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Section 2 Emissions Summary

2.1 Potential Emissions Summary

Emissions sources for the proposed facility include:

- One Recycled Asphalt Pavement feeder system equipped with one screen and two conveyors
- 50 MMBtu/hr oil-fired rotary drum aggregate dryer/mixer with baghouse
- One, 30,000-gallon asphalt cement (AC) storage tank
- One, 1.41 MMBTU/hr Asphalt Storage Tank Heater
- One, 15,000-gallon No. 2 diesel fuel storage tank
- Two, 100-ton hot mix asphalt (HMA) storage silos
- Truck loadout operation
- Aggregate storage piles

A summary of PTE emissions is presented in Table 1. Detailed emission calculations and assumptions are included in Appendix B.

**Table 1
Facility Emissions Summary**

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION						
AIR POLLUTANT EMITTED	ACTUAL EMISSIONS		POTENTIAL EMISSIONS			
	<small>(AFTER CONTROLS / LIMITS)</small>		<small>(BEFORE CONTROLS / LIMITS)</small>		<small>(AFTER CONTROLS / LIMITS)</small>	
	<small>lb/hr</small>	<small>tons/yr</small>	<small>lb/hr</small>	<small>tons/yr</small>	<small>lb/hr</small>	<small>tons/yr</small>
PARTICULATE MATTER (PM)	7.21	2.31	48.07		2.31	
PARTICULATE MATTER<10 MICRONS (PM ₁₀)	4.52	1.52	23.82		1.52	
PARTICULATE MATTER<2.5 MICRONS (PM _{2.5})						
SULFUR DIOXIDE (SO ₂)	13.39	6.86	58.66		6.86	
NITROGEN OXIDES (NO _x)	9.55	3.63	41.84		3.63	
CARBON MONOXIDE (CO)	22.58	6.85	98.90		6.85	
VOLATILE ORGANIC COMPOUNDS (VOC)	8.18	2.42	35.83		2.42	
TOTAL HAP	1.53	0.46	6.69		0.46	
LARGEST HAP (formaldehyde)	0.54	0.16	2.37		0.16	

2.2 General Assumptions

The following assumptions apply to PTE emissions for the new hot mix asphalt facility:

- Emissions were estimated using the NC DEQ Division of Air Quality (DAQ) "Asphalt Emissions Calculator Revision F 07/18/2012" spreadsheet.
- Vendor information was used to estimate fabric filter control effectiveness.

2.3 Air Dispersion Modeling

Emissions from the proposed facility were calculated using the NC DEQ DAQ "Asphalt Emissions Calculator Revision F 07/18/2012" (Appendix B). The worksheet calculated projected emissions for air toxic substances and identified that an air quality modeling assessment for arsenic, benzene and formaldehyde is required. It should be noted that projected emissions for nickel were below the 0.3 pounds per day threshold for vertical or unobstructed stacks. Although the asphalt heater and drum dryer stacks are vertical and unobstructed, nickel emissions were modeled to remain conservative. TRC performed the air quality modeling assessment and the predicted impacts for arsenic, benzene, formaldehyde and nickel are acceptable with respect to the defined acceptable ambient levels (AALs). A detailed discussion of the air quality modeling assessment is provided in Section 4.0 and a Modeling Protocol Checklist is included in Appendix C. Air quality modeling files will be e-mailed to the NC DEQ upon request.

Section 4

Air Quality Modeling Assessment

This section summarizes the air quality modeling assessment performed for the proposed asphalt plant located in Marshall, NC.

4.1 Background

Madison Asphalt LLC (Madison) is proposing to install and operate a new asphalt plant on a roughly 2-acre leased parcel located at 3807 US 25/70, Marshall, North Carolina. Potential emissions were calculated using the NC DEQ DAQ's "Asphalt Emissions Calculator Revision F 07/18/2012". The emissions worksheet calculates projected emissions of air toxic substances and compares estimated emissions to NC DEQ emission thresholds that would trigger the need for an air quality modeling evaluation of specific substance emissions. Completion of the worksheet has identified that an air quality modeling assessment is needed for arsenic, benzene, and formaldehyde. Although nickel emissions were below the threshold for modeling, TRC included nickel in the air quality modeling assessment to remain conservative. This section describes the air quality analysis conducted and the results. A North Carolina Modeling Protocol Checklist has also been prepared for this analysis and is included in Appendix C.

4.2 Facility Location and Description

The Madison Asphalt, LLC facility will be located at 3807 US 25/70, Madison County, Marshall, North Carolina. Madison Asphalt, LLC will be situated on a 2-acre, leased portion of the existing McCrary Stone Co. quarry. The site and surrounding area are zoned for industrial use. A site location map is included in Figure 1. Facility Layouts are included as Figures 2 and 3 respectively. Receptors were placed around only the leased property that constitutes the asphalt plant operations.

4.3 Emission Rates and Stack Parameters

The NC DEQ DAQ's Asphalt Emissions Calculator identified that emissions of arsenic, benzene, and formaldehyde must be modeled. Nickel emissions were also modeled to remain conservative. Emissions of these substance come from the dryer/baghouse, asphalt tank heater, silo filing and loadout. The dryer/baghouse, silo filling and asphalt tank heater are point sources, the silo loadout would be a nonpoint fugitive source. The calculated emission rates for the four emission sources are summarized below.

**Table 2
Emission Rates**

EMISSION SOURCE	FORMALDEHYDE (lb/hr)	BENZENE (lb/hr)	ARSENIC (lb/hr)	NICKEL (lb/hr)
Dryer/baghouse	0.53	0.0663	9.52E-05	0.0107
Silo Filling	0.0143	0.000663	0	0
Loadout	0.00062	0.000368	0	0
Asphalt Tank Heater	0.0004834	2.76E-05	5.64E-06	4.23E-06

The dryer/baghouse, asphalt tank heater, and the silo filling have the assumed stack parameters.

**Table 3
Stack Parameters**

STACK	X(m)*	Y(m)*	HGT(m)	TEMP(K)	m/s	DIAMETER(m)
Dryer/BH	350121.7	3961926	8.1	436	19.4	1.03
Silo Vent	350139.4	3961930	10.81	339	1.5**	0.1
Asphalt Tank Heater	350126.1	3961939.7	2.22	450	6.5	0.304

*UTM 83

The loadout operation was modeled as a volume source with dimensions corresponding to a typical asphalt transfer vehicle and using the conversion guideline in the United States Environmental Protection Agency's (USEPA's) AERMOD Guidance document as follows.

- The sigma-y parameter (lateral dimension) was assumed equal to 3m/4.3m or 0.7.
- The sigma-z (vertical dimension) parameters was assumed equal to 3.5m/2.15m or 1.6m

4.4 Air Quality Model Considerations

- The AERMOD dispersion model (Version 18081) was used for the analysis.
- The NC DEQ was contacted to determine an appropriate set of meteorological data to use for the analysis. The site is located in Madison County. For this county, NC DEQ provides meteorological data for modeling purposes corresponding to the specific location. NC DEQ was supplied a centroid UTM coordinate for the facility. The NC DEQ in turn supplied meteorological data files for the years 2013-2015 with the names:
 - MMIF_AERMET_2013_35.764N_82.585W.SFC (plus two more files for 2014 and 2015)

– MMIF_AERMET_2013_35.764N_82.585W.PFL (plus two more files for 2014 and 2015)

- Receptors in NAD83 coordinates were located on the boundary of the asphalt plant and at 25-meter intervals out to a distance to ensure that the worst case predicted impacts were well within the interior of the grid. All worst-case impacts were found at or near the boundary of the facility and well within the outer edges of the receptor network. Receptor elevations were determined using the USEPA’s AERMAP terrain processor and an applicable portion of a NED data set.
- The proposed asphalt plant has limited structures that are solid from ground to their top. Some structures were evaluated in the model using the BPIP-Prime algorithm. Structures included a number of storage vessels, baghouse and a maintenance building. Parameters for these structures are identified in the BPIP input file.

4.5 Modeling Results

Modeling results in comparison to the corresponding acceptable ambient concentrations (AACs) are summarized below.

Predicted Impacts and AALs in Micrograms per Cubic Meter

MODEL YEAR	FORMALDEHYDE (1-hr)	BENZENE (annual)	ARSENIC (annual)	NICKEL (24-hr)
2013	23.1	0.089*	0.00017	0.098
2014	32.3	0.093*	0.00019	0.094
2015	26.5	0.084*	0.00016	0.085
AAL	150	0.12	0.002	6

*Result based maximum hourly rate for 8760 hours/year.

An actual annual impact based on projected operation would yield a predicted impact less than 1/10th of the listed impact for benzene.

The predicted impacts above are all acceptable with respect to the defined AALs. The North Carolina Modeling Protocol Checklist is included in Appendix C.

Appendix A

NC DEQ Forms

FORM B

SPECIFIC EMISSION SOURCE INFORMATION (REQUIRED FOR ALL SOURCES)

REVISED 09/22/16

NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate

B

EMISSION SOURCE DESCRIPTION: Asphalt Tank Heater	EMISSION SOURCE ID NO: ES-4 CONTROL DEVICE ID NO(S):
OPERATING SCENARIO _____ OF _____	EMISSION POINT (STACK) ID NO(S): ES-4

DESCRIBE IN DETAIL THE EMISSION SOURCE PROCESS (ATTACH FLOW DIAGRAM):
 Asphalt Storage Tank Heater

TYPE OF EMISSION SOURCE (CHECK AND COMPLETE APPROPRIATE FORM B1-B9 ON THE FOLLOWING PAGES):

<input checked="" type="checkbox"/> Coal, wood, oil, gas, other burner (Form B1)	<input type="checkbox"/> Woodworking (Form B4)	<input type="checkbox"/> Manuf. of chemicals/coatings/inks (Form B7)
<input type="checkbox"/> Int. combustion engine/generator (Form B2)	<input type="checkbox"/> Coating/finishing/printing (Form B5)	<input type="checkbox"/> Incineration (Form B8)
<input type="checkbox"/> Liquid storage tanks (Form B3)	<input type="checkbox"/> Storage silos/bins (Form B6)	<input type="checkbox"/> Other (Form B9)

START CONSTRUCTION DATE: June 2019	DATE MANUFACTURED: TBD
MANUFACTURER / MODEL NO.: CEI-1200	EXPECTED OP. SCHEDULE: 8 HR/DAY 5 DAY/WK 14 WK/YR
IS THIS SOURCE SUBJECT TO? <input checked="" type="checkbox"/> NSPS (SUBPARTS?): _____	<input type="checkbox"/> NESHAP (SUBPARTS?): _____
PERCENTAGE ANNUAL THROUGHPUT (%): DEC-FEB 0 MAR-MAY 25 JUN-AUG 50 SEP-NOV 25	

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

AIR POLLUTANT EMITTED	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL		POTENTIAL EMISSIONS			
		(AFTER CONTROLS / LIMITS)		(BEFORE CONTROLS / LIMITS)		(AFTER CONTROLS / LIMITS)	
		lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
PARTICULATE MATTER (PM)	AP-42	0.03	0.15	0.03	0.15	0.03	0.15
PARTICULATE MATTER<10 MICRONS (PM ₁₀)	AP-42	0.02	0.09	0.02	0.09	0.02	0.09
PARTICULATE MATTER<2.5 MICRONS (PM _{2.5})	AP-42	0.01	0.06	0.01	0.06	0.01	0.06
SULFUR DIOXIDE (SO ₂)	AP-42	0.72	3.13	0.72	3.13	0.72	3.13
NITROGEN OXIDES (NO _x)	AP-42	0.20	0.88	0.20	0.88	0.20	0.88
CARBON MONOXIDE (CO)	AP-42	0.05	0.22	0.05	0.22	0.05	0.22
VOLATILE ORGANIC COMPOUNDS (VOC)	AP-42	0.00	0.01	0.00	0.01	0.00	0.01
LEAD	AP-42						
OTHER							

HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

HAZARDOUS AIR POLLUTANT	CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL		POTENTIAL EMISSIONS			
			(AFTER CONTROLS / LIMITS)		(BEFORE CONTROLS / LIMITS)		(AFTER CONTROLS / LIMITS)	
			lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Antimony Unlisted Compounds	SBC-Other	AP-42	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Arsenic Unlisted Compounds	ASC-Other	AP-42	5.6E-06	4.9E-02	5.6E-06	4.9E-02	5.6E-06	4.9E-02
Benzene	71432	AP-42	2.8E-05	2.4E-01	2.8E-05	2.4E-01	2.8E-05	2.4E-01
Beryllium Metal (unreacted)	7440417	AP-42	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.2E-06	3.7E-02
Cadium Metal (elemental unreacted)	7440439	AP-42	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.2E-06	3.7E-02
Chromic Acid (VI)	7738945	AP-42	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.2E-06	3.7E-02
Cobalt Unlisted Compounds	COC-Other	AP-42	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
Ethylbenzene	100414	AP-42	8.2E-06	7.2E-02	8.2E-06	7.2E-02	8.2E-06	7.2E-02
Fluorides (sum fluoride compounds)	16984488	AP-42	3.8E-04	3.3E+00	3.8E-04	3.3E+00	3.8E-04	3.3E+00
Formaldehyde	50000	AP-42	4.8E-04	4.2E+00	4.8E-04	4.2E+00	4.8E-04	4.2E+00
Lead Unlisted Compounds	PBC-Other	AP-42	1.3E-05	1.1E-01	1.3E-05	1.1E-01	1.3E-05	1.1E-01
Manganese Unlisted Compounds	MNC-Other	AP-42	8.5E-06	7.4E-02	8.5E-06	7.4E-02	8.5E-06	7.4E-02
Mercury, vapor	7439976	AP-42	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.2E-06	3.7E-02
Methyl chloroform	71566	AP-42	2.4E-06	2.1E-02	2.4E-06	2.1E-02	2.4E-06	2.1E-02
Napthalene	91203	AP-42	3.4E-06	2.9E-02	3.4E-06	2.9E-02	3.4E-06	2.9E-02
Nickle Metal	7440020	AP-42	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.2E-06	3.7E-02
Phosphorus Metal, Yellow or White	7723140	AP-42	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00
POM rates uncontrolled	POM	AP-42	3.3E-05	2.9E-01	3.3E-05	2.9E-01	3.3E-05	2.9E-01
Selenium compounds	SEC	AP-42	2.1E-05	1.9E-01	2.1E-05	1.9E-01	2.1E-05	1.9E-01
Toluene	108883	AP-42	8.0E-04	7.0E+00	8.0E-04	7.0E+00	8.0E-04	7.0E+00
Xylene	1330207	AP-42	1.4E-05	1.2E-01	1.4E-05	1.2E-01	1.4E-05	1.2E-01
Total HAP		AP-42	1.4E-03	1.3E+01	1.4E-03	1.3E+01	1.4E-03	1.3E+01
Largest HAP		AP-42	8.02E-04	7.03E+00	8.02E-04	7.03E+00	8.02E-04	7.03E+00

TOXIC AIR POLLUTANT EMISSIONS INFORMATION FOR THIS SOURCE

TOXIC AIR POLLUTANT	CAS NO.	SOURCE OF EMISSION FACTOR	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS		
			lb/hr	lb/day	lb/yr
Arsenic Unlisted Compounds	ASC-Other	AP-42	5.64E-06	1.35E-04	4.94E-02
Benzene	71432	AP-42	2.77E-05	6.65E-04	2.43E-01
Beryllium Metal (unreacted)	7440417	AP-42	4.23E-06	1.02E-04	3.71E-02
Cadium Metal (elemental unreacted)	7440439	AP-42	4.23E-06	1.02E-04	3.71E-02
Soluble chromate compounds, as chromium (VI) equivalent	SolCR6	AP-42	4.23E-06	1.02E-04	3.71E-02
Fluorides (sum fluoride compounds)	16984488	AP-42	3.76E-04	9.02E-03	3.29E+00
Formaldehyde	50000	AP-42	4.83E-04	1.16E-02	4.23E+00
Manganese Unlisted Compounds	MNC-Other	AP-42	8.46E-06	2.03E-04	7.41E-02
Mercury, vapor	7439976	AP-42	4.23E-06	1.02E-04	3.71E-02
Methyl chloroform	71566	AP-42	2.38E-06	5.70E-05	2.08E-02
Nickle Metal	7440020	AP-42	4.23E-06	1.02E-04	3.71E-02
Toluene	108883	AP-42	8.02E-04	1.93E-02	7.03E+00
Xylene	1330207	AP-42	1.41E-05	3.39E-04	1.24E-01

Attachments: (1) emissions calculations and supporting documentation; (2) indicate all requested state and federal enforceable permit limits (e.g. hours of operation, emission rates) and describe how these are monitored and with what frequency; and (3) describe any monitoring devices, gauges, or test ports for this source.

COMPLETE THIS FORM AND COMPLETE AND ATTACH APPROPRIATE B1 THROUGH B9 FORM FOR EACH SOURCE
 Attach Additional Sheets As Necessary

FORM B1

EMISSION SOURCE (WOOD, COAL, OIL, GAS, OTHER FUEL-FIRED BURNER)

REVISED 09/22/16

NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate

B1

EMISSION SOURCE DESCRIPTION: Asphalt Tank Heater	EMISSION SOURCE ID NO: ES-4
	CONTROL DEVICE ID NO(S):

OPERATING SCENARIO: <u>1</u> <u>1</u>	EMISSION POINT (STACK) ID NO(S): ES-1
---------------------------------------	---------------------------------------

DESCRIBE USE: PROCESS HEAT SPACE HEAT ELECTRICAL GENERATION
 CONTINUOUS USE STAND BY/EMERGENCY OTHER (DESCRIBE): _____

HEATING MECHANISM: INDIRECT DIRECT

MAX. FIRING RATE (MMBTU/HOUR): _____

WOOD-FIRED BURNER

WOOD TYPE: BARK WOOD/BARK WET WOOD DRY WOOD OTHER (DESCRIBE): _____

PERCENT MOISTURE OF FUEL: _____

UNCONTROLLED CONTROLLED WITH FLYASH REINJECTION CONTROLLED W/O REINJECTION

FUEL FEED METHOD: _____ HEAT TRANSFER MEDIA: STEAM AIR OTHER (DESCRIBE) _____

COAL-FIRED BURNER

TYPE OF BOILER		IF OTHER DESCRIBE:		
PULVERIZED	OVERFEED STOKER	UNDERFEED STOKER	SPREADER STOKER	FLUIDIZED BED
<input type="checkbox"/> WET BED	<input type="checkbox"/> UNCONTROLLED	<input type="checkbox"/> UNCONTROLLED	<input type="checkbox"/> UNCONTROLLED	<input type="checkbox"/> CIRCULATING
<input type="checkbox"/> DRY BED	<input type="checkbox"/> CONTROLLED	<input type="checkbox"/> CONTROLLED	<input type="checkbox"/> FLYASH REINJECTION	<input type="checkbox"/> RECIRCULATING
<input type="checkbox"/> NO FLYASH REINJECTION				

OIL/GAS-FIRED BURNER

TYPE OF BOILER: UTILITY INDUSTRIAL COMMERCIAL INSTITUTIONAL

TYPE OF FIRING: NORMAL TANGENTIAL LOW NOX BURNERS NO LOW NOX BURNER

OTHER FUEL-FIRED BURNER

TYPE(S) OF FUEL: _____ PE

TYPE OF BOILER: UTILITY INDUSTRIAL COMMERCIAL INSTITUTIONAL

TYPE OF FIRING: _____ TYPE(S) OF CONTROL(S) (IF ANY): _____

FUEL USAGE (INCLUDE STARTUP/BACKUP FUELS)

FUEL TYPE	UNITS	MAXIMUM DESIGN CAPACITY (UNIT/HR)	REQUESTED CAPACITY LIMITATION (UNIT/HR)
No 2 Fuel Oil	MMBTU/hr	1.41	NA

FUEL CHARACTERISTICS (COMPLETE ALL THAT ARE APPLICABLE)

FUEL TYPE	SPECIFIC BTU CONTENT	SULFUR CONTENT (% BY WEIGHT)	ASH CONTENT (% BY WEIGHT)
No 2 Fuel Oil	140,000 BTU/gal	0.5	NA

COMMENTS:

Attach Additional Sheets As Necessary

FORM D1

FACILITY-WIDE EMISSIONS SUMMARY

REVISED 09/22/16

NCDEQ/Division of Air Quality - Application for Air Permit to Construct/Operate

D1

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE						
		EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)		
AIR POLLUTANT EMITTED		tons/yr	tons/yr	tons/yr		
PARTICULATE MATTER (PM)		2.46	48.22	2.46		
PARTICULATE MATTER < 10 MICRONS (PM ₁₀)						
PARTICULATE MATTER < 2.5 MICRONS (PM _{2.5})						
SULFUR DIOXIDE (SO ₂)		9.99	61.79	9.99		
NITROGEN OXIDES (NO _x)		4.51	42.72	4.51		
CARBON MONOXIDE (CO)		7.07	99.12	7.07		
VOLATILE ORGANIC COMPOUNDS (VOC)		2.43	35.84	2.43		
LEAD		0.00	0.01	0.00		
GREENHOUSE GASES (GHG) (SHORT TONS)		2341.00	24883.00	2341.00		
OTHER						
HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE						
		EXPECTED ACTUAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITATIONS)	POTENTIAL EMISSIONS (AFTER CONTROLS / LIMITATIONS)		
HAZARDOUS AIR POLLUTANT EMITTED	CAS NO.	tons/yr	tons/yr	tons/yr		
Antimony Unlisted Compounds	SBC-Other	9.00E-06	1.34E-04	9.00E-06		
Arsenic Unlisted Compounds	ASC-Other	5.27E-05	4.42E-04	5.27E-05		
Benzene	71432	1.99E-02	2.95E-01	1.99E-02		
Beryllium Metal (unreacted)	7440417	1.85E-05	1.85E-05	1.85E-05		
Cadium Metal (elemental unreacted)	7440439	3.90E-05	3.24E-04	3.90E-05		
Chromic Acid (VI)	7738945	4.10E-05	3.54E-04	4.10E-05		
Cobalt Unlisted Compounds	COC-Other	1.30E-06	1.94E-05	1.30E-06		
Ethylbenzene	100414	1.28E-02	1.91E-01	1.28E-02		
Fluorides (sum fluoride compounds)	16984488	1.65E-03	1.65E-03	1.65E-03		
Formaldehyde	50000	1.62E-01	2.38E+00	1.62E-01		
Lead Unlisted Compounds	PBC-Other	8.06E-04	1.12E-02	8.06E-04		
Manganese Unlisted Compounds	MNC-Other	4.22E-04	5.77E-03	4.22E-04		
Mercury, vapor	7439976	1.49E-04	1.95E-03	1.49E-04		
Methyl chloroform	71566	2.41E-03	3.58E-02	2.41E-03		
Napthalene	91203	3.30E-02	4.91E-01	3.30E-02		
Nickle Metal	7440020	3.17E-03	4.69E-02	3.17E-03		
Phosphorus Metal, Yellow or White	7723140	1.40E-03	2.08E-02	1.40E-03		
POM rates uncontrolled	POM	4.41E-02	6.55E-01	4.41E-02		
Selenium compounds	SEC	1.10E-04	3.53E-04	1.10E-04		
Toluene	108883	1.49E-01	2.17E+00	1.49E-01		
Xylene	1330207	1.21E-02	1.80E-01	1.21E-02		
Total HAP		4.60E-01	6.69E+00	4.60E-01		
Largest HAP		1.62E-01	2.38E+00	1.62E-01		
TOXIC AIR POLLUTANT EMISSIONS INFORMATION - FACILITY-WIDE						
INDICATE REQUESTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS. EMISSIONS ABOVE THE TOXIC PERMIT EMISSION RATE (TPER) IN 15A NCAC 2Q .0711 MAY REQUIRE AIR DISPERSION MODELING. USE NETTING FORM D2 IF NECESSARY.						
TOXIC AIR POLLUTANT EMITTED	CAS NO.	lb/hr	lb/day	lb/year	Modeling Required ?	
					Yes	No
Arsenic Unlisted Compounds	ASC-Other	1.01E-04	2.42E-03	1.05E-01	X	
Benzene	71432	6.74E-02	1.62E+00	3.98E+01	X	
Beryllium Metal (unreacted)	7440417	4.23E-06	1.02E-04	3.71E-02		X
Cadium Metal (elemental unreacted)	7440439	7.39E-05	1.77E-03	7.81E-02		X
Soluble chromate compounds, as chromium (VI) equivalent	SolCR6		0.00E+00			X
Fluorides (sum fluoride compounds)	16984488	3.76E-04	9.02E-03	3.29E+00		X
Formaldehyde	50000	5.42E-01	1.30E+01	3.23E+02	X	
Manganese Unlisted Compounds	MNC-Other	1.32E-03	3.16E-02	8.44E-01		X
Mercury, vapor	7439976	4.46E-04	1.07E-02	2.97E-01		X
Methyl chloroform	71566	8.16E-03	1.96E-01	4.82E+00		X
Nickle Metal*	7440020	1.07E-02	2.57E-01	6.34E+00		X
Toluene	108883	4.97E-01	1.19E+01	2.99E+02		X
Xylene	1330207	4.11E-02	9.85E-01	2.43E+01		X
COMMENTS:						
*Although the asphalt heater tank stack is vertical and non-obstructed, nickel emissions were modeled to demonstrate compliance with ambient limitations.						

