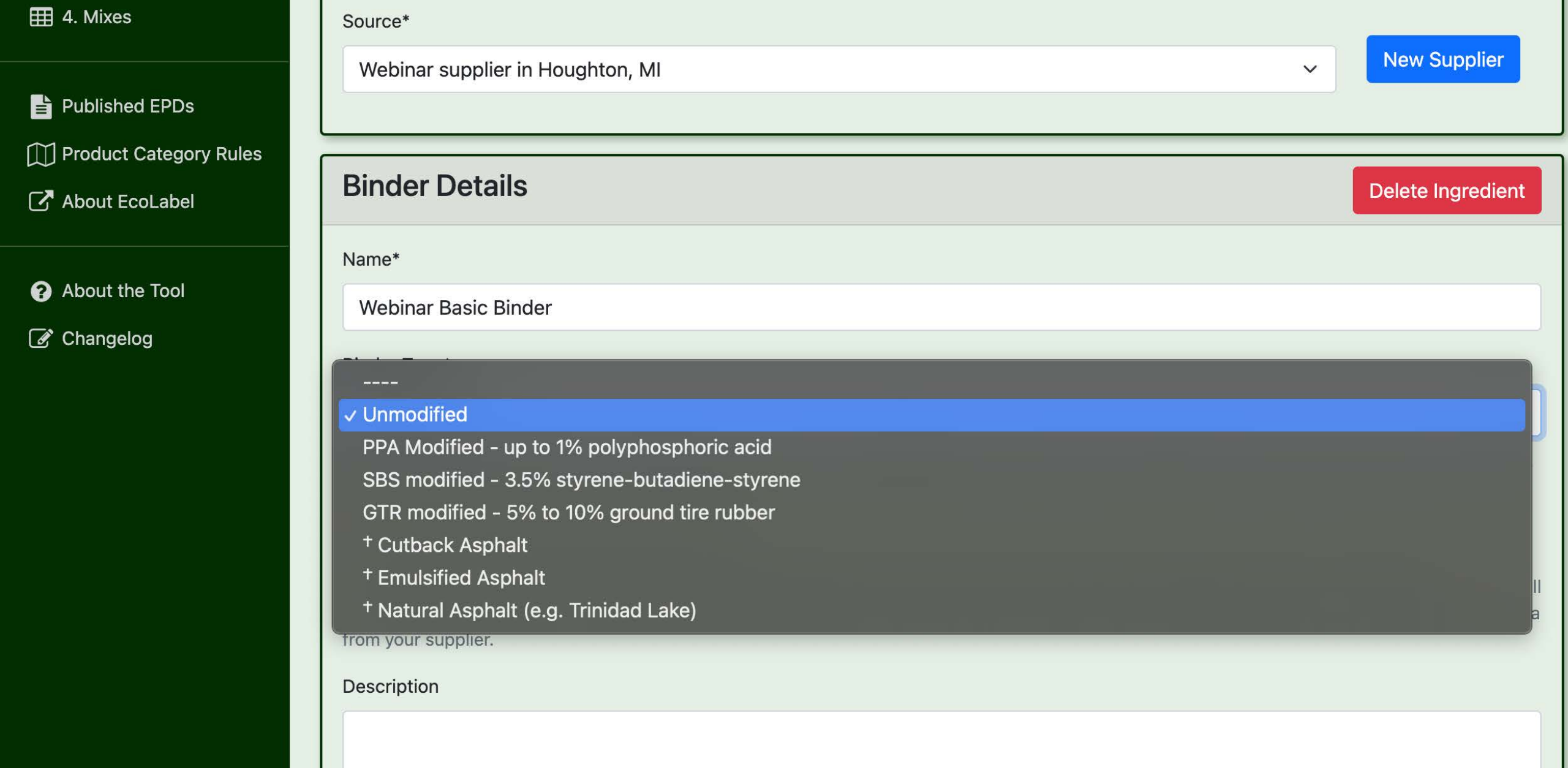
Published EPDs
Product Category Rules
About EcoLabel
About the Tool
Changelog
Define a New Aggregate
Select Source
Select a supplier company. Please ensure a company has not already been defined before adding a new supplier.
Source*

New Supplier
Aggregate Details
Ingredient Name*
Aggregate Type*
----
† Ingredients with upstream data gaps. Data gaps that represent more than 1% of the mix by mass (individually) or 5% of the mix by mass (combined) are ineligible for EPD creation. Data gaps below these thresholds will be indicated on the EPD. Work is ongoing to develop datasets to fill these data gaps. Please contact NAPA at epd@asphaltpavement.org with inquiries about timelines for filling data gaps and to request upstream data from your supplier.


