A. INTRODUCTION AND SUMMARY OF CONCLUSIONS

The potential for air quality impacts from the Proposed Project and from Phase 1 are examined in this chapter. Air quality impacts can either be direct or indirect. Direct impacts result from emissions generated by stationary sources at a development site, such as emissions from on-site fuel combustion for heat and hot water systems. Indirect impacts are impacts that are caused by emissions from nearby existing stationary sources or by emissions from on-road vehicle trips generated by a project or other changes to future traffic conditions due to a project. The potential for indirect mobile source impacts from the Proposed Project and from Phase 1 were analyzed. The Proposed Project may utilize either propane fuel or will consider utilizing electrical power for heating and hot water systems. Phase 1 will include propane combustion for the heating and hot water systems. Potential impacts caused by emissions from fuel burned on-site for the heating and hot water systems were examined.

An assessment of the potential air quality effects of carbon monoxide (CO) concentrations that would result from the Proposed Project and from Phase 1 was performed following the procedures outlined in the Scope and the New York State Department of Transportation (NYSDOT) *Environmental Procedures Manual (EPM)*, January 2001. This included a mobile source screening analysis to determine the locations where a more detailed mobile source analysis may be required. The study area corresponds to that of the traffic analysis, described in Chapter 11, "Trafpfic." The Proposed Project includes 24 intersections: nine signalized and 15 unsignalized. Phase 1 includes 20 intersections: nine signalized and 11 unsignalized for the CO microscale analysis.

This chapter demonstrates that the Proposed Project and Phase 1 are not expected to cause any new exceedance of air quality standards, or exacerbate any existing exceedances, and therefore would not result in any significant adverse air quality impacts.

CRITERIA POLLUTANTS

Ambient air quality is affected by air pollutants produced by both motor vehicles and stationary sources. Emissions from motor vehicles are referred to as mobile source emissions. Emissions from fixed facilities are referred to as stationary source emissions. Ambient concentrations of CO are predominantly influenced by mobile source emissions. Particulate matter (PM), volatile organic compounds (VOCs), and nitrogen oxides (nitric oxide, NO, and nitrogen dioxide, NO_2, collectively referred to as NO_x) are emitted from both mobile and stationary sources. Fine PM is also formed when emissions of NO_x, sulfur oxides (SO_x), ammonia, organic compounds, and other gases react or condense in the atmosphere. Emissions of sulfur dioxide (SO_2) are associated mainly with stationary sources and sources utilizing non-road diesel such as diesel trains, marine engines, and non-road vehicles (e.g., construction engines). On-road diesel vehicles currently contribute very little to SO_2 emissions since the sulfur content of on-road diesel fuel, which is Federally regulated, is extremely low. Ozone is formed in the atmosphere by complex photochemical processes that include NO_x and VOCs.

CARBON MONOXIDE

CO, a colorless and odorless gas, is produced in the urban environment primarily by the incomplete combustion of gasoline and other fossil fuels. In urban areas, approximately 80 to 90 percent of CO emissions are from motor vehicles. Since CO is a reactive gas which does not persist in the atmosphere, CO concentrations can vary greatly over relatively short distances. Elevated concentrations are usually limited to locations near crowded intersections, heavily traveled and congested roadways, parking lots, and garages. Consequently, CO concentrations must be predicted on a local, or microscale, basis.

The Proposed Project and Phase 1 would increase traffic volumes on streets near the Project Site and would result in localized increases in CO levels. Therefore, a mobile source screening analysis was performed to determine whether there are locations where a full mobile source analysis would be required.

NITROGEN OXIDES, VOCS, AND OZONE

NO_x are of principal concern because of their role, together with VOCs, as precursors in the formation of ozone. Ozone is formed through a series of reactions that take place in the atmosphere in the presence of sunlight. Because the reactions are slow, and occur as the pollutants are diffusing downwind, elevated ozone levels are often found many miles from sources of the precursor pollutants. The effects of NO_x and VOC emissions from all sources are therefore generally examined on a regional basis. The contribution of any action or project to regional emissions of these pollutants would include any added stationary or mobile source emissions. The change in regional mobile source emissions of these pollutants would be related to the total vehicle miles traveled added to or subtracted from various roadway types throughout New York State which is designated as a moderate non-attainment area for ozone by the U.S. Environmental Protection Agency (EPA).

The Proposed Project and Phase 1 would not have a significant effect on the overall volume of vehicular travel in the metropolitan area. Therefore, no measureable impact on regional NO_x emissions or on ozone levels is predicted. A regional analysis of emissions of these pollutants from mobile sources associated with the Proposed Project and Phase 1 was, therefore, not warranted.

In addition to being a precursor to the formation of ozone, NO_2 (one component of NO_x) is also a regulated criteria pollutant. Since NO_2 is mostly formed from the transformation of NO in the atmosphere, it is generally more of a concern further downwind from large stationary point sources, and less of a concern locally from mobile sources. (NO_x emissions from fuel combustion consist of approximately 90 percent NO and 10 percent NO_2 at the source.) However, with the promulgation of the 2010 1-hour average standard for NO_2, local sources such as vehicular emissions may become of greater concern for this pollutant.

