APPENDIX C
SUPPORTING DATA FOR ANALYSIS OF AFFECTED ENVIRONMENT AND AIR QUALITY ASSESSMENT TECHNICAL REPORT

The following Attachments are included in this Appendix:

- **Attachment C-1: Supporting Data for the Analysis of Affected Environment**
    - Socioeconomic Data
        - Table C.1 – Racial Characteristics
        - Table C.2 - Minority Populations by Census Tract Within the Study Area
        - Table C.3 - Households for Which Poverty Status is Determined, by Census Tract Within the Study Area
    - Governmental and Political Jurisdictions that fall within the Study Area for the Proposed Action
        - Exhibit C.1 – Federal Governmental and Political Jurisdictions
        - Exhibit C.2 – State of Nevada Senate Districts
        - Exhibit C.3 – State of Nevada Assembly Districts
        - Exhibit C.4 – Clark County, Nevada Commission Districts
        - Exhibit C.5 – City Governmental and Political Jurisdictions
- **Attachment C-2: Air Quality Assessment Technical Report**

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ATTACHMENT C-1

SUPPORTING DATA FOR THE ANALYSIS OF AFFECTED ENVIRONMENT

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Table C.1
RACIAL CHARACTERISTICS

Race[1]	Census 2000 Population[2]	*Percent of Total Census 2000 Population[2]*	Census 1990 Population[3]	*Percent of Total Census 1990 Population[3]*	Population Percent Change 1990–2000	*Change in Percent of Population 1990-2000*
United States	**281,421,906**	***100%***	**248,709,873**	***100%***	**13.2%**	***N/A***
White	211,460,626	*75.1%*	199,686,070	*80.3%*	**5.9%**	***-5.1%***
Black or African American	34,658,190	*12.3%*	29,986,060	*12.1%*	**15.6%**	***0.3%***
American Indian or Alaska Native	2,475,956	*0.9%*	1,959,234	*0.8%*	**26.4%**	***0.1%***
Asian [4/]	10,242,998	*3.6%*	7,273,662	*2.9%*	**40.8%**	***0.7%***
Native Hawaiian or Other Pacific Islander [5/]	398,835	*0.1%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	15,359,073	*5.5%*	9,804,847	*3.9%*	**56.6%**	***1.5%***
Two or more races [5/]	6,826,228	*2.4%*	N/A	*N/A*	**N/A**	***N/A***
Nevada	**1,998,257**	***100%***	**1,201,833**	***100%***	**66.3%**	***N/A***
White	1,501,886	*75.2%*	1,012,695	*84.3%*	**48.3%**	***-9.1%***
Black or African American	135,477	*6.8%*	78,771	*6.6%*	**72.0%**	***0.2%***
American Indian or Alaska Native	26,420	*1.3%*	19,637	*1.6%*	**34.5%**	***-0.3%***
Asian [4/]	90,266	*4.5%*	38,127	*3.2%*	**136.8%**	***1.3%***
Native Hawaiian or Other Pacific Islander [5/]	8,426	*0.4%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	159,354	*8.0%*	52,603	*4.4%*	**202.9%**	***3.6%***
Two or more races [5/]	76,428	*3.8%*	N/A	*N/A*	**N/A**	***N/A***

Table C.1, Continued
RACIAL CHARACTERISTICS

Race[1]	Census 2000 Population[2]	*Percent of Total Census 2000 Population[2]*	Census 1990 Population[3]	*Percent of Total Census 1990 Population[3]*	Population Percent Change 1990–2000	*Change in Percent of Population 1990-2000*
Clark County	**1,375,765**	***100%***	**741,459**	***100%***	**85.5%**	***N/A***
White	984,796	*71.6%*	602,658	*81.3%*	**63.4%**	***-9.7%***
Black or African American	124,885	*9.1%*	70,738	*9.5%*	**76.5%**	***-0.5%***
American Indian or Alaska Native	10,895	*0.8%*	6,416	*0.9%*	**69.8%**	***-0.1%***
Asian [4/]	72,547	*5.3%*	26,043	*3.5%*	**178.6%**	***1.8%***
Native Hawaiian or Other Pacific Islander [5/]	6,412	*0.5%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	118,465	*8.6%*	35,604	*4.8%*	**232.7%**	***3.8%***
Two or more races [5/]	57,765	*4.2%*	N/A	*N/A*	**N/A**	***N/A***
Enterprise CDP [6/]	**14,676**	***100%***	**6,412**	***100%***	**128.9%**	***N/A***
White	12,078	*82.3%*	6,086	*94.9%*	**98.5%**	***-12.6%***
Black or African American	464	*3.2%*	91	*1.4%*	**409.9%**	***1.7%***
American Indian or Alaska Native	118	*0.8%*	50	*0.8%*	**136.0%**	***0.0%***
Asian [4/]	762	*5.2%*	84	*1.3%*	**807.1%**	***3.9%***
Native Hawaiian or Other Pacific Islander [5/]	80	*0.5%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	593	*4.0%*	101	*1.6%*	**487.1%**	***2.5%***
Two or more races [5/]	581	*4.0%*	N/A	*N/A*	**N/A**	***N/A***

Table C.1, Continued
RACIAL CHARACTERISTICS

Race[1]	Census 2000 Population[2]	*Percent of Total Census 2000 Population[2]*	Census 1990 Population[3]	*Percent of Total Census 1990 Population[3]*	Population Percent Change 1990–2000	*Change in Percent of Population 1990-2000*
City of Henderson [6/]	**175,381**	***100%***	**64,942**	***100%***	**170.1%**	***N/A***
White	148,181	*84.5%*	59,387	*91.4%*	**149.5%**	***-7.0%***
Black or African American	6,590	*3.8%*	1,725	*2.7%*	**282.0%**	***1.1%***
American Indian or Alaska Native	1,236	*0.7%*	635	*1.0%*	**94.6%**	***-0.3%***
Asian [4/]	6,983	*4.0%*	1,316	*2.0%*	**430.6%**	***2.0%***
Native Hawaiian or Other Pacific Islander [5/]	728	*0.4%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	5,549	*3.2%*	1,879	*2.9%*	**195.3%**	***0.3%***
Two or more races [5/]	6,114	*3.5%*	N/A	*N/A*	**N/A**	***N/A***
City of Las Vegas	**478,434**	***100%***	**258,295**	***100%***	**85.2%**	***N/A***
White	334,230	*69.9%*	202,549	*78.4%*	**65.0%**	***-8.6%***
Black or African American	49,570	*10.4%*	29,529	*11.4%*	**67.9%**	***-1.1%***
American Indian or Alaska Native	3,570	*0.7%*	2,282	*0.9%*	**56.4%**	***-0.1%***
Asian [4/]	22,879	*4.8%*	9,325	*3.6%*	**145.4%**	***1.2%***
Native Hawaiian or Other Pacific Islander [5/]	2,145	*0.4%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	46,643	*9.7%*	14,610	*5.7%*	**219.3%**	***4.1%***
Two or more races [5/]	19,397	*4.1%*	N/A	*N/A*	**N/A**	***N/A***

Table C.1, Continued
RACIAL CHARACTERISTICS

Race[1]	Census 2000 Population[2]	*Percent of Total Census 2000 Population[2]*	Census 1990 Population[3]	*Percent of Total Census 1990 Population[3]*	Population Percent Change 1990–2000	*Change in Percent of Population 1990-2000*
Nellis Air Force Base CDP [6/]	8,896	***100%***	**8,377**	***100%***	**6.2%**	***N/A***
White	6,090	*68.5%*	6,429	*76.7%*	**-5.3%**	***-8.3%***
Black or African American	1,276	*14.3%*	1,314	*15.7%*	**-2.9%**	***-1.3%***
American Indian or Alaska Native	122	*1.4%*	67	*0.8%*	**82.1%**	***0.6%***
Asian [4/]	442	*5.0%*	322	*3.8%*	**37.3%**	***1.1%***
Native Hawaiian or Other Pacific Islander [5/]	65	*0.7%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	436	*4.9%*	245	*2.9%*	**78.0%**	***2.0%***
Two or more races [5/]	465	*5.2%*	N/A	*N/A*	**N/A**	***N/A***
City of North Las Vegas	115,488	***100%***	**47,707**	***100%***	**142.1%**	***N/A***
White	64,591	*55.9%*	21,578	*45.2%*	**199.3%**	***10.7%***
Black or African American	21,970	*19.0%*	17,827	*37.4%*	**23.2%**	***-18.3%***
American Indian or Alaska Native	943	*0.8%*	500	*1.0%*	**88.6%**	***-0.2%***
Asian [4/]	3,740	*3.2%*	1,127	*2.4%*	**231.9%**	***0.9%***
Native Hawaiian or Other Pacific Islander [5/]	610	*0.5%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	18,224	*15.8%*	6,675	*14.0%*	**173.0%**	***1.8%***
Two or more races [5/]	5,410	*4.7%*	N/A	*N/A*	**N/A**	***N/A***

Table C.1, Continued
RACIAL CHARACTERISTICS

Race[1]	Census 2000 Population[2]	*Percent of Total Census 2000 Population[2]*	Census 1990 Population[3]	*Percent of Total Census 1990 Population[3]*	Population Percent Change 1990–2000	*Change in Percent of Population 1990-2000*
Paradise CDP [6/]	186,070	***100%***	**124,682**	***100%***	**49.2%**	***N/A***
White	134,927	*72.5%*	107,908	*86.5%*	**25.0%**	***-14.0%***
Black or African American	12,260	*6.6%*	6,105	*4.9%*	**100.8%**	***1.7%***
American Indian or Alaska Native	1,424	*0.8%*	800	*0.6%*	**78.0%**	***0.1%***
Asian [4/]	12,135	*6.5%*	4,987	*4.0%*	**143.3%**	***2.5%***
Native Hawaiian or Other Pacific Islander [5/]	1,097	*0.6%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	15,568	*8.4%*	4,882	*3.9%*	**218.9%**	***4.5%***
Two or more races [5/]	8,659	*4.7%*	N/A	*N/A*	**N/A**	***N/A***
Spring Valley CDP [6/]	117,390	***100%***	**51,726**	***100%***	**126.9%**	***N/A***
White	85,224	*72.6%*	46,205	*89.3%*	**84.4%**	***-16.7%***
Black or African American	6,214	*5.3%*	1,597	*3.1%*	**289.1%**	***2.2%***
American Indian or Alaska Native	701	*0.6%*	245	*0.5%*	**186.1%**	***0.1%***
Asian [4/]	13,164	*11.2%*	2,631	*5.1%*	**400.3%**	***6.1%***
Native Hawaiian or Other Pacific Islander [5/]	567	*0.5%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	6,036	*5.1%*	1,048	*2.0%*	**476.0%**	***3.1%***
Two or more races [5/]	5,484	*4.7%*	N/A	*N/A*	**N/A**	***N/A***

