City of Albuquerque

Environmental Health Department

Timothy M. Keller, Mayor

Interoffice Memorandum

June 26, 2018

To: Regan Eyerman, Environmental Health Scientist

From: Jeff Stonesifer, Senior Environmental Health Scientist

Subject: Review of model for New Mexico Terminal Services HMA

Permit # 3340

Site Location

9615 Broadway Boulevard SE, Albuquerque, NM 87105
Easting: 347372.2m Northing: 3,869,319m Zone:13

Overview of Facilities

New Mexico Terminal Services (NMTS) plans to build a 400-ton per hour hot mix asphalt (HMA) plant. Aggregate used in the asphalt mix will be delivered by railcar and offloaded using a railcar bottom dump hopper, transfer conveyors, and radio telescope stacker to storage piles. All other materials, raw and product, will be transported to and from HMA plant by haul trucks. The HMA will be powered by commercial line power, so no generators or engines will be needed.

Conclusions of Dispersion Modeling

Modeling was performed for TSP, PM_{10}, $PM_{2.5}$, NO_2, CO, and SO_2 using AERMOD. Compliance was demonstrated for NAAQS and NMAAQS.

Modeling conducted in-house demonstrates compliance with applicable regulatory requirements. Modeling files are archived, are part of the public record for this permit application, and are available for printing. A modeling protocol was submitted and reviewed.

Modeling Parameters

- Rural dispersion coefficients
- Gravitational settling in TSP models
- Structural downwash
- Ozone Limiting Method (OLM) for 1-hour NO2 modeling
- Non-default in-stack ratios used with OLM
- Hourly emissions factors
- Hourly NO2 backgrounds per a March 1, 2011 EPA memo
- Hourly ozone backgrounds used in NO2 modeling

Emission rates used in the review can be seen below in **Tables 1 & 2.**

Table 1: Particulate emission rates and sources modeled for application #3340

Source ID	Emission Unit Description	TSP (lbs/hr)	PM10 (lbs/hr)	PM2.5 (lbs/hr)
HMASTK	Baghouse Stack – Unit 22	13.2	9.2	9.2
HMAHEAT	Asphalt Cement Heater - Unit 25	0.039	0.039	0.039
HMAFILL	Mineral Filler Silo Loading – Unit 21	0.18	0.115	0.009
DRUMUNL	Asphalt Silo Loading - Unit 23	0.234	0.234	0.234
HMASILO	Asphalt Silo Unloading - Unit 24	0.209	0.209	0.209
HMA4A	Aggregate Storage Pile 1 - Unit 4	0.157	0.074	0.011
HMA4B	Aggregate Storage Pile 2 - Unit 4	0.157	0.074	0.011
HMA4C	Aggregate Storage Pile 3 - Unit 4	0.157	0.074	0.011
HMA4D	Aggregate Storage Pile 4 - Unit 4	0.157	0.074	0.011
HMARP	RAP Storage Pile –Unit 6	0.198	0.094	0.014
HMATL	Aggregate Truck Loading – Unit 5	0.472	0.223	0.034
HMA7A	Cold Feed Bin 1 – Unit 7	0.181	0.086	0.013
HMA7B	Cold Feed Bin 2 – Unit 7	0.181	0.086	0.013
HMA7C	Cold Feed Bin 3 – Unit 7	0.181	0.086	0.013
HMA7D	Cold Feed Bin 4 – Unit 7	0.181	0.086	0.013
HMA7E	Cold Feed Bin 5 – Unit 7	0.181	0.086	0.013
HMA7F	Cold Feed Bin 6 – Unit 7	0.181	0.086	0.013
HMATP1	Bin Unloading - Unit 8	0.032	0.011	0.003
HMPTP2	Scalping Screen Unloading – Unit 10	0.032	0.011	0.003
HMATP3	Pug Mill Unloading – Unit 12	0.033	0.011	0.003
HMATP4	Conveyor Transfer to Drum Conveyor – Unit 13	0.033	0.011	0.003
HMASCR	Scalping Screen – Unit 9	0.506	0.170	0.012
HMAPUG	Pug Mill –Unit 11	0.033	0.011	0.003
RAPBIN	RAP Bin Loading – Unit 14	0.198	0.094	0.014
RAPCRH	RAP Crusher – Unit 15	0.168	0.076	0.014
RAPTP1	RAP Bin Unloading – Unit 16	0.020	0.006	0.002
RAPTP2	RAP Screen Unloading – Unit 18	0.020	0.006	0.002
RAPTP3	RAP Transfer Point – Unit 19	0.020	0.006	0.002
RAPTP4	RAP Transfer Point – Unit 20	0.020	0.006	0.002
RAPSCR	RAP Screen – Unit 17	0.308	0.104	0.007
RAILHOP2	Rail Car Unload to Underground Hopper – Unit 1	0.055	0.026	0.004
RAILTP1	Rail Conveyor Transfer Point 1 – Unit 2	0.019	0.006	0.002
RAILTP2	Rail Transfer Point 2 – Unit 3	0.019	0.006	0.002
HMAP_1-19	Haul Road Paved Ingress	3.068	0.614	0.151
ASP_1-33	Haul Road Unpaved Asphalt	3.157	0.805	0.081
RAP_1-22	Haul Road Unpaved RAP	1.305	0.333	0.033
PAGG_1-19	Aggregate Haul Road Paved In	0.538	0.108	0.026
UPA_1-12	Aggregate Haul Road Unpaved	0.498	0.127	0.013
	Totals	**26.33**	**13.47**	**10.24**