In order to evaluate the effect of mobile source emissions due to the Proposed Project and Phase 1, predicted mobile source pollutant concentrations at affected roadways and intersections must be added to background concentrations. Community-scale monitors currently in operation can be used to represent background NO_2 conditions away from roadways, but there is substantial uncertainty regarding background concentrations at or near ground-level locations in close proximity to roadways. EPA estimates that concentrations near roadways may be anywhere from 30 to 100 percent higher than those measured at community-scale monitors. Furthermore, the existing EPA mobile source models are not capable of assessing the chemical transformation of emitted NO to NO_2 over relatively short distances (e.g., sidewalks, low-floor windows). In addition, existing EPA mobile source models are designed to provide only peak concentrations, which are not consistent with the statistical format of the 1-hour average NO_2 standard.

Given EPA's current uncertainty regarding background concentrations near roadways, and the lack of approved modeling protocols for the prediction of total maximum 1-hour daily 98th percentile NO_2 concentrations, as well as the lack of a benchmark for evaluating the significance of these incremental concentrations, no methodology exists that could provide reasonable predictions about concentrations from mobile sources due to the Proposed Project and Phase 1 on the receptors at or near ground-level locations. The traffic associated with the Proposed Project and Phase 1 is not expected to change NO_2 concentrations appreciably, since the vehicular traffic from the Proposed Project and Phase 1 would be a small percentage of the total number of vehicles in the area. The amount of NO emitted that would rapidly transform to NO_2 in the immediate vicinity of roadways and intersections with traffic generated by the Proposed Project and Phase 1 would be small. It is not known whether conditions in the future without the Proposed Project or Phase 1 will be within or in excess of the NAAQS in these near-road areas. Background concentrations are in fact expected to decrease over time. Local sources would contribute an incremental amount of NO_2 to those background concentrations. The analysis limitations described above preclude the performance of an accurate quantitative assessment of the significance of the 1-hour NO_2 increments from the increase in traffic resulting from the Proposed Project and from Phase 1.

Potential impacts on local NO_2 concentrations from the proposed heating and hot water systems were examined.

LEAD

Airborne lead emissions are currently associated principally with industrial sources. Effective January 1, 1996, the Clean Air Act (CAA) banned the sale of the small amount of leaded fuel that was still available in some parts of the country for use in on-road vehicles, concluding a 25-year effort to phase out lead in gasoline. As newer vehicles replaced older ones, motor vehicle-related lead emissions have ceased to be a concern. As a result of CAA regulations, ambient lead emissions in urban areas have decreased by 97 percent nationwide since the 1970s. Even at locations in the New York City area where traffic volumes are very high, atmospheric lead concentrations are far below the 3-month average national standard of 0.15 micrograms per cubic meter ($\mu g/m^3$). No significant sources of lead are associated with the Proposed Project or with Phase 1 and, therefore, analysis was not warranted.

RESPIRABLE PARTICULATE MATTER—PM_{10} AND $PM_{2.5}$

Particulate matter (PM) is a broad class of air pollutants that includes discrete particles of a wide range of sizes and chemical compositions, as either liquid droplets (aerosols) or solids suspended in the atmosphere. The constituents of PM are both numerous and varied. They are emitted from a wide variety of sources (both natural and anthropogenic). Natural sources include the condensed and reacted forms of naturally occurring VOCs; salt particles resulting from the evaporation of sea spray; wind-borne pollen, fungi, molds, algae, yeasts, rusts, bacteria, and material from live and decaying plant and animal life; particles eroded from beaches, soil, and rock; and particles emitted from volcanic and geothermal eruptions and from forest fires. Naturally occurring PM is generally greater than 2.5 micrometers in diameter. Major anthropogenic sources include the combustion of fossil fuels (e.g., vehicular exhaust, power generation, boilers, engines, and home heating), chemical and manufacturing processes, all types of construction, agricultural activities, as well as wood-burning stoves and fireplaces. PM also acts as a substrate for the adsorption (accumulation of gases, liquids, or solutes on the surface of a solid or liquid) of other pollutants, often toxic and some likely carcinogenic compounds.

As described below, PM is regulated in two size categories: particles with an aerodynamic diameter of less than or equal to 2.5 micrometers ($PM_{2.5}$) and particles with an aerodynamic diameter of less than or equal to 10 micrometers (PM_{10}, which includes $PM_{2.5}$). $PM_{2.5}$ has the ability to reach the lower regions of the respiratory tract, delivering with it other compounds that adsorb to the surfaces of the particles. It is also extremely persistent in the atmosphere. $PM_{2.5}$ is mainly derived from combustion material that has volatilized and then condensed to form primary PM (often soon after the release from a source exhaust), or from precursor gases reacting in the atmosphere to form secondary PM.

Gasoline-powered vehicles do not produce any significant quantities of particulate emissions. Diesel–powered vehicles, especially heavy duty trucks and buses, do emit respirable PM, most of which is $PM_{2.5}$. PM concentrations may, consequently, be locally elevated near roadways with high volumes of heavy diesel–powered vehicles. The Proposed Project and Phase 1 would not result in any significant increases in truck traffic near the Project Site or in the region. Therefore, an analysis of potential impacts from PM was not warranted. In addition, as discussed in Chapter 18, “Construction,” the Proposed Project and Phase 1 will include specific recommendations to limit air quality impacts from construction activities to include staging vehicles and equipment on the Project Site and heavy vehicle routing instructions. PM emissions from propane combustion are very low, similar to natural gas combustion; however, potential future levels of PM from the proposed heating and hot water systems were examined.

SULFUR DIOXIDE

SO_2 emissions are associated primarily with the combustion of oil and coal, both sulfur–containing fuels. Due to the Federal rules on the sulfur content in fuel for on-road vehicles, no significant quantities are emitted from vehicular sources. Therefore, an analysis of SO_2 from mobile sources was not warranted. The Proposed Project may utilize either propane fuel or will consider utilizing electrical power for heating and hot water systems. As part of Phase 1, propane will be combusted in the heat and hot water systems. Therefore, potential future levels of SO_2 from the boilers were examined.

