3.4 AIR QUALITY

This section presents a description of the existing air quality setting in the vicinity of the La Center Interchange and Ridgefield Interchange Sites. Information presented here is condensed from the Cowlitz Casino Project Environmental Impact Statement Air Quality Technical Report, completed by CH2M Hill in 2006 (CH2M Hill, 2006a) and is included as Appendix E.

The alternative project sites are located in Clark County, Washington. The unifying feature of the area is the Columbia River. The alternative sites are approximately 16 and 14 miles north of the Vancouver/Portland metropolitan area, respectively, but are located in a rural area outside of the Vancouver ozone and carbon monoxide maintenance areas.

3.4.1 CLIMATE

The Coast Range to the west and the Cascade Range to the east influence the climate of Clark County. The Coast Range provides limited shelter from the Pacific Ocean. As moist, heavy air from the west rises up the steep slopes of the Cascade Range, the air is cooled, which creates moderate rainfall in the lower-lying areas and more significant rainfall on the west slope of the Cascades. The Cascades also form an eastern barrier from continental air masses originating over the Columbia River Basin. The County’s geographic position between two mountain ranges serves to insulate it against dramatically differing climates occurring 100 miles in either direction.

TEMPERATURE

Temperatures in the County, as recorded at four reporting stations, average 37 degrees Fahrenheit (°F) in January and 65°F in July. Temperatures may vary from one location to another, depending on the direction of the wind, type of vegetation, and topography. Generally, temperatures are higher in the urbanized areas than in the surrounding rural areas. This is often due to 1) increased human activities that occur within urban areas, 2) less evaporation because there is less water retention in the developed areas, and 3) less heat loss at night in urban areas because of heat retention in buildings and paved areas.

There are four definite seasons of the year, but the trend from one to another is very gradual. The average annual temperature in the County is approximately 50°F. The average growing season on the western plains ranges from 154 days at Battle Ground to 178 days at La Center and 222 days at Vancouver.

PRECIPITATION

Clark County has wet, mild winters and warm, dry summers. Precipitation ranges from a low of 41 inches annually in Vancouver to a high of 114 inches annually in the northeastern corner of the County. Approximately 80% to 85% of the precipitation occurs from October to May.
Seasonal differences in precipitation are much more marked than those of temperatures. The precipitation falls mostly as rain, with the normal annual snowfall ranging from less than 6 inches on the western plains to over 22 inches in the northeastern portion of the County.

**WIND**

The prevailing surface winds are generally from the northwest in the months of April through September and from the east/southeast from October through March. There are occasional winds from the east that are a part of extremes in either cold or hot weather. These extremes are tempered by nearly uniform ocean temperatures ranging from 50°F to 55°F. Winter storm tracks are generally from the southwest, with infrequent snowstorms dropping down from the Gulf of Alaska. Major wind events in Clark County occur infrequently. Two of the more famous were the Columbus Day storm in 1962 and the Peter Ogden tornado in 1972.

**FOG**

Fog often occurs in the valleys and low-lying areas of the County. Fog is either the result of clear skies and still air that allows large heat losses at night, or of warm moist air masses moving over cooler ground. In either case, when the lower air is cooled to below the dew point, fog occurs. Fog as a result of clear skies and still air is most common in the County during the spring and fall months.

**CLIMATIC CHANGE**

According to the United Nations Intergovernmental Panel on Climate Change (IPCC) and the U.S. Environmental Protection Agency (EPA), temperatures in Washington State could increase by about 5°F in winter and summer, and by about 4°F in spring and fall over the next 100 years. Precipitation is projected to change little in the spring, summer, and fall and to increase by about 10% in winter. The frequency of extreme hot days in summer is expected to increase along with the general warming trend. A recent study issued by the U.S. Department of Energy predicts similar climatic changes for the region.

**TOPOGRAPHY**

The structure and orientation of terrain features will often influence and even control air motion and mechanical turbulence in the lower atmosphere. Small hills and trees may alter wind speed and direction while also enhancing mechanical turbulence. Larger terrain features such as mountains, hills, and valleys may be a governing factor in the control of wind speed and wind direction.

Clark County lies within a geographic basin known as the Willamette-Puget Trough, formed by the Cascade and Pacific Coast Mountain Ranges. It is bounded on the south and west by the Columbia River, on the north by the Lewis River, and on the east by the foothills of the Cascades. Along the Columbia are low-lying bottomlands, from which a series of alluvial plains and terraces extend north...
and northeast. Land elevations rise from less than 10 feet on the south and west floodplains to over 3,000 feet above mean sea level (amsl) in the eastern portion. The western half of Clark County lies at the junction of the Columbia River and Willamette valleys and is comparatively level over the southern portion. As the terrain progresses northward and eastward, it develops into rolling hills, culminating in the Cascade Range.