Attach Additional Sheets As Necessary

Appendix B

Emission Calculations

ASPHALT EMISSIONS CALCULATOR REVISION F 07/18/2012 INPUT SCREEN



NOTICE: This spreadsheet is for your use only and should be used with caution. DENR does not guarantee the accuracy of the information contained. This spreadsheet is subject to continual revision and updating. It is your responsibility to be aware of the most current information available. DENR is not responsible for errors or omissions that may be contained herein.

- Instructions:**
1. Fill in all **BLUE** cells.
 2. Ensure all pull down boxes and **BLUE** cells reflect correct conditions.
 3. Read the README sheet.
 4. Use the mouse pointer to read the tips in the "red cornered" input cells.
- (See Tools->Options->Comments if these are not displayed.)

Company Name:	Madison Asphalt, LLC
Facility ID No.:	
Permit No.:	
Facility City:	Marshall
Facility County:	Madison
Spreadsheet Prepared by:	MP Riley - TRC

Is this spreadsheet being used for emissions inventory

Plant type:	Drum mix	
Fuel type:	No.2 fuel oil-fired	
Fuel Sulfur Content:	0.50	% (default value is 0.5 %)
Controls:	Fabric filter controls	

Dryer heat input:	50	million Btu per hour
Plant maximum production capacity:	170	tons per hour

Asphalt Properties		
Asphalt temperature:	325	degrees F (default value of 325 degrees F)
Volatility loss (V):	-0.5	% (default value of -0.5 %)

Silo Filling?

RAP crushing on site? <input type="text" value="YES"/>			
Crushing Capacity?	43	tons per hour	No. of crushers: 1
Hours of operation:	8760	hours per year	No. of screens: 1
			No. of conveyors: 2

Asphalt Cement Heater		
AC heater heat input:	1.41	million Btu per hour (No.2 or diesel fuel oil -fired assumed)
Fuel Sulfur Content:	0.50	% (default value is 0.5 %)
Hours of operation:	8760	hours per year (default is 8760 hours per year unless specified otherwise)

Calculated Annual Production Limit:	1,490,682	tons per year
Requested Annual Production Limit:	100,000	tons per year (if none desired leave default value =8760*tph)
Requested Daily Production Limit:	4,080	tons per day (if none desired leave default value = 24*tph)

Is this plant NSPS Subpart I affected? <input type="text" value="YES"/>		
Stack gas flow rate :	34,000	ACFM
Stack gas temperature :	240	oF
Stack % moisture:	33	%
Allowable emission rate under NSPS Subpart I:	5.89	lb/hr
Control efficiency required:	99.876	%
Does Method 5 data already exist?: <input type="text" value="NO"/>		
Method 5 determined emission rate:	40.00	lb/hr
Control efficiency based on test data:	99.160	%

Allowable emission rate under 2 D .0506:	46.79	lb/hr
Does this plant emit less than this limit ?:	Yes	(based on emission factors)
Control efficiency required:	99.017	%

**Dryer Emissions
Criteria Pollutants**

Pollutant	Uncontrolled Emission Factor (lb/ton)	Controlled Emission Factor (lb/ton)	uncontrolled emission rate (lb/hr)	controlled emission rate (lb/hr)	Title V, Potential Emissions (tpy) (no controls, 8760 hours per year operation)	PSD, Potential Emissions, (tpy) (with controls, 8760 hours per year operation)	Synthetic Minor, Potential Emissions (tpy) (with all operation restrictions)
Condensable PM (or PM ₁₀)	0.0654	0.0194	11.118	3.298			
Filterable PM	28	0.014	4760	2.38			
Filterable PM ₁₀	6.4	0.0039	1088	0.663			
Total PM	28	0.033	4760	5.61	40.2	24.6	1.7
Total PM ₁₀	6.5	0.023	1105	3.91	20.3	17.1	1.2
SO ₂	0.0746	0.0746	12.68	12.68	55.53	55.53	3.73
CO	0.1300	0.130	22.1	22.1	96.8	96.8	6.5
NO _x	0.0550	0.055	9.35	9.35	41.0	41.0	2.8
VOC	0.0320	0.032	5.44	5.44	23.8	23.8	1.6
HAPs, TOTAL		0.009		1.479	6.5	6.5	0.4

Silo Filling plus Load Out Emissions, Criteria Pollutants

Pollutant	Emission Factor, combined (lb/ton)	emission rate (lb/hr)	Title V, Potential Emissions (tpy) (no controls, 8760 hours per year operation)	PSD, Potential Emissions, (tpy) (8760 hours per year operation)	Synthetic Minor, Potential Emissions (tpy) (with all operation restrictions)
Total PM	1.11E-03	1.88E-01	0.8	0.8	0.1
CO	2.53E-03	4.30E-01	1.9	1.9	0.1
VOC	1.61E-02	2.74E+00	12.0	12.0	0.8
HAPs, TOTAL	2.74E-04	4.66E-02	0.2	0.2	0.0

Rap Crusher Emissions

Pollutant	Emission Factor, all sources combined (lb/ton)	emission rate (lb/hr)	Title V, Potential Emissions (tpy) (no controls, 8760 hours per year operation)	PSD, Potential Emissions, (tpy) (8760 hours per year operation)	Synthetic Minor, Potential Emissions (tpy) (with all operation restrictions)
Total PM	0.0364	1.57E+00	6.9	6.9	0.5
Total PM ₁₀	0.0133	5.72E-01	2.5	2.5	0.2

Asphalt Cement Heater Emissions

Pollutant	Uncontrolled Emission Factor (lb/MMBtu)	emission rate (lb/hr)	Title V, Potential Emissions (tpy) (no controls, 8760 hours per year operation)	PSD, Potential Emissions, (tpy) (8760 hours per year operation)	Synthetic Minor, Potential Emissions (tpy) (with all operation restrictions)
Total PM	0.0235714	3.32E-02	0.1	0.1	0.1
Total PM ₁₀	0.0235714	3.32E-02	0.1	0.1	0.1
SO ₂	0.5071429	7.15E-01	3.1	3.1	3.1
CO	0.0357143	5.04E-02	0.2	0.2	0.2
NO _x	0.1428571	2.01E-01	0.9	0.9	0.9
VOC	0.0024286	3.42E-03	0.0	0.0	0.0

Facility-wide Criteria Pollutant Emissions Summary

Pollutant	Controlled Emission Rate, lb/hr	Title V, Potential Emissions (tpy) (no controls, 8760 hours per year operation)	PSD, Potential Emissions, (tpy) (8760 hours per year operation)	Synthetic Minor, Potential Emissions (tpy) (with all operation restrictions)
Total PM	7.21E+00	48.1	32.4	2.3
Total PM ₁₀	4.52E+00	23.8	20.6	1.5
SO ₂	1.34E+01	58.7	58.7	6.9
CO	2.26E+01	98.9	98.9	6.8
NO _x	9.55E+00	41.8	41.8	3.6
VOC	8.18E+00	35.8	35.8	2.4
HAPs, TOTAL	1.53E+00	6.7	6.7	0.4

Facility-wide Toxic Air Pollutants Summary

TAP	CAS No.	Action	TAP	CAS No.	Action
Acetaldehyde (TH)	75070	NOTE 1	Mercury, vapor (TH)	7439976	NOTE 1
Acrolein (TH)	107028	NOTE 1	Methyl ethyl ketone (TH)	78933	NOTE 1
Arsenic unlisted cmpds (comp. of ASC) (TH)	ASC-other	NOTE 3	Methylene chloride (TH)	75092	NOTE 1
Benzene (TH)	71432	NOTE 3	Nickel metal (TH)	7440020	NOTE 3
Benzo(a)pyrene (T)	50328	NOTE 1	Perchloroethylene (tetrachloroethylene) (TH)	127184	NOTE 1
Beryllium metal (unreacted) (TH)	7440417	NOTE 1	Phenol (TH)	108952	NOTE 1
Cadmium metal (elemental unreacted) (TH)	7440439	NOTE 2	Soluble Chromate Compounds as Chrome VI (TH)	7738945	NOTE 1
Carbon disulfide (TH)	75150	NOTE 1	Styrene (TH)	100425	NOTE 1
Formaldehyde (TH)	50000	NOTE 3	Tetrachlorodibenzo-p-dioxin, 2,3,7,8- (TH)	1746016	NOTE 1
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8 (T)	57653857	NOTE 1	Toluene (TH)	108883	NOTE 1
Hexane, n- (TH)	110543	NOTE 1	Trichloroethylene (TH)	79016	NOTE 1
Hydrogen Sulfide (T)	7783064	NOTE 1	Trichlorofluoromethane (CFC 111) (T)	75694	NOTE 1
Manganese unlisted compounds (T)	MNC-other	NOTE 1	Xylene (TH)	1330207	NOTE 1
Methyl chloroform (TH)	71556	NOTE 1			

NOTE 1: Include TAP in TPER stipulation.
NOTE 2: Include TAP in TPER stipulation with operation restrictions.
NOTE 3: Modeling Required. See "Toxic calculations" worksheet.

ASPHALT EMISSIONS CALCULATOR REVISION F 07/18/2012 - OUTPUT SCREEN



Instructions: Enter emission source / facility data on the "INPUT" tab/screen. The air emission results and summary of input data are viewed / printed on the "OUTPUT" tab/screen. The different tabs are on the bottom of this screen.