Table C.1, Continued
RACIAL CHARACTERISTICS

Race[1]	Census 2000 Population[2]	*Percent of Total Census 2000 Population[2]*	Census 1990 Population[3]	*Percent of Total Census 1990 Population[3]*	Population Percent Change 1990–2000	*Change in Percent of Population 1990-2000*
Summerlin South CDP [6/, 7/]	3,735	***100%***	N/A	*N/A*	**N/A**	***N/A***
White	2,946	*78.9%*	N/A	*N/A*	**N/A**	***N/A***
Black or African American	155	*4.1%*	N/A	*N/A*	**N/A**	***N/A***
American Indian or Alaska Native	22	*0.6%*	N/A	*N/A*	**N/A**	***N/A***
Asian [4/]	375	*10.0%*	N/A	*N/A*	**N/A**	***N/A***
Native Hawaiian or Other Pacific Islander [5/]	16	*0.4%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	106	*2.8%*	N/A	*N/A*	**N/A**	***N/A***
Two or more races [5/]	115	*3.1%*	N/A	*N/A*	**N/A**	***N/A***
Sunrise Manor CDP [6/]	156,120	***100%***	**95,362**	***100%***	**63.7%**	***N/A***
White	102,212	*65.5%*	77,321	*81.1%*	**32.2%**	***-15.6%***
Black or African American	20,117	*12.9%*	9,251	*9.7%*	**117.5%**	***3.2%***
American Indian or Alaska Native	1,529	*1.0%*	939	*1.0%*	**62.8%**	***0.0%***
Asian [4/]	8,445	*5.4%*	3,987	*4.2%*	**111.8%**	***1.2%***
Native Hawaiian or Other Pacific Islander [5/]	713	*0.5%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	15,814	*10.1%*	3,864	*4.1%*	**309.3%**	***6.1%***
Two or more races [5/]	7,290	*4.7%*	N/A	*N/A*	**N/A**	***N/A***

Table C.1, Continued
RACIAL CHARACTERISTICS

Race[1]	Census 2000 Population[2]	*Percent of Total Census 2000 Population[2]*	Census 1990 Population[3]	*Percent of Total Census 1990 Population[3]*	Population Percent Change 1990–2000	*Change in Percent of Population 1990-2000*
Whitney CDP [6/, 7/]	18,273	***100%***	N/A	*N/A*	**N/A**	***N/A***
White	13,200	*72.2%*	N/A	*N/A*	**N/A**	***N/A***
Black or African American	1,247	*6.8%*	N/A	*N/A*	**N/A**	***N/A***
American Indian or Alaska Native	203	*1.1%*	N/A	*N/A*	**N/A**	***N/A***
Asian [4/]	697	*3.8%*	N/A	*N/A*	**N/A**	***N/A***
Native Hawaiian or Other Pacific Islander [5/]	82	*0.4%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	2,017	*11.0%*	N/A	*N/A*	**N/A**	***N/A***
Two or more races [5/]	827	*4.5%*	N/A	*N/A*	**N/A**	***N/A***
Winchester CDP [6/]	26,958	***100%***	**23,365**	***100%***	**15.4%**	***N/A***
White	19,364	*71.8%*	20,369	*87.2%*	**-4.9%**	***-15.3%***
Black or African American	1,895	*7.0%*	1,045	*4.5%*	**81.3%**	***2.6%***
American Indian or Alaska Native	234	*0.9%*	148	*0.6%*	**58.1%**	***0.2%***
Asian [4/]	1,445	*5.4%*	1,087	*4.7%*	**32.9%**	***0.7%***
Native Hawaiian or Other Pacific Islander [5/]	119	*0.4%*	N/A	*N/A*	**N/A**	***N/A***
Some other race	2,605	*9.7%*	716	*3.1%*	**263.8%**	***6.6%***
Two or more races [5/]	1,296	*4.8%*	N/A	*N/A*	**N/A**	***N/A***

Table C.1, Continued
RACIAL CHARACTERISTICS

Notes:

[1/] Census respondents identifying their origin or ethnicity as Spanish, Hispanic, or Latino may be of any race.
[2/] Seven categories of Race were identified for the 2000 Census: 1) White, 2) Black or African American, 3) American Indian or Alaska Native, 4) Asian, 5) Native Hawaiian or Other Pacific Islander, 6) Some other race, and 7) Two or more races.
[3/] Five categories of Race were identified for the 1990 Census: 1) White, 2) Black, 3) American Indian, Eskimo, or Aleut, 4) Asian or Pacific Islander, 5) Other race.
[4/] Categorized as "Asian or Pacific Islander" with the 1990 Census.
[5/] Not a possible category for Race with the 1990 Census.
[6/] A Census Designated Place (CDP) is a statistical entity defined for each decennial census according to Census Bureau guidelines, comprising a densely settled concentration of population that is not within an incorporated place, but is locally identified by a name. CDPs are delineated cooperatively by state and local officials and the Census Bureau, following Census Bureau guidelines. Beginning with Census 2000, there are no size limits. U.S. Census Bureau. 2000.
[7/] The U.S. Census Bureau does not report 1990 Census data for this community.

Sources:

U.S. Census Bureau, 2000 Census, *Summary File 1 (SF 1), Matrix P3.*
U.S. Census Bureau, 1990 Census, *Summary Tape File 1 (STF 1), Matrices P001 and P006.*

Table C.2
MINORITY POPULATIONS BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Population	Total Non-White Population	*Percent Non-White Population*	Total Hispanic or Latino Population	*Percent Hispanic or Latino Population*
1.01	6,401	2,112	*33.0%*	2,099	*32.8%*
1.02	7,166	2,292	*32.0%*	2,473	*34.5%*
1.03	5,470	1,879	*34.4%*	1,901	*34.8%*
1.04	7,821	2,026	*25.9%*	1,751	*22.4%*
1.05	3,458	906	*26.2%*	914	*26.4%*
2.01	3,844	2,293	*59.7%*	1,373	*35.7%*
2.03	4,419	1,785	*40.4%*	1,129	*25.5%*
2.04	1,345	159	*11.8%*	111	*8.3%*
3.01	3,501	2,716	*77.6%*	683	*19.5%*
3.02	5,348	4,577	*85.6%*	881	*16.5%*
4.00	9,041	4,079	*45.1%*	4,550	*50.3%*
5.03	7,023	3,287	*46.8%*	4,739	*67.5%*
5.04	6,442	3,396	*52.7%*	4,506	*69.9%*
5.10	5,581	2,636	*47.2%*	4,144	*74.3%*
5.11	6,618	4,066	*61.4%*	4,096	*61.9%*
5.12	9,879	4,240	*42.9%*	5,540	*56.1%*
5.13	3,387	1,056	*31.2%*	1,232	*36.4%*
5.14	6,146	3,057	*49.7%*	2,613	*42.5%*
5.15	4,329	1,633	*37.7%*	1,665	*38.5%*
5.16	4,504	1,785	*39.6%*	2,143	*47.6%*
5.17	5,091	2,338	*45.9%*	1,980	*38.9%*
5.18	6,567	2,815	*42.9%*	2,662	*40.5%*
5.19	5,433	2,878	*53.0%*	3,010	*55.4%*

Table C.2, Continued
MINORITY POPULATIONS BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Population	Total Non-White Population	*Percent Non-White Population*	Total Hispanic or Latino Population	*Percent Hispanic or Latino Population*
6.00	3,282	1,329	*40.5%*	1,072	*32.7%*
7.00	4,898	1,647	*33.6%*	688	*14.0%*
8.00	2,266	833	*36.8%*	629	*27.8%*
9.00	1,163	468	*40.2%*	315	*27.1%*
10.03	3,706	813	*21.9%*	714	*19.3%*
10.04	6,397	1,667	*26.1%*	1,409	*22.0%*
10.05	1,724	213	*12.4%*	116	*6.7%*
10.06	4,160	640	*15.4%*	440	*10.6%*
11.00	3,624	1,788	*49.3%*	1,982	*54.7%*
12.00	4,302	1,378	*32.0%*	1,490	*34.6%*
13.00	4,750	1,307	*27.5%*	1,884	*39.7%*
14.00	7,157	2,552	*35.7%*	3,187	*44.5%*
15.00	7,731	2,068	*26.7%*	1,994	*25.8%*
16.06	0	0	*0.0%*	0	*0.0%*
16.07	4,965	731	*14.7%*	711	*14.3%*
16.08	1,753	304	*17.3%*	479	*27.3%*
16.09	4,354	1,849	*42.5%*	1,365	*31.4%*
16.10	2,701	748	*27.7%*	743	*27.5%*
16.11	3,787	1,069	*28.2%*	1,038	*27.4%*
16.12	6,616	2,289	*34.6%*	1,512	*22.9%*
16.13	3,696	1,011	*27.4%*	1,172	*31.7%*
17.06	2,901	412	*14.2%*	194	*6.7%*
17.07	1,462	290	*19.8%*	223	*15.3%*
17.08	3,315	626	*18.9%*	413	*12.5%*
17.09	1,568	259	*16.5%*	178	*11.4%*
17.10	4,127	1,016	*24.6%*	1,025	*24.8%*
17.11	3,115	827	*26.5%*	553	*17.8%*

Table C.2, Continued
MINORITY POPULATIONS BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Population	Total Non-White Population	*Percent Non-White Population*	Total Hispanic or Latino Population	*Percent Hispanic or Latino Population*
17.12	3,715	541	*14.6%*	428	*11.5%*
17.13	2,905	388	*13.4%*	479	*16.5%*
17.14	3,300	703	*21.3%*	647	*19.6%*
17.15	2,412	638	*26.5%*	754	*31.3%*
17.16	1,972	467	*23.7%*	545	*27.6%*
17.17	1,363	118	*8.7%*	109	*8.0%*
17.18	2,650	979	*36.9%*	1,018	*38.4%*
18.01	5,921	1,221	*20.6%*	997	*16.8%*
18.03	2,653	673	*25.4%*	577	*21.7%*
18.04	3,361	889	*26.5%*	847	*25.2%*
19.01	5,339	2,245	*42.0%*	2,431	*45.5%*
19.02	3,933	1,188	*30.2%*	1,644	*41.8%*
20.00	4,452	1,004	*22.6%*	1,134	*25.5%*
22.01	4,217	1,229	*29.1%*	967	*22.9%*
22.03	4,556	1,911	*41.9%*	1,871	*41.1%*
22.04	5,203	2,196	*42.2%*	3,666	*70.5%*
22.05	7,418	3,652	*49.2%*	3,734	*50.3%*
23.00	6,082	2,090	*34.4%*	1,484	*24.4%*
24.03	5,060	1,779	*35.2%*	1,445	*28.6%*
24.04	6,283	2,796	*44.5%*	2,855	*45.4%*
24.05	5,166	1,819	*35.2%*	2,979	*57.7%*
24.06	2,350	749	*31.9%*	378	*16.1%*
25.01	4,735	1,543	*32.6%*	1,138	*24.0%*
25.04	3,726	1,212	*32.5%*	1,049	*28.2%*
25.05	2,153	891	*41.4%*	921	*42.8%*
25.06	3,528	1,388	*39.3%*	1,144	*32.4%*
26.01	35	5	*14.3%*	0	*0.0%*