3.4.2 REGULATORY CONTEXT

FEDERAL

The Federal Clean Air Act (CAA) of 1970, as amended, establishes air quality standards for several pollutants. These pollutants are termed “criteria” pollutants because the EPA has established specific concentration threshold criteria based upon specific medical evidence of health effects. These national ambient air quality standards (NAAQS) are divided into primary standards and secondary standards. Primary standards are designed to protect the public health and secondary standards are intended to protect the public welfare from effects such as visibility reduction, soiling, nuisance, and other forms of damage. Ambient air quality standards are presented in Table 3.4-1.

Regions of Clark County are classified with respect to their attainment or the extent of their “non-attainment” of these standards. Non-attainment areas must take steps towards attainment within a specific period of time. The CAA places most of the responsibility on states to achieve compliance with the NAAQS. The primary vehicle for implementation is known as the State Implementation Plan (SIP). The SIP for Washington is officially entitled A Plan for the Implementation, Maintenance and Enforcement of National Ambient Air Quality Standards in the State of Washington and is a number of documents that set forth the State’s strategies for achieving Federal air quality standards. The Code of Federal Regulations (CFR Title 40, Part 52, Subpart WW Section 52.2479) lists all of the items that are included in the Washington SIP.

Whereas the southern portion of Clark County is part of the Portland/Vancouver Metropolitan area and, as such, is part of an ozone and carbon monoxide maintenance area, as shown in Table 3.4-2, the northern portion of Clark County is designated as unclassifiable/attainment for all NAAQS. Both the La Center Interchange Site and the Ridgefield Interchange Site are located within this northern portion of Clark County.

The EPA Region 10 Office of Air Quality (OAQ) is responsible for administering the Tribal Authority Rule (40 CFR, Part 49), Indian Tribes: Air Quality Planning and Management (63 FR 7253, February 12, 1998), which implements Section 301 of the CAA. The Tribal Authority Rule authorizes the Regional EPA Administrator to decide which provisions of the CAA to make available for tribal implementation and which to reserve for EPA implementation. The rule provides that tribes may be treated in the same manner as states for virtually all CAA programs. The rule grants tribes with EPA-approved CAA programs authority over these programs for all air resources within the...
exterior boundaries of their reservation (including non-Indian owned fee lands). For off-reservation areas tribes must demonstrate the basis for jurisdiction.

### TABLE 3.4-1
**AMBIENT AIR QUALITY STANDARDS**

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>National Primary*</th>
<th>National Secondary</th>
<th>Washington State</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Carbon Monoxide (CO)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-Hour Average</td>
<td>9 ppm</td>
<td>Same as Primary</td>
<td>9 ppm</td>
</tr>
<tr>
<td>1-Hour Average</td>
<td>35 ppm</td>
<td>Same as Primary</td>
<td>35 ppm</td>
</tr>
<tr>
<td><strong>Lead (Pb)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Quarterly Average</td>
<td>1.5 μg/m³</td>
<td>Same as Primary</td>
<td>No Standard</td>
</tr>
<tr>
<td><strong>Total Suspended Particulates</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Arithmetic Mean</td>
<td>No Standard</td>
<td>No Standard</td>
<td>60 μg/m³</td>
</tr>
<tr>
<td>24-Hour Average</td>
<td>No Standard</td>
<td>No Standard</td>
<td>150 μg/m³</td>
</tr>
<tr>
<td><strong>Particulate Matter (PM₁₀)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Arithmetic Mean</td>
<td>50 μg/m³</td>
<td>Same as Primary</td>
<td>50 μg/m³</td>
</tr>
<tr>
<td>24-Hour Average</td>
<td>150 μg/m³</td>
<td>Same as Primary</td>
<td>150 μg/m³</td>
</tr>
<tr>
<td><strong>Particulate Matter (PM₂.₅)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24-Hour Average</td>
<td>65 μg/m³</td>
<td>Same as Primary</td>
<td>65 μg/m³</td>
</tr>
<tr>
<td>Annual Arithmetic Mean</td>
<td>15 μg/m³</td>
<td>Same as Primary</td>
<td>15 μg/m³</td>
</tr>
<tr>
<td><strong>Sulfur Dioxide (SO₂)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Average</td>
<td>0.03 ppm</td>
<td>No Standard</td>
<td>0.02 ppm</td>
</tr>
<tr>
<td>24-Hour Average</td>
<td>0.14 ppm</td>
<td>No Standard</td>
<td>0.10 ppm</td>
</tr>
<tr>
<td>3-Hour Average</td>
<td>No Standard</td>
<td>0.50 ppm</td>
<td>No Standard</td>
</tr>
<tr>
<td>1-Hour Average</td>
<td>No Standard</td>
<td>No Standard</td>
<td>0.40 ppm***</td>
</tr>
<tr>
<td><strong>Ozone (O₃)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8-Hour Average**</td>
<td>0.08 ppm</td>
<td>0.08 ppm</td>
<td>No Standard</td>
</tr>
<tr>
<td><strong>Nitrogen Dioxide (NO₂)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annual Average</td>
<td>0.053 ppm</td>
<td>Same as Primary</td>
<td>0.05 ppm</td>
</tr>
</tbody>
</table>