Table 2: Combustion gas emission rates and sources modeled for application #3340

Source ID	Source Description	NO_x (lbs/hr)	CO (lbs/hr)	SO_2 (lbs/hr)
HMASTK	Baghouse Stack	22	52.0	23.2
HMAHEAT	Asphalt Cement	0.391	0.205	0.139
DRUMUNL	Asphalt Silo Loading	0	0.47	0
HMASILO	Asphalt Silo Unloading	0	0.54	0
HMAP_1-19	Haul Road Paved Ingress	0	0.072	0
ASP_16-33	Haul Road Unpaved Asphalt	0	0.068	0
	Totals	**22.391**	**53.36**	**23.34**

Receptor Grid

Receptor spacing was less than 50 meters along the fenceline. Beyond the fence, receptor spacing was 50 meters from the fenceline outward to 500 meters; beyond that, receptor spacing was 100 meters outward to 1 kilometer from the fenceline; beyond that, receptor spacing was 250 meters. Receptor fields were cut back based on the professional judgement of the reviewer for some pollutants, while significance levels were used to reduce the number of receptors for other pollutants.

Meteorological Data

National Weather Service, KABQ, processed with AERMET v16216 and AERMINUTE v15272
One year of data for TSP modeling; five years data for modeling of criteria pollutants

Nearby and co-located sources

New Mexico Terminal Services Transloading Facility, permit #3311-M1
New Mexico Aggregates, application #1435-M1
Western Organics, permit #0470

Terrain Used

USGS NED files

Modeling Results

Table 3: Impact of emissions vs. Ambient Air Quality Standards

Pollutant	Averaging Time	Modeled Impact (µg/m³)	Background (µg/m³)	Model + Background (µg/m³)	Most stringent Standard (µg/m³)	Pass/Fail
NO_2	1-hour	127.1	53.9	181.0	188	P
NO_2	Annual	12.9	30	42.9	94	P
CO	1-hour	374.4	Modeled impacts not significant		15007	P
CO	8-hour	306.8			9967	P
SO_2	1-hour	166.2	15.7	181.9	196.4	P
SO_2	3-hour	165.5	0	165.5	1310	P
TSP	24-hour	118.5	31	149.5	150	P
TSP	Annual	27.6	31	58.6	60	P
PM_{10}	24-hour	81.6	31	112.6	150	P
$PM_{2.5}$	24-hour	13.5	18	31.5	35	P
$PM_{2.5}$	Annual	3.0	7.5	10.5	12	P

