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*Prevention of Significant Deterioration/Air Contaminant Discharge Permit Application*

Appendix D – Air Quality Impact Assessment  
(Revised)

**Intel Corporation Gordon  
Moore Park at Ronler  
Acres/Aloha Project**



Submitted to  
Oregon Department of Environmental Quality

Submitted by



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## INTRODUCTION

Intel Corporation (Intel) operates the Gordon Moore Park at Ronler Acres (also referred to as Ronler and Ronler Acres in this document) and Aloha semiconductor manufacturing facilities (together, the Facility) in Washington County, Oregon. The Gordon Moore Park at Ronler Acres campus is located at 2501 NE Century Boulevard, Hillsboro, Oregon, which has a Universal Transverse Mercator (UTM) North American Datum (NAD) 83 coordinate of 506601.5 meters Easting, 5043404.5 meters Northing (Zone 10). The Aloha campus is located at 3585 SW 198th Avenue, Aloha Oregon, and has a UTM NAD 83 coordinate of 509003.2 meters Easting, 5037811.5 meters Northing (Zone 10) latitude /longitude of 122.8851359° W, 45.4937841° N. The Aloha campus has been operating since 1976 while the Gordon Moore Park at Ronler Acres campus began operation in 1994. Both campuses are engaged in the production of semiconductor products and are considered co-located for permitting purposes because their production activities are interrelated. Both campuses are regulated under a single Standard Air Contaminant Discharge Permit (ACDP), 34-2681-ST-01, issued by the Oregon Department of Environmental Quality (ODEQ) in 2016 and most recently modified in 2022.

The revised modeling report is an addendum to the July 7<sup>th</sup> and September 6<sup>th</sup> 2023 submittal of the Type 4 Maintenance Area New Source Review (NSR) and Prevention of Significant Deterioration (PSD) permit application. This revised modeling supplement describes the changes to the project design and subsequent revised modeling results. Unless otherwise noted in this addendum, the modeling is based on the modeling protocol that was submitted and approved by the ODEQ on June 15<sup>th</sup>, 2023, with the subsequent 1-hour NO<sub>2</sub> Modeling Addendum submitted on November 1<sup>st</sup>, 2023. The modeling presented in this addendum follows the methods presented in the ODEQ *“Recommended Procedures for Air Quality Dispersion Modeling”* (March 2022). Unless otherwise called out in the text, the revised tables below are numbered as they were presented in the July 7<sup>th</sup> application.

## PROJECT DESIGN CHANGES

On September 6<sup>th</sup>, 2023, Intel submitted a modification to the July 7<sup>th</sup> 2023 ACDP application. The modification revised the basis for the natural gas fueled boiler PM10 and PM2.5 emission factors from the EPA NEI 2014 emission factors to the ODEQ AQ-EF05 emissions factors, resulting in a small increase of 3.08 and 3.14 tons per year, respectively. No other emission factors or emissions rates were modified. The updated modeling results are based on the emissions as referenced in Table 1.

In addition to the revised PM10 and PM2.5 emission factors, the following list summarizes the other changes to the project design:

- D1A EXSC Stack heights (SCDA\_01 – SCDA\_03) increased to 44.5 meters
- Boiler stacks on the CUB5 building (BOC5\_01 - BOC5\_08) increased to 27.92 meters
- MOD4 stack realignment (See Figure 1)
- MOD4 building height revised to 32.92 meters
- MOD4 gown changing room addition with height at 32.92 meters
- MSB2 building height and footprint update (See Figure 2)
- IMO south building size increase (See Figure 2)
- EGEN1 for D1X 4C and 5C stack parameters and emissions were corrected. The 4C engine was listed at 2,500 kW but was actually rated at 3,000 kW



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- RB1 scrubber modified to reflect a slightly lower water usage with a decrease in particulate matter emissions
- Extended the CTC5 cooling tower structure to enclose all cells.

<b>Table 1</b>							
<b>Ronler and Aloha Potential to Emit Summary</b>							
<b>Ronler and Aloha Plant Site Emission Limit Summary</b>	NO <sub>x</sub>	CO	VOC	TSP as PM	PM-10	PM-2.5	SO <sub>2</sub>
	tpy	tpy	tpy	tpy	tpy	tpy	tpy
<b>Boilers</b>	19.69	58.64	8.55	3.89	3.89	3.89	4.04
<b>EGENS/Fire Pumps</b>	52.46	4.28	0.96	0.48	0.48	0.48	0.05
<b>RCTOs</b>	80.73	106.28	150.01	19.05	19.05	19.05	2.10
<b>EXSC Scrubbers</b>	192.68	327.92	36.92	28.11	27.17	25.65	26.77
<b>EXAM Scrubbers</b>	43.45	81.51	86.51	13.55	8.54	8.27	0.77
<b>PSSS Scrubbers</b>	0	0	0	0.71	0.44	0	0
<b>Fugitive VOCs</b>	0	0	65.82	0	0	0	0
<b>Heaters</b>	10.41	17.13	0.57	0.26	0.26	0.26	0.27
<b>TMXW</b>	12.23	1.10	0.20	0.09	0.09	0.09	0.09
<b>Lime Silos</b>	0	0	0	0.44	0.44	0.44	0
<b>Cooling Towers</b>	0	0	0	8.81	7.19	0.03	0
<b>Aggregate insignificant activities</b>	1.00	1.00	1.00	1.00	1.00	1.00	1.00
<b>Paved Road Emissions</b>	0	0	0	0.75	0.15	0.04	0
<b>Total</b>	412.64	597.86	350.54	77.16	68.71	59.21	35.10
<b>Requested PSEL</b>	413	598	351	68	62	60	39

<sup>a</sup> Requested PSEL not to include categorically insignificant Activities including Paved Roads, and Cooling Towers

Figure 3 provides the locations of all source types based on the changes listed above. No stack placement or building changes are proposed for the Aloha site. The revised stack locations and stack heights are included with the facility source inventory in Attachment A.

### **MERP Analysis for Secondary PM-2.5 and Ozone Formation (Revised)**

The EPA developed a Tier 1 demonstration tool for ozone and PM-2.5 precursor emissions called Modeled Emission Rates for Precursors (MERPs). The development of the tool and related guidance is summarized in a memorandum from EPA dated April 30, 2019, with a subject, "Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for ozone (O<sub>3</sub>) and PM-2.5 under the PSD Permitting Program." The basic idea behind the MERPs is to use technically credible air quality modeling to relate precursor emissions and peak secondary pollutant impacts from specific or hypothetical sources. The ODEQ used the air quality modeling results presented in EPA MERPs memorandum to derive MERPs for hypothetical sources located in the Western U.S.