**NOTES:**
* Ambient concentrations are rounded using the next higher decimal place to determine whether a standard has been exceeded.
** Ozone 1-Hour Standard was officially revoked June 15, 2005.
*** 0.25 ppm not to be exceeded more than two times in any seven consecutive days.
ppm – parts per million
μg/m³ – micrograms per cubic meter

EPA Region 10 has established Federal Implementation Plans (FIPs) referred to as the Federal Air Rules for Reservations (FARRs) to fill the regulatory gap on 39 Indian reservations in Washington, Oregon, and Idaho. By means of these rules, EPA imposes regulatory requirements on industry and residents of reservations, similar to those imposed by the rules of state and local air agencies in the surrounding areas. Since the Cowlitz Indian Tribe was landless when the FARRs were established, they are not presently included, but retain the option of inclusion in the future when their tribal lands are established (EPA, 2005c). Therefore, subsequent to the establishment of tribal lands and prior to inclusion in the FARR system, the reservation would be subject to all nationally enforceable EPA regulations such as Prevention of Significant Deterioration (PSD), National Emission Standards for Hazardous Air Pollutants (NESHAPS), Air Permitting Program (Title V), and New Source Performance Standards (NSPS). The Federal government has responsibility for directly administering CAA mandated programs in Indian country in instances where a tribe is not administering provisions of these programs. EPA provides assistance to Tribes who wish to develop their own air quality regulations under the CAA for managing air quality on their reservations.

**STATE**

The Washington Clean Air Act (RCW 70.94) provides that the Washington State Department of Ecology (DOE) is the air quality management agency for a geographic region of the state unless a local air authority is formed to assume this responsibility. In the case of southwest Washington, the Southwest Clean Air Agency (SWCAA) was formed in 1968 by an agreement between Clark, Cowlitz, Lewis, Skamania, and Wahkiakum counties to regulate air quality at the local level. DOE’s role is to establish statewide standards and rules that local air authorities must meet. Local agencies may adopt more stringent standards and rules if the local air quality requires such action. The SWCAA has the responsibility for all outdoor air pollution sources within its five-county jurisdiction, with the exception of automobiles, chemical paper and pulp mills, and aluminum reduction plants.
3.0 Affected Environment

Local air authorities prepare the SIP and submit them to DOE for approval and forwarding to the EPA. As discussed above, the SIP for the State of Washington is not a single document, but a compilation of plans, programs, local air quality rules, and state and Federal rules.

SWCAA and DOE operate an air quality monitoring network that determines whether southwest Washington complies with each ambient air quality standard. Additionally, the State of Washington has codified several of the NAAQS in the Washington Administrative Code (WAC) Title 173, Chapters 470, 474, and 475. These Washington State Standards are also listed in Table 3.4-1.

Once the Federal government acquires the property in trust for the Tribe, the parcels would not be subject to state regulatory authority for air quality. As stated above, the Federal government will be responsible for directly administering CAA mandated programs on the Tribal land in instances where the Tribe is not administering provisions of these programs. EPA will provide assistance to the Tribe if they wish to develop their own air quality regulations under the CAA for managing air quality on their reservation.

LOCAL

Once the Federal government acquires the property in trust for the Tribe, the parcels would not be subject to local regulatory authority for air quality. However, since air quality concerns generated on Tribal land may affect citizens residing off Tribal lands, the Tribe would coordinate with local air quality authorities with regards to the potential air quality complaints arising from off-Tribal lands.

CONFORMITY

40 CFR Part 93 was promulgated in order to determine conformity of Federal actions to state or Federal implementation plans. Whereas Subpart A of Part 93 relates to transportation plans, Subpart B is directed to general Federal actions. A Federal agency must make a determination that a Federal action conforms to the applicable implementation plan before the action is taken. A conformity determination is required for each pollutant where a total of direct and indirect emissions in a nonattainment or maintenance area caused by the Federal action are greater than \textit{de minimus} thresholds as listed in CFR Section 93.153(b).