Assumptions used in the modeling review

1. Operating hours:
    a. The following HMA sources can operate 24/7 year-round:
        i. Asphalt-cement heater, unit #25
        ii. Railcar unload to underground hopper, unit #1
        iii. Rail Conveyor Transfer Point, unit #2
        iv. Rail Telescoping Conveyor, unit #3
        v. Aggregate Truck Loading, unit #5
        vi. Aggregate Haul Road Paved-In, PAGG_1-19
        vii. Aggregate Haul Road Unpaved, UPA_1-12
    b. All other HMA sources can only operate in the following schedules:
        i. From December through February: 4am to 9pm, 7 days a week.
        ii. From March through November: 24/7.
2. Throughput Limitations:
    a. For asphalt production:
        i. The hourly limit is 400 tph, per the modeling report.
        ii. The daily limit from December to February is 3,200 tons per day (tpd)
        iii. The daily limit from March to May is 4,000 tpd;
        iv. The daily limit from June to November is 4,800 tpd; and
        v. The annual limit is 800,000 tons per year.
    b. Per the modeling report, for railcar unloading of aggregate as well as loading of trucks and transport off-site:
        i. The daily limit for railcar unloading is 3200 tons/day.
        ii. Transport to off-site locations is limited to 4 haul truck loads (100 tons) per hour on roads PAGG and UPA
3. Except for the railcar, rail transfer points, and entrance road, HMA sources must remain at least 150 feet from the fence that restricts access. Active/working storage piles count as HMA sources, but not long-term storage piles.
4. A fence or some other barrier restricts access to the property
5. The haul road labeled ASP was modeled with dust emissions from one-way traffic
6. Two-way truck traffic dust emissions are modeled in the volume sources of the other roads: RAP, HMAP, PAGG, and UPA
7. The roads/truck traffic labeled UPA and PAGG serve the railhop associated the HMA plant, but not the HMA itself
8. The roads/truck traffic labeled HMAP, ASP, and RAP serve the HMA plant, but not the railhop associated with the HMA plant
9. The entrance road, labeled as both HMAP and PAGG, is paved from the southeast entrance of the property west to approximately parallel with the west side of the office building.
10. The roads labeled RAP, ASP, and UPA do not need to be paved.
11. While the road UPA connects to PAGG, both RAP and ASP connect to HMAP. In other words, PAGG and UPA have equal amounts of truck traffic; HMAP will have the same amount of truck traffic as RAP and ASP combined.
12. HMAP and PAGG are the same stretch of road. However, the truck traffic labeled as HMAP will serve a different purpose than the truck traffic labeled as PAGG. ASP, RAP, and UPA also share some stretches of road.

Discussion

Nearby/co-located sources and overview of the modeling

New Mexico Terminal Services wants to build a hot mix asphalt plant at 9615 Broadway Blvd SE. This property is on the northeast corner where I-25 passes over the railroad tracks in the South Valley. As of this writing, an application is being processed for the relocation of New Mexico Aggregates onto this property. New Mexico Terminal Services already has a permit for operating a transloading facility on this property. The modeling included both NM Aggregates and the transloading facility in the cumulative models.

Western Organics (WO) is located on a neighboring property to the north. Most of the WO sources of supercoarse particles were outside the 1000 foot threshold for inclusion in the TSP model. However, all the supercoarse emissions from WO were included in the TSP model anyway. Based on the professional judgement of the Environmental Health Department staff, the emissions from the engine at WO were determined high enough to be included in the NO_2 model, but not the other pollutant models.

Particulate Emissions Modeling

The TSP standards were modeled with gravitational settling and one year of meteorological data. The PM_{10} and $PM_{2.5}$ standards were modeled with five years of meteorological data and without gravitational settling. Western Organics sources were included in the TSP models because the background for TSP comes from PM_{10} monitors. That means nearby sources of supercoarse particles must be included in the TSP models. Western Organics was not included the models for PM_{10} and $PM_{2.5}$.

TSP modeling used only one year of meteorological data which is acceptable because TSP is not a criteria pollutant. In other words, the guidance in Appendix W does not apply to modeling of TSP. When five years of meteorological data are used with TSP modeling and compliance with the 24-hour TSP standard is successfully demonstrated, then PM_{10} does not need to be modeled because the 24-hour TSP standard is more restrictive of PM_{10} than the PM_{10} standard itself. However, when only one year of meteorological data is used with TSP modeling, then the 24-hour PM_{10} standard has to be modeled with five years of meteorological data.

Blocks of time modeling technique and implications

The particulate modeling for the NMTS HMA used blocks of time for the purposes of operational flexibility. For example, one modeling file would have HMA operations from Midnight to 10 AM for March through May, then another modeling file would have the HMA operating from 2 AM to Noon for March through May, then a third file would have the HMA operating from 4 AM to 2 PM for March through May, and so on until the entire 24 hour period was covered. This is done when a company needs the flexibility to operate any time of day, but a model with maximum hourly throughput for 24 hours won't pass.