Table C.2, Continued
MINORITY POPULATIONS BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Population	Total Non-White Population	*Percent Non-White Population*	Total Hispanic or Latino Population	*Percent Hispanic or Latino Population*
26.02	7,519	2,436	*32.4%*	2,953	*39.3%*
26.03	4,172	1,480	*35.5%*	735	*17.6%*
27.02	5,655	2,533	*44.8%*	2,338	*41.3%*
27.06	3,510	1,234	*35.2%*	1,275	*36.3%*
29.05	5,185	1,278	*24.6%*	647	*12.5%*
29.12	12,160	3,523	*29.0%*	2,337	*19.2%*
29.15	4,919	995	*20.2%*	473	*9.6%*
29.16	2,641	421	*15.9%*	162	*6.1%*
29.19	3,917	977	*24.9%*	543	*13.9%*
29.25	9,916	3,329	*33.6%*	1,774	*17.9%*
29.27	0	0	*0.0%*	0	*0.0%*
29.35	1,445	316	*21.9%*	172	*11.9%*
29.36	2,994	631	*21.1%*	391	*13.1%*
29.37	4,743	1,484	*31.3%*	859	*18.1%*
29.38	1,233	210	*17.0%*	103	*8.4%*
29.39	1,855	295	*15.9%*	123	*6.6%*
29.40	2,659	1,103	*41.5%*	229	*8.6%*
29.41	5,093	1,256	*24.7%*	1,158	*22.7%*
29.42	4,117	858	*20.8%*	467	*11.3%*
29.44	2,871	928	*32.3%*	279	*9.7%*
29.46	2,011	470	*23.4%*	212	*10.5%*
29.47	2,628	313	*11.9%*	142	*5.4%*
29.48	3,718	817	*22.0%*	913	*24.6%*
29.49	2,720	553	*20.3%*	459	*16.9%*
29.50	4,491	1,593	*35.5%*	602	*13.4%*
29.51	4,734	1,577	*33.3%*	573	*12.1%*
29.52	2,244	625	*27.9%*	146	*6.5%*

Table C.2, Continued
MINORITY POPULATIONS BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Population	Total Non-White Population	*Percent Non-White Population*	Total Hispanic or Latino Population	*Percent Hispanic or Latino Population*
29.53	4,406	1,294	*29.4%*	663	*15.0%*
29.54	4,448	1,330	*29.9%*	1,554	*34.9%*
29.55	7,124	3,475	*48.8%*	2,858	*40.1%*
29.56	2,463	1,009	*41.0%*	499	*20.3%*
29.57	2,106	202	*9.6%*	70	*3.3%*
29.58	6,057	1,671	*27.6%*	861	*14.2%*
29.60	6,356	1,618	*25.5%*	779	*12.3%*
29.61	1,354	254	*18.8%*	77	*5.7%*
29.62	1,141	144	*12.6%*	90	*7.9%*
29.63	2,194	213	*9.7%*	135	*6.2%*
30.01	3,968	769	*19.4%*	777	*19.6%*
30.03	5,538	1,285	*23.2%*	636	*11.5%*
30.04	2,408	526	*21.8%*	262	*10.9%*
30.05	3,643	686	*18.8%*	414	*11.4%*
30.06	3,548	800	*22.5%*	641	*18.1%*
31.01	7,182	2,207	*30.7%*	1,153	*16.1%*
31.02	5,435	1,482	*27.3%*	1,361	*25.0%*
32.09	7,447	1,647	*22.1%*	723	*9.7%*
32.11	3,229	139	*4.3%*	59	*1.8%*
32.12	7,276	1,339	*18.4%*	519	*7.1%*
32.14	1,722	54	*3.1%*	26	*1.5%*
32.15	4,584	1,119	*24.4%*	375	*8.2%*
32.17	6,715	1,066	*15.9%*	458	*6.8%*
32.18	5,943	851	*14.3%*	265	*4.5%*
32.19	5,971	1,149	*19.2%*	468	*7.8%*
32.20	6,559	1,572	*24.0%*	773	*11.8%*
32.21	5,070	980	*19.3%*	403	*7.9%*

Table C.2, Continued
MINORITY POPULATIONS BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Population	Total Non-White Population	*Percent Non-White Population*	Total Hispanic or Latino Population	*Percent Hispanic or Latino Population*
32.22	4,702	966	*20.5%*	304	*6.5%*
32.23	1,450	175	*12.1%*	56	*3.9%*
32.24	7,138	1,446	*20.3%*	855	*12.0%*
32.25	6,866	1,506	*21.9%*	730	*10.6%*
32.26	872	144	*16.5%*	37	*4.2%*
32.27	908	155	*17.1%*	69	*7.6%*
34.11	3,953	796	*20.1%*	389	*9.8%*
34.12	4,713	779	*16.5%*	498	*10.6%*
34.13	4,879	1,331	*27.3%*	838	*17.2%*
34.14	2,317	367	*15.8%*	225	*9.7%*
34.15	6,446	2,187	*33.9%*	1,071	*16.6%*
34.16	3,491	960	*27.5%*	421	*12.1%*
34.17	4,931	1,613	*32.7%*	859	*17.4%*
34.18	3,850	1,142	*29.7%*	477	*12.4%*
34.19	6,136	2,301	*37.5%*	1,288	*21.0%*
34.20	3,722	1,125	*30.2%*	794	*21.3%*
34.21	3,269	712	*21.8%*	353	*10.8%*
34.22	6,268	2,345	*37.4%*	1,622	*25.9%*
34.23	6,055	2,138	*35.3%*	2,022	*33.4%*
34.24	6,351	2,336	*36.8%*	1,980	*31.2%*
34.25	5,806	3,426	*59.0%*	2,800	*48.2%*
35.00	1,616	1,471	*91.0%*	152	*9.4%*
36.02	6,636	5,242	*79.0%*	1,497	*22.6%*
36.03	176	27	*15.3%*	9	*5.1%*
36.09	4,027	610	*15.1%*	331	*8.2%*
36.10	4,020	1,142	*28.4%*	486	*12.1%*
36.11	4,950	1,867	*37.7%*	868	*17.5%*

Table C.2, Continued
MINORITY POPULATIONS BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Population	Total Non-White Population	*Percent Non-White Population*	Total Hispanic or Latino Population	*Percent Hispanic or Latino Population*
36.12	4,603	1,311	*28.5%*	685	*14.9%*
36.13	4,148	1,540	*37.1%*	968	*23.3%*
36.14	6,497	2,988	*46.0%*	1,029	*15.8%*
36.15	2,520	871	*34.6%*	374	*14.8%*
37.00	3,172	2,849	*89.8%*	492	*15.5%*
38.00	6,799	4,015	*59.1%*	4,260	*62.7%*
40.00	3,579	1,564	*43.7%*	2,691	*75.2%*
41.00	5,809	2,238	*38.5%*	3,811	*65.6%*
42.00	5,509	2,324	*42.2%*	3,694	*67.1%*
43.00	8,020	2,925	*36.5%*	6,679	*83.3%*
44.00	7,145	4,313	*60.4%*	4,704	*65.8%*
45.00	4,881	2,923	*59.9%*	2,769	*56.7%*
46.00	7,608	4,347	*57.1%*	4,479	*58.9%*
47.03	4,332	2,191	*50.6%*	1,955	*45.1%*
47.07	2,607	899	*34.5%*	1,325	*50.8%*
47.08	2,760	904	*32.8%*	1,272	*46.1%*
47.09	5,829	2,553	*43.8%*	3,032	*52.0%*
47.10	5,228	2,763	*52.9%*	1,535	*29.4%*
47.11	491	91	*18.5%*	59	*12.0%*
47.12	6,661	2,483	*37.3%*	1,357	*20.4%*
47.13	4,525	2,662	*58.8%*	1,508	*33.3%*
47.14	4,252	2,065	*48.6%*	1,876	*44.1%*
47.15	2,801	1,280	*45.7%*	747	*26.7%*
47.16	2,913	1,660	*57.0%*	832	*28.6%*
47.17	3,073	1,305	*42.5%*	1,359	*44.2%*
49.07	1,696	362	*21.3%*	184	*10.8%*
49.10	2,851	1,089	*38.2%*	801	*28.1%*

Table C.2, Continued
MINORITY POPULATIONS BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Population	Total Non-White Population	*Percent Non-White Population*	Total Hispanic or Latino Population	*Percent Hispanic or Latino Population*
49.11	3,496	1,142	*32.7%*	826	*23.6%*
49.12	5,297	1,949	*36.8%*	1,432	*27.0%*
49.14	2,118	518	*24.5%*	387	*18.3%*
49.15	2,922	865	*29.6%*	535	*18.3%*
49.16	2,181	661	*30.3%*	534	*24.5%*
49.17	2,337	585	*25.0%*	255	*10.9%*
49.18	3,531	1,031	*29.2%*	616	*17.4%*
49.19	1,819	520	*28.6%*	277	*15.2%*
49.20	4,374	1,813	*41.4%*	1,103	*25.2%*
49.21	5,425	1,844	*34.0%*	1,491	*27.5%*
49.22	4,973	1,682	*33.8%*	838	*16.9%*
49.23	2,023	619	*30.6%*	278	*13.7%*
49.24	3,647	1,151	*31.6%*	726	*19.9%*
50.05	4,948	933	*18.9%*	498	*10.1%*
50.06	4,746	1,089	*22.9%*	701	*14.8%*
50.07	333	29	*8.7%*	18	*5.4%*
50.08	3,291	981	*29.8%*	702	*21.3%*
50.09	3,729	676	*18.1%*	525	*14.1%*
50.12	2,886	824	*28.6%*	646	*22.4%*
54.11	4,865	746	*15.3%*	562	*11.6%*
56.13	4,165	318	*7.6%*	362	*8.7%*
58.03	4,603	955	*20.7%*	369	*8.0%*
58.04	4,770	996	*20.9%*	425	*8.9%*
58.05	3,453	480	*13.9%*	243	*7.0%*
58.06	4,334	873	*20.1%*	394	*9.1%*
58.07	4,589	882	*19.2%*	422	*9.2%*
58.08	3,446	544	*15.8%*	237	*6.9%*

