IN THE SUPREME COURT OF THE STATE OF NEVADA

CITY OF LAS VEGAS, A POLITICAL SUBDIVISION OF THE STATE OF NEVADA, Appellant, vs. 180 LAND CO., LLC, A NEVADA LIMITED-LIABILITY COMPANY; AND FORE STARS, LTD., A NEVADA LIMITED-LIABILITY COMPANY, Respondents.	No. 84345
180 LAND CO., LLC, A NEVADA LIMITED-LIABILITY COMPANY; AND FORE STARS, LTD., A NEVADA LIMITED-LIABILITY COMPANY, Appellants/Cross-Respondents, vs. CITY OF LAS VEGAS, A POLITICAL SUBDIVISION OF THE STATE OF NEVADA, Respondent/Cross-Appellant.	No. 84640 **AMENDED JOINT APPENDIX VOLUME 77, PART 1**

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DISTRICT COURT

CLARK COUNTY, NEVADA

180 LAND CO LLC, a Nevada limited liability company, FORE STARS, LTD., a Nevada limited liability company and SEVENTY ACRES, LLC, a Nevada limited liability company, DOE INDIVIDUALS I-X, DOE CORPORATIONS I-X, and DOE LIMITED LIABILITY COMPANIES I-X, Plaintiffs, v. CITY OF LAS VEGAS, a political subdivision of the State of Nevada; ROE GOVERNMENT ENTITIES I-X; ROE CORPORATIONS I-X; ROE INDIVIDUALS I-X; ROE LIMITED-LIABILITY COMPANIES I-X; ROE QUASI-GOVERNMENTAL ENTITIES I-X, Defendants.	CASE NO.: A-17-758528-J DEPT. NO.: XVI **APPENDIX OF EXHIBITS IN SUPPORT OF CITY'S OPPOSITION TO PLAINTIFF'S MOTION TO DETERMINE TAKE AND FOR SUMMARY JUDGMENT ON THE FIRST, THIRD, AND FOURTH CLAIMS FOR RELIEF AND COUNTERMOTION FOR SUMMARY JUDGMENT** **VOLUME 16**

The City of Las Vegas ("City") submits this Appendix of Exhibits in Support of the City's Opposition to Plaintiff's Motion to Determine Take and For Summary Judgement on the First, Third, and Fourth Claims for Relief and its Countermotion for Summary Judgment.

Exhibit	Exhibit Description	Vol.	Bates No.
A	City records regarding Ordinance No. 2136 (Annexing 2,246 acres to the City of Las Vegas)	1	0001-0011
B	City records regarding Peccole Land Use Plan and Z-34-81 rezoning application	1	0012-0030

Exhibit	Exhibit Description	Vol.	Bates No.
C	City records regarding Venetian Foothills Master Plan and Z-30-86 rezoning application	1	0031-0050
D	Excerpts of the 1985 City of Las Vegas General Plan	1	0051-0061
E	City records regarding Peccole Ranch Master Plan and Z-139-88 phase I rezoning application	1	0062-0106
F	City records regarding Z-40-89 rezoning application	1	0107-0113
G	Ordinance No. 3472 and related records	1	0114-0137
H	City records regarding Amendment to Peccole Ranch Master Plan and Z-17-90 phase II rezoning application	1	0138-0194
I	Excerpts of 1992 City of Las Vegas General Plan	2	0195-0248
J	City records related to Badlands Golf Course expansion	2	0249-0254
K	Excerpt of land use case files for GPA-24-98 and GPA-6199	2	0255-0257
L	Ordinance No. 5250 and Excerpts of Las Vegas 2020 Master Plan	2	0258-0273
M	Miscellaneous Southwest Sector Land Use Maps from 2002-2005	2	0274-0277
N	Ordinance No. 5787 and Excerpts of 2005 Land Use Element	2	0278-0291
O	Ordinance No. 6056 and Excerpts of 2009 Land Use & Rural Neighborhoods Preservation Element	2	0292-0301
P	Ordinance No. 6152 and Excerpts of 2012 Land Use & Rural Neighborhoods Preservation Element	2	0302-0317
Q	Ordinance No. 6622 and Excerpts of 2018 Land Use & Rural Neighborhoods Preservation Element	2	0318-0332
R	Ordinance No. 1582	2	0333-0339
S	Ordinance No. 4073 and Excerpt of the 1997 City of Las Vegas Zoning Code	2	0340-0341
T	Ordinance No. 5353	2	0342-0361
U	Ordinance No. 6135 and Excerpts of City of Las Vegas Unified Development Code adopted March 16, 2011	2	0362-0364
V	Deeds transferring ownership of the Badlands Golf Course	2	0365-0377
W	Third Revised Justification Letter regarding the Major Modification to the 1990 Conceptual Peccole Ranch Master Plan	2	0378-0381
X	Parcel maps recorded by the Developer subdividing the Badlands Golf Course	3	0382-0410
Y	EHB Companies promotional materials	3	0411-0445
Z	General Plan Amendment (GPA-62387), Rezoning (ZON-62392) and Site Development Plan Review (SDR-62393) applications	3	0446-0466
AA	Staff Report regarding 17-Acre Applications	3	0467-0482

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Exhibit	Exhibit Description	Vol.	Bates No.
BB	Major Modification (MOD-63600), Rezoning (ZON-63601), General Plan Amendment (GPA-63599), and Development Agreement (DIR-63602) applications	3	0483-0582
CC	Letter requesting withdrawal of MOD-63600, GPA-63599, ZON-63601, DIR-63602 applications	4	0583
DD	Transcript of February 15, 2017 City Council meeting	4	0584-0597
EE	Judge Crockett's March 5, 2018 order granting Queensridge homeowners' petition for judicial review, Case No. A-17-752344-J	4	0598-0611
FF	Docket for NSC Case No. 75481	4	0612-0623
GG	Complaint filed by Fore Stars Ltd. and Seventy Acres LLC, Case No. A-18-773268-C	4	0624-0643
HH	General Plan Amendment (GPA-68385), Site Development Plan Review (SDR-68481), Tentative Map (TMP-68482), and Waiver (68480) applications	4	0644-0671
II	June 21, 2017 City Council meeting minutes and transcript excerpt regarding GPA-68385, SDR-68481, TMP-68482, and 68480.	4	0672-0679
JJ	Docket for Case No. A-17-758528-J	4	0680-0768
KK	Judge Williams' Findings of Fact and Conclusions of Law, Case No. A-17-758528-J	5	0769-0793
LL	Development Agreement (DIR-70539) application	5	0794-0879
MM	August 2, 2017 City Council minutes regarding DIR-70539	5	0880-0882
NN	Judge Sturman's February 15, 2019 minute order granting City's motion to dismiss, Case No. A-18-775804-J	5	0883
OO	Excerpts of August 2, 2017 City Council meeting transcript	5	0884-0932
PP	Final maps for Amended Peccole West and Peccole West Lot 10	5	0933-0941
QQ	Excerpt of the 1983 Edition of the Las Vegas Municipal Code	5	0942-0951
RR	Ordinance No. 2185	5	0952-0956
SS	1990 aerial photograph identifying Phase I and Phase II boundaries, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0957
TT	1996 aerial photograph identifying Phase I and Phase II boundaries, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0958
UU	1998 aerial photograph identifying Phase I and Phase II boundaries, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0959