The blocks of time technique obviously gives a company the flexibility to operate during any of the blocks of time covered by modeling. For example, in the case of the NMTS HMA, the facility would have the flexibility to operate any 10 hours of the day during March, April, and May. However, this technique gives the company even more flexibility. The worst time for dispersion of emissions is nighttime because that's when the atmosphere is most stable. Concentrating the emissions into blocks of time that include nighttime hours ensures that the worst-case scenario is covered. With the worst-case covered, the company can spread their emissions out over time. In other words, if NMTS wants to operate 12 or 14 hours at a reduced throughput, the ambient air quality standards will not be exceeded as long as the hourly and daily throughput limits are obeyed.

During the time frame of December through February, the blocks of time only covered after 4 AM and before 9 PM. In other words, the NMTS HMA cannot operate outside those hours during December, January, and February. For the other months of the year, the blocks of time technique granted 24 hour flexibility for most of the HMA sources. Some of the sources associated with the HMA were modeled as operating all hours, i.e. 24/7/365 without blocks of time, in every scenario. These sources will not be restricted by daily or annual throughputs, only by the hourly throughput associated with the modeled emission rate. These sources include the railhop and associated transfer points and truck loading, and truck traffic on roads PAGG and UPA, as well as the asphalt-cement heater.

Secondary Particulate Formation Analysis
Section 2.7 of the modeling report submitted by Class One Technical Services (COTS) states "Based on requested permit emission rates, the Case 2 analysis in the May 20 2014 *Guidance for PM2.5 Permit Modeling* the direct PM2.5 emissions are greater than 10 tpy, and NOx and SO2 emissions each are less than 40 tpy. For this case no secondary impact approach is required for NAAQS assessment."

The Environmental Health Department disagrees and believes that a Case 3 analysis is required for this project. Although the requested NO_X and SO_2 emissions rates for the NMTS HMA are indeed less than 40 tpy each, EPA's 20May2014 Guidance for $PM_{2.5}$ Permit Modeling directs modelers to consider secondary impacts from precursor emissions of nearby sources. The application for co-located NM Aggregates lists controlled NO_X emissions at 55.4 tons per year. A Case 3 analysis is required for the emissions of NM Aggregates.

A qualitative Case 3 analysis sufficiently demonstrates that secondary impacts will not result in an exceedance of the $PM_{2.5}$ NAAQS. Two observations regarding the $PM_{2.5}$ modeling results are revealing and pertinent in light of the EPA guidance.

First, the maximum design value impacts for direct $PM_{2.5}$ emissions are along the fence for both the 24-hour and annual modeling. The EPA guidance says on page D-3, "Formation of secondary sulfate and nitrate particulate is a fairly slow process with conversion rates taking many hours to days." Thus, in the context of the example in the EPA guidance where the highest primary emissions impacts occur on the project border, "the peak secondary impacts are expected to occur well downwind of the peak primary impacts."

Genuinely calm winds are very rare. There is usually at least some movement in the air. It is even rarer yet that winds would remain calm for "many hours to days." If secondary particulate formation takes "many hours to days" and the peak primary impact is along the fence, even a wind speed under 1 MPH will result in a lack of spatial pairing between peak secondary impacts and peak primary impacts.

Second, the highest primary impacts, in both the 24-hour and annual modeling of fine particulates, occur with nighttime operations scenarios for the HMA. The lack of photochemistry at nighttime further ensures the peak secondary impacts will not coincide with peak primary impacts.

Problems with application/modeling submitted
The most significant problem discovered in the modeling that was submitted for this project was the incorrect profile base elevation for the meteorological data. When the correct value was entered and the model executed again, an exceedance of the 1-hour NO_2 standard was revealed. COTS solved this problem by changing the titration algorithm in the 1-hour NO_2 model from PVMRM to OLM. Both methods are screening techniques. In other words, both OLM and PVMRM result in overestimates of NO_2 produced.

The EPA has stated it has no preference for either screening technique. In the 01Mar2011 memo, the EPA says "the PVMRM option in AERMOD is not inherently superior to the OLM option." In fact, the EPA openly discusses which technique performs "better" in which situations. The lack of preference for one screening technique over the other is dependent on the OLMGROUP ALL option being used with OLM. The revised 1-hour NO2 modeling submitted 31May2018 used the OLMGROUP ALL option with OLM.