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MERPs can be used to demonstrate that projected impacts from a proposed source are less than the applicable SILs or when included with the modeling results, would not cause or contribute to a violation of a NAAQS or PSD increment for that pollutant.

The MERP is based on a hypothetical source emission rate, the modeled concentration from that emission rate, and the relevant SILs for O<sub>3</sub> and PM-2.5 (1 ppb for O<sub>3</sub>, 1.2 µg/m<sup>3</sup> for 24-hr PM-2.5, and 0.2 µg/m<sup>3</sup> for annual PM-2.5). The lowest MERP value for each precursor identifies the most conservative condition. EPA provides a lookup table (MERPs View Qlik) which contains MERP data for the United States, from which, for the Tier I analysis, the smallest MERP values were used for the 8-hour O<sub>3</sub> impact assessment and the 24-hour and annual PM-2.5 assessments. ODEQ recommends the use of the Morrow, Oregon site, which is located near Arlington on the Columbia River. For the Tier I analysis, the smallest MERP values were used for the 8-hour O<sub>3</sub> impact assessment and the 24 and annual PM-2.5 assessment.

The MERP analysis used the following emissions data as input which is based on the project total PSEL:

- NO<sub>x</sub> – 412.64 tpy
- VOC – 350.54 tpy
- PM-2.5 – 59.21 tpy
- SO<sub>x</sub> - 39.0 tpy

The basic form of the equations for PM-2.5 is:

$$S = SIL \left[ \frac{Q_{NOx}}{MERP_{NOx}} + \frac{Q_{SOx}}{MERP_{SOx}} \right]$$

For O<sub>3</sub>, the equation takes the form of:

$$S = SIL \left[ \frac{Q_{NOx}}{MERP_{NOx}} + \frac{Q_{VOC}}{MERP_{VOC}} \right]$$

where:

S = final concentration

SIL = significant impact level

- 24-hr PM-2.5 = 1.2 µg/m<sup>3</sup>
- Annual PM-2.5 = 0.2 µg/m<sup>3</sup>
- 8-hr O<sub>3</sub> = 1 ppb

Q = mass emissions in tons per year

MERP = MERP in tons per year from Table 13 for each applicable precursor

Table 13 provides the MERPs View Qlik data for Morrow, Oregon based on a hypothetical 500 ton per year source with a stack height of 10 meters. This data along with the project specific PSEL data and applicable SILs were used in the equations to determine secondary PM-2.5 and ozone formation. A copy of the MERP data from View Qlik is also provided in Attachment B (See July 7<sup>th</sup> Application).





Table 13 MERP View Qlik Data							
State	County	Metric	Precursor	Emissions TPY	Stack Height	MERP TPY	Max Concentration ug/m <sup>3</sup>
Oregon	Morrow	8-hr Ozone	NO <sub>x</sub>	500	10	258	1.939569
Oregon	Morrow	8-hr Ozone	VOC	500	10	1,087	0.46018
Oregon	Morrow	Annual PM-2.5	NO <sub>x</sub>	500	10	7,942	0.012591
Oregon	Morrow	Annual PM-2.5	SO <sub>2</sub>	500	10	11,877	0.008419
Oregon	Morrow	Daily PM-2.5	NO <sub>x</sub>	500	10	3,003	0.19979
Oregon	Morrow	Daily PM-2.5	SO <sub>2</sub>	500	10	2,314	0.259274
Stack height in meters							

*PM-2.5 24-hr avg. analysis*

- For NO<sub>x</sub> the lowest MERP is 3,003 for a hypothetical 500 tpy source and a concentration of 0.19979 ug/m<sup>3</sup>
- For SO<sub>x</sub> the lowest MERP is 2,314 for a hypothetical 500 tpy source and a concentration of 0.25927 ug/m<sup>3</sup>

Secondary 24-hr PM-2.5 formation = 0.185 µg/m<sup>3</sup>

*Annual PM-2.5*

- For NO<sub>x</sub> the lowest MERP is 7,942 for a hypothetical 500 tpy source and a concentration of 0.01259 ug/m<sup>3</sup>
- For SO<sub>x</sub> the lowest MERP is 11,877 for a hypothetical 500 tpy source and a concentration of 0.00842 ug/m<sup>3</sup>

Secondary annual PM-2.5 formation = 0.01105 µg/m<sup>3</sup>

*O<sub>3</sub> 8-hr avg. analysis*

- For NO<sub>x</sub> the lowest MERP is 258 for a hypothetical 500 tpy source and a concentration of 1.9396 ppb
- For VOC the lowest MERP is 1,087 for a hypothetical 500 tpy source and a concentration of 0.46018 ppb

Primary 8-hr O<sub>3</sub> formation = 1.92 ppb

Table 14 below compares the results of the MERP analysis to the applicable SILs, and only the 8-hr O<sub>3</sub> resultant concentration is significant. This significant concentration was then added to the background O<sub>3</sub> concentration of 61.3 ppb to produce a Project total of 63.22 ppb, which is below the 8-hr O<sub>3</sub> standard of 70 ppb. Thus, any additional impacts to the background ozone concentration will comply with the NAAQS.



Based on the results of the MERP analysis, the calculated secondary PM-2.5 concentrations were added to all modeled PM-2.5 results from AERMOD for both 24-hr and annual averaging periods.

<b>Table 14</b> Results of MERP Analyses with Comparison to PSD SILs			
Pollutant	Avg. Period	MERP Concentration	Class II PSD SILs
<b>O<sub>3</sub></b>	8-Hour	1.92 ppb	1 (ppb)
<b>PM-2.5</b>	24-hr Max	0.185 µg/m <sup>3</sup>	1.2 (µg/m <sup>3</sup> )
	Annual Max	0.011 µg/m <sup>3</sup>	0.2 (µg/m <sup>3</sup> )

Single source impacts on secondary PM-2.5 tend to decrease as distance from the source increases (Baker et al., 2016), which means peak source impacts presented as PM-2.5 in the NAAQS air quality assessment may not provide relevant information for the spatial scales involved between Project sources and Class I areas. Given that Project source impacts will be lower at greater distances, the MERPs listed in Table 14 would overestimate the secondary PM-2.5 formation as the source and Class I areas are not in close proximity.