NON-CRITERIA POLLUTANTS

In addition to the criteria pollutants discussed above, non-criteria pollutants may be of concern. Non-criteria pollutants are emitted by a wide range of man-made and naturally occurring sources. These pollutants are sometimes referred to as hazardous air pollutants (HAP) and when emitted from mobile sources, as Mobile Source Air Toxics (MSATs). Emissions of non-criteria pollutants from industries are regulated by EPA. No major sources of non-criteria pollutants will be associated with the Proposed Project or from Phase 1. Therefore, an analysis of non-criteria pollutants was not warranted.

AIR QUALITY REGULATIONS, STANDARDS, AND BENCHMARKS

NATIONAL AND STATE AIR QUALITY STANDARDS

As required by the Clean Air Act (CAA), primary and secondary National Ambient Air Quality Standards (NAAQS) have been established for the six criteria air pollutants: CO, NO_2, ozone, PM (both $PM_{2.5}$ and PM_{10}), SO_2, and lead. The primary standards represent levels that are requisite to protect public health, allowing an adequate margin of safety. The secondary standards are intended to protect the nation's welfare, and account for air pollutant effects on soil, water, visibility, materials, vegetation, and other aspects of the environment. The primary and secondary standards are the same for NO_2 (annual), ozone, lead, and PM. There is no secondary standard for CO and the 1-hour NO_2 standard. The NAAQS are presented in **Table 12-1**. The NAAQS for CO, annual NO_2, and 3-hour SO_2 have also been adopted as the ambient air quality standards for New York State, but are defined on a running 12-month basis rather than for calendar years only. New York State also has standards for total suspended particulate matter (TSP), settleable particles, non-methane hydrocarbons (NMHC), 24-hour and annual SO_2, and ozone, which correspond to Federal standards that have since been revoked or replaced, and for the noncriteria pollutants beryllium, fluoride, and hydrogen sulfide (H_2S).

NAAQS ATTAINMENT STATUS AND STATE IMPLEMENTATION PLANS (SIP)

The CAA, as amended in 1990, defines non–attainment areas as geographic regions that have been designated as not meeting one or more of the NAAQS. When an area is designated as non–attainment by EPA, the state is required to develop and submit a State Implementation Plan (SIP) to the EPA, which describes how and when the state plans to achieve air quality that meets the NAAQS under the deadlines established by the CAA.

Sullivan County is an attainment area for CO, PM_{10}, $PM_{2.5}$, lead, and ozone.

New York State is currently in attainment of the annual-average NO_2 standard. EPA has designated the entire State of New York as "unclassifiable/attainment" in January 2012. Since additional monitoring is required for the 1-hour standard, areas will be reclassified once three years of monitoring data are available (2016 or 2017).[1]

EPA has established a 1-hour SO_2 standard, replacing the former 24-hour and annual standards, effective August 23, 2010.[2] Based on the available monitoring data, all New York State counties currently meet the 1-hour standard. Additional monitoring will be required. EPA plans to make final attainment designations in June 2012, based on 2008 to 2010 monitoring data and refined modeling. SIPs for nonattainment areas will be due by June 2014.[3]

---

[1] Environmental protection Agency, 40 CFR Part 81, [EPA-HQ-OAR-2011-0572],RIN-2060-AR06, Air Quality Designations for the 2010 Primary Nitrogen Dioxide (NO2) National Ambient Air Quality Standards, http://www.epa.gov/no2designations/pdfs/20120120FR.pdf

[2] Guidance Concerning the Implementation of the 1-hour SO_2 NAAQS for the Prevention of Significant Deterioration Program, August 23, 2010, http://epa.gov/nsr/documents/20100823guidance.pdf

[3] Fact Sheet, Implementation Guidance for the Primary National Ambient Air Quality Standard for Sulfur Dioxide, http://www.epa.gov/airquality/sulfurdioxide/pdfs/so2implementationnoa%20fs.pdf

Table 12-1
Ambient Air Quality Standards

Pollutant	Primary		Secondary	
	ppm	μg/m^3	ppm	μg/m^3
Carbon Monoxide (CO)				
8–Hour Concentration(1)	9	10,000	None	
1–Hour Concentration(1)	35	40,000		
Lead				
Rolling 3-Month Average(2)	NA	1.5	NA	1.5
Nitrogen Dioxide (NO_2)				
1-Hour Average(3)	0.100	188	None	
Annual Arithmetic Average	0.053	100	0.053	100
Ozone (O_3)				
8–Hour Average(4,5)	0.075	150	0.075	150
Respirable Particulate Matter (PM_{10})				
24–Hour Concentration(1)	NA	150	NA	150
Fine Respirable Particulate Matter ($PM_{2.5}$)				
Annual Mean	NA	15	NA	15
24–Hour Concentration(6,7)	NA	35	NA	35
Sulfur Dioxide (SO_2)(8)				
1-hour Average (9)	0.075	196	NA	NA
Maximum 3–Hour Average(1)	NA	NA	0.50	1,300