1. Organizations
Plants
2. Plants
3. Ingredients
4. Mixes
Published EPDs
Product Category Rules
About EcoLabel
About the Tool
Changelog
Define a New Source
Enter company and contact information for a new supplier. Please ensure that the supplier has not already been defined by checking the dropdown list above. This information is collected in order to track the use of each ingredient and ensure a verifiable audit trail for each EPD. All supplier details are covered under a non-disclosure policy.
Company Name*
Webinar supplier
Company Website
https://asphaltepd.org
Contact Name
Ben Ciavola
Email*
ben@trisightengineering.com
Phone Number*
(555) 393-9292
Address Line 1*
322 Shelden Ave
Address Line 2
City*
Houghton
State*
Michigan
5-digit Zip Code*
49931


Product Category Rules
About EcoLabel
About the Tool
Changelog
Aggregate Details
Ingredient Name*
Webinar Sand and Gravel
Aggregate Type*

Natural Stone
Glass Cullet
Recycled Concrete Aggregate
† Slag - Iron (blast furnace)
† Slag - Steel (basic oxygen furnace)
† Slag - Steel (electric arc furnace)
Mineral fillers - Baghouse fines
Mineral fillers - Crusher fines
Mineral fillers - Fly ash
Mineral fillers - Lime
Mineral fillers - Portland cement
Mineral fillers - Slag cement


4. Mixes
Published EPDs
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About the Tool
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Source*
Webinar supplier in Houghton, MI
New Supplier
Binder Details
Delete Ingredient
Name*
Webinar Basic Binder

Unmodified
PPA Modified - up to 1% polyphosphoric acid
SBS modified - 3.5% styrene-butadiene-styrene
GTR modified - 5% to 10% ground tire rubber
† Cutback Asphalt
† Emulsified Asphalt
† Natural Asphalt (e.g. Trinidad Lake)
from your supplier.
Description

Document

Choose File | No file chosen

Additives and Modifiers

If your binder is further modified at the terminal (in addition to any additives or modifiers listed in the selected data source) list the modifiers and the percent of the binder that they represent. If you modify your binder at your plant, do not include the modifiers here. Instead, create a binder additive on the Material Sources page (the same page that navigated you here to create a new Binder). The difference is important because it affects the travel distances of the binder additives.

Additive Type*

Percent of Binder by Mass*

%

- ✓ ----
- Warm Mix Additive - Ingevity Evotherm M1
- † Antistrip Agents - Amidoamines
- † Antistrip Agents - Imidazolines
- † Antistrip Agents - Organo-silanes
- † Antistrip Agents - Polyamines
- † Elastomer - Biopolymer
- † Elastomer - Natural Rubber

trISIGHT

Update Binder Additive

Select Source

Select a supplier company. Please ensure a company has not already been defined before adding a new supplier.

Source*

Webinar supplier in Houghton, MI

New Supplier

Binder Additive Details

Delete Ingredient

If the binder additive is blended at the asphalt plant, it should be entered here. Binder additives that are blended at the terminal should be entered using the Binder interface.