Using the distance correction outlined in the memorandum from EPA dated April 2019, “*Guidance on the Development of Modeled Emission Rates for Precursors (MERPs) as a Tier 1 Demonstration Tool for Ozone (O<sub>3</sub>) and PM<sub>2.5</sub> under the PSD Permitting Program.*”, the hypothetical source concentrations from MERPs View Qlik were selected based on the distance to the nearest Class I area, Mount Hood, at 80 km. Using the Morrow, Oregon site, this produced the following secondary PM-2.5 formations based on the modeled hypothetical source and resultant MERP concentration from the MERP View Qlik output:

- 24-hr = 0.0903 ug/m<sup>3</sup>
- Annual = 0.0039 ug/m<sup>3</sup>

## REVISIONS TO THE MODELING METHODOLOGY

Based on the ODEQ recommendations and the October 31<sup>st</sup> addendum to the modeling protocol, the 1-hour NO<sub>2</sub> modeling analyses were revised to include 24-hours of emergency diesel engine operation for each year of the modeling analysis. To assess this, two (2) separate and distinct methods were used for calculating the 1-hour NO<sub>2</sub> concentrations from the intermittent operations of diesel emergency engines during an emergency plant power outage. The first method utilized the approach outlined in the USEPA guidance document (March 1, 2011, USEPA memorandum “Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO<sub>2</sub> National Ambient Air Quality Standard”). The second method utilized a Monte Carlo simulation as recommended by the Oregon Department of Environmental Quality (ODEQ). Since emergency operations can be speculative, both modeling methods will rely on historical operations of diesel emergency engines that have occurred from 2016 to present. Historical operations reflect the fact that the electrical service to the Intel campuses is intentionally structured in such a way that it is highly unlikely that loss of electrical service would have a plant-wide impact. Instead, as past events document, Intel’s electrical service design is intentionally structured to maintain electrical service across most of the plant even if one source of electrical service is lost. A table listing these past events was provided to ODEQ on September 11<sup>th</sup>, 2023, and it was agreed that they form the best basis



for identifying reasonably likely future diesel emergency engine operating scenarios at the Aloha and Ronler Acres campuses.

Based on actual past occurrences, the event with the longest run time at the Ronler campus and with the utilization of the most diesel emergency engines occurred over two 12-hour periods in May 2022. Here, five (5) diesel emergency engines associated with operations at the D1D operations ran for roughly 23 hours for each engine. The emergency operations modeling utilized the D1D group of diesel emergency engines but modified the number of diesel emergency engines to reflect six (6) engines (EGDD\_01 through EGDD\_06) in place of five (5) that ran during the emergency. The 1-hour NO<sub>2</sub> analyses also include the 25-hours of non-emergency operations (e.g., maintenance and readiness testing) along with the steady state source (non-emergency sources).<sup>1</sup>

### **EPA 1-Hour NO<sub>2</sub> Methodology (Revised)**

The diesel emergency engines can run up to 25 hours per year for non-emergency operations. As noted above, emergency operations included up to 24 additional hours of operations for the Ronler D1D sources. The approach suggested by EPA is to model impacts from intermittent sources based on an annualized hourly emission rate, rather than the maximum hourly emissions. This approach accounts for potential worst-case meteorological conditions combined with essentially continuous operation of the diesel emergency engines (both regular testing and emergency operation) at an average hourly emission rate. Non-emergency steady state sources were included in the EPA methodology. The modeling results were based on the use of the Ambient Ratio Method Version 2 (ARM2). There were no daytime limitations to the operating hours for emergency operations. Background sources (non-Intel sources) for NO<sub>2</sub> were also included.

### **Monte Carlo 1-Hour Methodology (Revised)**

The second method for assessing emergency operations on the 1-hr NO<sub>2</sub> standard utilized a Monte Carlo Simulation to estimate the NO<sub>2</sub> impacts. Here the maximum 1-hour NO<sub>2</sub> emission rates on the diesel emergency engines were used and include both non-emergency (testing and maintenance) and emergency hours. As before, the non-emergency hours of operation will be limited to daytime conditions while the emergency operations did not have any hour of day restrictions. Additionally, the steady state sources were included in the Monte Carlo analyses.

The Monte Carlo simulation was used to model the probability of different outcomes in a process that cannot easily be predicted due to the intervention of random variables. For example, the specific hour/day of an emergency event that a set of diesel emergency engines will run is generally unknown. The operation of the diesel emergency engines may or may not correspond to a poor dispersion period, as the occurrence of these events is essentially random. The Monte Carlo approach can account for the random nature of both the diesel emergency engine operation and the underlying meteorological conditions. The Monte Carlo modeling utilized the following three (3) separate AERMOD runs to create output files of hourly (1-hr) NO<sub>2</sub> concentrations for each receptor across all five (5) years of meteorology. To minimize output file size, the receptor group will be broken out into three individual groups of roughly 800 receptors each, the

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<sup>1</sup> Intel does not participate in the Portland General Electric Dispatchable Standby Generation program and so non-emergency operation of the diesel emergency engines is limited to training and maintenance and readiness testing.



total of which included the entire high resolution downwash grid to identify and determine the maximum concentrations:

1. Continuous sources with ARM2 and seasonal hour by day background NO<sub>2</sub> background
2. M&R testing for the 20 emergency generator source groups with hours limited to daylight hours only and utilizing PVMRM as previously described in the modeling protocol and the July 14<sup>th</sup> permit application. Each engine is tested up to 24-hours per year and each source group has its own 1-hour hourly concentration files.
3. Emergency operations for 24-hours per engine per year which represents 24 single one-hour events for each of the five years with no day or nighttime limitations and utilizing PVMRM. The ODEQ has recommended that the maximum number of annual emergency operation hours in the recent historical record (24 hours) be used in the analysis. Since this maximum could possibly occur in any year, the 24 hours will be used in all years of the simulation. Since the length of operation cannot be predicted, the most conservative option is to treat all emergency hours as single hour events that could occur on any day of the year in the Monte Carlo simulation. The 24 occurrences will then be spread out over 12 months with two (2) random occurrences each month for each of the one-year meteorological data periods.