Notes:
ppm – parts per million (unit of measure for gases only)
μg/m^3 – micrograms per cubic meter (unit of measure for gases and particles, including lead)
NA – not applicable
All annual periods refer to calendar year.
Standards are defined in ppm. Approximately equivalent concentrations in μg/m3 are presented.
(1) Not to be exceeded more than once a year.
(2) EPA has lowered the NAAQS down from 1.5 μg/m^3, effective January 12, 2009.
(3) 3-year average of the annual 98th percentile daily maximum 1-hr average concentration. Effective April 12, 2010.
(4) 3-year average of the annual fourth highest daily maximum 8-hr average concentration.
(5) EPA has proposed lowering this standard further to within the range 0.060-0.070 ppm., and adding a secondary standard measured as a cumulative concentration within the range of 7 to 15 ppm-hours aimed mainly at protecting sensitive vegetation. A final decision on this standard has been postponed but is expected to occur in 2013.
(6) Not to be exceeded by the annual 98th percentile when averaged over 3 years.
(7) EPA has lowered the NAAQS down from 65 μg/m3, effective December 18, 2006.
(8) EPA revoked the 24-hour and annual primary standards, replacing them with a 1-hour average standard. Effective August 23, 2010.
(9) 3-year average of the annual 99th percentile daily maximum 1-hr average concentration.

Sources: 40 CFR Part 50: National Primary and Secondary Ambient Air Quality Standards.

DETERMINING THE SIGNIFICANCE OF AIR QUALITY IMPACTS

The State Environmental Quality Review Act (SEQRA) regulations state that the significance of a predicted consequence of a project (i.e., whether it is material, substantial, large or important) should be assessed in connection with its setting (e.g., urban or rural), its probability of occurrence, its duration, its irreversibility, its geographic scope, its magnitude, and the number of people affected.[1] In terms of the magnitude of air quality impacts, any action predicted to increase the concentration of a criteria air pollutant to a level that would exceed the concentrations defined by the NAAQS (see Table 12-1) would be deemed to have a potential significant adverse impact. In addition, in order to maintain concentrations lower than the NAAQS in attainment areas, or to ensure that concentrations will not be significantly increased in non-attainment areas, threshold levels have been defined for certain pollutants; any action predicted to increase the concentrations of these pollutants above the thresholds would be deemed to have a potential significant adverse impact, even in cases where exceedance of the NAAQS are not predicted.

$PM_{2.5}$ INTERIM GUIDANCE CRITERIA

The New York State Department of Environmental Conservation (NYSDEC) has published a policy to provide interim direction for evaluating $PM_{2.5}$ impacts[2]. This policy would apply only to facilities applying for permits or major permit modifications under SEQRA that emit 15 tons of PM_{10} or more annually. The policy states that such a project will be deemed to have a potentially significant adverse impact if the project's maximum impacts are predicted to increase $PM_{2.5}$ concentrations by more than 0.3 $\mu g/m^3$ averaged annually or more than 5 $\mu g/m^3$ on a 24-hour basis. Projects that exceed either the annual or 24-hour threshold will be required to prepare an Environmental Impact Statement (EIS) to assess the severity of the impacts, to evaluate alternatives, and to employ reasonable and necessary mitigation measures to minimize the $PM_{2.5}$ impacts of the source to the maximum extent practicable.

Actions that would increase $PM_{2.5}$ concentrations by more than the interim guidance criteria above would be considered to have a potential significant adverse impact. NYSDEC requires that permitted sources that would potentially cause exceedance of these criteria prepare an EIS and examine potential measures to reduce or eliminate such impacts. PM_{10} emissions from Phase 1 are estimated at less than 1 ton per year, and it is expected that emissions from the Proposed Project would also be well below the 15-ton-per year threshold under NYSDEC's $PM_{2.5}$ policy guidance; therefore, an analysis for $PM_{2.5}$ was not warranted.

B. COMPREHENSIVE DEVELOPMENT PLAN (DGEIS)

EXISTING CONDITIONS

Representative criteria pollutant concentrations measured in recent years at NYSDEC air quality monitoring stations nearest to the Project Site are presented in **Table 12-2**. These values presented are consistent with the NAAQS format. For example, the 8-hour ozone concentration shown is the 3-year average of the 4th highest daily maximum 8-hour average concentrations. The concentrations were obtained from the 2010 New York State Ambient Air Quality Report,

[1] State Environmental Quality Review Regulations, 6 NYCRR § 617.7

[2] CP33/Assessing and Mitigating Impacts of Fine Particulate Emissions, NYSDEC 12/29/2003.

the most recent report available. As shown in Table 12-2, the recently monitored levels did not exceed the NAAQS.

Table 12-2
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging Period	Concentrations	NAAQS
CO	Botanical Gardens	ppm	8-hour	1.5	9
			1-hour	2.0	35
SO_2	Belleayre Mtn.	μg/m³	1-hour	30.4	196
			3-hour	21.5	1300
PM_{10}	IS 52	μg/m³	24-hour	35	150
$PM_{2.5}$	Newburgh	μg/m³	Annual	8.4	15
			24-hour	23	35
NO_2	Botanical Gardens	μg/m³	1-hour	126.8	188
			Annual	65.8	100
Lead	Wallkill	μg/m³	3-month	0.078	0.15
O_3	Belleayre Mtn.	ppm	8-hour	0.068	0.075
Source: Annual New York State Air Quality Reports, NYSDEC 2010.					

To determine if there are any significant sources of stationary air pollutants near the Proposed Project that are not already accounted for in the monitored background levels of air pollutants for analysis, data from land use and field surveys was examined and a search of the NYSDEC's permit databases[1] and the EPA Envirofacts[2] database was undertaken. An assessment of large emission sources (e.g., power plants and concrete plants) within 1,000 feet of the study area and commercial, institutional, or large-scale residential developments within 400 feet of the study areas was undertaken. Based on the field surveys and data searches, there are no significant sources of stationary air pollutants near the Proposed Project that would need to be added to the monitored background levels.