Table C.2, Continued
MINORITY POPULATIONS BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Population	Total Non-White Population	*Percent Non-White Population*	Total Hispanic or Latino Population	*Percent Hispanic or Latino Population*
58.09	4,247	1,036	*24.4%*	513	*12.1%*
58.10	106	4	*3.8%*	0	*0.0%*
58.11	6,850	1,951	*28.5%*	667	*9.7%*
58.12	7,626	2,138	*28.0%*	702	*9.2%*
58.13	3,181	1,054	*33.1%*	415	*13.0%*
58.16	3,877	288	*7.4%*	300	*7.7%*
58.19	3,877	819	*21.1%*	313	*8.1%*
58.21	4,145	1,154	*27.8%*	461	*11.1%*
60.00	10,065	3,228	*32.1%*	1,247	*12.4%*
61.01	2,055	405	*19.7%*	135	*6.6%*
61.02	3,952	1,306	*33.0%*	1,006	*25.5%*
61.03	2,559	655	*25.6%*	326	*12.7%*
62.01	2,963	648	*21.9%*	397	*13.4%*
62.02	3,281	824	*25.1%*	529	*16.1%*
62.03	2,555	688	*26.9%*	399	*15.6%*
62.04	3,376	1,109	*32.8%*	661	*19.6%*
TOTAL	**964,732**	**317,412**	***32.9%***	**252,907**	***26.2%***

Source: U.S. Census Bureau, 2000 Census, *Summary File 1 (SF 1), Matrices P3 and P4.*

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Table C.3
HOUSEHOLDS FOR WHICH POVERTY STATUS IS DETERMINED BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Number of Households	Households with Income Below Poverty Level in 1999	
		Number	Percentage
1.01	1,918	110	5.7%
1.02	2,487	313	12.6%
1.03	1,849	300	16.2%
1.04	3,368	388	11.5%
1.05	1,162	87	7.5%
2.01	1,253	268	21.4%
2.03	1,757	264	15.0%
2.04	568	45	7.9%
3.01	1,140	394	34.6%
3.02	1,820	674	37.0%
4.00	3,030	804	26.5%
5.03	2,109	519	24.6%
5.04	2,076	558	26.9%
5.10	1,310	278	21.2%
5.11	1,845	612	33.2%
5.12	2,709	368	13.6%
5.13	1,143	133	11.6%
5.14	1,842	467	25.4%
5.15	1,378	174	12.6%
5.16	1,380	236	17.1%
5.17	1,650	183	11.1%
5.18	1,794	255	14.2%
5.19	1,448	165	11.4%
6.00	1,471	428	29.1%
7.00	1,715	501	29.2%
8.00	1,251	250	20.0%
9.00	754	264	35.0%
10.03	1,337	112	8.4%
10.04	2,883	226	7.8%
10.05	625	32	5.1%
10.06	1,849	86	4.7%
11.00	1,643	510	31.0%
12.00	1,718	220	12.8%
13.00	1,635	96	5.9%
14.00	2,493	334	13.4%
15.00	4,093	707	17.3%
16.06	0	0	0.0%
16.07	2,193	338	15.4%

Table C.3, Continued
HOUSEHOLDS FOR WHICH POVERTY STATUS IS DETERMINED BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Number of Households	Households with Income Below Poverty Level in 1999	
		Number	Percentage
16.08	772	117	15.2%
16.09	1,174	132	11.2%
16.10	751	28	3.7%
16.11	1,245	139	11.2%
16.12	2,906	296	10.2%
16.13	1,226	103	8.4%
17.06	1,437	41	2.9%
17.07	760	54	7.1%
17.08	1,238	89	7.2%
17.09	599	28	4.7%
17.10	1,473	89	6.0%
17.11	1,552	200	12.9%
17.12	1,686	46	2.7%
17.13	1,026	24	2.3%
17.14	1,113	62	5.6%
17.15	795	25	3.1%
17.16	680	52	7.6%
17.17	476	24	5.0%
17.18	931	152	16.3%
18.01	2,809	273	9.7%
18.03	1,163	84	7.2%
18.04	1,432	183	12.8%
19.01	1,970	342	17.4%
19.02	1,438	165	11.5%
20.00	2,441	338	13.8%
22.01	2,117	500	23.6%
22.03	1,437	168	11.7%
22.04	1,472	317	21.5%
22.05	2,681	321	12.0%
23.00	3,149	456	14.5%
24.03	2,869	432	15.1%
24.04	2,605	572	22.0%
24.05	2,024	452	22.3%
24.06	1,358	316	23.3%
25.01	2,063	362	17.5%
25.04	1,678	245	14.6%
25.05	852	146	17.1%
25.06	1,859	367	19.7%
26.01	16	0	0.0%

Table C.3, Continued
HOUSEHOLDS FOR WHICH POVERTY STATUS IS DETERMINED BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Number of Households	Households with Income Below Poverty Level in 1999	
		Number	Percentage
26.02	3,533	614	17.4%
26.03	1,793	304	17.0%
27.02	2,058	250	12.1%
27.06	1,557	276	17.7%
29.05	2,106	230	10.9%
29.12	5,714	599	10.5%
29.15	2,006	125	6.2%
29.16	1,090	98	9.0%
29.19	1,409	66	4.7%
29.25	4,597	463	10.1%
29.27	0	0	0.0%
29.35	555	30	5.4%
29.36	1,285	80	6.2%
29.37	2,126	71	3.3%
29.38	531	18	3.4%
29.39	576	45	7.8%
29.40	982	34	3.5%
29.41	1,761	105	6.0%
29.42	1,629	39	2.4%
29.44	1,187	71	6.0%
29.46	861	45	5.2%
29.47	912	37	4.1%
29.48	1,229	76	6.2%
29.49	1,080	104	9.6%
29.50	1,884	98	5.2%
29.51	2,041	183	9.0%
29.52	959	77	8.0%
29.53	1,500	43	2.9%
29.54	2,043	255	12.5%
29.55	3,055	508	16.6%
29.56	1,239	116	9.4%
29.57	1,172	86	7.3%
29.58	2,619	282	10.8%
29.60	2,405	111	4.6%
29.61	491	37	7.5%
29.62	461	63	13.7%
29.63	801	86	10.7%
30.01	1,278	141	11.0%
30.03	2,058	134	6.5%

Table C.3, Continued
HOUSEHOLDS FOR WHICH POVERTY STATUS IS DETERMINED BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Number of Households	Households with Income Below Poverty Level in 1999	
		Number	Percentage
30.04	1,218	93	7.6%
30.05	1,188	37	3.1%
30.06	1,121	90	8.0%
31.01	2,735	237	8.7%
31.02	1,905	148	7.8%
32.09	2,604	119	4.6%
32.11	1,824	72	3.9%
32.12	2,872	115	4.0%
32.14	954	66	6.9%
32.15	1,674	125	7.5%
32.17	2,459	67	2.7%
32.18	2,067	63	3.0%
32.19	2,370	68	2.9%
32.20	2,720	88	3.2%
32.21	2,053	32	1.6%
32.22	1,832	71	3.9%
32.23	667	13	1.9%
32.24	2,645	100	3.8%
32.25	2,868	113	3.9%
32.26	312	0	0.0%
32.27	334	0	0.0%
34.11	1,628	29	1.8%
34.12	1,751	103	5.9%
34.13	1,734	85	4.9%
34.14	741	7	0.9%
34.15	2,374	293	12.3%
34.16	1,199	66	5.5%
34.17	1,850	165	8.9%
34.18	1,573	102	6.5%
34.19	2,464	304	12.3%
34.20	1,452	197	13.6%
34.21	1,253	62	4.9%
34.22	2,244	317	14.1%
34.23	2,041	255	12.5%
34.24	2,296	313	13.6%
34.25	1,850	360	19.5%
35.00	465	105	22.6%
36.02	1,837	413	22.5%
36.03	61	0	0.0%

Table C.3, Continued
HOUSEHOLDS FOR WHICH POVERTY STATUS IS DETERMINED BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Number of Households	Households with Income Below Poverty Level in 1999	
		Number	Percentage
36.09	1,434	52	3.6%
36.10	1,314	73	5.6%
36.11	1,655	71	4.3%
36.12	1,588	93	5.9%
36.13	1,251	73	5.8%
36.14	2,181	90	4.1%
36.15	896	73	8.1%
37.00	1,047	162	15.5%
38.00	2,133	689	32.3%
40.00	893	153	17.1%
41.00	1,436	180	12.5%
42.00	1,464	239	16.3%
43.00	1,804	488	27.1%
44.00	1,830	490	26.8%
45.00	1,214	152	12.5%
46.00	1,872	476	25.4%
47.03	1,232	272	22.1%
47.07	740	197	26.6%
47.08	749	190	25.4%
47.09	1,731	385	22.2%
47.10	1,776	531	29.9%
47.11	170	12	7.1%
47.12	2,700	480	17.8%
47.13	1,518	346	22.8%
47.14	1,211	164	13.5%
47.15	981	135	13.8%
47.16	868	83	9.6%
47.17	744	92	12.4%
49.07	502	7	1.4%
49.10	851	38	4.5%
49.11	1,376	87	6.3%
49.12	1,600	67	4.2%
49.14	659	31	4.7%
49.15	929	68	7.3%
49.16	707	95	13.4%
49.17	818	33	4.0%
49.18	1,140	72	6.3%
49.19	602	0	0.0%
49.20	1,425	99	6.9%

Table C.3, Continued
HOUSEHOLDS FOR WHICH POVERTY STATUS IS DETERMINED BY CENSUS TRACT WITHIN THE STUDY AREA

Census Tract	Total Number of Households	Households with Income Below Poverty Level in 1999	
		Number	Percentage
49.21	1,888	184	9.7%
49.22	1,508	21	1.4%
49.23	554	0	0.0%
49.24	1,208	59	4.9%
50.05	2,451	344	14.0%
50.06	1,971	192	9.7%
50.07	168	0	0.0%
50.08	1,364	165	12.1%
50.09	1,501	42	2.8%
50.12	1,097	56	5.1%
54.11	1,882	67	3.6%
56.13	1,380	105	7.6%
58.03	1,905	98	5.1%
58.04	2,168	96	4.4%
58.05	1,410	51	3.6%
58.06	1,897	129	6.8%
58.07	1,697	56	3.3%
58.08	1,591	91	5.7%
58.09	1,807	167	9.2%
58.10	52	0	0.0%
58.11	2,520	71	2.8%
58.12	3,065	181	5.9%
58.13	1,392	70	5.0%
58.16	1,517	171	11.3%
58.19	1,569	59	3.8%
58.21	1,565	48	3.1%
60.00	2,981	229	7.7%
61.01	632	17	2.7%
61.02	1,351	166	12.3%
61.03	1,137	41	3.6%
62.01	837	100	11.9%
62.02	1,151	101	8.8%
62.03	885	68	7.7%
62.04	1,059	12	1.1%
TOTAL	**357,988**	**40,627**	**11.3%**

Source: U.S. Census Bureau, 2000 Census, *Summary File 3 (SF 3), Matrix P92.*

ATTACHMENT C-2
AIR QUALITY ASSESSMENT TECHNICAL REPORT

This Appendix provides information and documentation in support of the air quality assessment presented in **Chapter Four, Environmental Consequences**, for the operation of the McCarran International Airport (LAS) under the existing conditions, and provides the projected emissions due to airport operations under the Proposed Action to modify eastbound departures from Runway 25 under the Las Vegas Four Corner-Post Plan. The following sections include details of the current status of air quality in Clark County and a summary of the Nevada State Implementation Plan (SIP), a document that sets forth strategies to maintain healthful air quality in Nevada. Also included is an overview of the federal and State of Nevada regulatory requirements for an airport air quality assessment, a description of the assessment procedures, and an evaluation of the results of the analyses of emissions at the McCarran International Airport (LAS).