The general conformity rule implements Section 176 of the Federal CAA, which requires that a Federal agency ensure conformity with an approved SIP for those air emissions that would be brought about by a Federal action (EPA, 2004). There are two phases to general conformity: 1) the conformity review process entailing a review of each analyzed alternative to assess whether a full conformity determination is necessary, and 2) the conformity determination process, which demonstrates how an action would conform with the applicable implementation plan (usually the SIP). The first step compares emissions estimates for the project to the appropriate general conformity \textit{de minimus} threshold based on non-attainment type. If the emission estimates from step
one are below the thresholds, then a general conformity determination is not necessary and step two is not required.

The regulations apply to proposed Federal actions that would cause emissions of criteria air pollutants above certain levels to occur in locations designated as non-attainment or maintenance areas for the emitted pollutants. If a Federal action occurs in a location designated as attainment or unclassified, then the general conformity regulation does not apply to the project. As shown in Table 3.4-2, the alternative project sites are either unclassifiable or attainment for all national standards and, therefore, would not be subject to a conformity determination.

### 3.4.3 Criteria Air Pollutants

The Federal government has established NAAQS to define levels of air quality that protect the public health and welfare from the known adverse effects of air pollutants. Standards were developed for carbon monoxide, lead, particulate matter, sulfur dioxide, ozone, and nitrogen dioxide. However, in the La Center and Ridgefield area the pollutants of concern are ozone, carbon monoxide, and particulate matter.

**Ozone**

Ozone is a colorless gas with a pungent odor. Ozone causes eye irritation and respiratory function impairment. Most ozone in the atmosphere is formed as a result of the interaction of ultraviolet light, volatile organic compounds (VOC), and oxides of nitrogen (NO₅). VOC is composed of non-methane hydrocarbons, and NO₅ is made of different chemical combinations of nitrogen and oxygen, mainly nitrous oxide (NO) and nitrogen dioxide (NO₂). A highly reactive molecule, ozone readily combines with many different components of the atmosphere. Consequently, high levels of ozone tend to exist only while high VOC and NO₅ levels are present to sustain the ozone formation process. Once the precursors have been depleted, ozone levels rapidly decline. Because these reactions occur on a regional scale, ozone is considered a regional pollutant.

Ozone can irritate lung airways and cause inflammation much like sunburn. Other symptoms include wheezing, coughing, pain when taking a deep breath, and breathing difficulties during exercise or outdoor activities. People with respiratory problems are most vulnerable, but even healthy people that are active outdoors can be affected when ozone levels are high. Repeated exposure to ozone pollution for several months may cause permanent lung damage. Anyone who spends time outdoors in the summer is at risk, particularly children. Even at very low levels, ground-level ozone triggers a variety of health problems including aggravated asthma, reduced lung capacity, and increased susceptibility to respiratory illnesses like pneumonia and bronchitis.

The Federal CAA Amendments of 1990 designated the Portland/Vancouver area, which includes southern Clark County, as non-attainment (marginal) for ozone and required that attainment be
3.0 AFFECTED ENVIRONMENT

reached by December 31, 1993, in order to avoid sanctions from the EPA. The Portland/Vancouver area was redesignated attainment by the EPA in April of 1997. Areas that are redesignated to attainment are called maintenance areas. SWCAA continues to operate according to the terms of the Ozone Maintenance Plan. As shown in Table 3.4-2, the alternative project sites lie outside of this Ozone Maintenance area and are classified as unclassifiable/attainment.

**CARBON MONOXIDE**

Carbon monoxide (CO) can cause harmful health effects by reducing oxygen delivery to the body’s organs (like the heart and brain) and tissues. The health threat from lower levels of CO is most serious for those who suffer from heart disease. For a person with heart disease, a single exposure to CO at low levels may cause chest pain and reduce that person’s ability to exercise; repeated exposures may contribute to other cardiovascular effects. However, even healthy people can be affected by high levels of CO. People who breathe high levels of CO can develop vision problems, reduced ability to work or learn, reduced manual dexterity, and difficulty performing complex tasks. At extremely high levels, CO is poisonous and can cause death.

The Federal CAA Amendments of 1990 designated the Portland/Vancouver area, which includes southern Clark County, as non-attainment (moderate <=12.7 parts per million) for CO. Since southern Clark County only exceeded the standards once in 1994, and has had no exceedances since, it was granted redesignation in October of 1996. SWCAA continues to operate according to the terms of the Carbon Monoxide Maintenance Plan. As shown in Table 3.4-2, the alternative project sites are outside of this Carbon Monoxide Maintenance area and are classified as unclassifiable/attainment.