THE FUTURE WITHOUT THE PROPOSED ACTIONS AND PROPOSED PROJECT

In the future without the Proposed Project, no significant changes in air quality are expected to occur on the Project Site or in the study area. None of the identified approved or pending development projects (the "No Build" projects) planned within close proximity to the Project Site would significantly affect existing air quality conditions from either mobile or stationary sources.

[1] NYSDEC, Title V and State Facility Permit databases, http://www.dec.ny.gov/dardata/boss/afs/issued_atv.html, *[4/10/2012]*.and http://www.dec.ny.gov/dardata/boss/afs/issued_asf.html, *[4/10/2012]*.

[2] EPA, Envirofacts Data Warehouse, http://oaspub.epa.gov/enviro/ef_home2.air, *[4/10/2012]*.

PROBABLE IMPACTS OF THE PROPOSED ACTIONS AND PROPOSED PROJECT

MOBILE SOURCE AIR QUALITY SCREENING ANALYSIS

Methodology for Predicting Pollutant Concentrations

An assessment of the potential air quality effects of CO emissions that would result from vehicles traveling to and departing from the Proposed Project was performed following the Volume Threshold Screening analysis procedures outlined in the NYSDOT EPM. The Volume Threshold Screening was developed by NYSDOT to provide very conservative air quality estimates based on worst-case assumptions. The *EPM* states that if the project-related traffic volumes are below the volume threshold criteria, then a microscale air quality analysis is unnecessary even if the other Capture Criteria are met for a LOS D or worse location, since an exceedance of the NAAQS would be extremely unlikely. The Volume Threshold screening analysis (the last step in the multi-step EPM screening procedures) was performed for each intersection as a conservative analysis, using traffic volume and emission factor data to compare with specific volume thresholds established in the *EPM*. This conservative screening procedure was used to determine whether a detailed air quality analysis of CO concentrations is needed for any of the intersections in the study area for the Proposed Project.

The study areas include the intersections evaluated as part of the Traffic Impact Study completed for the Proposed Project and presented in Chapter 11, "Traffic," using traffic data for the multi-phase Build years during the peak traffic hours.

Mobile Source Air Quality Screening Results

A Volume Threshold screening analysis was conducted for each intersection to determine the need for a microscale air quality analysis. The volume thresholds (provided in the *EPM*) establish traffic volumes in which an exceedance of the NAAQs for CO is extremely unlikely. This approach uses Project Area specific emissions data to determine corresponding vehicle thresholds. For intersections where approach volumes are equal to or less than the applicable thresholds, microscale air quality analysis is not required.

Based on the Volume Threshold screening, the Proposed Project-related traffic volumes in the Build year at each of the intersections would be below the Volume Threshold criteria. Although the Proposed Project would generate additional traffic at these intersections, it would not be enough to necessitate further study. Therefore, a detailed CO microscale air quality analysis was not warranted at these intersections for the Proposed Project. As such, no significant adverse air quality impacts are expected to result from the mobile sources associated with the Proposed Project.

STATIONARY SOURCE AIR QUALITY SCREENING ANALYSIS

Stationary sources of air pollutants associated with the Proposed Project would include heating and hot water systems. These emissions were not evaluated using NYSDEC Policy DAR-1 (Air-Guide 1) screening analyses to determine the potential for significant pollutant concentrations since the EPT Concord Resort will explore several design options as its HVAC and mechanical systems are further developed and would minimize fossil-fuel consumption and resulting emissions, thereby increasing the overall sustainability of the project. Future developments will utilize propane fuel and/or consider utilizing electrical power for heating and cooking purposes.

For the Proposed Project's fossil-fueled heating and hot water systems, the primary pollutants of concern are NO_2 and SO_2 when burning propane. Since monitored concentrations of these pollutants indicate that levels are well below the standards in the study area, and the Proposed Project would not be a major source of stationary source emissions, the Proposed Project is not expected to result in significant adverse air quality impacts due to stationary sources.

CONSISTENCY WITH THE NEW YORK STATE AIR QUALITY IMPLEMENTATION PLAN

The Proposed Project is not expected to cause any new exceedance of air quality standards or exacerbate any existing exceedance for the projected 2014, 2015, 2016, 2019, and 2022 Build conditions. Therefore, the Proposed Project would not have a significant adverse impact on local air quality, and would be consistent with the requirements of the New York State Implementation Plan (SIP).

MITIGATION

Since there would be no significant adverse air quality impacts from the Proposed Project, mitigation is not required.

C. SITE-SPECIFIC DEVELOPMENT OF PHASE 1 (DEIS)

EXISTING CONDITIONS

The existing conditions related to the site specific development of Phase 1 are the same as those presented for the Comprehensive Development Plan above.

THE FUTURE WITHOUT THE DEVELOPMENT OF PHASE 1

In the future without the development of Phase 1, no significant changes in air quality are expected to occur on the Project Site or in the study area. None of the identified approved or pending development projects (the "No Build" projects) planned within close proximity to the Phase 1 development area would significantly affect existing air quality conditions from either mobile or stationary sources.