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Exhibit	Exhibit Description	Vol.	Bates No.
VV	2015 aerial photograph identifying Phase I and Phase II boundaries, retail development, hotel/casino, and Developer projects, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0960
WW	2015 aerial photograph identifying Phase I and Phase II boundaries, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0961
XX	2019 aerial photograph identifying Phase I and Phase II boundaries, and current assessor parcel numbers for the Badlands property, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0962
YY	2019 aerial photograph identifying Phase I and Phase II boundaries, and areas subject to inverse condemnation litigation, produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0963
ZZ	2019 aerial photograph identifying areas subject to proposed development agreement (DIR-70539), produced by the City's Planning & Development Department, Office of Geographic Information Systems (GIS)	5	0964
AAA	Membership Interest Purchase and Sale Agreement	6	0965-0981
BBB	Transcript of May 16, 2018 City Council meeting	6	0982-0998
CCC	City of Las Vegas' Amicus Curiae Brief, *Seventy Acres, LLC v. Binion*, Nevada Supreme Court Case No. 75481	6	0999-1009
DDD	Nevada Supreme Court March 5, 2020 Order of Reversal, *Seventy Acres, LLC v. Binion*, Nevada Supreme Court Case No. 75481	6	1010-1016
EEE	Nevada Supreme Court August 24, 2020 Remittitur, *Seventy Acres, LLC v. Binion*, Nevada Supreme Court Case No. 75481	6	1017-1018
FFF	March 26, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Entitlements on 17 Acres	6	1019-1020
GGG	September 1, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Final Entitlements for 435-Unit Housing Development Project in Badlands	6	1021-1026
HHH	Complaint Pursuant to 42 U.S.C. § 1983, *180 Land Co. LLC et al. v. City of Las Vegas, et al.*, 18-cv-00547 (2018)	6	1027-1122
III	9th Circuit Order in *180 Land Co. LLC; et al v. City of Las Vegas, et al.*, 18-cv-0547 (Oct. 19, 2020)	6	1123-1127
JJJ	Plaintiff Landowners' Second Supplement to Initial Disclosures Pursuant to NRCP 16.1 in 65-Acre case	6	1128-1137
LLL	Bill No. 2019-48: Ordinance No. 6720	7	1138-1142

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Exhibit	Exhibit Description	Vol.	Bates No.
MMM	Bill No. 2019-51: Ordinance No. 6722	7	1143-1150
NNN	March 26, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Entitlement Requests for 65 Acres	7	1151-1152
OOO	March 26, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Entitlement Requests for 133 Acres	7	1153-1155
PPP	April 15, 2020 Letter from City of Las Vegas Office of the City Attorney to Counsel for the Developer Re: Entitlement Requests for 35 Acres	7	1156-1157
QQQ	Valbridge Property Advisors, Lubawy & Associates Inc., Appraisal Report (Aug. 26, 2015)	7	1158-1247
RRR	Notice of Entry of Order Adopting the Order of the Nevada Supreme Court and Denying Petition for Judicial Review	7	1248-1281
SSS	Letters from City of Las Vegas Approval Letters for 17-Acre Property (Feb. 16, 2017)	8	1282-1287
TTT	Reply Brief of Appellants 180 Land Co. LLC, Fore Stars, LTD, Seventy Acres LLC, and Yohan Lowie in *180 Land Co LLC et al v. City of Las Vegas*, Court of Appeals for the Ninth Circuit Case No. 19-16114 (June 23, 2020)	8	1288-1294
UUU	Excerpt of Reporter's Transcript of Hearing on City of Las Vegas' Motion to Compel Discovery Responses, Documents and Damages Calculation and Related Documents on Order Shortening Time in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No. A-17-758528-J (Nov. 17, 2020)	8	1295-1306
VVV	Plaintiff Landowners' Sixteenth Supplement to Initial Disclosures in *180 Land Co., LLC v. City of Las Vegas*, Eighth Judicial District Court Case No. A-17-758528-J (Nov. 10, 2020)	8	1307-1321
WWW	Excerpt of Transcript of Las Vegas City Council Meeting (Aug. 2, 2017)	8	1322-1371
XXX	Notice of Entry of Findings of Facts and Conclusions of Law on Petition for Judicial Review in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No.A-17-758528-J (Nov. 26, 2018)	8	1372-1399
YYY	Notice of Entry of Order *Nunc Pro Tunc* Regarding Findings of Fact and Conclusion of Law Entered November 21, 2019 in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No.A-17-758528 (Feb. 6, 2019)	8	1400-1405
ZZZ	City of Las Vegas Agenda Memo – Planning, for City Council Meeting June 21, 2017, Re: GPA-68385, WVR-68480, SDR-68481, and TMP-68482 [PRJ-67184]	8	1406-1432