The receptor-by-receptor hourly files from the three AERMOD runs above will then be used in the Monte Carlo analysis. The hourly files were split into individual daily files, each with 24 hours of concentration for each receptor. These files are then grouped by month. For each iteration, 365 days were randomly selected from the five-year dataset to form a simulation year. Any particular day was used only once in the simulation year. The hourly continuous source concentrations are loaded into the simulation year concentration arrays. Two days in each month were assigned to the emergency runs. On those days, one hour was randomly selected for the emergency runs. For this hour, the concentration from the emergency runs was added to the continuous source concentration. For the M&R source, 15 days in a month were identified for the 20 groups of generators to be evaluated. For each generator group, a random hour between hours 9:00 AM and 6:00 PM was selected. For this hour, the concentration from the M&R group run was added to the continuous source concentration. If two M&R groups are run on the same day, they will run at different hours. Once this step is completed, the highest 1-hr concentration on each day was calculated (on a receptor-by-receptor basis) from which the highest eighth highest concentration at each receptor was found. This process was then repeated two more times to generate a three-year simulation data set. Once the three simulation years were assembled, the high-eighth-high concentrations from each year was determined and then averaged to produce a final high-eighth-high concentrations for that iteration. The process was then repeated 1000 more times and a median concentration was then calculated from the 1001 simulations. If this median value is less than the standard, then compliance is demonstrated.

The advantage of this approach over the original submittal of pairing results based on receptor location only is that concentrations of continuous, M&R, and emergency operations are paired both in space and time, and the 98<sup>th</sup> percentile calculation for each receptor and hour is done as a last step.

### **Emergency Engine Screening Analyses for the M&R Testing (Revised)**

While either the maximum modeled single engine or group of engines from Table 11 was identified from modeling just those 20 groups in AERMOD, the location may not correspond to the maximum location of the steady state source impact locations, which is important to identify to determine the overall maximum



modeled concentrations. So, to determine the combined maximum impact for the 1, 8 and 24-hour averaging periods, where the intermittent sources would contribute the highest concentration to the steady state source impact location(s), the top 10 receptor locations where the steady state sources maximum impact occurred were input into AERMOD based on the following:

- All 20 engine source groups were input to determine the 1-hour NO<sub>2</sub> concentration using the EPA 1-hour method (annual average emissions rates).
- Each individual engine input as an individual source group with the maximum 1-hour emission rate (1-hr SO<sub>2</sub> and CO).
- Each individual engine input as an individual source group with the maximum 8-hour emission rate ratioed by 10/8 (8-hr CO) to account for 10 engines tested in 8 hours.
- Each individual engine input as an individual source group with 1-hour of the maximum hourly emission rate (24-hr SO<sub>2</sub> and PM-10, PM-2.5).

Table 12 presents the results of the screening analyses. To illustrate this screening procedure, the top ten locations of the steady state 24-hour PM-2.5 concentrations, based on the form of the NAAQS, are presented in Figure 10. All engine source groups, or the single engines as individual source groups were then run in AERMOD at these ten receptor locations. The engine groups or single engine that resulted in the highest concentration was then selected to be used in the subsequent modeling analyses for the SILs, NAAQS, and PSD increment assessments. Note, the Monte Carlo analysis was treated as a separate modeling procedure and is not associated with this screening method.

Table 12			
Identified Generator Groups from the Screening Modeling			
Group ID	Engine ID <sup>1</sup>	Pollutant	Averaging Period <sup>2</sup>
G02	All	CO	1-HR
	EGRP1_02	CO	8-HR
	EGDC_01	PM-10	24-HR
	EGDC_01	PM-2.5	24-HR
G17	All	SO <sub>2</sub>	1-HR
	EGF15_01	SO <sub>2</sub>	24-HR
G14	All	NO <sub>2</sub>	1-HR

<sup>1</sup> 1-hr CO, SO<sub>2</sub> and NO<sub>2</sub> used the specific source groups in Table 11.  
<sup>2</sup> Annual modeling used all 90 diesel engines for the SIL, NAAQS and Increment Analyses

For assessing the 24-hour PM-2.5 increment, the use of 10 hours of emissions from source EGDC\_01 (10 hours modeled from a single engine) was replaced with the testing from all 10 engines that would be tested on any particular day modeled day. Thus, the 10 diesel engines modeled for 24-hour PM-2.5 increment were EGDC\_01 through EGDC\_05, EGRP1\_01 and EGRP1\_02 and EGDD\_01 through EGDD\_03.

### **Class I Impact Assessment (Revised)**

OAR 340-225-0070 requires PSD sources to assess compliance with Air Quality Related Values (AQRVs) if the source could impact visibility or deposition. This requirement is also summarized in EPA’s Draft NSR Workshop Manual, where an impact analysis must be performed for any PSD source which “may affect” a Class I area. The AQRV requirement includes any PSD source located within 100 km of a Class I area.



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However, Class I areas typically within 300 km are included in this type of analysis. OAR 340-225-0700 requires the ODEQ to provide notice of PSD permit applications to the EPA and Federal Land Managers. This notification was completed by the ODEQ and was incorporated into the ODEQ comments on the modeling protocol.

Intel is now a major source for criteria pollutant emissions and is therefore subject to PSD permitting requirements. The nearest Class I area is Mount Hood, located 80 km from the Gordon Moore Park at Ronler Acres (see Figure 13 in the July 7<sup>th</sup> application). Eight (8) additional Class I areas are identified within 300 km of the Project. The Class I coordinates are based on the National Park Service (NPS) Class I receptor list converted from latitude/longitude to UTM NAD83 coordinates.

Following OAR 340 division 225 and the FLAG Workshop procedures (June 2010) for PSD sources greater than 50 km from a Class I area, the use of the Screening Procedure Q/D was utilized to determine if the Project could screen out of a formal AQRV assessment for visibility and nitrogen deposition (Q is the total emissions in tons per year and D is the distance in kilometers to the Class I area). Following these procedures, Q is calculated as the sum (in tons/year) of emissions of NO<sub>x</sub> and PM-10 based on the maximum 24-hour net emissions increase for each pollutant from the proposed Project. The actual baseline emissions were not included in the proposed increase, as per FLAG with ODEQ concurrence. There will be no increase in SO<sub>2</sub> emissions over the existing PSEL so this pollutant was not included in the calculation of Q. The existing PSEL emissions and the proposed hourly increases converted to tons are summarized in Table 24.

The screening calculation takes the form of:

$$Q = \text{sum } (NO_x + PM-10) \text{ in lbs/hr (for 24-hours) for the worst-case day} * 365 \text{ days/year}$$

<b>Table 24</b>			
<b>Existing and Proposed Emissions Profiles</b>			
	<b>NO<sub>x</sub></b>	<b>PM-10</b>	<b>Q</b>
	<b>tpy</b>	<b>tpy</b>	<b>tons</b>
<b>Current PSEL</b>	197.0	35.0	-
<b>Proposed Increase without Emergency Generators</b>	193.7*	27*	-
<b>Proposed Increase Emergency Generators Only (worst-case day)</b>	124.1*	1.17*	-
<b>Total for Q/D Calculation</b>	317.8	28.2	347
<b>Total PTE</b>	412.6	62.0	
* Based on worst case day multiplied by 365 days and converted to tons per year.			