C-2.1 CLARK COUNTY AIR QUALITY STATUS

The City of Las Vegas, including McCarran International Airport (LAS), is located in Clark County, Nevada, and more specifically, in the Las Vegas Valley, which is designated by the Nevada Division of Water Resources as hydrographic area 212.[1] Hydrographic area 212[2] and all of the remainder of Clark County is located within the larger United States Environmental Protection Agency (USEPA) Las Vegas Intrastate Air Quality Control Region (AQCR)[3]. The largest USEPA nonattainment area in the Clark County AQCR is defined for ozone. The area of Clark County designated nonattainment for ozone is shown in **Figure C-2.1**.[4] The City of Las Vegas and LAS are also included in an area designated by the USEPA as nonattainment for emissions of CO, and serious nonattainment of PM_{10} emissions.[5]

[1] State of Nevada, Department of Conservation & Natural Resources, Division of Water Resources (DWR), identifies the Las Vegas Valley as hydrographic area 212, available on the DWR Web site at: http://water.nv.gov/Water%20planning/dict-1/appd-a4.cfm.

[2] State of Nevada, Department of Conservation & Natural Resources, Division of Water Resources (DWR), *Geography and Climatic Summary for the Las Vegas and Apex Valleys*, available on the DWR Web site at: http://www.co.clark.nv.us/air_quality/NEAP/Appn%20B%20FINALGeography%20and%20Climatic%20Summary.pdf.

[3] 40 CFR Part 81.80 *Las Vegas Intrastate Air Quality Control Region*.

[4] USEPA map of the Clark County, Nevada, ozone nonattainment area, available on the USEPA Web site at: http://www.epa.gov/ozonedesignations/areamaps/LasVegas.pdf.

[5] USEPA, Green Book, *Nonattainment Areas for Criteria Pollutants*, available on the USEPA Web site : http://www.epa.gov/airprogm/oar/oaqps/greenbk/, March 15, 2006.

On May 24, 2005, the USEPA announced that the Las Vegas Valley area of Clark County was in compliance with the Federal standards for CO emissions.[6] At that time, there had been no unhealthful levels of CO detected by the monitoring stations since 1998. According to the USEPA database of air quality monitoring data, the area has not exceeded Federal standards of CO emissions during 2005.[7] The USEPA news release announcing the compliance of the CO standard indicated the improvement in air quality was due to the "carbon monoxide control measures that have been successfully implemented in Las Vegas," including, " the motor vehicle inspection and maintenance program, and Clark County's cleaner burning gasoline program."[8] Clark County is attainment for the remaining federally-regulated pollutants, namely, NO_2, SO_2, $PM_{2.5}$, and lead (Pb).

C-2.2 NEVADA STATE IMPLEMENTATION PLAN

According to provisions of the Clean Air Act, including the 1990 Amendments (CAA), each state must provide the USEPA with a State Implementation Plan (SIP) that includes a strategy to improve the air quality in areas that do not meet the National Ambient Air Quality Standards (NAAQS),[9] and will also maintain acceptable air quality in areas that are not exceeding the NAAQS.

The Nevada SIP contains the Clark County Air Quality Regulations (CCAQR), which may be adopted, modified, or repealed by the Clark County Board of County Commissioners (CCBCC). Administration of the CCAQR is the responsibility of the Clark County Department of Air Quality and Environmental Management (DAQEM). Under Section 11 of the CCAQR, the NAAQS[10] and the CAA regulations[11] are incorporated by reference. The Nevada SIP also incorporates by reference the USEPA *Guideline on Air Quality Models*.[12]

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[6] USEPA, Region 9 News Release, *EPA Finds Las Vegas Area Complies with Federal Carbon Monoxide Standard*, May 24, 2005.

[7] USEPA, *Monitor Values Report – Criteria Air Pollutants*, available on the USEPA Web site at: http://www.epa.gov/air/data/monvals.html?st~NV~Nevada.

[8] USEPA, Region 9 News Release, *EPA Finds Las Vegas Area Complies with Federal Carbon Monoxide Standard*, May 24, 2005.

[9] Refer to Table C-2-2 *National and Nevada Ambient Air Quality Standards*, in this Air Quality section.

[10] CCBCC, Clark County Air Quality Regulations (CCAQR), Section 11, *Ambient Air Quality Standards*, incorporates the NAAQS into the Nevada SIP, refer to 69 FR 54006 dated September 7, 2004.

[11] CCBCC, Clark County Air Quality Regulations (CCAQR), Section 11, *Ambient Air Quality Standards*, incorporates the conformity regulations into the Nevada SIP, refer to 69 FR 54006 dated September 7, 2004.

[12] CCBCC, Clark County Air Quality Regulations (CCAQR), Section 11, *Ambient Air Quality Standards*, incorporates 40 CFR Part 51 Appendix W modeling guidelines into the Nevada SIP, refer to 69 FR 54006 dated September 7, 2004.

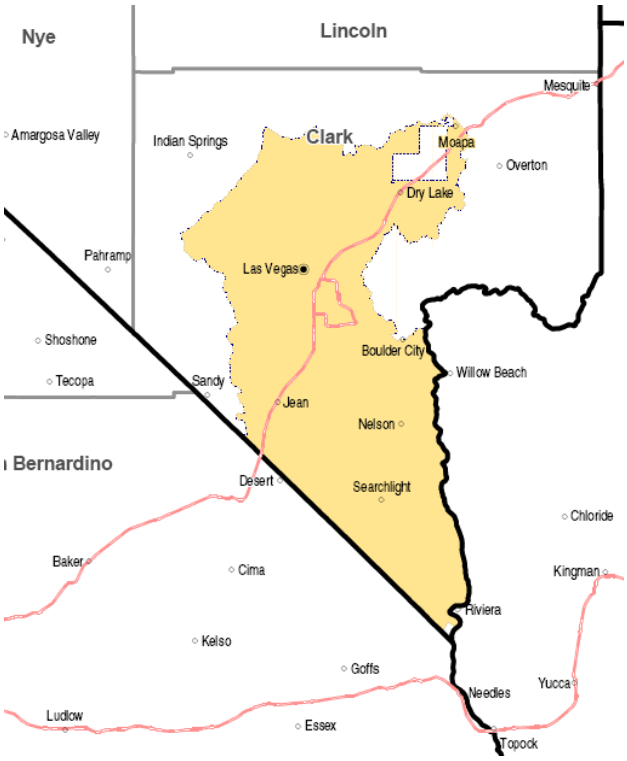

FIGURE C-2.1.
CLARK COUNTY, NEVADA, OZONE NONATTAINMENT AREA[13]

C-2.3 REGULATORY OVERVIEW

The assessment of air quality impacts for the Proposed Action was conducted in accordance with the guidelines provided in the FAA *Air Quality Procedures for Civilian Airports & Air Force Bases (referred to as the Airport Air Quality Handbook),*[14] which together with the guidelines provided in the FAA Order 1050.1E, *Environmental Impacts: Policies and Procedures*[15], constitutes compliance with all the relevant provisions of the National Environmental Policy Act (NEPA), the CAA, and the Nevada air pollution control regulations, including the Nevada SIP.

An airport air quality assessment requires consideration under both the CAA and the NEPA, which are unique legislative acts that require distinct analyses and may be separately applicable to an airport project. Consider that compliance under the CAA requires a demonstration of conformity to the SIP only for the preferred project alternative ultimately selected for agency approval and/or funding and then only

[13] USEPA, retrieved from the USEPA Web site at: http://www.epa.gov/ozonedesignations/areamaps/LasVegas.pdf.
[14] FAA and USAF, *Air Quality Procedures for Civilian Airports & Air Force Bases*, April 1997.
[15] FAA Order 1050.1E *Environmental Impacts: Policies and Procedures*.

when the project is located in areas of nonattainment or maintenance.[16] Conversely, the NEPA requires compliance to the NAAQS[17] for all the reasonable project alternatives regardless of the area's attainment status.

Ultimately, the NEPA and CAA analyses conducted for the air quality assessment of a Federal action must collectively serve to adequately demonstrate compliance to CAA Title 1, Section 176(c)(1), which is given in **Table C-2.1**.

Table C-2.1
CAA TITLE 1, SECTION 176(c)(1)

(c)(1)	No department, agency, or instrumentality of the Federal Government shall engage in, support in any way or provide financial assistance for, license or permit, or approve any activity which does not conform to an implementation plan after it has been approved or promulgated under Section 110.[1] No metropolitan planning organization designated under Section 134[2] of Title 23, United States Code, shall give its approval to any project, program, or plan which does not conform to an implementation plan approved or promulgated under Section 110.[1] The assurance of conformity to such an implementation plan shall be an affirmative responsibility of the head of such department, agency, or instrumentality. Conformity to an implementation plan means: (A) conformity to an implementation plan's purpose of eliminating or reducing the severity and number of violations of the national ambient air quality standards and achieving expeditious attainment of such standards; and (B) that such activities will not: (i) cause or contribute to any new violation of any standard in any area; (ii) increase the frequency or severity of any existing violation of any standard in any area; or (iii) delay timely attainment of any standard or any required interim emission reductions or other milestones in any area.

Notes:

[1] Section 110 refers to CAA Title 1, Part A, Section 110, *Implementation Plans*.
[2] Section 134 refers to USC, Title 23, Section 134, *Metropolitan Planning*, relating to Federal aid for highway projects.