The application states the requested operating hours of the facility as 24/7/365. The modeling, however, limits hours of operation during December, January, and February to after 4:00 AM and before 9:00 PM for most of the HMA plant. For the other months of the year, the modeling grants the 24/7 flexibility requested in the application.

Haul Roads/Truck Traffic
Numerous roads were included in the model for dust emissions from truck traffic. Specifically, there were roads serving NM Aggregates proposed site, NMTS transloading facility, NMTS proposed HMA plant and separate roads serving the railhop associated with the proposed HMA plant. Figure 1 shows the planned layout of the facilities on the property.

The roads labeled PAGG and UPA only serve the railhop associated with the HMA. Specifically, more aggregate will likely come in by rail than is needed for the HMA. Trucks will haul the excess aggregate to other facilities in the region that need the aggregate. The road labeled PAGG is assumed to be paved; UPA does not need to be paved. Figure 2 highlights the haul roads PAGG and UPA.

The road labeled HMAP includes emissions going to and returning from the HMA plant. HMAP turns into RAP and ASP where the paved road becomes unpaved in the model. The ASP and RAP roads serve the HMA plant. Figure 3 highlights the haul roads HMAP, ASP, and RAP. The traffic on ASP was modeled with one-way emission rates because the road is a loop. Emission rates for RAP, HMAP, PAGG, and UPA count for traffic in both directions.

Conclusion
The Technical Analysis Section recommends accepting this model.