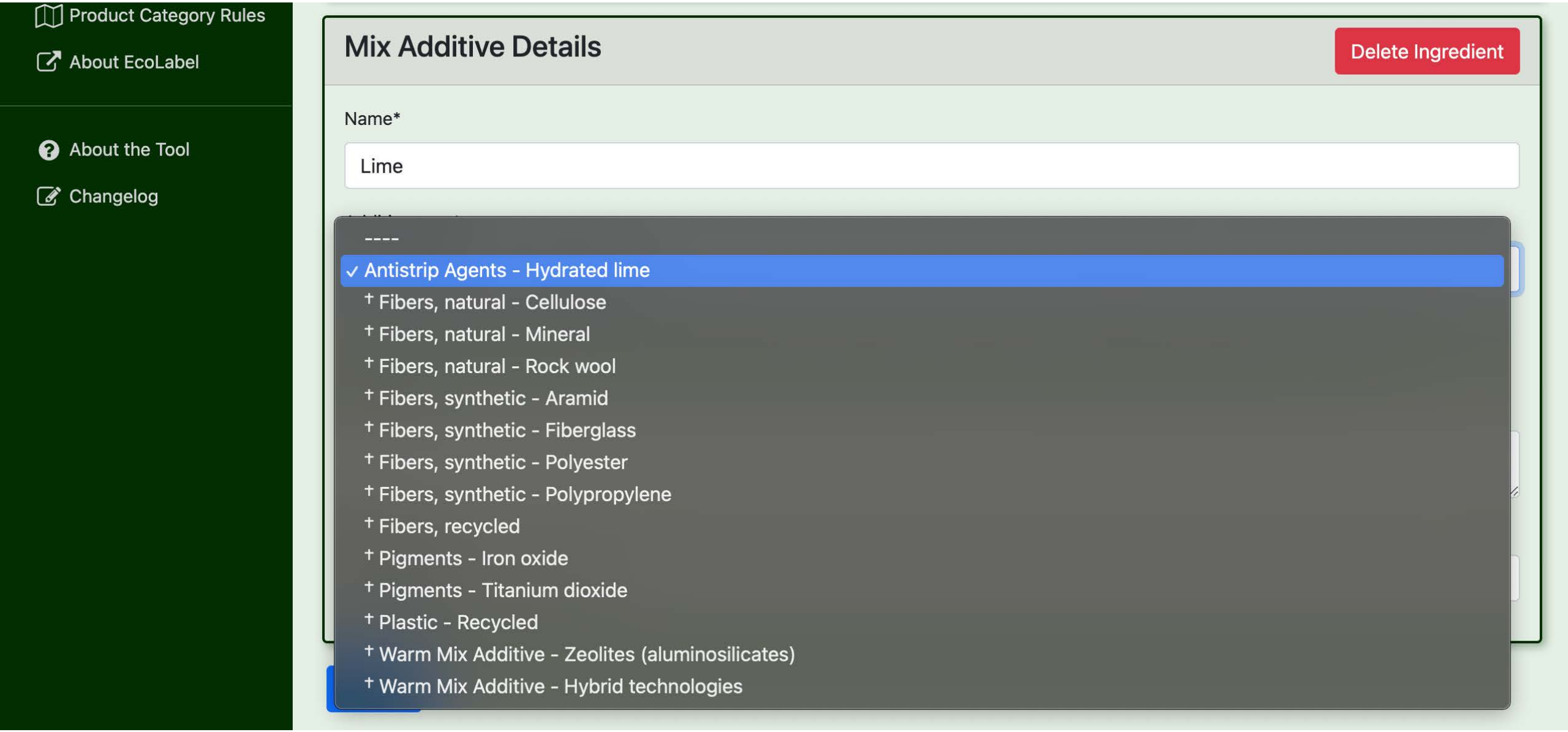
Name*

Evotherm

Additive Type*

Warm Mix Additive - Ingevity Evotherm M1

† Indicates ingredient has a data gap. Select the relevant category of additive or modifier. If it is not found in the list, please contact NAPA at epd@asphaltpavement.org.


Product Category Rules
About EcoLabel
About the Tool
Changelog
Mix Additive Details
Delete Ingredient
Name*
Lime

✓ Antistrip Agents - Hydrated lime
† Fibers, natural - Cellulose
† Fibers, natural - Mineral
† Fibers, natural - Rock wool
† Fibers, synthetic - Aramid
† Fibers, synthetic - Fiberglass
† Fibers, synthetic - Polyester
† Fibers, synthetic - Polypropylene
† Fibers, recycled
† Pigments - Iron oxide
† Pigments - Titanium dioxide
† Plastic - Recycled
† Warm Mix Additive - Zeolites (aluminosilicates)
† Warm Mix Additive - Hybrid technologies

Binders

Your library of asphalt binders used by any plant associated with this Organization, including binders that are modified at the terminal.

New

Source	Ingredient	Details	Origin
Webinar supplier	Webinar Basic Binder *Unmodified*	Edit	322 Shelden Ave Houghton, MI 49931

Field Blended Binder Additives

Your library of additives used to modify asphalt binder at asphalt plants associated with thie Organization. Binder additives that are blended at the terminal do not need to be listed here and should be entered using the Binder interface instead.

New

Source	Ingredient	Details	Origin
Webinar supplier	Natural Rubber *Elastomer - Natural Rubber*	Edit	322 Shelden Ave Houghton, MI 49931

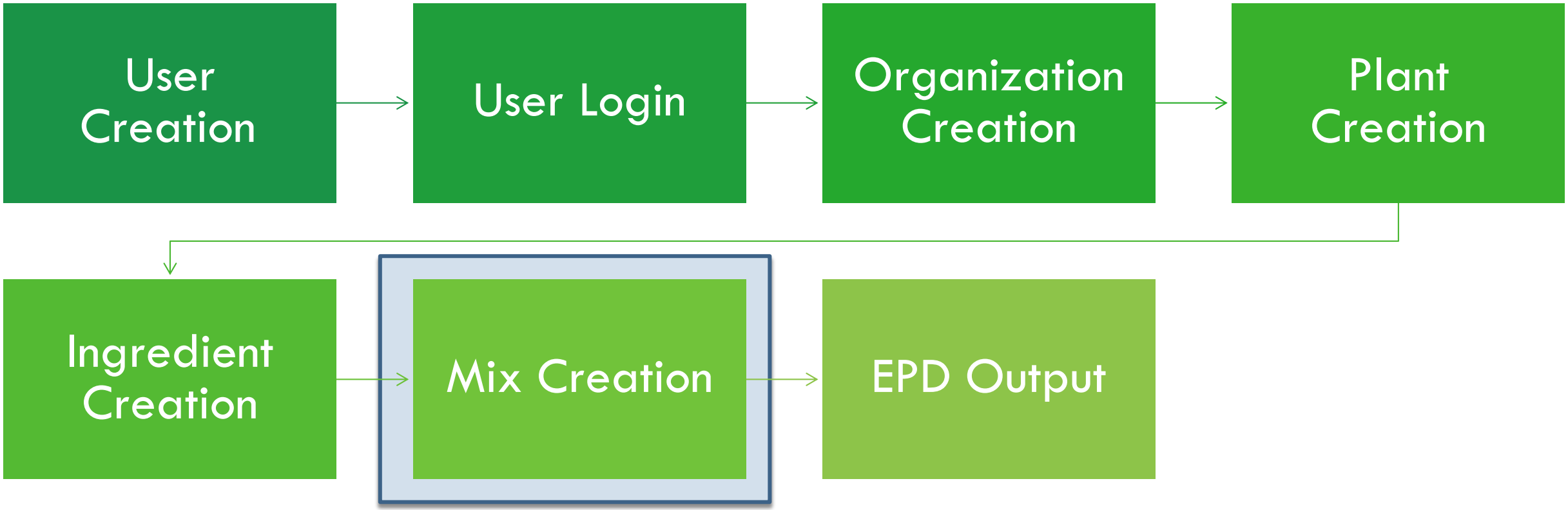
Mix Additives

Your library of mix additives that are blended at asphalt plants associated with this Organization.