All the non-emergency sources are steady state and operate almost continuously 24-hours per day. The emergency diesel generators are limited to 25 hours per year, with no more than 10 engines being tested during any day. To determine the worst-case daily emissions for the emergency generators, the 10 highest emitting engines' emissions were summed to calculate a pound per day (lb/day) emission rate. This was then multiplied by 365 days and converted to tons per year (tpy) to calculate the engines contribution to the total emissions (Q). As an example, for NO<sub>x</sub>:



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Each emergency generators at 68 lb/hr each or 10 engines on a daily basis at 680 lb/day  
 $680 \text{ lb/day} * 365 \text{ day/yr} * 1 \text{ ton}/2000 \text{ lb} = 124.1 \text{ tpy}$

This is repeated for PM-10 but with a different set of 10 engines which have a higher PM-10 emission rate.

Each emergency generators at 0.641 lb/hr each or 10 engines on a daily basis at 6.41 lb/day  
 $6.41 \text{ lb/day} * 365 \text{ day/yr} * 1 \text{ ton}/2000 \text{ lb} = 1.17 \text{ tpy}$

Using this procedure on the emergency generators which is then added to the steady state Q, the total Facility Q based on the increase in NO<sub>x</sub> and PM-10 is:

$Q = \text{sum (NO}_x\text{+PM-10) in maximum lbs/day (for the worst-case day including emergency generators) * 365 days/year * 1 ton}/2000 \text{ lbs} = 346.9 \text{ tons}$

The results of the Q/D scenarios are presented in Table 25. If Q/D is less than 10, then the AQRV analysis can be waived as a requirement. All of the Class I areas have a Q/D ratio less than threshold of 10. In accordance with OAR 340-225-0070, the Federal Land Managers (FLMs) of Class I areas potentially affected by the project were notified by ODEQ of the pending permit application. In the FLM responses, the U.S Forest Service and the National Park Service, as FLMs, have both stated that an analysis of AQRVs is not required for their respective Class I areas and the Columbia River Gorge National Scenic Area.

In addition to the above AQRV analysis, OAR 340-225-0060 requires Class I SILs modeling to be performed to determine if a Class I increment and NAAQS analyses would be required for the major source pollutants.

<b>TABLE 25 NEARBY CLASS I AREAS AND Q/D SCREENING RESULTS</b>		
<b>Class I Areas</b>	<b>Minimum Distance (km)</b>	<b>Q/D*</b>
<b>Mt Hood OR (MOHO)</b>	80	4.4
<b>Mt Jefferson OR (MOJE)</b>	116	3.0
<b>Mt Adams WA (MOAD)</b>	121	2.9
<b>Goat Rocks WA (GORO)</b>	145	2.4
<b>Mt Washington WA (MOWA)</b>	150	2.3
<b>Mt Rainier WA (MORA)</b>	153	2.3
<b>Three Sisters OR (THSI)</b>	167	2.1
<b>Diamond Creek (DC)</b>	223	1.6
<b>Crater Lake (CR)</b>	279	1.3
*Q/D based on worst case day.		



## Modeling Impact Tables (Revised)

The following tables reflect the revised air quality modeled concentrations based on the reference project changes. The table numbers have been retained from the July 7<sup>th</sup> application submittal and correspond to the applicable report sections. No additional narrative is provided as the July 7<sup>th</sup> application sections associated with these tables are unchanged.

Table 15 Air Quality Impact Results for Significant Impact Levels*				
Pollutant	Averaging Period	Maximum Concentration (µg/m <sup>3</sup> )	Class II SIL (µg/m <sup>3</sup> )	Significant Impact Area Radius (km)
<b>Steady State and Intermittent Source Operating Conditions*</b>				
<b>NO<sub>2</sub><sup>a</sup></b>	1-hr 5-year Avg of Max's	129.5	7.5	18.7
	Annual Max	17.1	1.0	8.5
<b>CO</b>	1-hour Max	483.9	2,000	N/A
	8-hour Max	159.2	500	N/A
<b>SO<sub>2</sub></b>	1-HR Max	46.1	7.8	-
	24-HR Max	20.1	5	-
	Annual Max	4.9	1	-
<b>PM-10</b>	24-hour Max	10.6	5	6.3
	Annual Max	3.3	1	6.4
<b>PM-2.5<sup>b</sup></b>	24-hr 5-yr Avg of Max's	8.6	1.2	7.1
	5-yr Avg of Annual Concentrations	2.5	0.2	8.7

<sup>a</sup> NO<sub>2</sub> 1-hour and annual impacts evaluated using ARM2. Emergency generators included using EPA modeling procedure.  
<sup>b</sup> PM-2.5 modeled concentrations were adjusted by the MERP results to account for secondary PM-2.5 formation.  
 \* All sources (new and existing)





# AIR QUALITY IMPACT ASSESSMENT

**Table 18**  
**Intel Facility Sources (New + Existing) Modeling Results**

Pollutant	Averaging Period	Modeled Concentration ( $\mu\text{g}/\text{m}^3$ )	Background ( $\mu\text{g}/\text{m}^3$ )	Total ( $\mu\text{g}/\text{m}^3$ )	National Ambient Air Quality Standards ( $\mu\text{g}/\text{m}^3$ )
NO <sub>2</sub>	1-hr 5-yr Avg of 98 <sup>th</sup> %	EPA Method <sup>a</sup>	-	162.6	188
	1-hr 5-yr Avg of 98 <sup>th</sup> %	Monte Carlo <sup>b</sup>	-	163.0	188
	Annual Max	17.1	35.6	52.7	100
SO <sub>2</sub>	1-hr 5-yr Avg of 99 <sup>th</sup> %	40.0	7.0	47.0	196
	24-hr Avg	20.1	4.7	24.8	1,300
	Annual Max	4.9	1.1	6.0	80
PM-10	24-hour H6H	9.1	39.0	48.1	150
PM-2.5 <sup>c</sup>	24-hr 5-yr Avg of 98 <sup>th</sup> %	6.2	20.7	27.1	35
	5-yr Avg of Ann Conc's	2.5	6.6	9.1	12.0

<sup>a</sup> NO<sub>2</sub> 1-hour and annual impacts evaluated using the ARM2. Seasonal hour by day added in model.  
<sup>b</sup> NO<sub>2</sub> 1-hr evaluated with PVMRM with the NO<sub>2</sub>/NO<sub>x</sub> ratios as described previously. Background from seasonal hour by day in AERMOD.  
<sup>c</sup> PM-2.5 24-hour and annual concentration adjusted by 0.185 and the annual by 0.0111 to reflect secondary PM-2.5 formation.