Figure 1: Overview of planned facilities for 9615 Broadway SE

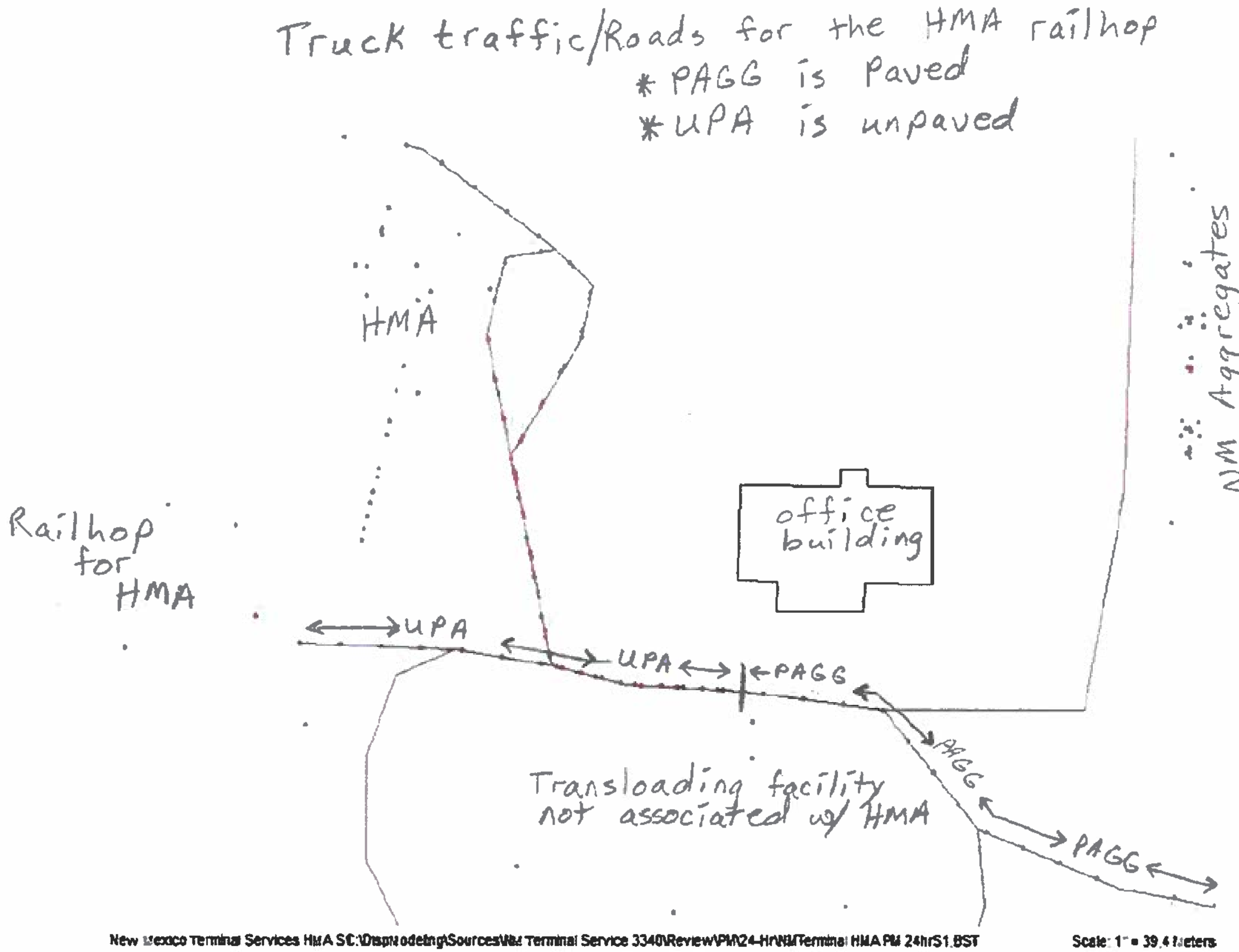

Figure 2: Haul road/truck traffic sources labeled PAGG and UPA serve the HMA Railhop, not the HMA itself