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SOURCE / FACILITY / USER INPUT SUMMARY (FROM INPUT SCREEN)

COMPANY:	Madison Asphalt, LLC	FACILITY ID NO.:	0
		PERMIT NUMBER:	0
EMISSION SOURCE DESCRIPTION:	NSPS affected 170 tph No.2 fuel oil-fired, Drum mix asphalt plant (50 mmBtu/hr heat input, w/silofill, with RAP, sulfur=0.5%)	FACILITY CITY:	Marshall
		FACILITY COUNTY:	Madison
Annual Production Limit:	100,000 ton/year	Daily Production Limit:	n/a ton/day
SPREADSHEET PREPARED BY:	MP Riley - TRC		

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION

AIR POLLUTANT EMITTED	ACTUAL EMISSIONS (AFTER CONTROLS / LIMITS)		POTENTIAL EMISSIONS			
			(BEFORE CONTROLS / LIMITS)		(AFTER CONTROLS / LIMITS)	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
PARTICULATE MATTER (PM)	7.21	2.31		48.07		2.31
PARTICULATE MATTER<10 MICRONS (PM ₁₀)	4.52	1.52		23.82		1.52
PARTICULATE MATTER<2.5 MICRONS (PM _{2.5})						
SULFUR DIOXIDE (SO ₂)	13.39	6.86		58.66		6.86
NITROGEN OXIDES (NO _x)	9.55	3.63		41.84		3.63
CARBON MONOXIDE (CO)	22.58	6.85		98.90		6.85
VOLATILE ORGANIC COMPOUNDS (VOC)	8.18	2.42		35.83		2.42
TOTAL HAP	1.53	0.45		6.68		0.45
LARGEST HAP (formaldehyde)	0.54	0.16		2.37		0.16

Attach INPUT worksheet

TOXIC / HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION

TOXIC / HAZARDOUS AIR POLLUTANT	CAS Number	ACTUAL EMISSIONS (AFTER CONTROLS / LIMITS)		POTENTIAL EMISSIONS			EMISSION FACTOR (lb/ton asphalt produced, with Fabric filter controls)
				(BEFORE CONTROLS / LIMITS)		(AFTER CONTROLS / LIMITS)	
		lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	
Acetaldehyde (TH)	75070	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Acrolein (TH)	107028	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Antimony unlisted compounds (H)	SBC-other	3.06E-05	1.80E-02	3.06E-05	0.27	3.06E-05	1.80E-02
Arsenic unlisted cmpds (comp. of ASC) (TH)	ASC-other	9.52E-05	5.60E-02	9.52E-05	0.83	9.52E-05	5.60E-02
Benzene (TH)	71432	6.73E-02	3.96E+01	6.73E-02	589.82	6.73E-02	3.96E+01
Benzo(a)pyrene (T)	50328	3.00E-06	1.76E-03	3.00E-06	0.03	3.00E-06	1.76E-03
Beryllium metal (unreacted) (TH)	7440417	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Cadmium metal (elemental unreacted) (TH)	7440439	6.97E-05	4.10E-02	6.97E-05	0.61	6.97E-05	4.10E-02
Carbon disulfide (TH)	75150	4.23E-04	2.49E-01	4.23E-04	3.71	4.23E-04	2.49E-01
Chromium unlisted cmpds (add w/chrom acid to get CRC) (H)	CRC-other	8.59E-04	5.05E-01	8.59E-04	7.52	8.59E-04	5.05E-01
Chromic acid (VI) (component of solCR6 and CRC) (TH)	7738945	7.65E-05	4.50E-02	7.65E-05	0.67	7.65E-05	4.50E-02
Cobalt unlisted compounds (H)	COC-other	4.42E-06	2.60E-03	4.42E-06	0.04	4.42E-06	2.60E-03
Cumene (H)	98828	7.78E-04	4.57E-01	7.78E-04	6.81	7.78E-04	4.57E-01
Ethyl benzene (H)	100414	4.36E-02	2.56E+01	4.36E-02	381.65	4.36E-02	2.56E+01
Ethyl chloride (chloroethane) (H)	75003	1.48E-06	8.73E-04	1.48E-06	0.01	1.48E-06	8.73E-04
Formaldehyde (TH)	50000	5.42E-01	3.19E+02	5.42E-01	4747.19	5.42E-01	3.19E+02
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8 (T)	57653857	2.21E-10	1.30E-07	2.21E-10	0.00	2.21E-10	1.30E-07
Hexane, n- (TH)	110543	1.63E-01	9.57E+01	1.63E-01	1424.94	1.63E-01	9.57E+01
Hydrogen Chloride (hydrochloric acid) (TH)	7647010	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Hydrogen Sulfide (T)	7783064	9.30E-03	5.47E+00	9.30E-03	81.49	9.30E-03	5.47E+00
Lead unlisted compounds (H)	PBC-other	2.55E-03	1.50E+00	2.55E-03	22.34	2.55E-03	1.50E+00
Manganese unlisted compounds (T)	MNC-other	1.31E-03	7.70E-01	1.31E-03	11.47	1.31E-03	7.70E-01
Mercury, vapor (TH)	7439976	4.42E-04	2.60E-01	4.42E-04	3.87	4.42E-04	2.60E-01
Methyl bromide (H)	74839	1.69E-04	9.96E-02	1.69E-04	1.48	1.69E-04	9.96E-02
Methyl chloride (H)	74873	1.06E-04	6.24E-02	1.06E-04	0.93	1.06E-04	6.24E-02
Methyl chloroform (TH)	71556	8.16E-03	4.80E+00	8.16E-03	71.48	8.16E-03	4.80E+00
Methyl ethyl ketone (TH)	78933	1.15E-03	6.79E-01	1.15E-03	10.11	1.15E-03	6.79E-01
Methylene chloride (TH)	75092	5.59E-06	3.29E-03	5.59E-06	0.05	5.59E-06	3.29E-03
Naphthalene (H)	91203	1.12E-01	6.59E+01	1.12E-01	981.21	1.12E-01	6.59E+01
Nickel metal (TH)	7440020	1.07E-02	6.30E+00	1.07E-02	93.82	1.07E-02	6.30E+00
Perchloroethylene (tetrachloroethylene) (TH)	127184	5.44E-05	3.20E-02	5.44E-05	0.48	5.44E-05	3.20E-02
Phenol (TH)	108952	6.84E-04	4.02E-01	6.84E-04	5.99	6.84E-04	4.02E-01
Phosphorus Metal, Yellow or White (H)	7723140	4.76E-03	2.80E+00	4.76E-03	41.70	4.76E-03	2.80E+00
Polycyclic Organic Matter (H)	POM	1.50E-01	8.80E+01	1.50E-01	1310.50	1.50E-01	8.80E+01
Propionaldehyde (H)	123386	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Quinone (H)	106514	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00
Selenium compounds (H)	SEC	5.95E-05	3.50E-02	5.95E-05	0.52	5.95E-05	3.50E-02
Styrene (TH)	100425	1.63E-04	9.62E-02	1.63E-04	1.43	1.63E-04	9.62E-02
Tetrachlorodibenzo-p-dioxin, 2,3,7,8- (TH)	1746016	3.57E-11	2.10E-08	3.57E-11	0.00	3.57E-11	2.10E-08

Toluene (TH)	108883	4.96E-01	2.92E+02	4.96E-01	4342.94	4.96E-01	2.92E+02	2.9E-03
Trichloroethylene (TH)	79016	0.00E+00	0.00E+00	0.00E+00	0.00	0.00E+00	0.00E+00	0.0E+00
Trichlorofluoromethane (CFC 111) (T)	75694	9.19E-06	5.41E-03	9.19E-06	0.08	9.19E-06	5.41E-03	5.4E-08
Trimethylpentane, 2,2,4- (H)	540841	6.82E-03	4.01E+00	6.82E-03	59.74	6.82E-03	4.01E+00	4.0E-05
Xylene (TH)	1330207	4.10E-02	2.41E+01	4.10E-02	359.53	4.10E-02	2.41E+01	2.4E-04
Xylene, o- (H)	95476	1.75E-03	1.03E+00	1.75E-03	15.30	1.75E-03	1.03E+00	1.0E-05

TOXIC AIR POLLUTANT EMISSIONS INFORMATION (FOR PERMITTING PURPOSES)

Expected actual emissions after controls and limitations consisting of an annual production limit of 100000 tons .							EMISSION FACTOR (lb/ton asphalt produced, with Fabric filter controls)
TOXIC AIR POLLUTANT	CAS Num.	lb/hr	lb/day	lb/yr	Modeling Required?		
Acetaldehyde (TH)	75070	0.00E+00	0.00E+00	0.00E+00	NO. Based on facility-wide potential.	0.00E+00	
Acrolein (TH)	107028	0.00E+00	0.00E+00	0.00E+00	NO. Based on facility-wide potential.	0.00E+00	
Arsenic unlisted cmpds (comp. of ASC) (TH)	ASC-other	9.52E-05	2.28E-03	5.60E-02	YES. Modeling required	5.60E-07	
Benzene (TH)	71432	6.73E-02	1.62E+00	3.96E+01	YES. Modeling required	3.96E-04	
Benzo(a)pyrene (T)	50328	3.00E-06	7.20E-05	1.76E-03	NO. Based on facility-wide potential.	1.76E-08	
Beryllium metal (unreacted) (TH)	7440417	0.00E+00	0.00E+00	0.00E+00	NO. Based on facility-wide potential.	0.00E+00	
Cadmium metal (elemental unreacted) (TH)	7440439	6.97E-05	1.67E-03	4.10E-02	NO. Because of operating restriction	4.10E-07	
Carbon disulfide (TH)	75150	4.23E-04	1.02E-02	2.49E-01	NO. Based on facility-wide potential.	2.49E-06	
Soluble Chromate compounds as Chrome (VI) (TH)	SOLCR6	7.65E-05	1.84E-03	4.50E-02	NO. Based on facility-wide potential.	4.50E-07	
Formaldehyde (TH)	50000	5.42E-01	1.30E+01	3.19E+02	YES. Modeling required	3.19E-03	
Hexane, n- (TH)	110543	1.63E-01	3.90E+00	9.57E+01	NO. Based on facility-wide potential.	9.57E-04	
Hexachlorodibenzo-p-dioxin 1,2,3,6,7,8 (T)	57653857	2.21E-10	5.30E-09	1.30E-07	NO. Based on facility-wide potential.	1.30E-12	
Hydrogen Sulfide (T)	7783064	9.30E-03	2.23E-01	5.47E+00	NO. Based on facility-wide potential.	5.47E-05	
Manganese unlisted compounds (T)	MNC-other	1.31E-03	3.14E-02	7.70E-01	NO. Based on facility-wide potential.	7.70E-06	
Mercury, vapor (TH)	7439976	4.42E-04	1.06E-02	2.60E-01	NO. Based on facility-wide potential.	2.60E-06	
Methylene chloride (TH)	75092	5.59E-06	1.34E-04	3.29E-03	NO. Based on facility-wide potential.	3.29E-08	
Methyl chloroform (TH)	71556	8.16E-03	1.96E-01	4.80E+00	NO. Based on facility-wide potential.	4.80E-05	
Methyl ethyl ketone (TH)	78933	1.15E-03	2.77E-02	6.79E-01	NO. Based on facility-wide potential.	6.79E-06	
Nickel metal (TH)	7440020	1.07E-02	2.57E-01	6.30E+00	YES. Modeling required	6.30E-05	
Perchloroethylene (tetrachloroethylene) (TH)	127184	5.44E-05	1.31E-03	3.20E-02	NO. Based on facility-wide potential.	3.20E-07	
Phenol (TH)	108952	6.84E-04	1.64E-02	4.02E-01	NO. Based on facility-wide potential.	4.02E-06	
Styrene (TH)	100425	1.63E-04	3.92E-03	9.62E-02	NO. Based on facility-wide potential.	9.62E-07	
Tetrachlorodibenzo-p-dioxin, 2,3,7,8- (TH)	1746016	3.57E-11	8.57E-10	2.10E-08	NO. Based on facility-wide potential.	2.10E-13	
Toluene (TH)	108883	4.96E-01	1.19E+01	2.92E+02	NO. Based on facility-wide potential.	2.92E-03	
Trichloroethylene (TH)	79016	0.00E+00	0.00E+00	0.00E+00	NO. Based on facility-wide potential.	0.00E+00	
Trichlorofluoromethane (CFC 111) (T)	75694	9.19E-06	2.21E-04	5.41E-03	NO. Based on facility-wide potential.	5.41E-08	
Xylene (TH)	1330207	4.10E-02	9.85E-01	2.41E+01	NO. Based on facility-wide potential.	2.41E-04	