New

Source	Ingredient	Details	Origin
Webinar supplier	Evotherm *Warm Mix Additive - Evotherm*	Edit	322 Shelden Ave Houghton, MI 49931

EPD Tool Workflow

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Define a New Asphalt Mix

Remaining mass budget of 100% is outside 0.01% tolerance

Mix Definition

*Identify the primary characteristics of this mix. Note that all mass percentages are in terms of **total mix mass.***

Mix ID*

Webinar Mix

Enter a meaningful unique identifier for this mix. We suggest you use your company's naming convention and/or identifier.

Primary Contact*

btciavol@mtu.edu

Identify a primary contact person for this mix. This person's contact information will be included on all EPDs generated for this mix design.

Safety Data Sheet

Webinar Demo Org SDS

Please select the SDS for this mix. If your organization has no SDS sheets defined, please create one using the Organizations interface before continuing

Remaining mass budget of 100% is outside 0.01% tolerance

Specification

Mix Specification Entity*

DOT

Name of the entity that developed the specification for this mix.

Mix Specification*

Webinar Superpave Spec

Mix specification name

Mix design method

Superpave

Project or Customer ID

MY-DOT-PROJECT-1A

OPTIONAL: ID for the project or customer for whom this mix was designed.

Upper PG Grade

58

Lower PG Grade

-28

Nominal Maximum Aggregate Size

Enter the nominal maximum aggregate size used in this mix. Please enter a value either in decimal inches or in millimeters, but not both.

Nominal maximum aggregate size (inches)

0.75 inches

Nominal maximum aggregate size (millimeters)

mm

Heating

How would you categorize this mix's processing?*

Hot Mix

Warm mix technology*

Chemical Additive

Min Temp*	Max Temp*	Units*
300	310	Fahrenheit
Minimum temperature of mix production.	Maximum temperature of mix production.	Ensure correct units are selected.

Remaining mass budget of 70% is outside 0.01% tolerance

Reclaimed Asphalt Pavement

Percent RAP by Mass

30 %

Reclaimed Asphalt Pavement used, as percent of total mix mass. Value should be between 0 and 100.

RAP is processed onsite

RAP Truck Distance	RAP Train Distance	RAP Barge Distance	RAP Ocean Distance
15 miles	miles	miles	miles

Enter the approximate average distance that RAP is transported from the initial processing or storage location to the asphalt plant. If the initial processing or storage location is onsite, you may enter a distance of zero if you included fuel consumption for on-site transport activities in the Equipment Fuel Consumption field of the Plants interface.

Recycled Asphalt Shingles

Percent RAS by Mass

%

Recycled Asphalt Shingles used, as percent of total mix mass. Value should be between 0 and 100.

RAS is processed onsite

RAS Truck Distance	RAS Train Distance	RAS Barge Distance	RAS Ocean Distance

Remaining mass budget of 4% is outside 0.01% tolerance

Aggregate

Identify all aggregates used in this mix. Do not include RAP or RAS - these are accounted for in the Mix Overview section above.

Distances should include all travel from the aggregate quarry or gravel pit to the asphalt plant. For recycled aggregates such as glass cullet or recycled concrete aggregates, the distance should include all travel from the material processing facility to the asphalt plant

Ingredient*

Natural Stone - Webinar Sand and Gravel from Webinar supplier

Percent of Mix by Mass*

66 %

Truck Distance	Train Distance	Barge Distance	Ocean Distance
50 Miles	Miles	Miles	Miles
One-way distance. Default is 50 miles.	One-way distance.	One-way distance.	One-way distance.

remove

Document

Choose File No file chosen

Please attach a file that documents the use of this ingredient in this mix, if available.

Add another aggregate

Remaining mass budget of 0% is outside 0.01% tolerance

Virgin Binder

Identify types and amounts of virgin binder used in this mix.

Do not include binder content due to RAP, RAS, or any other recycled sources. Do not include mass due to binder additives or modifiers added at your plant. Report all such additives in the next section.

Distances should include all trave from the asphalt terminal to the final mix production facility. If you source the binder directly from the refinery, use the distance from the refinery to the final mix production facility.

Ingredient*

Webinar Basic Binder from Webinar supplier

Percent of Mix by Mass*

3.99 %

Truck Distance

50 Miles

One-way distance calculated from the terminal. Default is 50 miles.

Train Distance

Miles

One-way distance calculated from the terminal.

Barge Distance

Miles

One-way distance calculated from the terminal.

Ocean Distance

Miles

One-way distance.

remove

Document

Choose File No file chosen

Please attach a file that documents the use of this ingredient in this mix, if available.