**SUSPENDED PARTICULATE MATTER**

Particulate matter, or PM, is the term for particles found in the air, including dust, dirt, soot, smoke, and liquid droplets. Particles can be suspended in the air for long periods of time. Some particles are large or dark enough to be seen as soot or smoke. Others are so small that individually they can only be detected with an electron microscope. Some particles are directly emitted into the air. They come from a variety of sources such as cars, trucks, buses, factories, construction sites, tilled fields, unpaved roads, stone crushing, and burning of wood. Other particles may be formed in the air from the chemical change of gases. They are indirectly formed when gases from burning fuels react with sunlight and water vapor. These can result from fuel combustion in motor vehicles, at power plants, and in other industrial processes.

PM causes a wide variety of health and environmental impacts. Many scientific studies have linked breathing PM to a series of significant health problems, including aggravated asthma, increases in respiratory symptoms like coughing, difficult or painful breathing, chronic bronchitis, decreased lung function, and even premature death. In addition, PM is the major cause of reduced visibility (haze) in parts of the United States, including many national parks. Particles can also be carried over long
distances by wind and then settle on ground or water. The effects of this settling include making
lakes and streams acidic, changing the nutrient balance in coastal waters and large river basins,
depleting the nutrients in soil, damaging sensitive forests and farm crops, and affecting the diversity
of ecosystems. Soot, a type of PM, stains and damages stone and other materials, including culturally
important objects such as monuments and statues.

NAAQS for PM are expressed in terms of both 24-hour and annual average concentrations, and
consider the fractions of particulate matter less than 10 microns in diameter (PM$_{10}$) and less than 2.5
microns in diameter (PM$_{2.5}$). In addition, the State of Washington has standards for total suspended
particulates (TSPs) in the WAC, but these standards are not monitored. As shown in Table 3.4-2,
Clark County is designated unclassifiable/attainment for all particulate matter standards.

**NITROGEN DIOXIDE**

Nitrogen oxides, or NO$_x$, is the generic term for a group of highly reactive gases, all of which contain
nitrogen and oxygen in varying amounts. Many of the nitrogen oxides are colorless and odorless.
However, one common pollutant, NO$_2$, along with particles in the air, can often be seen as a reddish-
brown layer over many urban areas. NO$_x$ causes a wide variety of health and environmental impacts
because of various compounds and derivatives in the family of nitrogen oxides, including nitrogen
dioxide, nitric acid, nitrous oxide, nitrates, and nitric oxide. For example, ground-level ozone is
formed when NO$_x$ and VOCs react in the presence of sunlight. In addition, NO$_x$ and sulfur dioxide
react with other substances in the air to form acids, which fall to the ground as rain, fog, snow or dry
particles. NO$_x$ also reacts with ammonia, moisture, and other compounds to form nitric acid and
related particles. As shown in Table 3.4-2, Clark County is designated unclassifiable/attainment for
all nitrogen dioxide standards.

**SULFUR DIOXIDE**

Sulfur dioxide, or SO$_2$, belongs to the family of sulfur oxide gases (SO$_x$). These gases dissolve easily
in water. Sulfur is prevalent in all raw materials, including crude oil, coal, and ore that contains
common metals like aluminum, copper, zinc, lead, and iron. SO$_x$ gases are formed when fuel
containing sulfur, such as coal and oil, is burned, and when gasoline is extracted from oil, or metals
are extracted from ore. SO$_2$ dissolves in water vapor to form acid, and interacts with other gases and
particles in the air to form sulfates and other products that can be harmful to people and their
environment. As shown in Table 3.4-2, Clark County is designated unclassifiable/attainment for
all sulfur dioxide standards.

**LEAD**

Lead is a metal found naturally in the environment as well as in manufactured products. The major
sources of lead emissions have historically been motor vehicles (such as cars and trucks) and
industrial sources. Due to the phase-out of leaded gasoline, metals processing is the major source of
lead emissions in the air today. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers. As shown in Table 3.4-2, Clark County is designated unclassifiable/attainment for all lead standards.

**TOXIC AIR POLLUTANTS**

Toxic air pollutants (TAPs) are compounds emitted individually, or in a mixture, that have been found to cause health effects such as cancer or neurological or reproduction problems. EPA has identified 188 compounds that are known or suspected to cause cancer or other serious health effects.

Motor vehicles emit several toxic air pollutants that EPA classifies as known or probable human carcinogens. Benzene, for instance, is a known human carcinogen, while formaldehyde, acetaldehyde, 1,3-butadiene, and diesel particulate matter are probable human carcinogens. Emissions of these pollutants may result from 1) evaporation from gasoline or diesel fuel, or 2) release via tailpipe exhaust as a result of combustion of these fuels in motor vehicle engines. DOE has adopted WAC 460 as a statewide rule to limit the emission of toxic air pollutants from industrial and commercial sources of pollution.