Emissions summary from Silo Filling and Loadout operations

Pollutant	CAS Nos.	Emission Factors		Potential Emissions		Emission factors (lb/ton)
		(lb/ton)	(lb/ton)	(lb/hr)	(lb/hr)	
		Silo Filling SCC-3-05- 002-13	Load out SCC-3-05- 002-14	Silo Filling SCC-3-05- 002-13	Load out SCC-3-05- 002-14	Silo Filling plus Load Out
Total PM		5.86E-04	5.22E-04	9.96E-02	8.87E-02	1.11E-03
CO		1.18E-03	1.35E-03	2.01E-01	2.29E-01	2.53E-03
VOC		1.22E-02	3.91E-03	2.07E+00	6.65E-01	1.61E-02
PAH HAPs TOTAL		2.89E-05	2.02E-05	4.92E-03	3.44E-03	4.92E-05
Volatile organic HAPs, TOTAL		1.58E-04	6.24E-05	2.69E-02	1.06E-02	2.21E-04
HAPs, TOTAL		1.87E-04	8.66E-05	3.19E-02	1.47E-02	2.74E-04
Benzo(a)pyrene (T)	50328	0.00E+00	7.84E-09	0.00E+00	1.33E-06	7.84E-09
Napthalene (H)	91203	4.62E-06	4.26E-06	7.86E-04	7.24E-04	8.88E-06
Phenol (TH)	108952	0.00E+00	4.02E-06	0.00E+00	6.84E-04	4.02E-06
Benzene (TH)	71432	3.90E-06	2.16E-06	6.63E-04	3.68E-04	6.06E-06
Methyl bromide (H)	74839	5.97E-07	3.99E-07	1.02E-04	6.79E-05	9.96E-07
Methyl ethyl ketone (TH)	78933	4.75E-06	2.04E-06	8.08E-04	3.46E-04	6.79E-06
Carbon disulfide (TH)	75150	1.95E-06	5.41E-07	3.31E-04	9.19E-05	2.49E-06
Cumene (H)	98828	0.00E+00	4.57E-06	0.00E+00	7.78E-04	4.57E-06
Ethyl benzene (H)	100414	4.63E-06	1.16E-05	7.87E-04	1.98E-03	1.63E-05
Ethyl chloride (chloroethane) (H)	75003	0.00E+00	8.73E-09	0.00E+00	1.48E-06	8.73E-09
Formaldehyde (TH)	50000	8.41E-05	3.66E-06	1.43E-02	6.22E-04	8.77E-05
Hexane, n- (TH)	110543	1.22E-05	6.24E-06	2.07E-03	1.06E-03	1.84E-05
Methyl chloride (H)	74873	0.00E+00	6.24E-07	0.00E+00	1.06E-04	6.24E-07
Methyl chloroform (TH)	71556	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Methylene chloride (TH)	75092	3.29E-08	0.00E+00	5.59E-06	0.00E+00	3.29E-08
Perchloroethylene (tetrachloroethylene) (TH)	127184	0.00E+00	3.20E-07	0.00E+00	5.44E-05	3.20E-07
Styrene (TH)	100425	6.58E-07	3.04E-07	1.12E-04	5.16E-05	9.62E-07
Toluene (TH)	108883	7.56E-06	8.73E-06	1.28E-03	1.48E-03	1.63E-05
Trichloroethylene (TH)	79016	0.00E+00	0.00E+00	0.00E+00	0.00E+00	0.00E+00
Trichlorofluoromethane (CFC 111) (T)	75694	0.00E+00	5.41E-08	0.00E+00	9.19E-06	5.41E-08
Trimethylpentane, 2,2,4- (H)	540841	3.78E-08	7.49E-08	6.42E-06	1.27E-05	1.13E-07
Xylene (TH)	1330207	2.44E-05	1.71E-05	4.14E-03	2.90E-03	4.14E-05
Xylene, o- (H)	95476	6.95E-06	3.33E-06	1.18E-03	5.66E-04	1.03E-05
Hydrogen Sulfide (T)	7783064	1.46E-06	1.46E-06	2.48E-04	2.48E-04	2.92E-06

Plant maximum production capacity:	170	tons per hour
Requested Annual Production Limit:	100,000	tons per year
Requested Daily Production Limit:	4,080	tons per day

V
t

-0.5 %
325 oF
785 oR

Table 11.1-14

Predictive Emission Factor Equations for Load-out and silo Filling Operations

source	pollutant	EF (lb/ton)
Load out SCC-3-05-002-14	Total PM	0.000521937
	Organic PM	0.000340937
	TOC	0.004158948
	CO	0.00134924
Silo Filling SCC-3-05-002-13	Total PM	0.000585889
	Organic PM	0.000253889
	TOC	0.012186685
	CO	0.001179981

Table 11.1-15

Speciation Profiles for Load-out, Silo Filling and Asphalt Storage Emissions - Organic PM based Compounds

		Spec. profile for Load-out and yard emissions	Spec. profile for Silo filling and asphalt storage tank emissions
		% Compound / Organic PM	% Compound / Organic PM
Benzo(a)pyrene (T)	50328	0.0023	0
Napthalene (H)	91203	1.25	1.82
PAH HAPs TOTAL		5.93	11.4
Phenol (TH)	108952	1.18	0

loadout emission factors (lb/ton)	Silo filling emission factors (lb/ton)
7.84155E-09	0
4.26171E-06	4.62078E-06
2.02176E-05	2.89434E-05
4.02306E-06	0

Table 11.1-16

Speciation Profiles for Load-out, Silo Filling and Asphalt Storage Emissions - Organic Volatile based Compounds

		Spec. profile for Load-out and yard emissions	Spec. profile for Silo filling and asphalt
		% Compound / TOC	% Compound / TOC
VOC		94	100
Benzene (TH)	71432	0.052	0.032
Methyl bromide (H)	74839	0.0096	0.0049
Methyl ethyl ketone (TH)	78933	0.049	0.039
Carbon disulfide (TH)	75150	0.013	0.016
Cumene (H)	98828	0.11	0
Ethyl benzene (H)	100414	0.28	0.038
Ethyl chloride (chloroethane) (H)	75003	0.00021	
Formaldehyde (TH)	50000	0.088	0.69
Hexane, n- (TH)	110543	0.15	0.1
Methyl chloride (H)	74873	0.015	
Methyl chloroform (TH)	71556	0	0
Methylene chloride (TH)	75092	0	0.00027
Perchloroethylene (tetrachloroethylene) (TH)	127184	0.0077	0
Styrene (TH)	100425	0.0073	0.0054
Toluene (TH)	108883	0.21	0.062
Trichloroethylene (TH)	79016	0	0
Trichlorofluoromethane (CFC 111) (T)	75694	0.0013	
Trimethylpentane, 2,2,4- (H)	540841	0.0018	0.00031
Xylene (TH)	1330207	0.41	0.2
Xylene, o- (H)	95476	0.08	0.057
Volatile organic HAPs, TOTAL		1.5	1.3

loadout emission factors (lb/ton)	Silo filling emission factors (lb/ton)
0.003909411	0.012186685
2.16265E-06	3.89974E-06
3.99259E-07	5.97148E-07
2.03788E-06	4.75281E-06
5.40663E-07	1.94987E-06
4.57484E-06	0
1.16451E-05	4.63094E-06
8.73379E-09	0
3.65987E-06	8.40881E-05
6.23842E-06	1.21867E-05
6.23842E-07	0
0	0
0	3.29041E-08
3.20239E-07	0
3.03603E-07	6.58081E-07
8.73379E-06	7.55574E-06
0	0
5.40663E-08	0
7.48611E-08	3.77787E-08
1.70517E-05	2.43734E-05
3.32716E-06	6.94641E-06
6.23842E-05	0.000158427

		loadout emission factors (lb/ton)	Silo filling emission factors (lb/ton)
Hydrogen Sulfide	7783064	0.00000146	0.00000146

*** These emissions factors were taken from the October 12, 2005 letter from Keith Overcash stating the emissions factors resulting from testing at Mangum Asphalt Services, Knightdale, Wake County, and at S.T. Wooten Asphalt Services, Sanford, Lee County.

FUEL OIL COMBUSTION EMISSIONS CALCULATOR REVISION G 11/5/2012 - INPUT SCREEN



Instructions: Enter emission source / facility data on the "INPUT" tab/screen. The air emission results and summary of input data are viewed / printed on the "OUTPUT" tab/screen. The different tabs are on the bottom of this screen.

This spreadsheet is for your use only and should be used with caution. DENR does not guarantee the accuracy of the information contained. This spreadsheet is subject to continual revision and updating. It is your responsibility to be aware of the most current information available. DENR is not responsible for errors or omissions that may be contained herein.

Directions: Enter and select information in the boxes that are highlighted in blue:

COMPANY NAME:	Madison Asphalt, LLC
FACILITY ID NUMBER:	NA
PERMIT NUMBER:	NA
FACILITY CITY:	Marshall
FACILITY COUNTY:	Madison
SPREADSHEET PREPARED BY:	MP Riley
EMISSION SOURCE DESCRIPTION:	Asphalt Tank Heater
EMISSION SOURCE ID NO.:	NA
LATEST CONSTRUCTION/MODIFICATION DATE:	2019
SELECT THE TYPE OF BOILER FROM THE LISTS BELOW:	26

Boilers=>100 mmBtu/hr		Boilers=>100 mmBtu/hr (cont'd)	
1 =	No. 6 oil-fired, normal firing (U)	17 =	No. 2 oil-fired (C)
2 =	No. 6 oil-fired, normal firing (I)	18 =	No. 2 oil-fired, LNB/FGR (U)
3 =	No. 6 oil-fired, normal firing (C)	19 =	No. 2 oil-fired, LNB/FGR (I)
4 =	No. 6 oil-fired, normal firing, low Nox burner (U)	20 =	No. 2 oil-fired, LNB/FGR (C)
5 =	No. 6 oil-fired, normal firing, low Nox burner (I)		
6 =	No. 6 oil-fired, normal firing, low Nox burner (C)	21 =	Vertical fired utility boiler
7 =	No. 6 oil-fired, tangential firing (U)		
8 =	No. 6 oil fired, tangential firing, low Nox burner (U)		
9 =	No. 5 oil-fired, normal firing (U)	Small Boilers <100 mmBtu/hr	
10 =	No. 5 oil-fired, normal firing (I)	22 =	No. 6 oil-fired (I)
11 =	No. 5 oil-fired, tangential firing (U)	23 =	No. 6 oil-fired (C)
12 =	No. 4 oil-fired, normal firing (U)	24 =	No. 5 oil-fired (C)
13 =	No. 4 oil-fired, normal firing (I)	25 =	No. 4 oil-fired (C)
14 =	No. 4 oil-fired, tangential firing (U)	26 =	No. 2 oil-fired (I)
15 =	No. 2 oil-fired (U)	27 =	No. 2 oil-fired (C)
16 =	No. 2 oil-fired (I)	28 =	Residential Furnace

Note: The emission factors for fuel oil-fired boilers depend on the boiler size and application type. In the listing of boiler types, the following notation is used: U = Utility boilers (producing steam for the generation of electricity), I = Industrial boilers (generating steam or hot water for process heat, electricity generation, or space heat), C = Commercial or institutional (used for space heating of commercial or institutional facilities) and residential (furnaces used for space heating purposes). Please be sure to select the proper boiler from the lists above.