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Exhibit	Exhibit Description	Vol.	Bates No.
AAAA	Excerpts from the Land Use and Rural Neighborhoods Preservation Element of the City's 2020 Master Plan adopted by the City Council of the City on September 2, 2009	8	1433-1439
BBBB	Summons and Complaint for Declaratory Relief and Injunctive Relief, and Verified Claims in Inverse Condemnation in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No.A-18-780184-C	8	1440-1477
CCCC	Notice of Entry of Findings of Fact and Conclusions of Law Granting City of Las Vegas' Motion for Summary Judgment in *180 Land Co. LLC v. City of Las Vegas*, Eighth Judicial District Court Case No.A-18-780184-C (Dec. 30, 2020)	8	1478-1515
DDDD	Peter Lowenstein Declaration	9	1516-1522
DDDD-1	Exhibit 1 to Peter Lowenstein Declaration: Diagram of Existing Access Points	9	1523-1526
DDDD-2	Exhibit 2 to Peter Lowenstein Declaration: July 5, 2017 Email from Mark Colloton	9	1527-1531
DDDD-3	Exhibit 3 to Peter Lowenstein Declaration: June 28, 2017 Permit application	9	1532-1533
DDDD-4	Exhibit 4 to Peter Lowenstein Declaration: June 29, 2017 Email from Mark Colloton re Rampart and Hualapai	9	1534-1536
DDDD-5	Exhibit 5 to Peter Lowenstein Declaration: August 24, 2017 Letter from City Department of Planning	9	1537
DDDD-6	Exhibit 6 to Peter Lowenstein Declaration: July 26, 2017 Email from Peter Lowenstein re Wall Fence	9	1538
DDDD-7	Exhibit 7 to Peter Lowenstein Declaration: August 10, 2017 Application for Walls, Fences, or Retaining Walls; related materials	9	1539-1546
DDDD-8	Exhibit 8 to Peter Lowenstein Declaration: August 24, 2017 Email from Steve Gebeke	9	1547-1553
DDDD-9	Exhibit 9 to Peter Lowenstein Declaration: Bill No. 2018-24	9	1554-1569
DDDD-10	Exhibit 10 to Peter Lowenstein Declaration: Las Vegas City Council Ordinance No. 6056 and excerpts from Land Use & Rural Neighborhoods Preservation Element	9	1570-1577
DDDD-11	Exhibit 11 to Peter Lowenstein Declaration: documents submitted to Las Vegas Planning Commission by Jim Jimmerson at February 14, 2017 Planning Commission meeting	9	1578-1587
EEEE	GPA-72220 application form	9	1588-1590
FFFF	Chris Molina Declaration	9	1591-1605
FFFF-1	Fully Executed Copy of Membership Interest Purchase and Sale Agreement for Fore Stars Ltd.	9	1606-1622

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Exhibit	Exhibit Description	Vol.	Bates No.
FFFF-2	Summary of Communications between Developer and Peccole family regarding acquisition of Badlands Property	9	1623-1629
FFFF-3	Reference map of properties involved in transactions between Developer and Peccole family	9	1630
FFFF-4	Excerpt of appraisal for One Queensridge place dated October 13, 2005	9	1631-1632
FFFF-5	Site Plan Approval for One Queensridge Place (SDR-4206)	9	1633-1636
FFFF-6	Securities Redemption Agreement dated September 14, 2005	9	1637-1654
FFFF-7	Securities Purchase Agreement dated September 14, 2005	9	1655-1692
FFFF-8	Badlands Golf Course Clubhouse Improvement Agreement dated September 6, 2005	9	1693-1730
FFFF-9	Settlement Agreement and Mutual Release dated June 28, 2013	10	1731-1782
FFFF-10	June 12, 2014 emails and Letter of Intent regarding the Badlands Golf Course	10	1783-1786
FFFF-11	July 25, 2014 email and initial draft of Golf Course Purchase Agreement	10	1787-1813
FFFF-12	August 26, 2014 email from Todd Davis and revised purchase agreement	10	1814-1843
FFFF-13	August 27, 2014 email from Billy Bayne regarding purchase agreement	10	1844-1846
FFFF-14	September 15, 2014 email and draft letter to BGC Holdings LLC regarding right of first refusal	10	1847-1848
FFFF-15	November 3, 2014 email regarding BGC Holdings LLC	10	1849-1851
FFFF-16	November 26, 2014 email and initial draft of stock purchase and sale agreement	10	1852-1870
FFFF-17	December 1, 2015 emails regarding stock purchase agreement	10	1871-1872
FFFF-18	December 1, 2015 email and fully executed signature page for stock purchase agreement	10	1873-1874
FFFF-19	December 23, 2014 emails regarding separation of Fore Stars Ltd. and WRL LLC acquisitions into separate agreements	10	1875-1876
FFFF-20	February 19, 2015 emails regarding notes and clarifications to purchase agreement	10	1877-1879
FFFF-21	February 26, 2015 email regarding revised purchase agreements for Fore Stars Ltd. and WRL LLC	10	1880
FFFF-22	February 27, 2015 emails regarding revised purchase agreements for Fore Stars Ltd. and WRL LLC	10	1881-1882
FFFF-23	Fully executed Membership Interest Purchase Agreement for WRL LLC	10	1883-1890

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FFFF-24	June 12, 2015 email regarding clubhouse parcel and recorded parcel map	10	1891-1895
FFFF-25	Quitclaim deed for Clubhouse Parcel from Queensridge Towers LLC to Fore Stars Ltd.	10	1896-1900
FFFF-26	Record of Survey for Hualapai Commons Ltd.	10	1901
FFFF-27	Deed from Hualapai Commons Ltd. to EHC Hualapai LLC	10	1902-1914
FFFF-28	Purchase Agreement between Hualapai Commons Ltd. and EHC Hualapai LLC	10	1915-1931
FFFF-29	City of Las Vegas' First Set of Interrogatories to Plaintiff	10	1932-1945
FFFF-30	Plaintiff 180 Land Company LLC's Responses to City of Las Vegas' First Set of Interrogatories to Plaintiff, 3rd Supplement	10	1946-1973
FFFF-31	City of Las Vegas' Second Set of Requests for Production of Documents to Plaintiff	11	1974-1981
FFFF-32	Plaintiff 180 Land Company LLC's Response to Defendant City of Las Vegas' Second Set of Requests for Production of Documents to Plaintiff	11	1982-1989
FFFF-33	September 14, 2020 Letter to Plaintiff regarding Response to Second Set of Requests for Production of Documents	11	1990-1994
FFFF-34	First Supplement to Plaintiff Landowners Response to Defendant City of Las Vegas' Second Set of Requests for Production of Documents to Plaintiff	11	1995-2002
FFFF-35	Motion to Compel Discovery Responses, Documents and Damages Calculation, and Related Documents on Order Shortening Time	11	2003-2032
FFFF-36	Transcript of November 17, 2020 hearing regarding City's Motion to Compel Discovery Responses, Documents and Damages Calculation, and Related Documents on Order Shortening Time	11	2033-2109
FFFF-37	February 24, 2021 Order Granting in Part and denying in part City's Motion to Compel Discovery Responses, Documents and Damages Calculation, and Related Documents on Order Shortening Time	11	2110-2118
FFFF-38	April 1, 2021 Letter to Plaintiff regarding February 24, 2021 Order	11	2119-2120
FFFF-39	April 6, 2021 email from Elizabeth Ghanem Ham regarding letter dated April 1, 2021	11	2121-2123
FFFF-40	Hydrologic Criteria and Drainage Design Manual, Section 200	11	2124-2142
FFFF-41	Hydrologic Criteria and Drainage Design Manual, Standard Form 1	11	2143
FFFF-42	Hydrologic Criteria and Drainage Design Manual, Standard Form 2	11	2144-2148
FFFF-43	Email correspondence regarding minutes of August 13, 2018 meeting with GCW regarding Technical Drainage Study	11	2149-2152