Sources: USEPA, CAA, available on the CAA Web site: www.epa.gov/air/caa.
U.S. Code, available on the GPO Web site: www.access.gpo.gov/uscode/uscmain.html.

[16] USEPA, Office of Air Quality Planning and Standards (OAQPS), *General Conformity Guidance: Questions and Answers*, July 13, 1994.
[17] The National Ambient Air Quality Standards (NAAQS) are established by the USEPA for six pollutants determined to be harmful to human health and welfare. Refer to **Table C-2.2, National and Nevada Ambient Air Quality Standards**.

C-2.3.1 National Ambient Air Quality Standards (NAAQS)

Under the CAA, the USEPA established a set of standards, or "criteria," for six air pollutants determined to be harmful to human health and welfare.[18] The standards for the criteria pollutants are known as the National Ambient Air Quality Standards (NAAQS).[19] The USEPA considers these six criteria pollutants to be indicators of air quality:

- Ozone (O_3)
- Carbon Monoxide (CO)
- Nitrogen Dioxide (NO_2)
- Particulate Matter (PM_{10} and $PM_{2.5}$)[20]
- Sulfur Dioxide (SO_2)
- Lead (Pb)

For each of these criteria pollutants, the USEPA establishes primary standards intended to protect public health, and secondary standards for the protection of other aspects of public welfare, such as preventing damage to materials, preventing crop and vegetation damage, and assuring good visibility. The air quality assessment for the LAS Draft Supplemental Environmental Assessment (DSEA) is concerned with impacts to public health. As such, only the primary standards were considered in the evaluation.

Areas of the country where air pollution levels consistently exceed the primary standards may be designated nonattainment by the USEPA. A nonattainment area is a homogeneous geographical area[21] (usually referred to as an air quality control region, AQCR)[22] that is in violation of one or more NAAQS and has been designated nonattainment by the USEPA as provided for under the CAA. The federal and State of Nevada ambient air quality standards are given in **Table C-2.2**.

[18] 40 CFR Part 50 *National Primary and Secondary Ambient Air Quality Standards (*NAAQS).

[19] "Ambient air" is defined as that portion of the atmosphere, external to buildings, to which the general public has access. The air that is within the fenced in or guarded area of facility property is not ambient.

[20] PM_{10} and $PM_{2.5}$ are airborne inhalable particles defined as coarse (particles less than 10 micrometers in diameter) and fine (particles less than 2.5 micrometers in diameter), respectively.

[21] A homogeneous geographical area, with regard to air quality, is an area, not necessarily bounded by state lines, where the air quality characteristics have been shown to be similar over the whole area. This may include several counties encompassing more than one state, or may be a very small area within a single county.

[22] A listing of all designated AQCRs is given at 40 CFR Part 81.

Table C-2.2
NATIONAL AND NEVADA AMBIENT AIR QUALITY STANDARDS

POLLUTANT	AVERAGING PERIOD	PRIMARY STANDARDS[1]		SECONDARY STANDARDS[2]	
		PPM	$\mu g / m^3$	PPM	$\mu g / m^3$
Sulfur Dioxide (SO_2)	Annual Arithmetic Mean 24-Hour Average 3-Hour Average	0.03 0.14 None	80 365 None	None None 0.50	None None 1,300
Particulate Matter (PM_{10})	Annual Arithmetic Mean 24-Hour Average	NA NA	50 150	NA NA	50 150
Particulate Matter ($PM_{2.5}$)	Annual Arithmetic Mean 24-Hour Average	NA NA	15.0 65	NA NA	15 65
Carbon Monoxide (CO)	8-Hour Average 1-Hour Average	9 35	10,000 40,000	None None	None None
Ozone (O_3)	8-Hour Average 1-Hour Average[3]	0.08 0.12	157 235	0.08 0.12	157 235
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.053	100	0.053	100
Lead (Pb)[4]	3-Month Arithmetic Mean	NA	1.5	NA	1.5

Notes:

- PPM denotes parts per million
- $\mu g/m^3$ denotes micrograms per cubic meter
- There is no NAAQS for VOC or for hydrocarbons (HC)
- "NA" denotes Not Applicable
- "None" denotes No Established Standard

[1] Primary standards protect public health.

[2] Secondary standards protect public welfare.

[3] The one-hour standard was revoked by USEPA on June 15, 2005, published at 69 FR 23871, dated June 30, 2004.

[4] Airborne lead in urban areas is primarily emitted by motor vehicles using leaded fuels. The primary source of lead emissions at airports would be from the combustion of leaded aviation gasoline in small piston-engine general aviation aircraft. However, the USEPA and FAA have determined that an exceedance of the lead standard would be unlikely at an airport because of the use of low-lead fuel. Therefore, emissions of lead were not considered for this assessment.

Sources: 40 CFR Parts 50.4 through 50.12.
USEPA, Office of Air and Radiation, *National Ambient Air Quality Standards (NAAQS),* available on the USEPA Web site: www.epa.gov/air/criteria.html.
Clark County Air Quality Regulations (CCAQR), Section 11.
FAA and USAF, *Air Quality Procedures for Civilian Airports & Air Force Bases*, April 1997.
USEPA, *Clean Air Rules of 2000*, April 15, 2004, available On-line at: www.epa.gov/cleanair2004/ and www.epa.gov/ozonedesignations/finrulefs.htm.

When a NEPA analysis is needed for an airport project, air quality is assessed by evaluating the impact of the proposed action on the NAAQS. Initially, the emissions inventory prepared for the proposed action ("action") is compared to the baseline emissions inventory ("no action") to reveal the net emissions due to the proposed action. Further analysis is not required when net emissions do not exceed the emissions thresholds established by the General Conformity Rule of the CAA.[23]

C-2.3.2 Clean Air Act

The CAA Amendments of 1990 included provisions to ensure emissions from Federal actions will comply with the goals of the SIP to improve air quality in a nonattainment or maintenance area. Compliance to the SIP requires the sponsoring Federal agency to prepare an analytical demonstration of the potential for significant air quality impacts from Federal actions.

The USEPA promulgated the conformity regulations on November 24, 1993[24] to assist Federal agencies in complying with the SIP by specifying rules for two categories of Federal actions: transportation actions and general actions. The two rules have separate and distinct applicability and evaluation requirements. Transportation conformity applies to highway and transit projects, and general conformity regulations apply to all other Federal actions that are not transportation projects, such as airport improvement projects.

C-2.3.2.1 General Conformity Rule Applicability

The General Conformity Rule establishes minimum values, referred to as de minimis thresholds, for the criteria and precursor pollutants to identify Federal actions with project-related emissions that are clearly negligible (de minimis) to avoid unreasonable administrative burdens on the sponsoring agency and to focus efforts on key actions with the potential for significant impacts. Notably, there are no de minimis thresholds to assess ozone emissions. This is because ozone is not directly emitted from a source. Rather, ozone is formed through photochemical reactions involving emissions of NO_x VOC, and abundant sunlight. Therefore, emissions of ozone are evaluated based on projected emissions of the ozone precursor pollutants, NO_x and VOC. The de minimis thresholds are given in **Table C-2.3.**

[23] FAA, *Environmental Impacts: Policies and Procedures*, Appendix A, Section 2, Paragraph 2.1c. Refer also to **Section C-2.4.2.1, General Conformity Rule Applicability**, of this Appendix.
[24] 58 FR 62188, dated November 24, 1993.

Table C-2.3
CLEAN AIR ACT DE MINIMIS THRESHOLDS

POLLUTANT	NONATTAINMENT AREA EMISSION THRESHOLDS (tons per year)	MAINTENANCE AREA EMISSION THRESHOLDS (tons per year)
Carbon Monoxide (CO)	100	100
Particulate Matter (PM_{10})		100
Moderate Nonattainment Area	100	
Serious Nonattainment Area	70	
Particulate Matter ($PM_{2.5}$)	100	100
Precursor pollutants SO_2, NO_x, VOC, & NH_4[1]	100	100
Sulfur Dioxide (SO_2)	100	100
Nitrogen Dioxide (NO_2)	100	100
Lead (Pb)	25	25
Ozone[2] (O_3)	VOC/NOx	VOC/NO_x
Serious Nonattainment Area	50/50	
Severe Nonattainment Area	25/25	
Extreme Nonattainment Area	10/10	
Inside an ozone transport region[3]:		50/100
Marginal Nonattainment Area	50/100	
Moderate Nonattainment Area	50/100	
Outside an ozone transport region[3]:		100/100
Marginal Nonattainment Area	100/100	
Moderate Nonattainment Area	100/100	

Notes:

[1] NH_4 is the chemical formula for ammonia, a precursor to the development of $PM_{2.5}$. Net emissions of pollutants determined by USEPA as precursors, or contributors, to $PM_{2.5}$ emissions include SO_2, NO_x, VOC, and NH_4, and are each limited to net emissions of 100 tons per year in a $PM_{2.5}$ nonattainment or maintenance area.

[2] The rate of increase of ozone emissions is not usually evaluated because the formation of ozone occurs on a regional level and is the result of the photochemical reaction of NO_x and VOC in the presence of abundant sunlight. Therefore, USEPA considers the rates of increase of NO_x and VOC emissions to reflect the likelihood of ozone formation on a project-level.

[3] An ozone transport region (OTR) is a single transport region for ozone, comprised of the States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia.

Sources: 40 CFR 93.153(b)(1).
71 FR 17003, April 5, 2006, *$PM_{2.5}$ De Minimis Emission Levels for General Conformity Applicability*.

The de minimis thresholds are relevant only for those pollutants, or precursor pollutants, for which the area is nonattainment or maintenance. These are referred to as the "pollutants of concern" and for LAS these would be NO_x, VOC, CO, and PM_{10}. The de minimis rates depend on the severity of the nonattainment area and further depend on whether the general Federal action is located inside an ozone transport region (OTR).[25] Las Vegas is not located within an OTR. The applicable de minimis thresholds for LAS limit net emissions due to a Federal action to 100 tons per year, each, of NO_x and VOC emissions, 100 tons per year of CO emissions, and because Las Vegas is designated as serious nonattainment for PM_{10} emissions, net emissions due to a Federal project are limited to 70 tons per year.

The General Conformity Rule (the Rule), published under Title 40 of the Code of Federal Regulations (40 CFR) Part 93,[26] applies only to a general federal action that is:

- Federally-funded or Federally-approved;
- Not a highway or transit project;
- Not identified as an exempt project under the CAA and is not a project identified on the approving Federal agency's Presumed to Conform list;[27]
- Located within a nonattainment or maintenance area; and,
- Expected to cause net emissions of the nonattainment or maintenance criteria or precursor pollutants.

Otherwise, the federal action is not applicable under the Rule. If applicable under the general conformity regulations, the net emissions due to a federal action cannot equal or exceed the de minimis thresholds for the pollutants of concern.