EMISSION SOURCE INPUT DATA	
MAXIMUM HEAT INPUT (MILLION BTU PER HOUR):	1.41 MMBTU/HR
ACTUAL ANNUAL FUEL USAGE (GALLONS PER YEAR):	88,225.7 GAL/YR
MAXIMUM ANNUAL FUEL USAGE (GALLONS PER YEAR):	88,225.7 GAL/YR
MAXIMUM FUEL SULFUR CONTENT (%):	0.50 % - (TYPEOVER IF NECESSARY - DEFAULT VALUE = 2.1 FOR RESIDUAL FUEL OIL OR 0.5 FOR DISTILLATE FUEL OIL)
FUEL HEATING VALUE	
FUEL HEATING VALUE (BTU/GAL):	140,000 BTU/GAL
DEFAULT WILL APPEAR AS FOLLOWS (not used for Greenhouse Gas calcs --See below for GHG defaults):	
150,000 BTU/GAL FOR No. 6, 5, and 4 FUEL OIL	
140,000 BTU/GAL ALL OTHERS	
(TYPE OVER NUMBER AT RIGHT IF YOU HAVE SITE SPECIFIC DATA)	

CONTROL DEVICE INPUT DATA	
Note: Select the type of control devices from the pull-down menus below. Default control efficiencies will appear for each control device that is selected. The user may enter a different control efficiency to override these values if site specific data is available.	
TYPE OF PARTICULATE CONTROL: NONE/OTHER	AVERAGE PARTICULATE CONTROL EFF.: 0
TYPE OF POSTCOMBUSTION SULFUR DIOXIDE CONTROL: NONE/OTHER	AVERAGE SULFUR DIOXIDE CONTROL EFF.: 0
TYPE OF NITROGEN OXIDE CONTROL: NONE/OTHER	AVERAGE NITROGEN OXIDE CONTROL EFF.: 0

REQUESTED PERMIT LIMITATIONS (IF APPLICABLE)	
REQUESTED MAXIMUM FUEL USAGE LIMIT (GALLONS PER YEAR)	88,225.7 GAL/YR
REQUESTED MAXIMUM FUEL SULFUR CONTENT (%)	0.50 %
(TYPEOVER IF NECESSARY - DEFAULT VALUES ARE THE CALCULATED POTENTIAL AND THE MAXIMUM SULFUR CONTENT AS SHOWN IN THE EMISSION SOURCE INPUT DATA SECTION)	

ADDITIONAL INFORMATION FOR GREENHOUSE GAS EMISSIONS	
ENTER CALCULATION TIER from EPA Mandatory Reporting Rule (MRR) Subpart C - www.epa.gov/climatechange/emissions/ghgrulemaking.html NOTE: EF is "Emission Factor"	TIER 1: DEFAULT HIGH HEAT VALUE AND DEFAULT EF
SINCE TIER 3 IS NOT BEING USED, FUEL CARBON CONTENT WILL NOT BE USED	2.7600 kg Carbon/gal
SELECT FUEL TYPE	Distillate Fuel Oil No. 2
HIGH HEAT VALUE (HHV) FOR GHGs	
FOR TIER 1 and TIER 3, the FUEL HEATING VALUE entered above is overridden with the EPA DEFAULT from Table C-1 of the EPA MRR:	
Distillate Fuel Oil No. 2	0.138 mmBTU/gal THIS VALUE WILL BE USED FOR GHG calculations- actual emissions
Distillate Fuel Oil No. 4	0.146 mmBTU/gal
Residual Fuel Oil No. 5	0.14 mmBTU/gal
Residual Fuel Oil No. 6	0.15 mmBTU/gal
FOR TIER 2, the FUEL HEATING VALUE entered above is used. The value entered must be the annual average HHV of the fuel determined using procedures in the EPA MRR (see 98.33(a)(2))	
Distillate Fuel Oil No. 2	DEFAULT HHV OF 0.138 mmBTU/gal THIS VALUE WILL BE USED FOR GHG calculations- actual emissions

FUEL OIL COMBUSTION EMISSIONS CALCULATOR REVISION G 11/5/2012 - OUTPUT SCREEN



Instructions: Enter emission source / facility data on the "INPUT" tab/screen. The air emission results and summary of input data are viewed / printed on the "OUTPUT" tab/screen. The different tabs are on the bottom of this screen.

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SOURCE / FACILITY / USER INPUT SUMMARY (FROM INPUT SCREEN)

COMPANY:	Madison Asphalt, LLC	MAX HEAT INPUT:	1.41	MMBTU/HR
FACILITY ID NO.:	NA	FUEL HEAT VALUE:	140,000	BTU/GAL
PERMIT NUMBER:	NA	HHV for GHG CALCULATIONS:	0.138	mm BTU/GAL
FACILITY CITY:	Marshall	ACTUAL ANNUAL FUEL USAGE:	88,226	GAL/YR
FACILITY COUNTY:	Madison	MAXIMUM ANNUAL FUEL USAGE:	88,226	GAL/YR
USER NAME:	MP Riley	MAXIMUM SULFUR CONTENT:	0.5	%
EMISSION SOURCE DESCRIPTION:	Asphalt Tank Heater	REQUESTED PERMIT LIMITATIONS		
EMISSION SOURCE ID NO.:	NA	MAX. FUEL USAGE:	88,226	GAL/YR
		MAX. SULFUR CONTENT:	0.5	%
TYPE OF CONTROL DEVICES		POLLUTANT		CONTROL EFF.
NONE/OTHER		PM		0
NONE/OTHER		SO2		0
NONE/OTHER		NOx		0
METHOD USED TO COMPUTE ACTUAL GHG EMISSIONS:		TIER 1: DEFAULT HIGH HEAT VALUE AND DEFAULT EF		
CARBON CONTENT USED FOR GHGS (kg C/gal):		CARBON CONTENT NOT USED FOR CALCULATION TIER CHOSEN		

CRITERIA AIR POLLUTANT EMISSIONS INFORMATION

AIR POLLUTANT EMITTED	ACTUAL EMISSIONS (AFTER CONTROLS / LIMITS)		POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS)				EMISSION FACTOR (lb/10 ³ gal)	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr	uncontrolled	controlled
TOTAL PARTICULATE MATTER (PM) (FPM+CPM)	0.03	0.15	0.03	0.15	0.03	0.15	3.30E+00	3.30E+00
FILTERABLE PM (FPM)	0.02	0.09	0.02	0.09	0.02	0.09	2.00E+00	2.00E+00
CONDENSABLE PM (CPM)	0.01	0.06	0.01	0.06	0.01	0.06	1.30E+00	1.30E+00
FILTERABLE PM<10 MICRONS (PM ₁₀)	0.01	0.04	0.01	0.04	0.01	0.04	1.00E+00	1.00E+00
FILTERABLE PM<2.5 MICRONS (PM _{2.5})	0.00	0.01	0.00	0.01	0.00	0.01	2.50E-01	2.50E-01
SULFUR DIOXIDE (SO ₂)	0.72	3.13	0.72	3.13	0.72	3.13	7.10E+01	7.10E+01
NITROGEN OXIDES (NO _x)	0.20	0.88	0.20	0.88	0.20	0.88	2.00E+01	2.00E+01
CARBON MONOXIDE (CO)	0.05	0.22	0.05	0.22	0.05	0.22	5.00E+00	5.00E+00
VOLATILE ORGANIC COMPOUNDS (VOC)	0.00	0.01	0.00	0.01	0.00	0.01	2.00E-01	2.00E-01
LEAD	0.00	0.00	0.00	0.00	0.00	0.00	1.26E-03	1.26E-03

TOXIC / HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION

TOXIC / HAZARDOUS AIR POLLUTANT	CAS NUMBER	ACTUAL EMISSIONS (AFTER CONTROLS / LIMITS)		POTENTIAL EMISSIONS (BEFORE CONTROLS / LIMITS)				EMISSION FACTOR (lb/10 ³ gal)	
		lb/hr	lb/yr	lb/hr	lb/yr	lb/hr	lb/yr	uncontrolled	controlled
Antimony Unlisted Compounds	(H) SBC-Other	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00E+00	0.00E+00
Arsenic Unlisted Compounds	(TH) ASC-Other	5.6E-06	4.9E-02	5.6E-06	4.9E-02	5.6E-06	4.9E-02	5.60E-04	5.60E-04
Benzene	(TH) 71432	2.8E-05	2.4E-01	2.8E-05	2.4E-01	2.8E-05	2.4E-01	2.75E-03	2.75E-03
Beryllium Metal (unreacted)	(TH) 7440417	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.20E-04	4.20E-04
Cadmium Metal (elemental unreacted)	(TH) 7440439	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.20E-04	4.20E-04
Chromic Acid (VI)	(TH) 7738945	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.20E-04	4.20E-04
Cobalt Unlisted Compounds	(H) COC-Other	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00E+00	0.00E+00
Ethylbenzene	(H) 100414	8.2E-06	7.2E-02	8.2E-06	7.2E-02	8.2E-06	7.2E-02	8.17E-04	8.17E-04
Fluorides (sum fluoride compounds)	(T) 16984488	3.8E-04	3.3E+00	3.8E-04	3.3E+00	3.8E-04	3.3E+00	3.73E-02	3.73E-02
Formaldehyde	(TH) 50000	4.8E-04	4.2E+00	4.8E-04	4.2E+00	4.8E-04	4.2E+00	4.80E-02	4.80E-02
Lead Unlisted Compounds	(H) PBC-Other	1.3E-05	1.1E-01	1.3E-05	1.1E-01	1.3E-05	1.1E-01	1.26E-03	1.26E-03
Manganese Unlisted Compounds	(TH) MNC-Other	8.5E-06	7.4E-02	8.5E-06	7.4E-02	8.5E-06	7.4E-02	8.40E-04	8.40E-04
Mercury, vapor	(TH) 7439976	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.20E-04	4.20E-04
Methyl chloroform	(TH) 71566	2.4E-06	2.1E-02	2.4E-06	2.1E-02	2.4E-06	2.1E-02	2.36E-04	2.36E-04
Napthalene	(H) 91203	3.4E-06	2.9E-02	3.4E-06	2.9E-02	3.4E-06	2.9E-02	3.33E-04	3.33E-04
Nickel Metal	(TH) 7440020	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.2E-06	3.7E-02	4.20E-04	4.20E-04
Phosphorus Metal, Yellow or White	(H) 7723140	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.0E+00	0.00E+00	0.00E+00
POM rates uncontrolled	(H) POM	3.3E-05	2.9E-01	3.3E-05	2.9E-01	3.3E-05	2.9E-01	3.30E-03	3.30E-03
Selenium compounds	(H) SEC	2.1E-05	1.9E-01	2.1E-05	1.9E-01	2.1E-05	1.9E-01	2.10E-03	2.10E-03
Toluene	(TH) 108883	8.0E-04	7.0E+00	8.0E-04	7.0E+00	8.0E-04	7.0E+00	7.97E-02	7.97E-02
Xylene	(TH) 1330207	1.4E-05	1.2E-01	1.4E-05	1.2E-01	1.4E-05	1.2E-01	1.40E-03	1.40E-03
Total HAP	(H)	1.4E-03	1.3E+01	1.4E-03	1.3E+01	1.4E-03	1.3E+01	1.4E-01	1.4E-01
Largest HAP	(H)	8.02E-04	7.03E+00	8.02E-04	7.03E+00	8.02E-04	7.03E+00	7.97E-02	7.97E-02

TOXIC AIR POLLUTANT EMISSIONS INFORMATION (FOR PERMITTING PURPOSES)