Add another binder

Remaining mass budget of 0% is within 0.01% tolerance

Binder Additives and Modifiers

Identify all binder additives or modifiers used in this mix.

Please include any materials added to virgin binder by your organization at your mix production facility, after the binder has been received from the terminal but before the binder is added to the mix.

*Enter the percent per ton of mix (not binder!) that this binder additive comprises. Typical values are 0.05-1.0%. To convert from % of binder to % of total mix mass, multiply the percentage of the additive in the binder by the decimal percentage of the binder in the mix. So, if your additive is 2% of the total binder mass, and your mix is 5% binder, your additive is 2.0%*0.05 = 0.10% of total mix mass. Be sure that this mass percent calculation is factored into your reported amounts of virgin binder.*

Distances should include all travel from the additive manufacturing facility to the final mix production facility.

Ingredient*

Evotherm from Webinar supplier

Percent of Mix by Mass*

0.01 %

Please calculate the percent of total mix mass that this additive represents.

Truck Distance	Train Distance	Barge Distance	Ocean Distance
50.0 Miles	Miles	Miles	Miles
One-way distance. Default is 50 miles.	One-way distance.	One-way distance.	One-way distance.

remove

Mix Additives

Identify all other materials added directly to this mix. Please include any material that is not included in base aggregates, binders, RAP, or RAS. For a list of possible categories please see the Ingredient Category dropdown on the "New Mix Additive Source" page.

Ingredient*

Percent of Mix by Mass*

%

Truck Distance

50 Miles

One-way distance. Default is 50 miles.

Train Distance

Miles

One-way distance.

Barge Distance

Miles

One-way distance.

Ocean Distance

Miles

One-way distance.