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Exhibit	Exhibit Description	Vol.	Bates No.
FFFF-44	Excerpts from Peccole Ranch Master Plan Phase II regarding drainage and open space	11	2153-2159
FFFF-45	Aerial photos and demonstrative aids showing Badlands open space and drainage system	11	2160-2163
FFFF-46	August 16, 2016 letter from City Streets & Sanitation Manager regarding Badlands Golf Course Drainage Maintenance	11	2164-2166
FFFF-47	Excerpt from EHB Companies promotional materials regarding security concerns and drainage culverts	11	2167
GGGG	Landowners' Reply in Support of Countermotion for Judicial Determination of Liability on the Landowners' Inverse Condemnation Claims Etc. in *180 Land Co., LLC v. City of Las Vegas*, Eighth Judicial District Court Case No. A-17-758528-J (March 21, 2019)	11	2168-2178
HHHH	State of Nevada State Board of Equalization Notice of Decision, *In the Matter of Fore Star Ltd., et al.* (Nov. 30, 2017)	11	2179-2183
IIII	Clark County Real Property Tax Values	11	2184-2199
JJJJ	Clark County Tax Assessor's Property Account Inquiry - Summary Screen	11	2200-2201
KKKK	February 22, 2017 Clark County Assessor Letter to 180 Land Co. LLC, re Assessor's Golf Course Assessment	11	2202
LLLL	Petitioner's Opening Brief, *In the matter of 180 Land Co. LLC* (Aug. 29, 2017), State Board of Equalization	12	2203-2240
MMMM	September 21, 2017 Clark County Assessor Stipulation for the State Board of Equalization	12	2241
NNNN	Excerpt of Reporter's Transcript of Hearing in *180 Land Co. v. City of Las Vegas*, Eighth Judicial District Court Case No. A-17-758528-J (Feb. 16, 2021)	12	2242-2293
OOOO	June 28, 2016 Letter from Mark Colloton re: Reasons for Access Points Off Hualapai Way and Rampart Blvd.	12	2294-2299
PPPP	Transcript of City Council Meeting (May 16, 2018)	12	2300-2375
QQQQ	Supplemental Declaration of Seth T. Floyd	13	2376-2379
QQQQ-1	1981 Peccole Property Land Use Plan	13	2380
QQQQ-2	1985 Las Vegas General Plan	13	2381-2462
QQQQ-3	1975 General Plan	13	2463-2558
QQQQ-4	Planning Commission meeting records regarding 1985 General Plan	14	2559-2786
QQQQ-5	1986 Venetian Foothills Master Plan	14	2787
QQQQ-6	1989 Peccole Ranch Master Plan	14	2788
QQQQ-7	1990 Master Development Plan Amendment	14	2789
QQQQ-8	Citizen's Advisory Committee records regarding 1992 General Plan	14	2790-2807

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Exhibit	Exhibit Description	Vol.	Bates No.
QQQQ-9	1992 Las Vegas General Plan	15-16	2808-3257
QQQQ-10	1992 Southwest Sector Map	17	3258
QQQQ-11	Ordinance No. 5250 (Adopting 2020 Master Plan)	17	3259-3266
QQQQ-12	Las Vegas 2020 Master Plan	17	3267-3349
QQQQ-13	Ordinance No. 5787 (Adopting 2005 Land Use Element)	17	3350-3416
QQQQ-14	2005 Land Use Element	17	3417-3474
QQQQ-15	Ordinance No. 6056 (Adopting 2009 Land Use and Rural Neighborhoods Preservation Element)	17	3475-3479
QQQQ-16	2009 Land Use and Rural Neighborhoods Preservation Element	18	3480-3579
QQQQ-17	Ordinance No. 6152 (Adopting revisions to 2009 Land Use and Rural Neighborhoods Preservation Element)	18	3580-3589
QQQQ-18	Ordinance No. 6622 (Adopting 2018 Land Use and Rural Neighborhoods Preservation Element)	18	3590-3600
QQQQ-19	2018 Land Use & Rural Neighborhoods Preservation Element	18	3601-3700

DATED this 25th day of August 2021.

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CERTIFICATE OF SERVICE

I HEREBY CERTIFY that I am an employee of McDonald Carano LLP, and that on the 25th day of August, 2020, I caused a true and correct copy of the foregoing **APPENDIX OF EXHIBITS IN SUPPORT OF CITY'S OPPOSITION TO PLAINTIFF'S MOTION TO DETERMINE TAKE AND FOR SUMMARY JUDGMENT ON THE FIRST, THIRD, AND FOURTH CLAIMS FOR RELIEF AND COUNTERMOTION FOR SUMMARY JUDGMENT – VOLUME 16** to be electronically served with the Clerk of the Court via the Clark County District Court Electronic Filing Program which will provide copies to all counsel of record registered to receive such electronic notification.

/s/ Jelena Jovanovic
An employee of McDonald Carano LLP

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Table 7c

2000 Population Profile

AGE	%	POP.
0-5	10%	37,050
6-11	8%	31,200
12-17	7%	27,300
18-24	7%	27,300
25-34	21%	81,900
35-44	15%	58,500
45-54	11%	42,900
55-64	11%	40,950
64+	11%	42,900
Total Population		*390,000*
Median Age		*35*

SEX	%	POP.
Male	48%	187,200
Female	52%	202,800

RACE		
White	66%	257,400
Black	15%	56,550
Hispanic	13%	48,750
Asian	6%	21,450
Am. Indian	1%	3,900
Other	1%	1,950
Total	*100%*	*390,000*

ANNUAL HOUSEHOLD INCOME

Income Group From$	To$	% HH
0	9,999	4%
10,000	19,999	10%
20,000	24,999	11%
25,000	34,999	24%
35,000	49,999	26%
50,000	+	25%
Total Households		*162,500*
Median HH Income		*56,022*

OVERALL EDUCATION LEVEL		
College Degree	29%	85,391
Some College	37%	108,947
High School	29%	85,391
Some High School	5%	14,723
Adults over 18	*100%*	*294,450*