TOXIC AIR POLLUTANT	CAS Num.	EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS			EMISSION FACTOR (lb/10 ³ gal)	
		lb/hr	lb/day	lb/yr	uncontrolled	controlled
Arsenic Unlisted Compounds	(TH) ASC-Other	5.64E-06	1.35E-04	4.94E-02	5.60E-04	5.60E-04
Benzene	(TH) 71432	2.77E-05	6.65E-04	2.43E-01	2.75E-03	2.75E-03
Beryllium Metal (unreacted)	(TH) 7440417	4.23E-06	1.02E-04	3.71E-02	4.20E-04	4.20E-04
Cadmium Metal (elemental unreacted)	(TH) 7440439	4.23E-06	1.02E-04	3.71E-02	4.20E-04	4.20E-04
Soluble chromate compounds, as chromium (VI) e	(TH) SolCR6	4.23E-06	1.02E-04	3.71E-02	4.20E-04	4.20E-04
Fluorides (sum fluoride compounds)	(T) 16984488	3.76E-04	9.02E-03	3.29E+00	3.73E-02	3.73E-02
Formaldehyde	(TH) 50000	4.83E-04	1.16E-02	4.23E+00	4.80E-02	4.80E-02
Manganese Unlisted Compounds	(TH) MNC-Other	8.46E-06	2.03E-04	7.41E-02	8.40E-04	8.40E-04
Mercury, vapor	(TH) 7439976	4.23E-06	1.02E-04	3.71E-02	4.20E-04	4.20E-04
Methyl chloroform	(TH) 71566	2.38E-06	5.70E-05	2.08E-02	2.36E-04	2.36E-04
Nickel Metal	(TH) 7440020	4.23E-06	1.02E-04	3.71E-02	4.20E-04	4.20E-04
Toluene	(TH) 108883	8.02E-04	1.93E-02	7.03E+00	7.97E-02	7.97E-02
Xylene	(TH) 1330207	1.41E-05	3.39E-04	1.24E-01	1.40E-03	1.40E-03

GREENHOUSE GAS EMISSIONS INFORMATION (FOR EMISSIONS INVENTORY PURPOSES) - CONSISTENT WITH EPA MANDATORY REPORTING RULE (MRR) METHOD

GHG - POTENTIAL TO EMIT NOT BASED ON EPA MRR METHOD

Distillate Fuel Oil No. 2	ACTUAL EMISSIONS			POTENTIAL EMISSIONS - utilize max heat input capacity and EPA MRR Emission Factors		POTENTIAL EMISSIONS With Requested Emission Limitation - utilize requested fuel limit and EPA MRR Emission Factors	
	EPA MRR CALCULATION METHOD: TIER 1			short tons/yr	short tons/yr, CO ₂ e	short tons/yr	short tons/yr, CO ₂ e
	metric tons/yr	metric tons/yr, CO ₂ e	short tons/yr				
CARBON DIOXIDE (CO ₂)	900.47	900.47	992.60	1,006.99	1,006.99	1,006.99	1,006.99
METHANE (CH ₄)	3.65E-02	7.67E-01	4.03E-02	4.08E-02	8.58E-01	4.08E-02	8.58E-01
NITROUS OXIDE (N ₂ O)	7.31E-03	2.26E+00	8.05E-03	8.17E-03	2.53E+00	8.17E-03	2.53E+00
TOTAL		903.51		TOTAL	1,010.38	TOTAL	1,010.38

NOTES: 1) CO₂e means CO₂ equivalent
2) The DAQ Air Emissions Reporting Online (AERO) system requires short tons and the EPA MRR requires metric tons

TOXIC / HAZARDOUS AIR POLLUTANT EMISSIONS WITH ASPHALT TANK HEATER
Madison Apshalt, LLC

TOXIC / HAZARDOUS AIR POLLUTANT EMISSIONS INFORMATION

TOXIC / HAZARDOUS AIR POLLUTANT	ACTUAL EMISSIONS		POTENTIAL EMISSIONS			
	(AFTER CONTROLS / LIMITS)		(BEFORE CONTROLS / LIMITS)		(AFTER CONTROLS / LIMITS)	
	lb/hr	tons/yr	lb/hr	tons/yr	lb/hr	tons/yr
Antimony Unlisted Compounds (H)	3.06E-05	9.00E-06	3.06E-05	1.34E-04	3.06E-05	9.00E-06
Arsenic Unlisted Compounds (TH)	1.01E-04	5.27E-05	1.01E-04	4.42E-04	1.01E-04	5.27E-05
Benzene (TH)	6.74E-02	1.99E-02	6.74E-02	2.95E-01	6.74E-02	1.99E-02
Beryllium Metal (unreacted) (TH)	4.23E-06	1.85E-05	4.23E-06	1.85E-05	4.23E-06	1.85E-05
Cadium Metal (elemental unreacted) (TH)	7.39E-05	3.90E-05	7.39E-05	3.24E-04	7.39E-05	3.90E-05
Chromic Acid (VI) (TH)	8.07E-05	4.10E-05	8.07E-05	3.54E-04	8.07E-05	4.10E-05
Cobalt Unlisted Compounds (H)	4.42E-06	1.30E-06	4.42E-06	1.94E-05	4.42E-06	1.30E-06
Ethylbenzene (H)	4.36E-02	1.28E-02	4.36E-02	1.91E-01	4.36E-02	1.28E-02
Fluorides (sum fluoride compounds) (T)	3.76E-04	1.65E-03	3.76E-04	1.65E-03	3.76E-04	1.65E-03
Formaldehyde (TH)	5.42E-01	1.62E-01	5.42E-01	2.38E+00	5.42E-01	1.62E-01
Lead Unlisted Compounds (H)	2.56E-03	8.06E-04	2.56E-03	1.12E-02	2.56E-03	8.06E-04
Manganese Unlisted Compounds (TH)	1.32E-03	4.22E-04	1.32E-03	5.77E-03	1.32E-03	4.22E-04
Mercury, vapor (TH)	4.46E-04	1.49E-04	4.46E-04	1.95E-03	4.46E-04	1.49E-04
Methyl chloroform (TH)	8.16E-03	2.41E-03	8.16E-03	3.58E-02	8.16E-03	2.41E-03
Napthalene (H)	1.12E-01	3.30E-02	1.12E-01	4.91E-01	1.12E-01	3.30E-02
Nickle Metal (TH)	1.07E-02	3.17E-03	1.07E-02	4.69E-02	1.07E-02	3.17E-03
Phosphorus Metal, Yellow or White (H)	4.76E-03	1.40E-03	4.76E-03	2.08E-02	4.76E-03	1.40E-03
POM rates uncontrolled (H)	1.50E-01	4.41E-02	1.50E-01	6.55E-01	1.50E-01	4.41E-02
Selenium compounds (H)	8.07E-05	1.10E-04	8.07E-05	3.53E-04	8.07E-05	1.10E-04
Toluene (TH)	4.97E-01	1.49E-01	4.97E-01	2.17E+00	4.97E-01	1.49E-01
Xylene (TH)	4.11E-02	1.21E-02	4.11E-02	1.80E-01	4.11E-02	1.21E-02
Total HAP (H)	1.53	0.46		6.69		0.46

TOXIC AIR POLLUTANT EMISSIONS INFORMATION (FOR PERMITTING PURPOSES)

EXPECTED ACTUAL EMISSIONS AFTER CONTROLS / LIMITATIONS

Brandon, Mona

From: Carlos Cardenas <carlos@admasphaltplants.com>
Sent: Thursday, April 11, 2019 10:54 AM
To: Brandon, Mona
Subject: RE: Asphalt Heater Specs

Mona,

I apologize, for the delay, attached are specs for the heater, The stack is approximately 7'-0" from the base of the skid.

General Dimensions and Specifications																		
Heater Model	Input Btu/hr	Output Btu/hr	Max. Fuel Usage		Burner Motor HP	Pump Motor HP	Volume Flow Rate (gpm)	Electric Load (kw)	Pump Avail. Head (PSIG)	Heat Transfer Fluid Required (US Gal.)	Length A	Width B	Height C	Supply & Return Connections				Approx. Weight (lbs)
			No.2 (gph)	Gas (cfph)										Pipe Size D	E	F	G	
CEI-1200	1,410,000	1,227,000	10	1,400	3/4	5	120	5.2	35	95	10'-9"	5'	7'-3"	2"	9-1/4"	10"	7"	3900
CEI-1800	2,115,000	1,840,050	15	2,100	1-1/2	7.5	175	7.6	40	145	11'-9"	5'-7"	7'-4"	3"	12-3/4"	9"	8"	4900
CEI-2400	2,820,000	2,453,400	20	2,800	1-1/2	7.5	235	7.6	40	165	13'	5'-7"	7'-4"	3"	12-3/4"	9"	8"	5400
CEI-3600	4,230,000	3,680,100	30	4,200	2	15	350	13.6	50	240	14'-10"	6'-2"	8'-9"	3"	12-3/4"	9"	10"	7200
CEI-4900	5,640,000	4,907,800	40	5,600	3	20	470	18.1	50	270	17'-6"	6'-11"	8'-9"	3"	13-1/4"	9"	10"	8100
CEI-6300	7,300,000	6,351,000	50	7,300	5	20	590	21.8	60	400	18'	6'-11"	10'-5"	4"	20"	12"	12-1/4"	9400

MODEL CEI-1200

ELECTRICAL

VOLTAGE 480/60/3
HEATER AMP RATING 60
BURNER MOTOR HP 1
PUMP MOTOR HP 5

AGENCY APPROVAL

UL 296 & 795
CSA B140.8

BURNER FUELS

FUEL FLOW
NATURAL GAS-1000 BTU/CU.FT 1400.0 cfh
NO. 2 OIL-140,000 BTU/GAL 10.0 GPH
PROPANE: 90,000 BTU/GAL 15.6 GPH
POWERFLAME MODEL C2R-GO-15

COMBUSTION AIR

Fan Capacity 326.7 CFM
Air/Fuel Ratio 14

PURGE AIR REQUIRMENTS

COMBUSTION CHAMBER 33 CU.FT
CSA /UL AIR CHANGES 4
PURGE AIR REQ. 133 CU.FT
BURNER PURGE TIME 30 SECONDS
CSA PURGE TIME 24 SECONDS

HEATER CAPACITY

HEATER INPUT 1400000 BTU/HR
HEATER OUTPUT 1200000 BTU/HR
TEMPERATURE RISE 50 Deg.F
PUMP CAPACITY 120.0 gpm
PUMP PRESSURE 35.0 psi
TYP. FLUE GAS TEMP 400 Deg.f
FIREBOX HX AREA 51.0 ft^2
SHELL/TUBE HX AREA 86.0 ft^2
HEAT TRANS FLUID-CAP 95 GAL

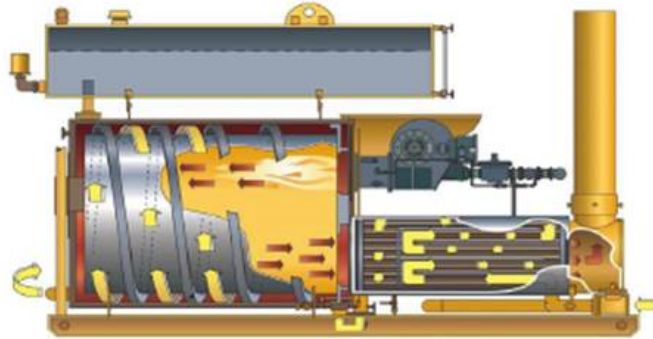
EXPANSION TANK

EXPANSION TANK LGTH 74
EXPANSION TANK DIA 24
EXPANSION TANK VOL 41 GAL

FIREBOX CONSTRUCTION

MATERIAL A36
SHELL THICKNESS 0.1875
OVERALL SHELL LENGTH 44.75
OUTER SHELL DIA 41.5
INNER SHELL DIA 38.5
CHAMBER OIL VOLUME 37 GAL

FIREBOX HEATER



HEAT EXCHANGER CONSTR.