PROBABLE IMPACTS OF THE DEVELOPMENT OF PHASE 1

MOBILE SOURCE AIR QUALITY SCREENING ANALYSIS

Methodology for Predicting Pollutant Concentrations

An assessment of the potential air quality effects of CO emissions that would result from vehicles traveling to and departing from Phase 1 was performed following the procedures outlined in the NYSDOT EPM. The study areas include the intersections evaluated as part of the Traffic Impact Study developed for the Proposed Project and presented in Chapter 11, "Traffic."

The potential for CO impacts was assessed using traffic data for the Build year during Friday peak traffic hour (3:30 PM to 4:30 PM) and the Sunday peak traffic hour (5:00 PM to 6:00 PM). The following multi-step EPM screening procedure was used to determine whether a detailed air quality analysis of CO concentrations is needed for any of the intersections in the study area for Phase 1.

CO Screening Criteria

Screening criteria described in the *EPM* were employed to determine whether Phase 1 requires a detailed air quality analysis at the intersections in the study areas.

Before undertaking a detailed microscale modeling analysis of CO concentrations at the study area intersections, the screening criteria first determines whether a project would increase traffic volumes or implement any other changes (e.g., changes in speed, roadway width, sidewalk locations, or traffic signals) to the extent whereby significant increases in air pollutant concentrations could be expected. The following is a summary of the multi-step procedure suggested in the *EPM* to determine if there is the potential for CO impacts from Phase 1:

- Level-of-Service (LOS) Screening: If the Build condition LOS is A, B, or C, no air quality analysis is required. For intersections operating at LOS D or worse, proceed to Capture Criteria.
- Capture Criteria: If the Build condition LOS is at D, E, or F, then the following Capture Criteria should be applied at each intersection or corridor to determine if an air quality analysis may be warranted:
    - A 10 percent or more reduction in the source-to-receptor distance (e.g., street or highway widening); or
    - A 10 percent or more increase in traffic volume on affected roadways for the Build year; or
    - A 10 percent or more increase in vehicle emissions for the Build year using emission factors provided in the *EPM*; or
    - Any increase in the number of queued lanes for the Build year (this applies to intersections); it is not expected that intersections in the Build condition controlled by stop signs would require an air quality analysis; or
    - A 20 percent reduction in speed when Build average speeds are below 30 miles per hour (mph).

If Phase 1 does not meet any of the above criteria, a microscale analysis is not required. Should any one of the above Capture Criteria be met in addition to the LOS screening, then a Volume Threshold Screening is performed, using traffic volume and emission factor data to compare with specific volume thresholds established in the *EPM*.

Both the above Capture Criteria and Volume Threshold Screening were developed by NYSDOT to be very conservative air quality estimates based on worst-case assumptions. The *EPM* states that if the project-related traffic volumes are below the volume threshold criteria, then a microscale air quality analysis is unnecessary even if the other Capture Criteria are met for a LOS D or worse location, since an exceedance of the NAAQS would be extremely unlikely.

For Phase 1, the LOS Screening analysis and the Capture Criteria were applied first, followed by the Volume Threshold Screening analysis for applicable intersections meeting the LOS and Capture Criteria requiring further analysis.

Mobile Source Air Quality Screening Results

The area roadway intersections were reviewed based on NYSDOT's *EPM* criteria for determining locations that may warrant a CO microscale air quality analysis. The screening analysis examined the LOS and projected volume increases by intersection approach. As described below, the results of the screening analysis show that none of the Phase 1-affected intersections would require a detailed microscale air quality analysis.

LOS Screening Analysis

Results of the traffic capacity analysis performed for the Build year condition, for the peak traffic periods, were reviewed at each of the study area intersections to determine the potential need for a microscale air quality analysis.

The LOS screening criteria were first applied to identify those intersections with approach LOS D or worse. Based on the review of the 20 intersections analyzed, the following seven intersections were projected to operate at LOS D or worse on approaches during any of the peak traffic periods analyzed:

- Route 42/Pleasant Street & Anawana Lake Road
- Route 42/Pleasant Street & Depot Road
- Route 42/Pleasant Street & Concord Road
- Route 42/Pleasant Street & Fraser Road/Kiamesha Lake Road
- Cimarron Road & Joyland Road
- Cimarron Road & Towner Road
- Cimarron Road & Route 17 Ramps

Capture Criteria Screening Analysis

Further screening on the intersections identified in the LOS Screening Analysis was conducted using the Capture Criteria outlined above. This screening indicated that for four of the seven intersections listed above, at least one of the listed Capture Criteria would be met; there would be a 10 percent or more increase in traffic volume on affected roadways for the Build year for all four intersections, and a 10 percent or more reduction in the source-to-receptor distance (widening) in addition to the increase in traffic volume for one of the intersections. Therefore, a volume threshold screening analysis was conducted for the following four intersections:

- Route 42/Pleasant Street & Fraser Road/Kiamesha Lake Road
- Cimarron Road & Joyland Road
- Cimarron Road & Towner Road
- Cimarron Road & Route 17 Ramps

Volume Threshold Screening

As discussed in the Capture Criteria Screening Analysis above, the Capture Criteria was triggered for four study area intersections in the Phase 1 Build year. Therefore, a Volume Threshold screening analysis was conducted to further determine the need for a microscale air quality analysis at these intersections. The volume thresholds (provided in the *EPM*) establish traffic volumes in which an exceedance of the NAAQs for CO is extremely unlikely. This approach uses Project Area specific emissions data to determine corresponding vehicle thresholds. For intersections where approach volumes are equal to or less than the applicable thresholds, microscale air quality analysis is not required.