remove

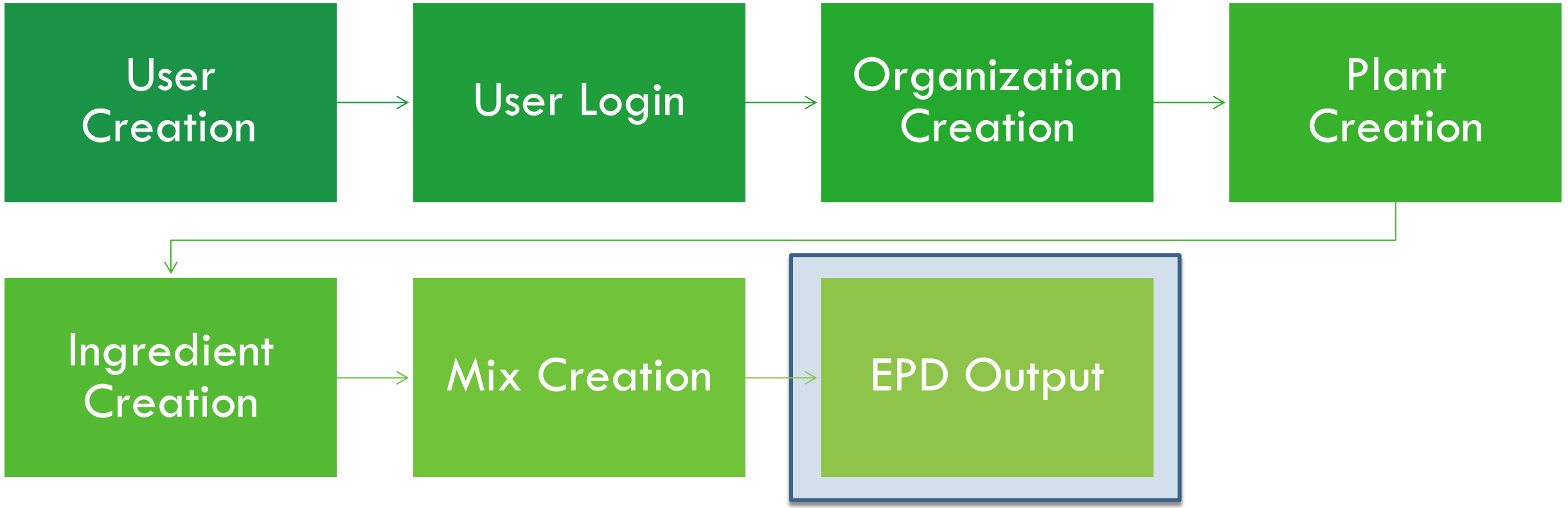
Document

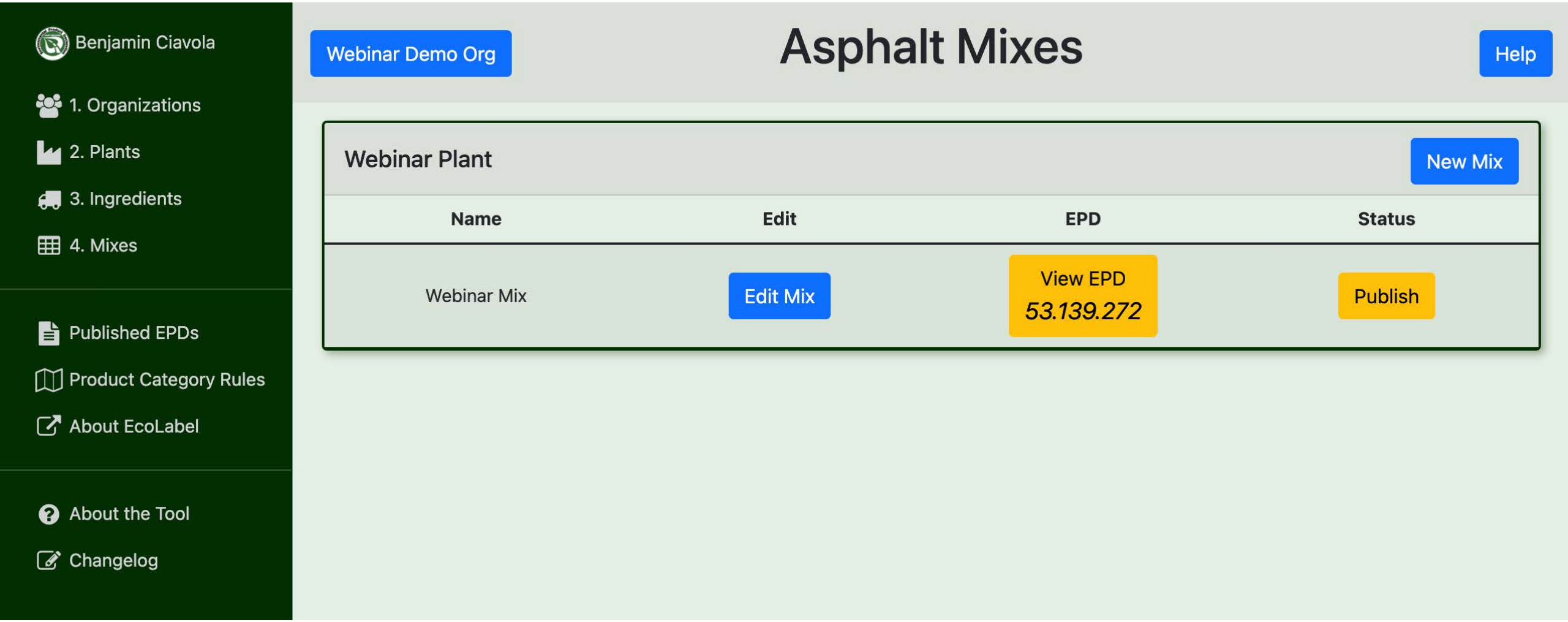
Choose File No file chosen

Please attach a file that documents the use of this ingredient in this mix, if available.

Add another mix additive

EPD Tool Workflow

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Emerald ECO LABEL

An Environmental Product Declaration (EPD) for Asphalt Mixtures

Company Information

Webinar Demo Org is an asphalt mixture producer.

Webinar Plant asphalt plant

322 Shelden Ave

Houghton, MI 49931

USA

trISIGHT

Product Description

This EPD reports the potential environmental impacts and additional environmental information for an asphalt mixture, which falls under the United Nations Standard Products and Services Code 30111509. Asphalt mixtures are typically incorporated as part of the structure of a roadway, parking lot, driveway, airfield, bike lane, pedestrian path, railroad track bed, or recreational surface.

Mix Name: Webinar Mix

Specification Entity: DOT

Specification: Webinar Superpave Spec

Gradation Type: dense

Mix Design Method: superpave

Nominal Maximum Aggregate Size: 0.75 inches

Performance Grade of Asphalt Binder: PG 58-28

Customer [Project/Contract] Number: MY-DOT-PROJECT-1A

This mix producer categorizes this product as a Hot Mix Asphalt (HMA) asphalt mixture. This asphalt mixture was produced within a temperature range of 149 to 154°C (300.0 to 310.0°F). Energy and environmental impacts are based on a plant's average performance over a 12-month period and are not adjusted for mix-specific production temperatures.

Environmental Product Declaration NAPA VERIFIED

This declaration is an EPD in accordance with ISO 14025:2006[1] and ISO 21930:2017[2]. The PCR is *Product Category Rules for Asphalt Mixtures*[3,4]. This EPD transparently describes the potential environmental impacts associated with the identified life cycle stages of the described product.

Declaration Number: 53.139.272 v1 **Software Version:** 2.0.0

Date of Issue: March 22, 2022 **Period of Validity:** March 31, 2027

This EPD is valid for asphalt mixtures produced at the location indicated on this page. Data used to inform this EPD reflect plant operations from a 12-month period beginning on March 22, 2021.

This EPD can be found at https://staging.asphaltepd.org/epd/d/gGyuG6uExSB/

LCA performed by: Ben Ciavola, PhD

redients

nts as identified in the mix design are provided in the table below.

T INGREDIENTS

	MATERIAL	WEIGHT %
	Natural Stone	*66*
	Reclaimed Asphalt Pavement	*30*
	Unmodified	*4*
ve	*Warm Mix Additive - Ingevity Evotherm M1*	*< 1%*

aterial is a data gap. Upstream data associated with extraction and processing is not accounted for in

lazardous Substances

substances, if applicable, are listed on the safety data sheet (SDS) associated with this asphalt mixture. The composition of the mix from the SDS are provided here for transparency.