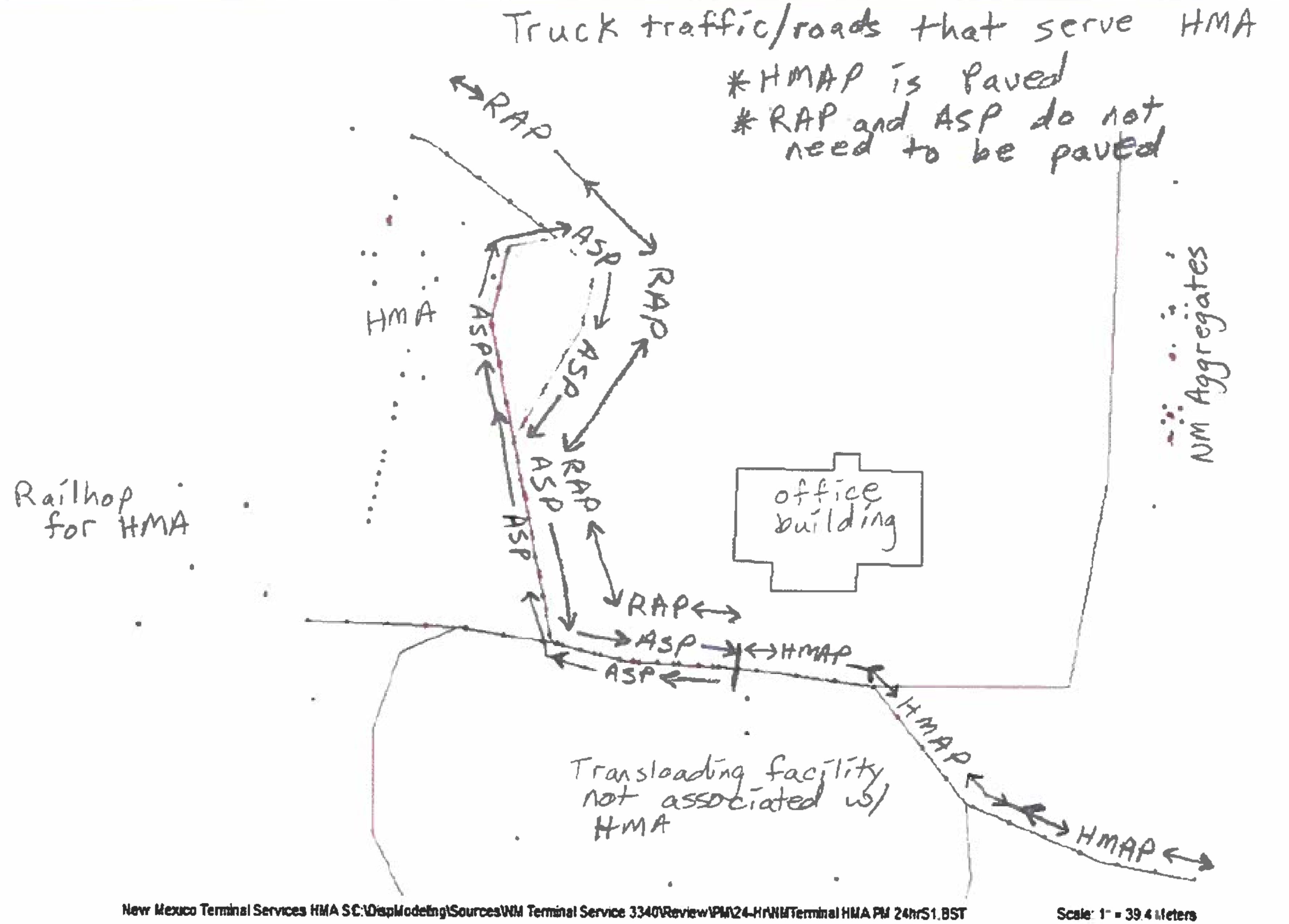

Figure 3: Haul roads/truck traffic labeled HMAP, ASP, and RAP would serve the HMA plant only, not the HMA Railhop