**Table 23**  
**PSD Class II Increment Results**

Pollutant	Avg. Period	Modeled Concentration ( $\mu\text{g}/\text{m}^3$ )	PSD Class II Increment ( $\mu\text{g}/\text{m}^3$ )
NO <sub>2</sub>	Annual	17.1	25
PM-10	24-hr (H2H)	9.8	30
	Annual	3.4	17
PM-2.5	24-hr (H2H)	8.6	9
	Annual	2.7	4

H2H = high second high on an annual basis. Increment not to be exceeded more than once per year.  
 PM-2.5 includes secondary formation.



# AIR QUALITY IMPACT ASSESSMENT

**Table 23**  
Air Quality Impact Results for  
Cumulative Modeling Analysis – National Ambient Air Quality Standards

Pollutant	Avg. Period	Modeled Concentration ( $\mu\text{g}/\text{m}^3$ )	Background ( $\mu\text{g}/\text{m}^3$ )	Total ( $\mu\text{g}/\text{m}^3$ )	National Ambient Air Quality Standard ( $\mu\text{g}/\text{m}^3$ )
<b>NO<sub>2</sub></b>	1-hr 5-yr Avg of 98 <sup>th</sup> %	N/A	--	162.6	188
	Annual	17.2	35.6	52.8	100
<b>PM-10</b>	24-hr H6H	9.1	39.0	48.1	150
	Annual	-	-	-	-
<b>PM-2.5</b>	24-hr 98 <sup>th</sup> %	6.2	20.7	27.1	35
	Annual	2.5	6.6	9.1	12

NO<sub>2</sub> impacts were evaluated using the ARM2 with hourly seasonal background values added consistent with EPA modeling guidelines (so separate modeled and background values not available). Monte Carlo results are not required for multisource NAAQS.

Secondary PM-2.5 formation from MERPs included in PM-2.5 results.

**TABLE 26**  
Criteria Pollutant Class I SILs and Increments

Pollutant	Averaging Interval	Maximum Modeled Impact on Receptor Ring (50 km) ( $\mu\text{g}/\text{m}^3$ )	Class I Significant Impact Level ( $\mu\text{g}/\text{m}^3$ )	Class I PSD Increment ( $\mu\text{g}/\text{m}^3$ )
<b>NO<sub>2</sub></b>	Annual	0.043	0.1	2.5
<b>PM-10</b>	24-Hour	0.071	0.3	25
	Annual	0.010	0.2	5
<b>PM-2.5</b>	24-Hour	0.135	0.27	2
	Annual	0.011	0.05	1

Secondary PM-2.5 were added to the primary PM-2.5 modeled concentrations using 0.0903  $\mu\text{g}/\text{m}^3$  for 24-hour and 0.0039  $\mu\text{g}/\text{m}^3$  for annual.