Source: US Census 1980 + 1990, Projectors

GP.ED Table 7c Population2000;DL;pm/9-9-91

Table 7d

Population by Sector

POPULATION	1980	1990	1995	2000
SE Area	118,319	151,884	153,373	160,359
SW Area	30,970	88,829	151,938	209,550
NW Area	15,386	17,582	18,837	20,091
City Totals	*164,674*	*258,295*	*324,148*	*390,000*

1980-2000	INCREASE	% CHANGE
SE	42,041	35%
SW	178,580	576%
NW	4,705	30%
City Total	*225,326*	*136%*

Source: US Census 1980 + 1990, Projectors

GP.ED Table 7d Population sec;DL;pm/9-16-91

7.1.8 Las Vegas in Comparison to Other Regional Cities

The following tables display four major employment sectors of the City of Las Vegas and four competing regional cities. This data are for one period in time. The four sectors are: Manufacturing, Trade, Service and Other.

Figure 15 displays the manufacturing sector. At 3%, Las Vegas is below the regional average of 14.2%. Clearly, this is one of the areas that should be studied further. Los Angeles employs over 20% in this sector, and if Las Vegas competes in that market, great opportunities could exist.

Figure 16 displays the trade sector. Again, Las Vegas is below the regional average of 26.2%. Further study of Phoenix might provide insights for pursuing trade sector employment.

Figure 17 displays the service sector. Las Vegas's specialization is obvious, nearly 45% of the workforce is employed in the service sector. The regional average is 30.2%.

Figure 18 displays the other sector, this includes the mining, construction, transportation and public utilities, fire, and government. Las Vegas approaches the average of 29.4%, for the regional comparison. Opportunities in this area for expansion will require careful research. This sector has increased as a percentage of workforce in the county over the last decade.

From the comparison of Las Vegas to the other regional cities several things are noticed. First, Las Vegas lags behind the region in manufacturing, but leads it in service employment. The other two categories are relatively even, although there may be some possible potential in the trade sector.

Table 8

Clark County Employment

Year	Employ.	Increase	%
1970	111,000	n/a	n/a
1975	143,400	32,400	22.59%
1980	220,600	77,200	35.00%
1985	250,700	30,100	12.01%
1990	340,400	89,700	26.35%

Source: Nevada Employment Security Dept.

GP.ED Table 8 County employ;DL;pm/8-21-91

7.1.9 Livability

Las Vegas is well known for moderate weather. The high desert's warm, dry climate and clean atmosphere offer a wholesome healthful environment. The overall mean temperature is 66 degrees.

Las Vegas hosts exciting international talents, promising community performers, and world-renowned speakers. UNLV features an art gallery, 2 theaters, a music auditorium, and an 18,000 seat sports center. The community has a symphony orchestra, dance theater, ballet, and various theater groups.

There are a variety of recreational opportunities also. There are over 120 parks, with a variety of activities, including: tennis, swimming, golf courses and ball fields, along with the playground equipment and picnic areas. Las Vegas is one of the finest areas in the nation in which to live.

Figure 19 displays the composite Cost of Living index for Las Vegas and competing regional cities. Las Vegas has the second highest composite index, skewed by the housing component. This housing issue is expanded later in element VIII (Housing).

Table 9

Average Household Income

		% Increase
1980	17,468	
1985	24,274	38.9
1990	32,862	35.4
1995	43,288	31.7
2000	56,022	29.4

Source: NV Statistical Abstracts & Projectors

GP.ED Table 9 Avg. household;DL;pm/9-9-91

Table 10

Las Vegas Valley Wage Structure

Occupation	Hourly Median Wage	Occupation	Hourly Median Wage
Accountant	$13.91	Packer/Shipper	$ 8.00
Assembler, Electronics	9.00	Sales	10.00
Assembler, Production	7.00	Secretary	4.50
Computer Operator	8.05	Shipping/Receiving Clerk	8.85
Drafter/Detailer	14.00	Truck Driver	7.00
Machine Operator	7.50	Word Processing Operator	6.50
Manager Production	14.38		

Source: Perspective 1990

GP.ED Table 10 Wages;DL;pm/8-14-91

7.1.10 Conclusion

Economic opportunities exist for the City of Las Vegas. Manufacturing, especially from the Los Angeles area, appears attractive. Commercial and office demands are high, but mainly for suburban space. The Minami Site and Union Pacific site provide great opportunity for the downtown to attract that market. Retail is also expanding rapidly, but again, in the suburban areas.

Gaming has also declined in the downtown. However, Main Street Station may be a sign of recovery for this gaming industry in this area.

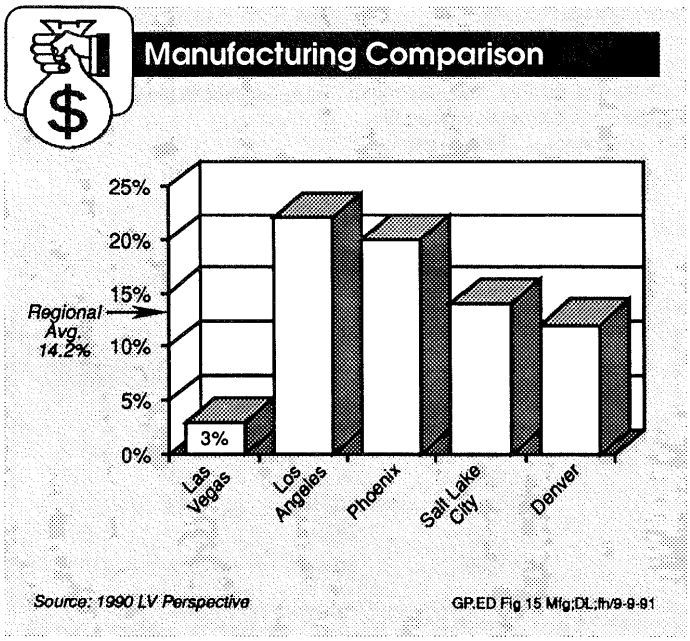
Revitalization is the key to helping the rapidly deteriorating image of the "Downtown". The "Strip" has become the most frequently visited area at the expense of the City of Las Vegas and its downtown casinos/hotels.

The trends, when considered along with the current economic indicators, indicate that Las Vegas needs to diversify its economy to maintain its standard of living. The Comparative Share Analysis provides the guidance for diversified growth.