Based on the Volume Threshold screening, the Phase 1-related traffic volumes in the Build year at each of the intersections would be below the Volume Threshold criteria. Although Phase 1 would generate additional traffic at these intersections, it would not be enough to necessitate further study. Therefore, a detailed CO microscale air quality analysis was not warranted at these intersections.

As discussed above, the results of the screening analysis based on NYSDOT's *EPM*, which was employed to determine whether the Phase 1 requires further air quality analysis, demonstrated that none of the 20 Phase 1-affected intersections would require a detailed microscale air quality analysis. Therefore, no significant adverse air quality impacts are expected to occur as a result of the Phase 1's mobile sources.

STATIONARY SOURCE AIR QUALITY SCREENING ANALYSIS

Methodology for Predicting Pollutant Concentrations

Phase 1 is expected to have a total of seven 4 million British Thermal Units per hour (mmBtu/hr) propane fired low NOx condensing boilers associated with the heating and hot water systems located in the central utility plant. Stationary source emissions were evaluated using NYSDEC Policy DAR-1 (Air Guide 1) screening analyses to determine the potential for significant pollutant concentrations from these systems. Potential impacts from criteria pollutants were evaluated using the EPA-approved AERSCREEN model (version 11076, EPA 2011). The AERSCREEN model was recently endorsed by EPA[1] as a replacement to the SCREEN3 model. If the worst-case concentrations predicted by AERSCREEN are above significant impact levels, further analysis with AERMOD is required to determine the potential for air quality impacts from a Proposed Project. However, if the worst-case concentrations predicted by the AERSCREEN model are below impact levels, there is no potential for impact and no further analysis is required.

Emission Rates and Stack Parameters

Table 12-3 presents the emissions and stack parameters from the proposed boilers. The analysis was modeled using a unitary emission rate of 1 gram per second (g/s) yielding maximum unitized impacts in units of micrograms per cubic meter per gram per second (µg/m^3/g/s). The unitized impacts were then multiplied by the pollutant specific emission rates shown in Table 12-3 to determine the maximum modeled concentrations.

Table 12-3
Emission Rates and Stack Parameters

	Boilers
Stack Parameters	
Stack Height above grade (ft)	30
Stack Diameter (ft)[1]	1.17
Exhaust Velocity (ft/s)[1]	29
Exhaust Temperature (°F)[1]	140
Emission Rates (g/s)[2]	
NOx	0.0855
CO	0.2892
PM_{10}	0.0270
SO_2	0.0578

Notes:
1. The stack diameter, exhaust velocity, and exhaust temperature are based on manufacturer data.
2. The emission rates were based on AP-42 emission factors, except for NOx, which was based on manufacturer's data.

[1] Memorandum, "AERSCREEN Released as the EPA Recommended Screening Model", April 11, 2011.

The exhaust stack for the boiler systems would be located on the roof of the central utility plant at a height of 30 feet above-grade, based on available design information.

Annual NO_2 concentration increments were estimated using a NO_2 to NO_x ratio of 0.46, which is based on the ambient annual average NO_2 to NO_x ratio as measured at New York City monitoring stations in the most recent available three year period (2006-2010), as described in EPA's *Guideline on Air Quality Models* at 40 CFR part 51 Appendix W, Section 5.2.4.[1] For the analysis of the 1-hour average NO_2 concentrations, the Plume Volume Molar Ratio Method (PVMRM) module was applied within AERSCREEN, following EPA's modeling guidance.[2] PVMRM analyzes chemical transformation of NO emitted from the stack to NO_2. The PVMRM module incorporates hourly background ozone concentrations to estimate NO_x transformation within the source plume. An initial NO_2 to NO_x ratio of 10 percent at the source exhaust was assumed for the boilers, which is appropriate for this type of combustion source.[3]

Model Selection

The screening level modeling analysis was performed using the EPA-approved AERSCREEN model. Similar to SCREEN3, AERSCREEN predicts worst-case 1-hour impacts downwind from a point, area, or volume source. AERSCREEN generates application-specific worst-case meteorology using representative minimum and maximum ambient air temperatures, and site-specific surface characteristics such as albedo, Bowen ratio, and surface roughness. The model incorporates the PRIME downwash algorithms that are part of the AERMOD refined model and utilizes BPIPRIM to provide a detailed analysis of downwash influences on a direction-specific basis.

AERSCREEN also incorporates AERMOD's complex terrain algorithms and utilizes the AERMAP terrain processor to account for the actual terrain in the vicinity of the source on a direction-specific basis. The AERSCREEN model was used to calculate ground-level ambient concentrations of criteria pollutants from the boilers. The model was run both with and without the influence of building downwash and with rural diffusion coefficients based on a review of land-use maps of the area. Other model options were selected based upon EPA guidance.

Meteorological Data

The meteorological data used by the AERSCREEN model is generated by the MAKEMET program which uses application-specific worst-case meteorology, using representative minimum and maximum ambient air temperatures, and site-specific surface characteristics such as albedo, Bowen ratio, and surface roughness to determine worst-case hourly impacts. The default minimum and maximum air temperatures of 250ºK and 310ºK, a minimum wind speed of 0.5 m/s, and an anemometer height of 10 m were used in the model. Surface characteristics in the study area were determined using the AERSURFACE preprocessor and the source location coordinates.

---

[1] http://www.epa.gov/scram001/guidance/guide/appw_05.pdf

[2] EPA, Additional Clarification Regarding Application of Appendix W Modeling Guidance for the 1-hour NO_2 National Ambient Air Quality Standard, March 1, 2011.