The EPA and state agencies including Washington and Oregon have reduced emissions of benzene, toluene, and other air toxics from mobile sources by requiring the use of reformulated gasoline and placing limits on tailpipe emissions. EPA promulgated two rules in 2001 to control emissions from gasoline- and diesel-fueled vehicles. The Heavy-Duty Engine and Vehicle Standards and Highway Diesel Fuel Sulfur Control Requirements (40 CFR Part 80) will require the use of cleaner diesel fuels starting in 2006, and improvements to diesel vehicles beginning in 2007. The Control of Emissions of Hazardous Air Pollutants from Mobile Sources (40 CFR 80) will reduce emissions of 21 mobile source air toxics (MSATs) through formulation requirements applicable to fuel refiners. The toxics identified are:

- Acetaldehyde
- Acrolein
- Arsenic compounds
- Benzene
- 1,3-Butadiene
- Chromium compounds
- Diesel particulate matter + diesel exhaust organic gases
- Dioxin/furans
- Ethylbenzene
- Formaldehyde
- n-Hexane
- Lead compounds
In a 2001 rulemaking, EPA identified six priority MSATs: acetaldehyde, benzene, formaldehyde, diesel exhaust, acrolein, and 1,3-butadiene (66 FR 17230). EPA, in its Integrated Risk Information System (IRIS), classifies benzene and butadiene as known human carcinogens, formaldehyde and acetaldehyde as probable human carcinogens, diesel exhaust as a likely human carcinogen, and acrolein as having insufficient data to assess human carcinogenic potential (EPA, 2005b).

3.4.4 EXISTING AIR QUALITY

SOURCES OF EMISSIONS

Emissions are estimated and documented through the combined effort of the DOE and the SWCAA. Emissions for all of Clark County are presented in the SWCAA’s 2003 Annual Report (SWCAA, 2004).

Table 3.4-3 summarizes estimated 2003 emissions of key criteria air pollutants from major categories of air pollutant sources. For each pollutant, estimated emissions are presented for Clark County as a whole, and no further spatial refinement is available. The dominance of the Vancouver urban area is readily apparent with the dominance of on-road vehicles in CO emissions (44.7% of the total). However, 25.1% of the CO emissions are from woodstoves and fireplaces, which would be more representative of the rural areas.

Since ozone is a reaction between VOCs and NOx, to get a clearer picture of the relative contribution of urban versus rural, emissions for both must be evaluated. NOx is primarily a product of the complete combustion of fossil fuels, and the urban influence on Clark County emissions is apparent. On-road vehicles contribute 55.3% of the total NOx and construction equipment contributes an additional 13.4%. VOCs are largely an evaporative emission, albeit also from combustion sources, and therefore, the urban/rural distinction is less definitive. The largest single category of VOC emissions is from solvent usage (34.3% of the total) but the other two largest contributing categories are on-road vehicles (21.4%) and woodstoves and fireplaces (19.5%).

- Manganese compounds
- Mercury compounds
- MTBE
- Naphthalene
- Nickel compounds
- POM
- Styrene
- Toluene
- Xylene

April 2006
### TABLE 3.4-3
CLARK COUNTY 2003 ANNUAL EMISSIONS TONS PER YEAR (TPY)