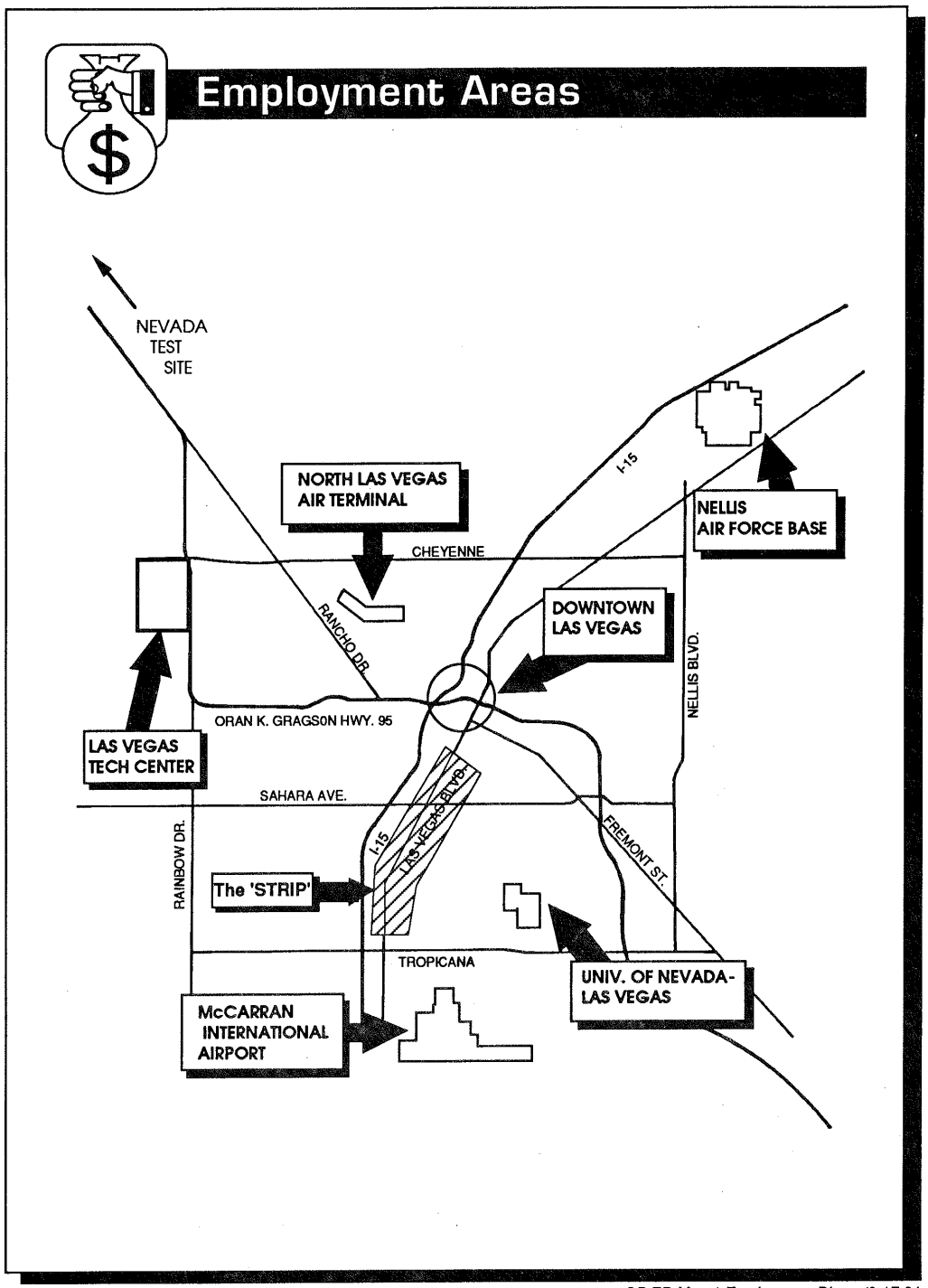
Las Vegas is ideally located near the largest market in the nation. Low utilities costs, advantageous labor costs, no state income or business tax and a high quality of life make Las Vegas an ideal place to live and work.

This General Plan update springs from several requirements. Among them are the requirement for timely data, the requirement to keep up with changing issues and their focus and the requirement to develop strategic planning for resources. The last requirement was addressed in the 1990 "Las Vegas 2000 and Beyond" strategic plan which is described in the Introduction Section

Figure 15



Map 1



GP.ED Map 1 Employ area;DL;pm/9-17-91

Figure 16

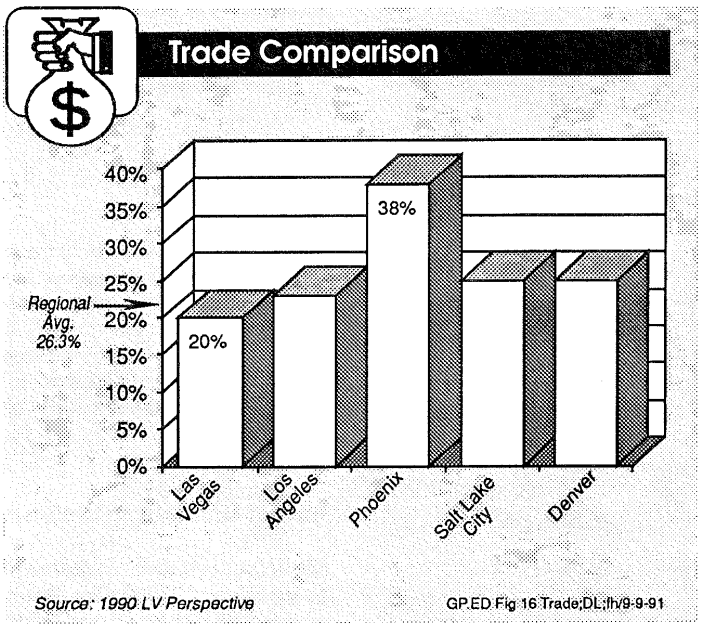
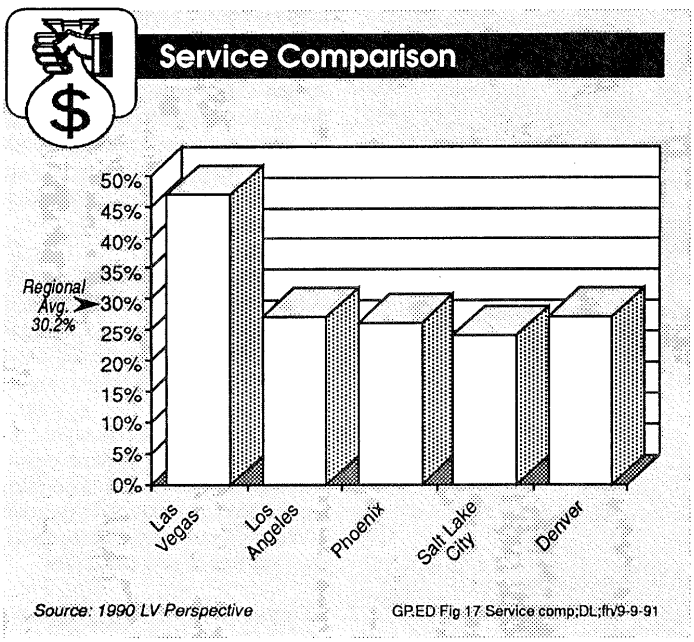


Figure 17



of this Plan. The "2000 and Beyond" document contained "Actions" specified to be accomplished.