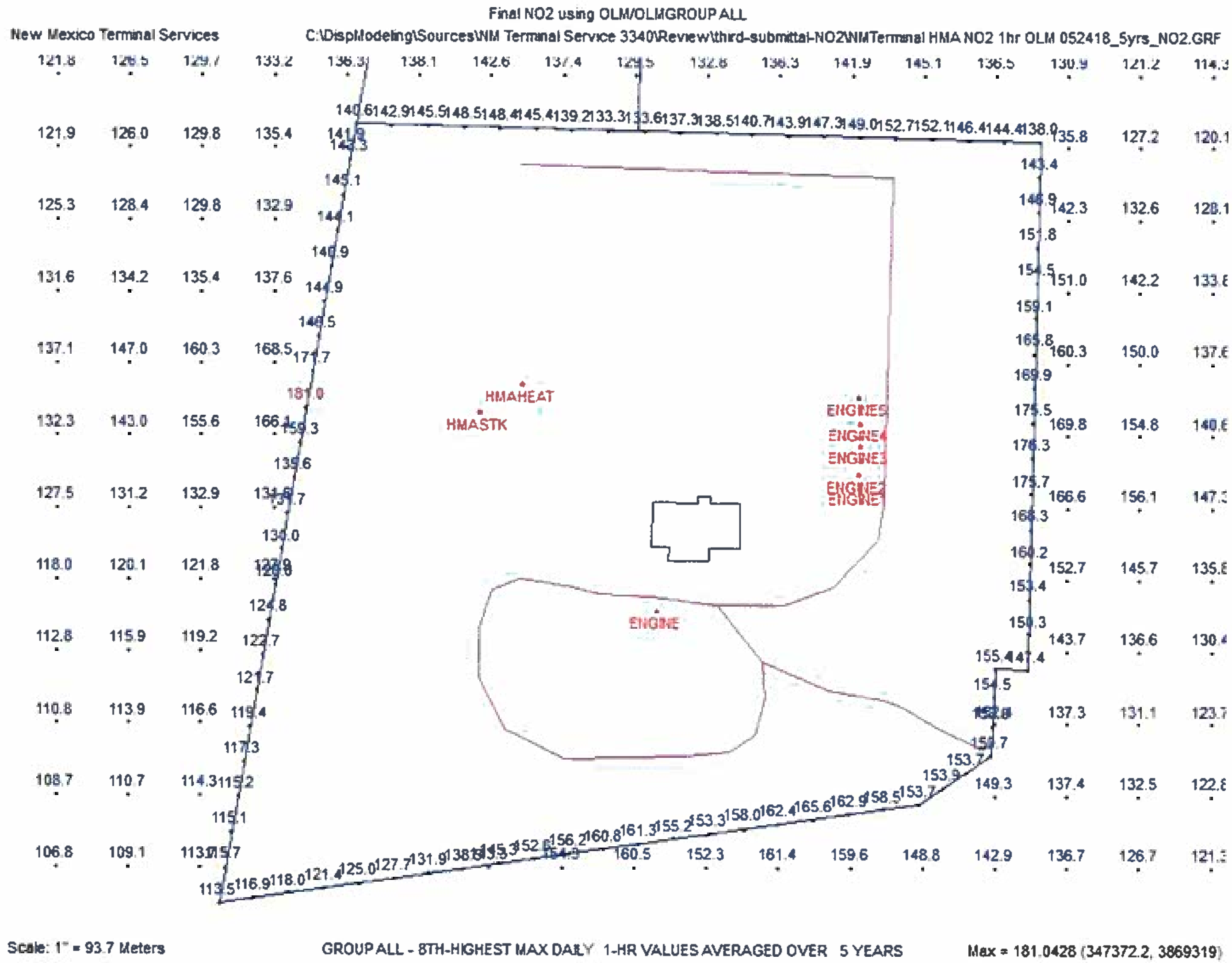

Figure 4: Final 1-hour NO_2 results using OLM/OLMGROUP ALL

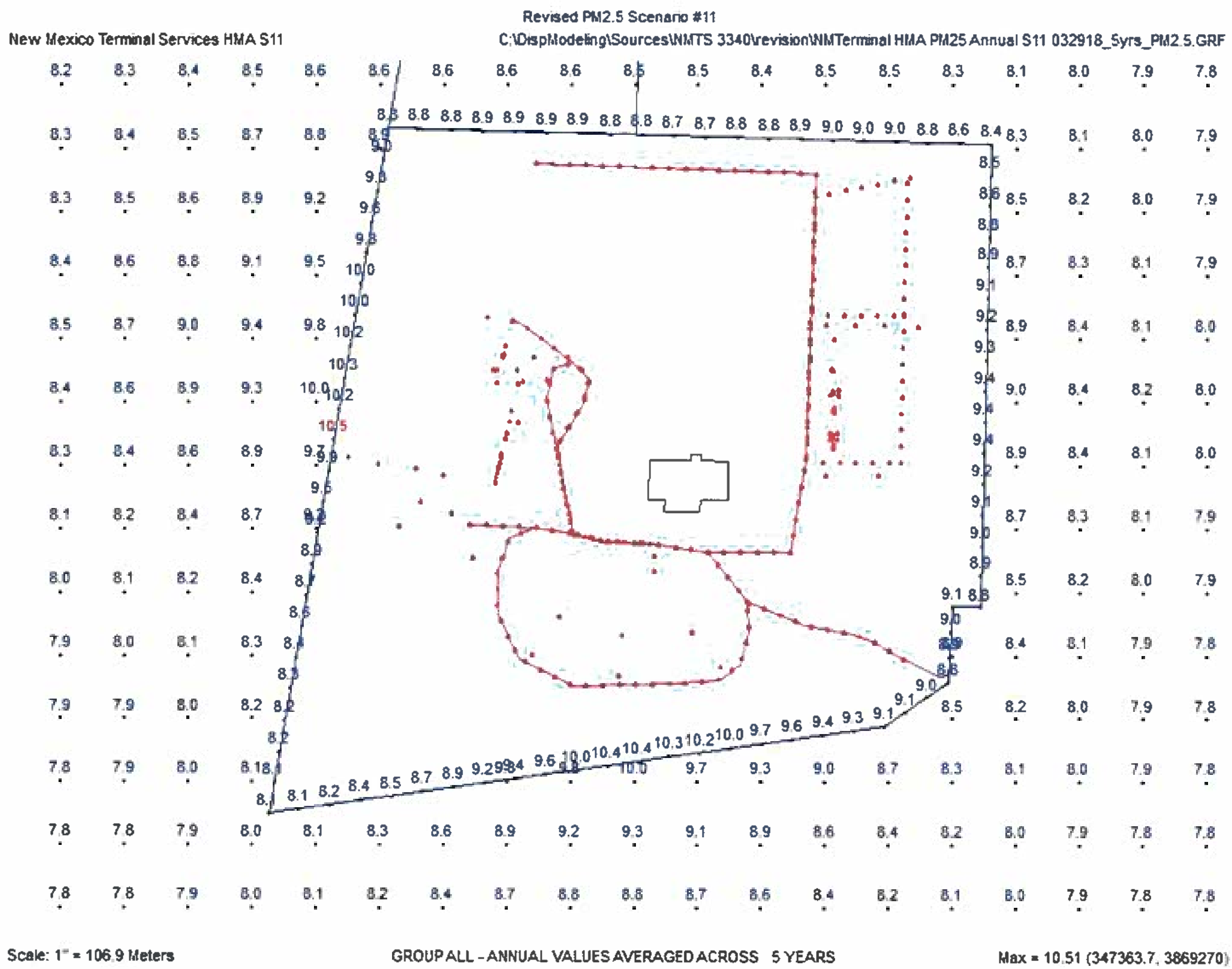

Figure 5: Annual $PM_{2.5}$, maximum impacts, nighttime operations most of the year in this scenario