Figure 1  
MOD4 Stack Realignment

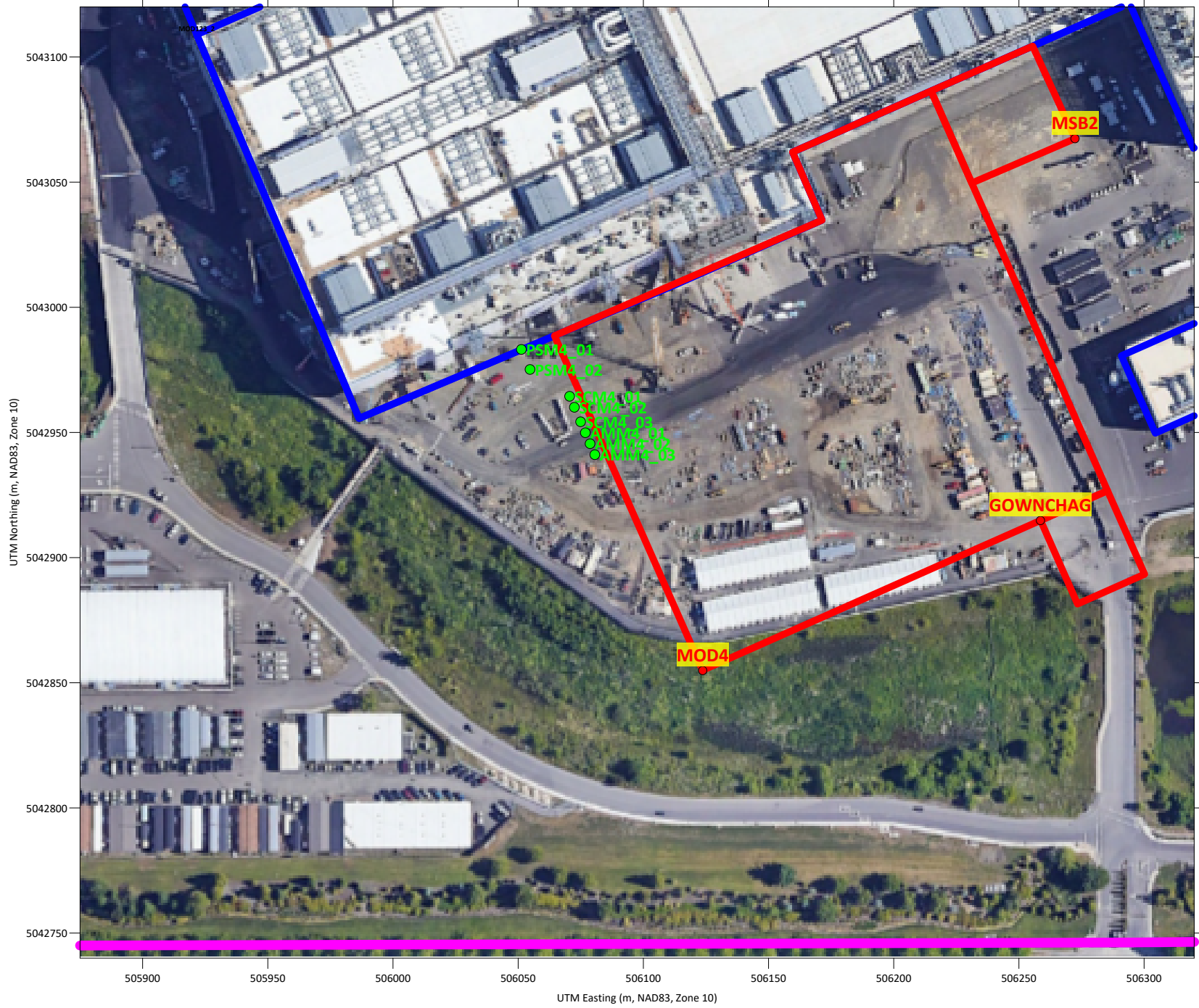




Figure 2  
Building Revisions

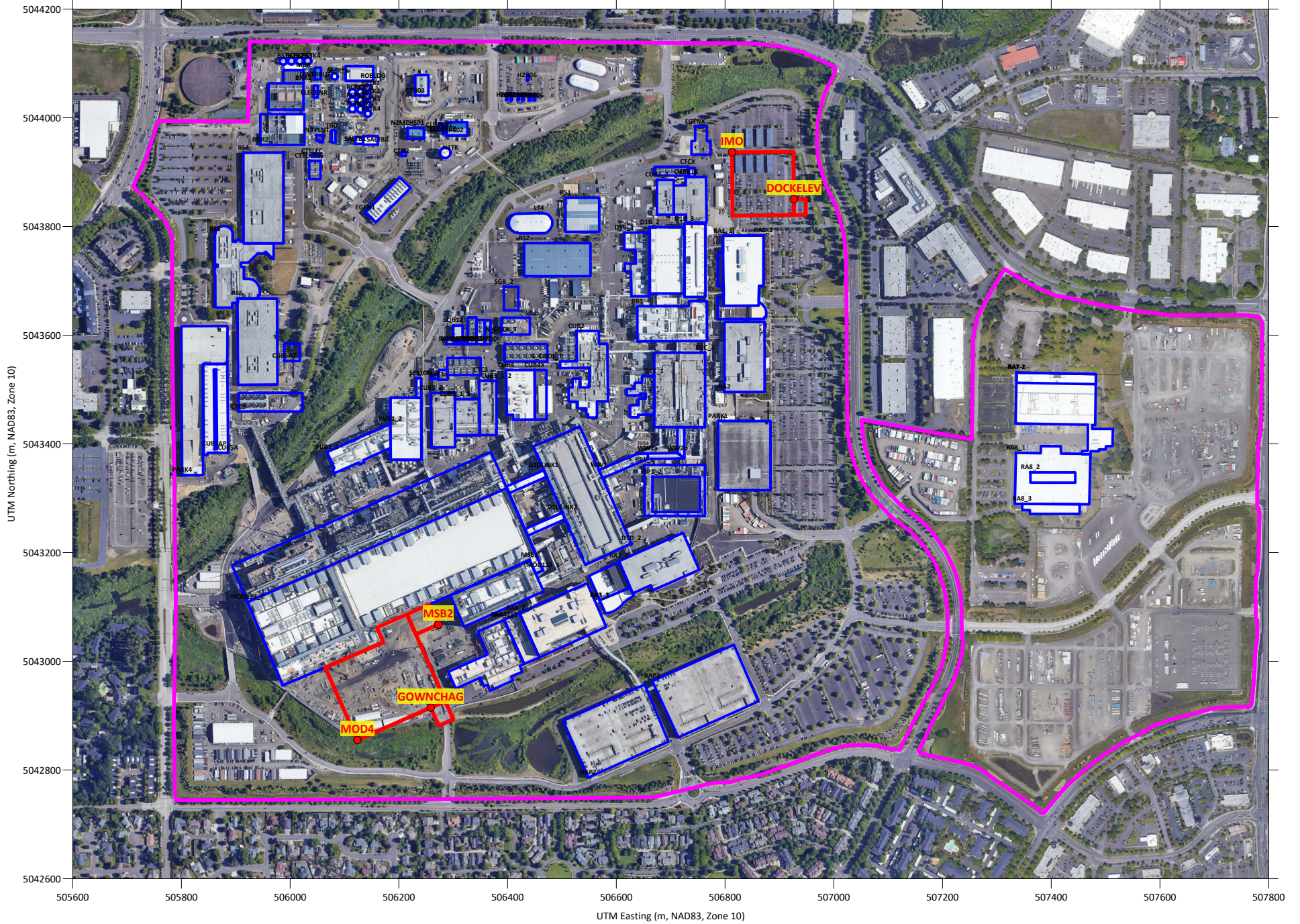
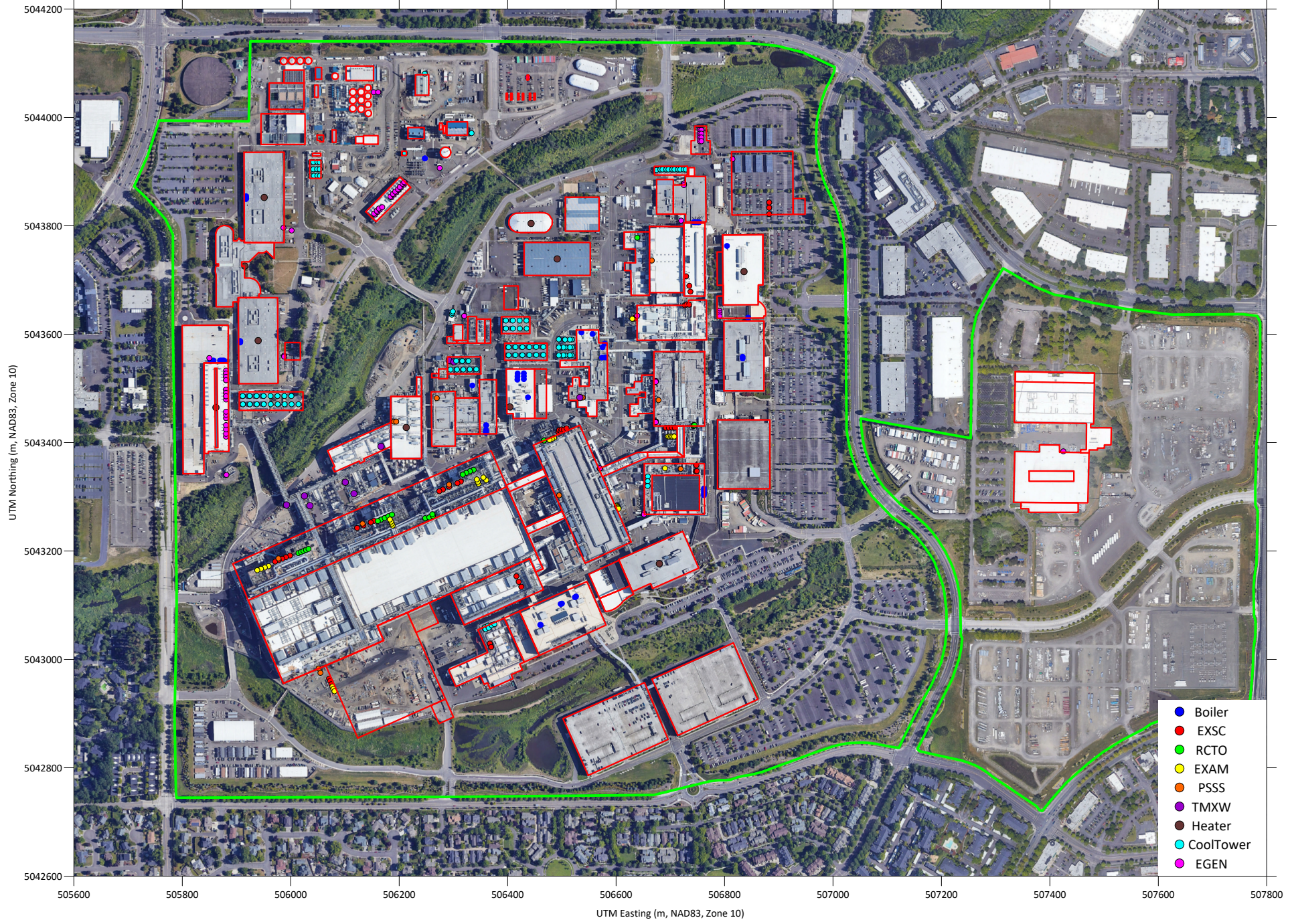