TED HAZARDOUS SUBSTANCES

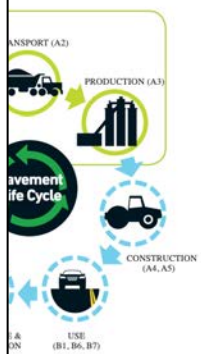
AL NAME	CAS NO.	WEIGHT %
egate	*Various*	*90.0 < 95.0*
Cement	*8052-42-4*	*< 10.0*
itives	*Various*	*< 1.0*

MENTAL IMPACT SUMMARY TABLE

IMPACT CATEGORY	POTENTIAL IMPACT PER METRIC TONNE ASPHALT MIXTURE (PER TON ASPHALT MIXTURE)
ential (GWP-100)	*58.60 (53.16) kg CO2 Equiv.*
ential (ODP)	*1.36e-06 (1.24e-06) kg CFC-11 Equiv.*
ntial (EP)	*1.29e-02 (1.17e-02) kg N Equiv.*
al (AP)	*1.66e-01 (1.50e-01) kg SO2 Equiv*
e creation potential (POCP)	*5.04 (4.57) kg O3 Equiv.*

ical Framework

metric tonne (1 short ton) of an asphalt mixture (UNSPSC Code 30111509: Asphalt Based Concrete), which is oduced composite material of aggregates, asphalt binder, and other materials." [3]



LIFE CYCLE STAGES AND INFORMATION MODULES

This is a cradle to gate EPD. It covers the raw material supply, transport, and manufacturing life cycle stages (modules A1-A3). It does not include construction (placement and compaction), use, maintenance, rehabilitation, or the end-of-life life cycle stages (modules A4-5, B1-7, and C1-4).[3]

Materials (A1): This stage includes raw material extraction and manufacturing (e.g., quarry operations for aggregates, petroleum extraction and refinery operations for asphalt binder production, etc.) based on the relative proportion of ingredients in the mix design.

Transport (A2): This stage includes transport of raw materials to the asphalt plant based on actual transportation distances and modes for ingredients in the mix design.

Production (A3): This stage comprises plant operations involved in the production of asphalt mixtures, including generation of electricity and heat used during asphalt mix production (e.g., extraction, refining, and transport of fuels). Data for this stage is plant specific.

TORY

using plant-specific data for asphalt mix production of the production stage (A1-A3). Potential variations e design, supplier locations, manufacturing processes, efficiencies, and energy consumption are accounted tream data sources are prescribed in the Product Category Rules (PCR) and are publicly available and freely transparency and comparability. Use of the prescribed data sources improves comparability among the EPDs variability due to differences in the upstream data within the system boundaries.[3]

CEDURES

m production and transportation of raw materials are subdivided based on the relative material quantities ix design. For conventional asphalt plants that produce both hot-mix asphalt (HMA) and warm-mix asphalt ation of energy and other resources for asphalt mix production is on a mass basis. Mix-specific production used to separately allocate energy inputs to HMA and WMA mixtures. For conventional asphalt plants that also ures at ambient temperatures using cold central plant recycling (CCPR) technologies, HMA and WMA mixtures CPR mixtures by segregating burner fuel consumption from CCPR mixtures.

This mix producer categorizes this product as a Hot Mix Asphalt (HMA) asphalt mixture. This asphalt mixture was produced within a temperature range of 149 to 154°C (300.0 to 310.0°F). Energy and environmental impacts are based on a plant's average performance over a 12-month period and are not adjusted for mix-specific production temperatures.

This declaration is an EPD in accordance with ISO 14025:2006[1] and ISO 21930:2017[2]. The PCR is *Product Category Rules for Asphalt Mixtures*[3,4]. This EPD transparently describes the potential environmental impacts associated with the identified life cycle stages of the described product.

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This EPD can be found at https://staging.asphaltepd.org/epd/d/gGyuG6uExSB/

LCA performed by: Ben Ciavola, PhD

Product Ingredients

The product ingredients as identified in the mix design are provided in the table below.