<table>
<thead>
<tr>
<th>Category</th>
<th>CO</th>
<th>SO₂</th>
<th>VOC</th>
<th>NOₓ</th>
<th>PM</th>
<th>PM₁₀</th>
</tr>
</thead>
<tbody>
<tr>
<td>Large Industries</td>
<td>961</td>
<td>62</td>
<td>331</td>
<td>835</td>
<td>219</td>
<td>205</td>
</tr>
<tr>
<td>Small Industries</td>
<td>115</td>
<td>24</td>
<td>350</td>
<td>143</td>
<td>301</td>
<td>224</td>
</tr>
<tr>
<td><strong>Industry Total</strong></td>
<td>1,076</td>
<td>86</td>
<td>681</td>
<td>978</td>
<td>520</td>
<td>429</td>
</tr>
<tr>
<td>Vehicles</td>
<td>34,010</td>
<td>368</td>
<td>3,283</td>
<td>6,399</td>
<td>613</td>
<td>613</td>
</tr>
<tr>
<td>Road Dust Paved</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>13,444</td>
<td>7,230</td>
</tr>
<tr>
<td>Road Dust Unpaved</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>830</td>
<td>332</td>
</tr>
<tr>
<td><strong>On-Road Vehicles Total</strong></td>
<td>34,010</td>
<td>368</td>
<td>3,283</td>
<td>6,399</td>
<td>14,887</td>
<td>8,175</td>
</tr>
<tr>
<td>Aircraft</td>
<td>785</td>
<td>1</td>
<td>25</td>
<td>4</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Vessels/Ships</td>
<td>98</td>
<td>27</td>
<td>52</td>
<td>309</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>Railroads</td>
<td>150</td>
<td>87</td>
<td>61</td>
<td>1,501</td>
<td>37</td>
<td>37</td>
</tr>
<tr>
<td>Lawn and Garden Equipment</td>
<td>10,723</td>
<td>6</td>
<td>879</td>
<td>29</td>
<td>23</td>
<td>23</td>
</tr>
<tr>
<td>Recreational Vehicles</td>
<td>542</td>
<td>0</td>
<td>162</td>
<td>1</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Recreational Marine Vehicles</td>
<td>2,846</td>
<td>8</td>
<td>911</td>
<td>94</td>
<td>39</td>
<td>39</td>
</tr>
<tr>
<td>Light Commercial Equipment</td>
<td>3,845</td>
<td>5</td>
<td>140</td>
<td>38</td>
<td>5</td>
<td>5</td>
</tr>
<tr>
<td>Industrial Equipment</td>
<td>897</td>
<td>6</td>
<td>60</td>
<td>119</td>
<td>8</td>
<td>8</td>
</tr>
<tr>
<td>Construction Equipment</td>
<td>1,955</td>
<td>164</td>
<td>283</td>
<td>1,547</td>
<td>192</td>
<td>192</td>
</tr>
<tr>
<td>Agricultural Equipment</td>
<td>4</td>
<td>0</td>
<td>1</td>
<td>3</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Logging Equipment</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td><strong>Non-Road Mobile Sources Total</strong></td>
<td>21,845</td>
<td>304</td>
<td>2,574</td>
<td>3,645</td>
<td>318</td>
<td>318</td>
</tr>
<tr>
<td>Solvent Utilization</td>
<td>0</td>
<td>0</td>
<td>5,257</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Gasoline Dispensing</td>
<td>0</td>
<td>0</td>
<td>343</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Stationary Source Fuel Combustion</td>
<td>104</td>
<td>10</td>
<td>47</td>
<td>294</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Woodstoves/Fireplaces</td>
<td>18,301</td>
<td>34</td>
<td>2,989</td>
<td>227</td>
<td>2,569</td>
<td>2,569</td>
</tr>
<tr>
<td>Residential Trash and Yard Burning</td>
<td>223</td>
<td>2</td>
<td>96</td>
<td>20</td>
<td>61</td>
<td>61</td>
</tr>
<tr>
<td>Slash Burning</td>
<td>393</td>
<td>0</td>
<td>27</td>
<td>6</td>
<td>66</td>
<td>48</td>
</tr>
<tr>
<td>Structure and Wildfires</td>
<td>143</td>
<td>0</td>
<td>22</td>
<td>4</td>
<td>43</td>
<td>43</td>
</tr>
<tr>
<td><strong>Area Sources Total</strong></td>
<td>19,164</td>
<td>46</td>
<td>8,781</td>
<td>551</td>
<td>2,769</td>
<td>2,751</td>
</tr>
<tr>
<td>Grand Total</td>
<td>76,095</td>
<td>804</td>
<td>15,319</td>
<td>11,573</td>
<td>18,494</td>
<td>11,673</td>
</tr>
</tbody>
</table>


**AIR POLLUTANT AMBIENT CONCENTRATIONS**

Air pollutant emissions contribute (directly or indirectly) to the concentrations of air pollutants that are experienced and measured. The following tables summarize ambient air pollutant concentration data for monitoring stations in Clark County for the last three monitoring years. The nearest active monitoring stations in Clark County are in the Vancouver area. Particulate matter is monitored at
8205 NE 4th Plain Boulevard, CO is monitored at 2104 East 4th Plain Boulevard, and ozone is monitored at 1500 SE Blairmount Drive. All of the monitors are at least 15 miles from the alternative project sites but represent the nearest active monitoring. Ambient air quality data for PM$_{10}$ and PM$_{2.5}$ for the last three monitoring years are presented in Table 3.4-4. Carbon monoxide data in relation to the 1-hour and 8-hour standards for the last three monitoring years are presented in Table 3.4-5. Ozone data for the now revoked 1-hour and the current 8-hour standards for the last three monitoring years are presented in Table 3.4-6.