An exempt project is one that the USEPA has determined would have no impact on air quality at the facility, or would have a net increase in emissions so small as to be considered negligible or "de minimis." Actions that the USEPA considers clearly de minimis are exempt and are not subject to the general conformity regulations. Instead, such actions are exempt from the rule as provided in 40 CFR Part 93.153(c)(2), and would include actions such as administrative actions relating to personnel[28] and planning studies.[29] In the preamble to the General Conformity

[25] An ozone transport region (OTR) is a single transport region for ozone (within the meaning of Section 176A(a) of the CAA), comprised of the States of Connecticut, Delaware, Maine, Maryland, Massachusetts, New Hampshire, New Jersey, New York, Pennsylvania, Rhode Island, Vermont, and the Consolidated Metropolitan Statistical Area that includes the District of Columbia, as given at Section 184 of the Act.

[26] 40 CFR Part 93, Subpart B *Determining Conformity of General Federal Actions to State or Federal Implementation Plans*.

[27] The provisions of the CAA allow a Federal agency to submit a list of actions demonstrated to have low emissions that would have no potential to cause an exceedance of the NAAQS and are presumed to conform to the CAA conformity regulations. This list would be referred to as the "Presumed to Conform" list. The FAA is currently developing a Presumed to Conform list of airport projects that would not require evaluation under the general conformity regulations.

[28] 40 CFR Part 93.153(c)(2)(vi).

Rule, published in Volume 58 of the Federal Register (58 FR, page 63229) (November 30, 1993), the USEPA states, "There are too many Federal actions that are de minimis to completely list in either the rule or this preamble. In addition to the list in the rule, the USEPA believes that the following actions are illustrative of de minimis actions:" following which the USEPA lists "air traffic control activities and adopting approach, departure, and enroute procedures for air operations."

The proposed federal action required for a proposed modification to the 2001 Four Corner-Post Plan is described in **Chapter One, Purpose and Need**, of this SEA (see **Section 1.3, Proposed Federal Action**). The description of the LAS proposed federal action in Chapter One of this SEA includes various administrative actions including refinement of the language defining the procedure, personnel training, and publication of the procedures following FAA approval. Prior to approval, the FAA would test the procedure for compliance to safety and operational standards by operating a "flight check" of the procedure at LAS. Following approval, the Proposed Action would require the implementation of the modified air traffic control procedures. Each of these elements of the Proposed Action is defined as exempt under the general conformity regulations or is listed as a de minimis action under USEPA guidelines.[30] Consequently, the Proposed Action at LAS is exempt and assumed to conform under the CAA general conformity regulations.

C-2.3.2.2 Transportation Conformity Rule Applicability

Although airport improvement projects are considered subject to general conformity regulations, there may be elements of a proposed project alternative that may require an analysis to show transportation conformity. For example, a highway project may have modifications to highway ramps that are not included on the regional Transportation Plan or Transportation Improvement Plan (TIP). In such case, the sponsoring federal agency would be required to coordinate with the Federal Highway Administration (FHWA), the State Department of Transportation, and the local metropolitan planning organization (MPO) to assist in completing a transportation conformity evaluation. The Proposed Action at LAS would not include any modifications or plans for highways or transit projects. Therefore, transportation conformity regulations would not apply to the Proposed Action at LAS.

C-2.3.3 Indirect Source Review

Some states require an air quality review when a federal action has the potential to cause an increase in emissions from indirect sources. Indirect sources cause emissions that occur later in time or are farther removed from the federal action. Depending on the state, indirect sources may be identified as motor vehicles on highways, parking at sports and entertainment facilities, or an increase in aircraft operations. This state requirement is referred to as an Indirect Source Review

[29] 40 CFR Part 93.153(c)(2)(xii).
[30] 58 FR 63229 (November 30, 1993) and 40 CFR Part 93.153(c)(2).

(ISR) and each state requiring an ISR sets thresholds for increased operation of the indirect sources. When a federal action has the potential to exceed these thresholds, an air quality review is required to assess the character and impact of the additional emissions, which is separate from the analyses required under NEPA or the CAA. According to the FAA document, *Air Quality Procedures for Airports and Air Force Bases*,[31] Nevada is not listed as one of the states requiring an ISR.

C-2.3.4 References

The following list of regulations and guidelines were the primary references used in the preparation of the air quality assessment:

- *USEPA, Clean Air Act Amendments of 1990*, Section 176(c)(1).
- *USEPA, Clean Air Rules of 2004.*
- *USEPA, Conformity to State or Federal Implementation Plans of Transportation Plans, Programs, and Projects Developed, Funded or Approved Under 23 U.S.C. or the Federal Transit Laws*, 40 CFR Part 93, Subpart A.
- *USEPA, Designation of Areas for Air Quality Planning Purposes*, 40 CFR Part 81.
- *USEPA, Determining Conformity of General Federal Actions to State or Federal Implementation Plans*, 40 CFR Part 93, Subpart B.
- USEPA, Memorandum from William T. Harnett, Director, Air Quality Policy Division, Research Triangle Park, North Carolina, dated April 3, 2006.
- *USEPA, National Primary and Secondary Ambient Air Quality Standards*, 40 CFR Part 50.
- USEPA, *Preamble to the General Conformity Rule*, 58 FR 63229, November 30, 1993.
- FAA Order 1050.1E *Environmental Impacts: Policies and Procedures*.
- FAA Report AEE-97-03 *Air Quality Procedures for Civilian Airports & Air Force Bases*, 1997.
- FAA Policy *Statement Emissions and Dispersion Modeling System Policy for Airport Air Quality Analysis - Interim Guidance to FAA Order 1050.1D and 5050.4A*, April 13, 1998.

[31] FAA and USAF, *Air Quality Procedures for Civilian Airports & Air Force Bases*, Appendix J, April 1997.

C-2.4 ASSESSMENT PROCEDURES

Five emissions inventories were prepared for the air quality assessment for the Proposed Action:

- No Action (baseline conditions -2004)
- No Action 2005 baseline
- Proposed Action 2005
- No Action 2010 baseline
- Proposed Action 2010

The inventories were limited to emissions from aircraft reflecting the change in the ground operations of aircraft that would potentially occur under the Proposed Action. The following steps were required to complete the assessment:

- Determine the appropriate local meteorology for modeling the emissions inventory;
- Identify the relevant computer model;
- Develop relevant emission source data and prepare the inventory of criteria and precursor pollutants reflecting aircraft emissions due to the existing conditions, and the two baseline scenarios, 2005 and 2010;
- Develop relevant emission source data and prepare the inventory of criteria and precursor pollutants reflecting aircraft emissions due to the implementation of the Las Vegas Four Corner-Post Plan in 2005 and 2010;
- Prepare the net emissions evaluation.

C-2.4.1 Meteorology

Local meteorology data is required to accurately calculate the emissions from the operation of aircraft. The average annual temperature is used in the calculation of emission indices for the aircraft engines. The annual average temperature at LAS is 68.1 degrees Fahrenheit.[32]

The average annual mixing height is used to calculate how long each aircraft operates during approach and climb-out. The mixing height is defined by the depth of the surface temperature inversion, or the mixing layer, which usually occurs in the morning or late afternoon. A temperature inversion occurs when the air aloft is warmer than the air near the ground. This causes air pollutants released at the surface to remain beneath the level where the air is warmer, trapping the pollutants close to the ground where the emissions could potentially impact human health. The height above ground level (AGL) of the top of the inversion is referred to as the

[32] National Climatic Data Center (NCDC), *Las Vegas Weather Service Office (WSO) Airport, Nevada – NCDC 1971-2000 Monthly Normals*, retrieved from the Western Regional Climate Center Web site at: http://www.wrcc.dri.edu/cgi-bin/cliMAIN.pl?nv4436.

mixing height. Pollutants released above the mixing height would have a negligible impact at the surface. All pollutant emissions released within the mixing zone must be accounted for in a complete emissions inventory. When evaluating aircraft emissions, only the emissions occurring below the mixing height and within the mixing layer would be considered in the analysis. Further, a user-defined mixing layer would be assumed for every approach and climb-out operation. Each aircraft is assumed to operate on approach from the point where the aircraft intercepts the mixing height on a three degree approach path until the aircraft touches down on the runway surface. During climb-out, emissions are calculated until the aircraft reaches the mixing height level on departure. By applying this methodology, a higher mixing height at an airport results in more emissions. The average annual mixing height at LAS is 4,536 feet AGL.[33]

C-2.4.2 EDMS – FAA Emissions and Dispersion Modeling System

The FAA Emissions and Dispersion Modeling System (EDMS) computer program is the FAA-required and USEPA-approved model for estimating emissions from aircraft engines and other airport-specific sources of emissions.[34] The EDMS Version 4.4 includes the "first order approximation"[35] algorithm for the calculation of particulate matter emissions from commercial jet aircraft and the model can predict emissions of coarse particles, PM_{10}, and fine particles, $PM_{2.5}$. Turboprop and piston-engine aircraft, and some of the smaller jet aircraft, are not assigned particulate matter emission factors in the EDMS database. For these aircraft, particulate matter emissions estimates were made from USEPA guidance documents.[36]

C-2.4.3 Aircraft Emissions Inventory

Emissions from aircraft depend on the type of aircraft, the type and number of engines powering the aircraft, fuel type, and the number of annual operations. Therefore, it is important that the characteristics of each aircraft in the fleet be as complete as reasonably possible. A summary of the LAS aircraft fleet for the existing conditions as well as 2005 and 2010 is given in **Table C-2.4**.

[33] USEPA, *Mixing Heights, Wind Speeds, and Potential for Urban Air Pollution Throughout the Contiguous United States (AP-101)*, by Holzworth, George C., January 1972.

[34] FAA, *Policy Statement Emissions and Dispersion Modeling System Policy for Airport Air Quality Analysis - Interim Guidance to FAA Order 1050.1D and 5050.4A*, April 13, 1998.

[35] First Order Approximation (FOA) Version 2.0 applies a methodology to calculate particulate matter emissions from aircraft engines and was included for the first time in FAA EDMS Version 4.3. The FOA is applicable for engines that have both a smoke number and fuel flow information for each mode of aircraft operation, namely, approach, landing, idle/taxi, takeoff, and climb out. The FOA is not applicable to piston, turboprop, or military engines. Refer to FAA, EDMS Reference Manual Supplement: Model changes Between EDMS 4.21 and EDMS 4.3, July 18, 2005.

[36] USEPA, *Compilation of Air Pollutant Emission Factors - Volume II: Mobile Sources (AP-42)*, Table II-1-9, 1995.