The Actions relating to economic development are:

- Bring upscale retail and family entertainment to downtown through financial assistance and property acquisition
- Take an active role in the planning and development process of the Union Pacific Property by implementing a City policy to discourage piecemeal development
- Attract financial institutions, insurance companies, and residential real estate development to the downtown area
- Build and maintain adequate parking facilities downtown
- Maintain strong redevelopment laws
- Meet with casino and business owners and developers to determine their projected needs for natural resources
- Support the Convention Authority and offer assistance on every level
- Review the Convention Authority's 10-year plan on a regular basis
- Create a panel of casino and government people to make Las Vegas a stronger, more diverse gaming center
- Add theme parks and family type entertainment resorts
- Develop and implement a comprehensive marketing plan
- Address the needs companies doing business or relocating to Las Vegas

Figure 18

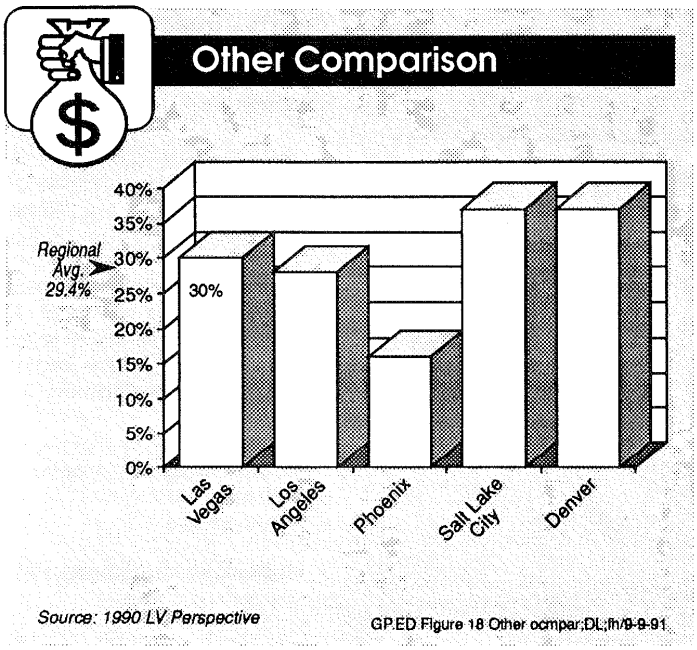
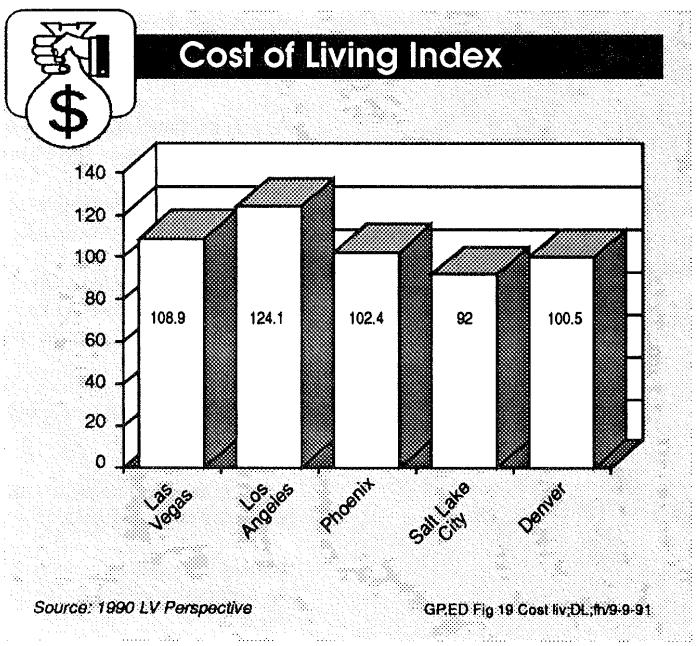


Figure 19



- Influence tax structure changes to be consistent with the competitive advantages
- Retain advantageous labor costs

7.2 Issues

The issues section addresses the major concerns developed throughout this element. Three major issues are developed here. They include diversification efforts, downtown revitalization and job opportunity. In the next section these issues will be addressed with specific programs.

Issue 1: Diversification efforts

Las Vegas has become too dependent on one industry. The City has already experienced gaming losses in the downtown, and to counter these declining trends in the gaming industry, the city needs to pursue other types of business. Diversification will help lessen the effect of any long-term decline in the gaming industry.

As the City's population increases, there is a concern that the tax base will not grow at the same pace as the demand for services. Warning signals are already visible, such as the recent hiring freeze in the city.

Diversifying jobs means tax growth. Fortunately, sales tax redistribution is partly based on population. Las Vegas received about $98,000,000 in Fiscal year 89-90, or about $390 per person. However, an increasing population places a great strain on operations, so alternative means for tax base expansion must be utilized. Those alternatives include: retention and expansion of existing firms, creation of new firms, and attraction of new employers.

As shown earlier, Las Vegas lags in the

economic sectors of manufacturing and trade. These economic sectors need further examination to determine the applicability to Las Vegas. In addition, a complete economic sector analysis must be completed to fully understand the area economy.

Issue 2: Downtown Development efforts

Cities directly reflect their downtowns. Most major cities have vibrant diverse downtowns that are the focal point of activity. The sign of redevelopment is the amount of investment, activity and civic pride placed in the downtown. Traditionally, a downtown is the center of the financial, cultural, legal and government functions. Symbolically, the downtown must regain its vibrancy. Increased residential, commercial and office development, as well as gaming uses need to be encouraged to reestablish the downtown as the focal point of the area.