SHELL ID 12.875
OF TUBES 55
TUBE DIA 1
TUBE WALL 0.095
TUBE MATERIAL SA53
TUBE LENGTH 47.50 in.
SHELL THICKNESS 0.25 in.
SHELL LENGTH 47.5
TUBESHEET THICK 0.25
HX VOLUME 18 GAL

PHYSICAL DATA

HEIGHT 7.3 FT
WIDTH 4.3 FT
LENGTH 10.5 FT
WGHT 3800 LBS

HEAT TRANSFER OIL

MFG PARATHERM
TYPE HT
DENSITY 5.8 LBS/gal
VISCOSITY 4.2
MAX FILM TEMP 705 De.f
MIN OPER.TEMP 124 DEG.F
MAX OPER TEMP 650 DEG.F
P/N 3401001
SPEC GRAV 0.7
SPEC HEAT 0.62

PUMP DATA

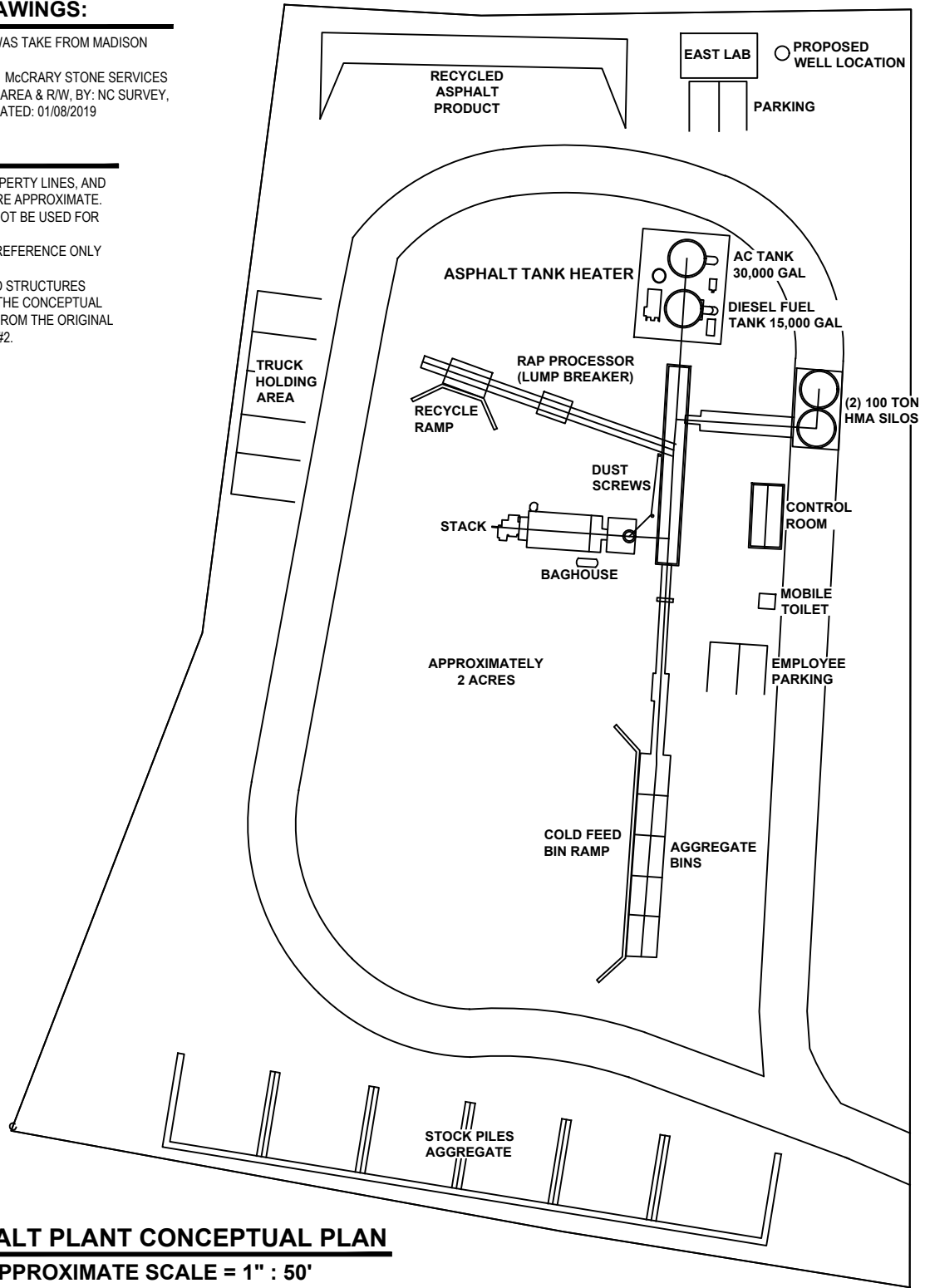
HP 5
MODEL ZTND-40-125 140M
CAPACIT 120.0 GPH
HEAD 80.8 FT
CURVE#
RPM 3500
INLET 2 1/2
OUTLET 1 1/2

REFERENCE DRAWINGS:

1. BACKGROUND IMAGE WAS TAKE FROM MADISON COUNTY, NC GIS.
2. REFERENCE DRAWING: McCRARY STONE SERVICES INC. PROPOSED LEASE AREA & R/W, BY: NC SURVEY, P.C., JOHN B. YOUNG, DATED: 01/08/2019

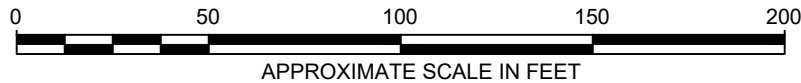
NOTES:

1. ALL STRUCTURES, PROPERTY LINES, AND DIMENSIONS SHOWN ARE APPROXIMATE.
2. THIS FIGURE SHOULD NOT BE USED FOR CONSTRUCTION.
3. SCALE SHOWN IS FOR REFERENCE ONLY AND IS APPROXIMATE.
4. ADDITIONAL PROPOSED STRUCTURES HAVE BEEN ADDED TO THE CONCEPTUAL LAYOUT AND DEVIATE FROM THE ORIGINAL REFERENCE DRAWING #2.



ASPHALT PLANT CONCEPTUAL PLAN

APPROXIMATE SCALE = 1" : 50'



PROJECT: **PROPOSED ASPHALT PLANT LAYOUT
MADISON ASPHALT LLC
MARSHALL, NC**

TITLE: **ASPHALT PLANT CONCEPTUAL LAYOUT**

DRAWN BY:	K. KJOS
CHECKED BY:	M. BRANDON
APPROVED BY:	M. BRANDON
DATE:	JANUARY 2019
PROJ. NO.:	325749.0000
FILE:	BASE.dwg

FIGURE 2



APPROXIMATE GIS PROPERTY LINE

ASPHALT PLANT CONCEPTUAL PLAN

APPROXIMATE SCALE = 1" : 200'

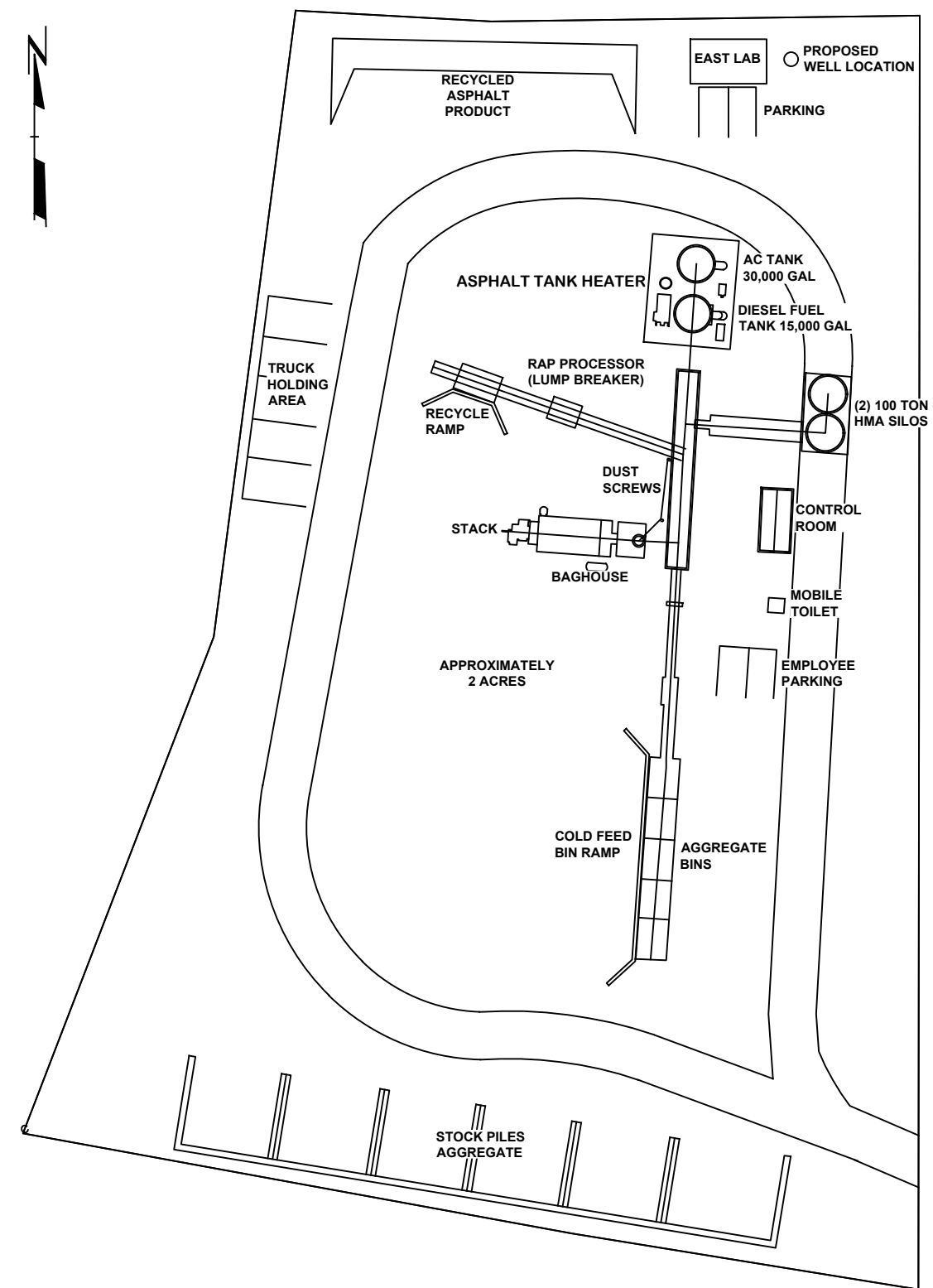


REFERENCE DRAWINGS:

1. BACKGROUND IMAGE WAS TAKE FROM MADISON COUNTY, NC GIS.
2. REFERENCE DRAWING: McCRARY STONE SERVICES INC. PROPOSED LEASE AREA & RW, BY: NC SURVEY, P.C., JOHN B. YOUNG, DATED: 01/08/2019

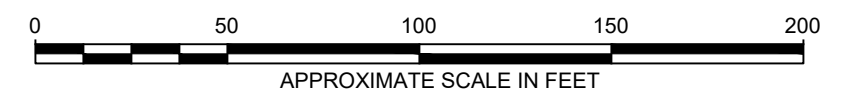
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ASPHALT PLANT CONCEPTUAL LAYOUT

APPROXIMATE SCALE = 1" : 50'



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FIGURE 3

1x17 - USER: Kjos - ATTACHED: XREFS - ATTACHED: IMAGES - ARG: GIS No. Top: gispath: GIS: DRAWING NAME: J:\CAD\French Broad Paving\325749 - French Broad Paving\0000.BASE.dwg --- PLOT DATE: January 24, 2019 - 3:19PM --- LAYOUT: FIG-1 Version: 2017-10-21