Table C-2.4
AIRCRAFT FLEET –2004 (EXISTING CONDITIONS), 2005, AND 2010

AIRCRAFT TYPE	ENGINE TYPE	ANNUAL OPERATIONS			ANNUAL LTOs [1]		
		2004	2005	2010	2004	2005	2010
A310	CF6-80A3	1,826	1,826	1,826	913	913	913
A319	CFM56-5B6/P	17,150	18,244	25,180	8,575	9,122	12,590
A320	V2527-A5	58,746	60,208	69,330	29,373	30,104	34,665
B717-200	BR700-715A1-30 new FI	1,460	1,460	2,190	730	730	1,095
B727-200	JT8D-15	4,378	4,014	2,190	2,189	2,007	1,095
B737-200	JT8D-15A	12,772	11,312	4,014	6,386	5,656	2,007
B737-300	CFM56-3-B1	94,138	95,602	112,754	47,069	47,801	56,377
B737-400	CFM56-3B-2	2,190	2,190	1,096	1,095	1,095	548
B737-500	CFM56-3C-1	6,204	5,838	3,648	3,102	2,919	1,824
B737-700	CFM56-7B22	60,206	63,128	80,644	30,103	31,564	40,322
B737-800	CFM56-7B26	12,042	12,042	13,136	6,021	6,021	6,568
B747-400	PW4056	730	1,096	1,826	365	548	913
B757-200	RB211-535C	53,272	54,370	60,574	26,636	27,185	30,287
B767-300	CF6-80A2	6,204	6,568	8,758	3,102	3,284	4,379
B777-200	GE90-76B	0	364	1,458	0	182	729
B777-300	GE90-94B	0	0	730	0	0	365
Bell 206	250B17B	88,666	89,034	91,954	44,333	44,517	45,977
BH-1900	PT6A-67D	4,014	4,014	3,286	2,007	2,007	1,643
Cessna 172 Skyhawk	IO-320-D1AD	14,594	15,326	19,340	7,297	7,663	9,670
CL600S	ALF 502L-2	7,662	8,756	15,326	3,831	4,378	7,663
DC10-30	CF6-50C2	1,096	1,096	366	548	548	183
DC9-30	JT8D-7B	730	730	1,096	365	365	548
Embraer ERJ 145LR	AE3007A1/3 (Type 1)	6,568	6,568	6,568	3,284	3,284	3,284
F-16	F100-PW-100	366	366	366	183	183	183
Gulfstream II	SPEY MK511-8	2,918	2,920	2,556	1,459	1,460	1,278
Gulfstream IV	TAY Mk611-8	16,054	15,692	14,962	8,027	7,846	7,481
Learjet 25B	CJ610-6	3,284	3,648	4,014	1,642	1,824	2,007
Learjet 35/36	TFE 731-2-2B	22,622	22,990	24,450	11,311	11,495	12,225
MD-80-83	JT8D-217 (old comb)	21,162	21,164	22,990	10,581	10,582	11,495
MD-95	BR700-715A1-30 new FI	2,188	2,190	2,188	1,094	1,095	1,094
Navajo	TIO-540-J2B2	14,232	15,324	22,624	7,116	7,662	11,312
PA-42 Cheyenne	PT6A-41	4,744	5,108	6,568	2,372	2,554	3,284
Total		**542,218**	**553,188**	**628,008**	**271,109**	**276,594**	**314,004**

Notes: All aircraft types and engine types are as defined in the FAA EDMS (V. 4.4) aircraft database.
[1] "LTOs" denotes Landing and Takeoff cycles.

Sources: FAA, Emissions and Dispersion Modeling System (EDMS V. 4.4), 2005.
Landrum & Brown Analysis, 2006.

The number of aircraft operations for a given year would be the same regardless of the implementation of the Proposed Action.

Two types of fuel are used to power aircraft engines – jet fuel and aviation gasoline. Jet fuel, or JET A fuel, is used to power jets and turboprop aircraft, which produce higher emissions of NO_x than engines powered by aviation gasoline, or AvGas. AvGas is used by small piston aircraft and produces high levels of CO. To create an accurate accounting of emissions from all types of aircraft at LAS, each aircraft type was identified by aircraft type, unique engine type, the number of engines, and the number of annual operations by each unique aircraft/engine combination.

In addition to the physical characteristics of the aircraft operating at the airport, emissions from aircraft further depend on the length of time each aircraft type operates in the various modes that define a landing and takeoff cycle. A landing and takeoff cycle (LTO) consists of the approach, taxi time[37] and idle time, takeoff, and climb-out. The methodology used to calculate how long each aircraft operates during approach and climb-out was discussed previously in Section **C-2.4.1, Meteorology,** of this Appendix. The operating time during takeoff is a function of aircraft performance and is assigned by default as given in the EDMS aircraft performance database. Taxi time and departure delay time is unique to each airport and is also a function of the operational characteristics of the proposed project. A list of the times-in-mode assigned to each aircraft in the LAS aircraft fleet is given in **Table C-2.5**.

The calculation of emissions due to aircraft operation requires the average airport total taxi time (including taxi-in and taxi-out time, and ground delay time) and average departure queue delay time. The average total taxi time at an airport would change year-to-year depending on the increase or decrease of annual aircraft operations, even when the airfield configuration and runway use remains unchanged. Changes in approach and departure procedures, as would be the case with the Proposed Action, would modify the ground movement of aircraft, affecting total taxi time. Like taxi time, the departure delay time at an airport usually varies from year to year depending on the number of aircraft operations and also depends on the airfield configuration. Further, when an airport implements new approach and departure procedures, as would be the case with the Proposed Action at LAS, the average departure delay time may be affected, particularly when the changes increase the efficiency of aircraft movement on the ground. The average airport total taxi and departure queue delay times under existing conditions and the Proposed Action is given in **Table C-2.6, Total Taxi, Idle, and Departure Delay Times per Landing and Takeoff Cycle (LTO).**

[37] Includes taxi operation between the gate and the runway end, ground delay during taxi, the landing roll, which is defined from the point of touchdown until the aircraft exits the runway to the taxiway, and includes departure queue delay time.

Table C-2.5
AIRCRAFT TIMES-IN-MODE

AIRCRAFT TYPE	ENGINE TYPE	OPERATING TIME (in minutes)		
		APPROACH	CLIMB-OUT	TAKE-OFF
A310	CF6-80A3	5.57	1.39	0.95
A319	CFM56-5B6/P	5.49	1.65	0.91
A320	V2527-A5	5.93	1.74	0.96
B717-200	BR700-715A1-30 new FI	5.23	1.52	0.95
B727-200	JT8D-15	5.51	2.10	1.35
B737-200	JT8D-15A	5.65	1.60	0.87
B737-300	CFM56-3-B1	5.52	1.23	0.78
B737-400	CFM56-3B-2	5.52	1.23	0.78
B737-500	CFM56-3C-1	5.64	1.39	0.88
B737-700	CFM56-7B22	5.72	1.43	0.98
B737-800	CFM56-7B26	5.61	1.53	1.03
B747-400	PW4056	5.11	2.75	1.22
B757-200	RB211-535C	5.85	1.53	0.72
B767-300	CF6-80A2	5.63	2.13	1.13
B777-200	GE90-110B1	7.83	2.30	1.01
B777-300	GE90-94B	5.50	2.24	1.01
Bell 206	250B17B	9.83	7.66	2.17
BH-1900	PT6A-67D	11.96	1.94	0.82
Cessna 172 Skyhawk	IO-320-D1AD	10.67	5.80	1.75
CL600S	ALF 502L-2	5.90	1.31	0.84
DC10-30	CF6-50C2	5.16	1.91	1.15
DC9-30	JT8D-7B	5.50	2.04	1.01
Embraer ERJ 145LR	AE3007A1/3 (Type 1)	5.94	2.50	0.84
F-16	F100-PW-100	5.81	0.67	0.65
Gulfstream II	SPEY MK511-8	5.34	1.86	1.03
Gulfstream IV	TAY Mk611-8	5.35	1.04	0.69
Learjet 25B	CJ610-6	5.53	1.08	0.81
Learjet 35/36	TFE 731-2-2B	6.18	1.27	0.74
MD-80-83	JT8D-217 (old comb)	5.63	1.90	0.97
MD-95	BR700-715A1-30 new FI	5.60	1.07	0.90
Navajo	TIO-540-J2B2	7.71	3.15	0.98
PA-42 Cheyenne	PT6A-41	8.09	1.43	0.90

Note: Climb-out and approach times-in-mode are a function of the LAS mixing height of 4,536 feet above ground level (AGL).

Source: FAA, Emissions and Dispersion Modeling System (EDMS V. 4.4), 2005.

Table C-2.6
TOTAL TAXI, IDLE, AND DEPARTURE DELAY TIMES PER LANDING AND TAKEOFF CYCLE (LTO)

ALTERNATIVES	AVERAGE TIME IN MINUTES PER LTO					
	2004		2005		2010	
	Total Taxi/Idle Time	Departure Delay Time	Total Taxi/Idle Time	Departure Delay Time	Total Taxi/Idle Time	Departure Delay Time
No Action	15.36	3.63	15.99	4.05	16.46	4.59
Proposed Action	NA	NA	15.24	3.48	15.54	3.92

Notes: LTO is landing and takeoff cycle, comprised of one departure operation and one arrival operation.
Total taxi time includes taxi-in and taxi-out time, idle time, and accounts for ground delay.
NA is not applicable.
The Proposed Action was not implemented in 2004.

Sources: **Section 1.5 Purpose and Need, Table 1.4 Historic and Forecast Passenger Levels at LAS**, of this SEA.
Section 4.2.1.2 Activity Data, Table 4.1 Current and Forecast Annual Operations, of this SEA.
Landrum & Brown Analysis, 2006.

The data in **Table C-2.6** show that total taxi time per aircraft LTO increases over time from the year 2004 to 2010 as the annual number of aircraft operations increase causing increased ground delay during taxi-in and taxi-out. However, the increased efficiency of aircraft operations under the Proposed Action would reduce total taxi time by reducing ground delay time.

Likewise, departure delay time increases over time as the annual number of aircraft operations increase causing longer queues at the runway ends. However, more efficient use of the airfield under the Proposed Action would reduce departure delay as compared to the No Action alternative of the same year.

Larger jet aircraft operate an onboard auxiliary power unit (APU) located at the rear of the aircraft to restart the engines at the gate before departure. The APU can also provide power for lights, air conditioning, and heat while at the gate during passenger loading and unloading.

The APU is a jet engine with emissions similar to the aircraft's main engines. The Proposed Action would not affect the time an aircraft is parked at the gate area for servicing. Therefore, emissions from APUs would not be affected by implementation of the Proposed Action. Likewise, the use of ground support equipment (GSE) at the gates, and therefore emissions from the use of GSE, would not be affected by the Proposed Action.

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