Figure 3  
Source Locations





**Figure 10**  
**Maximum Impact Locations**

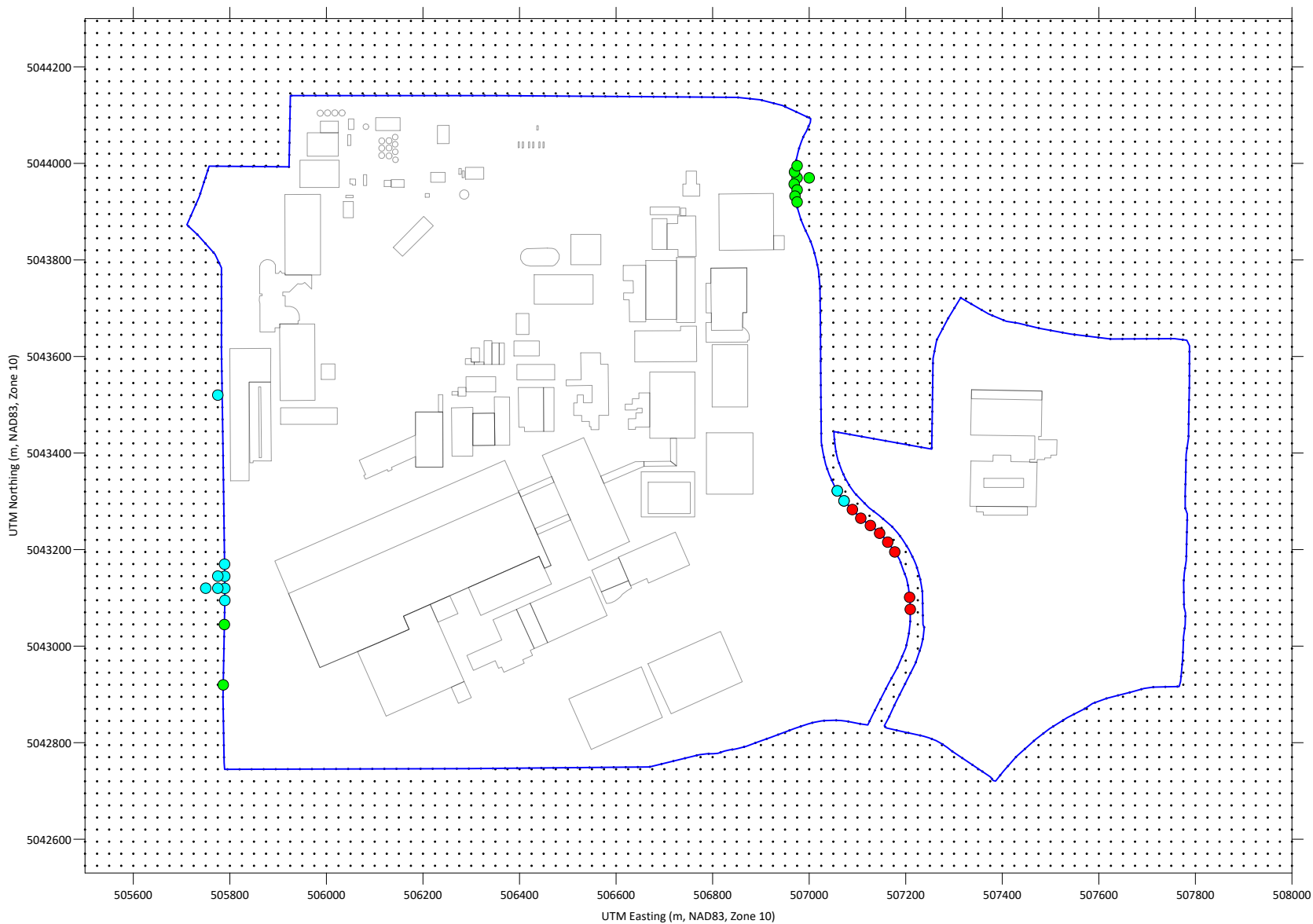


Figure 10: Locations of the 10 Max 24-Hour PM<sub>2.5</sub> H8H Receptors (Red) 24-Hour PM<sub>2.5</sub> H2H Receptors (Cyan) and 1-HR NO<sub>2</sub> H8H Receptors (Green) Used in the EGEN Screening Modeling

**Attachment A**  
**Facility Stack Parameter Data**