### Table 3.4-4
PARTICULATE AMBIENT AIR QUALITY (µg/m$^3$)

<table>
<thead>
<tr>
<th>Year</th>
<th>Pollutant</th>
<th>1st Highest</th>
<th>2nd Highest</th>
<th>Arithmetic Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>PM$_{10}$</td>
<td>53</td>
<td>45</td>
<td>17.0</td>
</tr>
<tr>
<td></td>
<td>PM$_{2.5}$</td>
<td>45.2</td>
<td>44</td>
<td>10.13</td>
</tr>
<tr>
<td>2003</td>
<td>PM$_{10}$</td>
<td>30</td>
<td>27</td>
<td>14.2</td>
</tr>
<tr>
<td></td>
<td>PM$_{2.5}$</td>
<td>35.6</td>
<td>28.7</td>
<td>8.95</td>
</tr>
<tr>
<td>2002</td>
<td>PM$_{10}$</td>
<td>65</td>
<td>52</td>
<td>16.7</td>
</tr>
<tr>
<td></td>
<td>PM$_{2.5}$</td>
<td>57.2</td>
<td>47.1</td>
<td>9.90</td>
</tr>
</tbody>
</table>

NOTES: µg/m$^3$ – micrograms per cubic meter
Source: DOE, 2005.

### Table 3.4-5
CARBON MONOXIDE AMBIENT AIR QUALITY (ppm)

<table>
<thead>
<tr>
<th>Year</th>
<th>Avg. Time</th>
<th>1st Highest</th>
<th>2nd Highest</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>1-Hour</td>
<td>6.4</td>
<td>6.3</td>
</tr>
<tr>
<td></td>
<td>8-Hour</td>
<td>5.0</td>
<td>5.0</td>
</tr>
<tr>
<td>2003</td>
<td>1-Hour</td>
<td>7.9</td>
<td>7.1</td>
</tr>
<tr>
<td></td>
<td>8-Hour</td>
<td>4.7</td>
<td>4.5</td>
</tr>
<tr>
<td>2002</td>
<td>1-Hour</td>
<td>8.1</td>
<td>7.2</td>
</tr>
<tr>
<td></td>
<td>8-Hour</td>
<td>5.9</td>
<td>5.7</td>
</tr>
</tbody>
</table>

Source: DOE, 2005.

### Table 3.4-6
OZONE AMBIENT AIR QUALITY (ppm)

<table>
<thead>
<tr>
<th>Year</th>
<th>Avg. Time</th>
<th>1st Highest</th>
<th>2nd Highest</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>1-Hour</td>
<td>0.083</td>
<td>0.076</td>
</tr>
<tr>
<td></td>
<td>8-Hour</td>
<td>0.065</td>
<td>0.065</td>
</tr>
<tr>
<td>2003</td>
<td>1-Hour</td>
<td>0.098</td>
<td>0.087</td>
</tr>
<tr>
<td></td>
<td>8-Hour</td>
<td>0.076</td>
<td>0.075</td>
</tr>
<tr>
<td>2002</td>
<td>1-Hour</td>
<td>0.086</td>
<td>0.083</td>
</tr>
<tr>
<td></td>
<td>8-Hour</td>
<td>0.073</td>
<td>0.072</td>
</tr>
</tbody>
</table>

Source: DOE, 2005.
According to the SWCAA 2003 Annual Report, the Mountain View High School Site (Blairmount Drive) has not registered an exceedance of the ozone standard since 1994; the Atlas & Cox Site (2104 East 4th Plain Boulevard) has not registered an exceedance of the CO standard since 1999; and the Moose Lodge Site (8205 NE 4th Plain Boulevard) has never registered an exceedance of either the PM$_{10}$ or the PM$_{2.5}$ standards since it began measuring in 1989.

**SENSITIVE RECEPTORS**

Sensitive receptors are facilities that house or attract children, the elderly, people with illnesses, or others who are especially sensitive to the effects of air pollutants. Hospitals, schools, convalescent facilities, and residential areas are examples of sensitive receptors. The majority of the land uses in the vicinity of the alternative project sites consist of rural residential and agriculture uses.

Sensitive receptors in the vicinity of the La Center Interchange Site include some residential areas. The adjacent parcel to the north is developed with rural residential and agricultural activities; the parcels to the east, across Interstate 5 (I-5), consist of agricultural and residential uses and include a restaurant and two gasoline service stations; the parcels to the south are developed with agricultural and residential uses; and the parcels to the west consist of agricultural and rural residential development.

Sensitive receptors in the vicinity of the Ridgefield Interchange Site include some residential areas. A private residence is located in the central portion of the site and several single-family homes are located towards the eastern property boundary. A medium density housing subdivision, which includes approximately nine housing units, is located to the north of the site. Land uses to the south and east of the site include mostly rural residential housing and agricultural lands; however, a business park is located immediately south of the site. To the west of the Ridgefield Interchange Site, development consists of more urbanized land uses, including the I-5 freeway interchange, a gas station, truck stop, and small shopping center.