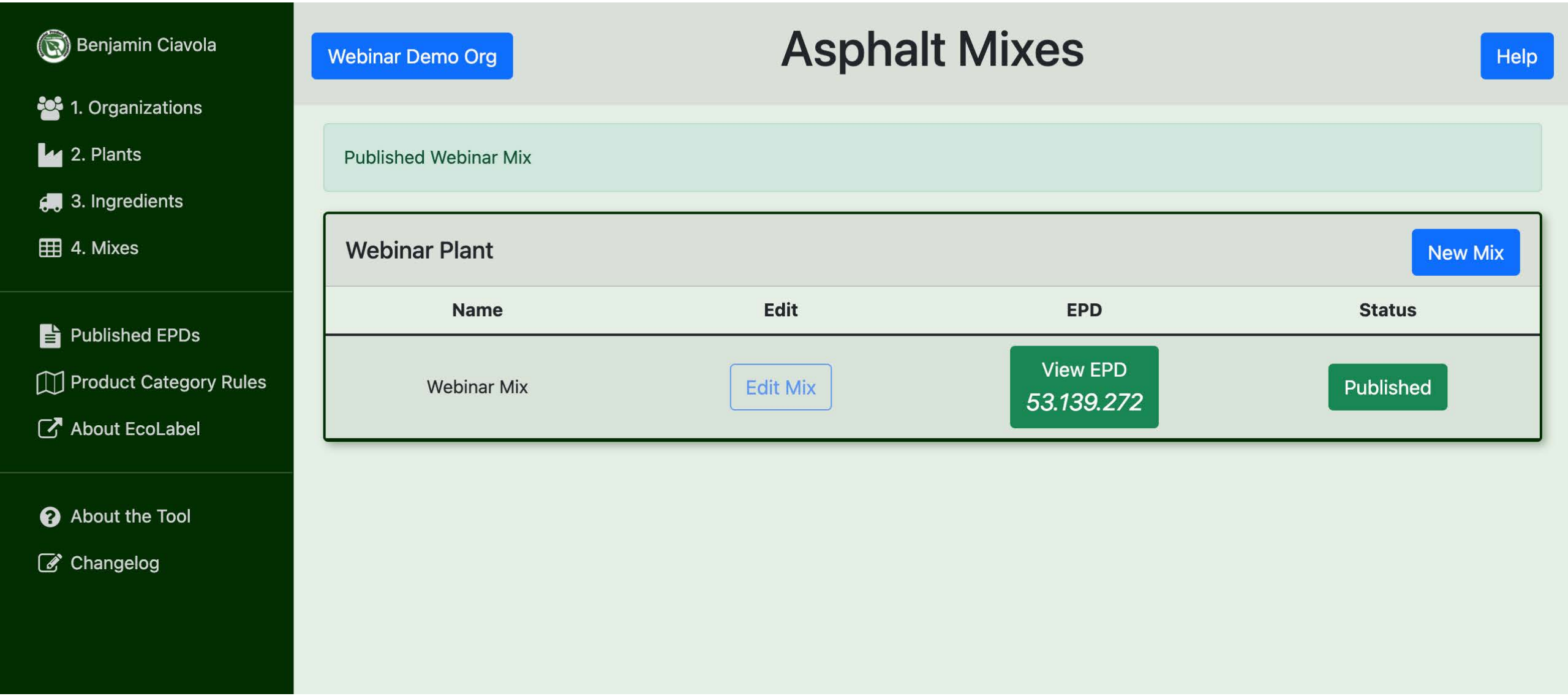
TABLE 1. PRODUCT INGREDIENTS

COMPONENT	MATERIAL	WEIGHT %
Aggregate	*Natural Stone*	*66*
RAP	*Reclaimed Asphalt Pavement*	*30*
Binder	*Unmodified*	*4*
Binder Additive	*Warm Mix Additive - Ingevity Evotherm M1*	*< 1%*

*Indicates that this material is a data gap. Upstream data associated with extraction and processing is not accounted for in this EPD.

TABLE 4. LIFE CYCLE IMPACT INDICATORS

ACRONYM	INDICATOR	UNIT	QUANTITY PER METRIC TONNE ASPHALT MIXTURE (PER SHORT TON ASPHALT MIXTURE)			
			MATERIALS (A1)	TRANSPORT (A2)	PRODUCTION (A3)	TOTAL (A1-A3)
GWP-100	Global warming potential, incl. biogenic CO2	kg CO2 Equiv.	27.28 (24.75)	8.08 (7.33)	23.24 (21.08)	58.60 (53.16)
ODP	Ozone depletion potential	kg CFC-11 Equiv.	1.25e-06 (1.14e-06)	4.88e-08 (4.42e-08)	6.07e-08 (5.50e-08)	1.36e-06 (1.24e-06)
EP	Eutrophication potential	kg N Equiv.	8.08e-03 (7.33e-03)	2.41e-03 (2.18e-03)	2.37e-03 (2.15e-03)	1.29e-02 (1.17e-02)
AP	Acidification potential	kg SO2 Equiv.	8.24e-02 (7.47e-02)	4.12e-02 (3.73e-02)	4.21e-02 (3.82e-02)	1.66e-01 (1.50e-01)
POCP	Photochemical ozone creation potential	kg O3 Equiv.	2.47 (2.24)	1.32 (1.20)	1.25 (1.13)	5.04 (4.57)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Common Concerns

- Can someone figure out details of my plant operations from an EPD?
  - **NO**. The algorithm calculating environmental impacts goes through several large transformation matrices rendering back-calculation extremely complex.
- How long is an EPD good for?
  - 5 years or March 31, 2027, whichever is sooner.
- Is there a limit on the number of EPDs I can make?
  - **NO.** Payment is by plant; you can make unlimited EPDs for each plant.

HOW TO USE VERSION 2 OF EMERALD ECO-LABEL: NAPA'S EPD TOOL

Ben Ciavola, PhD, Trisight
Joseph Shacat, NAPA