[3] MACTEC for Alaska Department of Environmental Conservation, Evaluation of Bias in AERMOD-PVMRM, June 2005 http://www.epa.gov/scram001/7thconf/aermod/pvmrm_bias_eval.pdf;

San Joaquin Valley, Recommended In-stack NO_2/NOx Ratios,

http://www.valleyair.org/busind/pto/Tox_Resources/AirQualityMonitoring.htm

Receptor Locations

Receptor information provides the distance from the source, terrain height, and height above ground for selected locations. An automated ground level receptor array was chosen to represent discrete receptors in the area out to a distance of 2000 meters from the center of the boiler exhaust stacks in order to capture the location of maximum impact. National Elevation Dataset (NED) files were utilized to incorporate the influence of terrain and a terrain preprocessor (AERMAP) was used to determine the representative elevations for each receptor location.

Background Concentrations

To estimate the maximum expected pollutant concentration at a given receptor, the predicted impacts must be added to a background value that accounts for existing pollutant concentrations from other sources that are not directly accounted for in the model. **Table 12-4** presents the background concentrations utilized in the analysis. The background concentrations are based on concentrations monitored at the most representative NYSDEC ambient air monitoring stations over a recent five-year period for which data are available and are consistent with the form of NAAQS.

Table 12-4
Representative Monitored Ambient Air Quality Data

Pollutant	Location	Units	Averaging Period	Concentrations	NAAQS
CO	Botanical Gardens	μg/m^3	8-hour(1)	2,176	10,000
			1-hour(1)	3,207	40,000
SO_2	Belleayre Mtn.	μg/m^3	1-hour(2)	30.4	196
			3-hour(1)	43.7	1300
PM_{10}	IS 52	μg/m^3	24-hour(1)	45	150
NO_2	Botanical Gardens	μg/m^3	1-hour(3)	126.8	188
			Annual(4)	65.8	100

Notes:
(1) 5-year highest second-highest measured value from 2006 – 2010 except for PM10 which is based on the 3-year highest second-highest value from 2007 – 2010.
(2) 5-year average of the annual 99th percentile daily maximum 1-hr average concentration (2006-2010).
(3) 5-year average of the annual 98th percentile daily maximum 1-hr average concentration (2006-2010).
(4) 5-year maximum from 2006 – 2010.
Source: New York State Air Quality Report Ambient Air Monitoring System, NYSDEC, 2006-2010.

Stationary Source Air Quality Screening Results

A screening level modeling analysis of criteria pollutants was performed to determine the potential for significant adverse impacts from the heating and hot water systems for Phase 1. The model calculates 1-hour average concentrations. For other periods, the emissions were prorated to determine longer-term concentrations using EPA-approved conversion factors. Maximum predicted concentrations from the modeling analysis were added to the maximum ambient background concentrations and compared to the NAAQS. Criteria pollutant impacts from Phase 1 are less than their respective NAAQS; therefore, Phase 1 would not result in any significant adverse air quality impacts due to the proposed heating and hot water system. The results of the analysis are presented in **Table 12-5**.

Table 12-5
Maximum Modeled Pollutant Concentration (in μg/m^3)

Pollutant	Averaging Period	Maximum Modeled Impact	Background	Total Concentration	NAAQS
CO	8-hour	332	2,176	2,508	10,000
	1-hour	369	3,207	3,576	40,000
SO_2	1-hour	73.8	30.4	104.2	196
	3-hour	73.8	43.7	117.6	1300
PM_{10}	24-hour	20.7	45	65.7	150
NO_2	1-hour	54.3	126.8	181.1	188
	Annual	5.0	65.8	70.8	100

Based on the current design, it is envisioned that Phase 1 would also include several very small dryers (less than 1 mmBtu/hr each) for the laundry and two 1,000 kilowatt (KW) emergency generators. Design options to minimize fossil-fuel consumption and resulting emissions from the dryers, either utilizing propane fuel, the waste heat from the boilers, or electrical power will be explored. Potential emissions from these units would be a relatively small fraction of the emissions from the heating and hot water system and potential impacts would not be expected to occur in the same location as the maximum predicted impacts associated with the heating and hot water system; therefore, Phase 1 would not result in significant adverse air quality impacts due to the dryers.

The emergency generators would be tested periodically for a short period (once per month or less for approximately 30 minutes) to ensure their availability and reliability in the event of a sudden loss in utility electrical power. They would not be utilized in a peak load sharing program,[1] minimizing the use of this equipment during non-emergency periods. Emergency generators are exempt from NYSDEC air permitting requirements, but if used during non-emergency periods would be required to obtain an air permit or registration. The emergency generators would be installed and operated in accordance with EPA requirements, as well as other applicable codes and standards. Potential air quality impacts from the emergency generators would be insignificant, since they would be used only for testing purposes outside of an actual emergency use, and individual generators would be tested at different times. Therefore, it is not expected that Phase 1 would result in significant adverse air quality impacts due to the emergency generators.

CONSISTENCY WITH THE NEW YORK STATE AIR QUALITY IMPLEMENTATION PLAN

Phase 1 is not expected to cause any new exceedance of air quality standards or exacerbate any existing exceedance for the projected Build condition. Therefore, Phase 1 is not expected to have a significant adverse impact on local air quality, and would be consistent with the requirements of the New York SIP.

MITIGATION

Since there would be no significant adverse air quality impacts from Phase 1, mitigation is not required. ✷

[1] The term “peak load sharing” refers to the use of customer-operated (non-utility) generators to produce electricity at the request of the local electrical utility in order to reduce the electrical demand during peak demand periods, particularly during the summer period.