Downtown Las Vegas has continued to lose gaming dominance to the "Strip" area, which is located in Clark County. The legal and governmental functions are emerging as major employers in the downtown district (or area). A Downtown Development Plan, prepared by Laventhol & Horwath, has been approved. From that will come strategies to rejuvenate the downtown and surrounding areas. For example, Clark County recently agreed to keep its governmental offices downtown by accepting a 38 acre parcel of land from the City, located on the downtown Union Pacific Railroad site.

Issue 3: Job Opportunity

Diversification and expansion of the tax base are needed to increase jobs. However, it must be understood that local job creation should be for current residents. It is more beneficial for employees to be selected from the city than from outside the city.

As the city continues to grow, jobs are needed for its residents, especially those that are unemployed or underemployed. Residents with jobs, earning good wages, contribute to the community and spur additional economic growth. Job training programs can help provide people with the necessary skills to obtain employment. These programs also benefit firms since they provide a trained labor force.

7.3 Goal, Objectives, Policies, and Programs

Goal: Develop a growing, healthy and diverse city economy.

Objective A: Increase economic development and the diversification of the City's economic base.

Policy A1: Continue and expand local and regional economic development through diversification efforts.

Program A1.1: Encourage new economic activity through the preparation of a functional master plan for economic development, to: (a) Establish a Retention and Expansion Program (b) Establish a Creation Program (c) Continue Attraction efforts.

Program A1.2: Develop and maintain database of critical financial and marketing information.

Program A1.3: Coordinate economic development activities with local business leaders to secure industries which are compatible with community needs.

Program A1.4: Conduct a target study to determine what type of manufacturing firms to attract.

Program A1.5: Encourage economic development revenue bond financing for businesses which qualify under established city policies and criteria.

Program A1.6: Study and report on the need to establish local improvement districts or other special districts, which will improve the geographic area and enhance opportunities for continued economic growth and development.

Program A1.7: Cooperate with the private sector in the development, upgrading, and/or redevelopment of properties which will contribute substantially to the local economy, through marketing, financing, and real estate mechanisms.

Program A1.8: Support modification of state laws which may limit sound, stable economic growth and diversity.

Program A1.9: Support tax structure changes to be consistent with competitive advantages in other jurisdictions.

Program A1.10: Explore how the City's low bonded indebtedness may be used to provide needed capital improvements to achieve desired economic growth.

Policy A.2: Support development of non-polluting, high value added industries, light manufacturing, warehousing/ transportation and related activities at appropriate locations in the City, based on guidelines in the Land Use Element of the General Plan.

Policy A.3: Encourage employment uses in sufficient locations so that residence to work trip distances are reduced and fit into community design patterns.

Program A3.1: By 1993, designate appropriate areas of the City for business park development. Such designations shall be in conformance with the adopted General Land Use Plan and Map.

Program A3.2: Continue to encourage the development of existing regional business centers for corporate headquarters and research and development operations.

Policy A4: Coordinate with other local, regional, state, and federally efforts to diversify the economy of southern Nevada.

Program A4.1: Support the efforts of the State of Nevada Commission on Economic Development to encourage economic development and diversification and establish mechanisms for regular information exchanges.

Program A4.2: Continue working with state and local development entities to enhance the ability of the Las Vegas area to attract new jobs and increase capital investment.

Program A4.3: Support improvements to the University of Nevada at Las Vegas which will enhance the attractiveness of southern Nevada for new non-polluting industry.

Program A4.4: Maintain city rapport with the federal defense establishment and monitor federal programs in southern Nevada which can be beneficial to local economic activity.

Policy A5: Support programs which provide employment opportunities and help improve labor skills.

Program A5.1: Support public and private sector efforts to provide job development and skill training programs through the University of Nevada, Clark County Community College, the Clark County School District, federal funded programs and private organizations.

Policy A6: Encourage economic development within areas which will benefit from economic revitalization.

Program A6.1: Secure federal aid programs to help business development and expansion.

Program A6.2: Develop and implement the use of Federal Enterprise Zones.

Policy A7: Assist the Department of Energy and Clark County in the development of the Nuclear Waste Repository Program.

Program A7:1: Continue participation on the Nuclear Waste Repository Steering Committee.

Program A7:2: Continue cooperative socio-economic data collection with the various consultants for the "Base Case" Analysis.

Objective B: Expand gaming and tourism development in the downtown.

Policy B1: Accommodate expanded tourist/gaming and support facilities in the general downtown area and other appropriate locations.

Program B1.1: Adopt the "Downtown" Redevelopment Plan.

Program B1.2: By 1993, update the economic analysis study of the downtown.

Program B1.3: Use the Redevelopment Agency to return industries to the redevelopment area.

Program B1.4: Locate development strategically so that it will generate new investment in the "Downtown", effectively leverage public dollars and expand the area affected by the City's redevelopment efforts.

Program B1.5: The Redevelopment Agency will provide direct financial and other assistance as necessary to selected projects within the "Redevelopment Area".

Program B1.6: Provide sufficient land area to accommodate gaming and tourist facilities expansion and development including possible mixed zoning districts.

Program B1.7: Provide appropriate assistance through the Redevelopment Agency, in locating and/or expanding gaming in the "Downtown" casino core.

Program B1.8: Coordinate the development of the Union Pacific Railroad property to ensure that gaming establishments sited in this area are compatible with those in the casino core.

Program B1.9: Use appropriate financial assistance and property acquisition to locate and expand new redevelopment activities in the downtown area including high density residential development and or upscale retail, theme attractions and family type entertainment.

Policy B2: Provide mechanisms for public sector support of efforts which strengthen tourism in the City.

Program B2.1: Continue to maintain government sector communication and accessibility to the business community and its organizations.

Program B2.2: Participate in and support the Las Vegas Convention and Visitors Authority through city representation on the Board of Directors and by reviewing the Authority's 10-year Plan on a regular basis.

Program B2.3: Include public improvements within the City's capital improvement program which will enhance and facilitate tourism development.

Program B2.4: In concert with major employers, build and maintain adequate on site and offsite parking facilities downtown.

Program B2.5: Encourage public-private sector partnerships to increase the benefit of using public resources such as providing needed site improvements and infrastructure and/or transportation facilities within the City and its downtown area.

Policy B3: Strengthen the continuing development of "Downtown" Las Vegas as the Southern Nevada regional center for finance, business, governmental services, entertainment and recreation, while retaining the gaming and tourism vital to economic prosperity.

Program B3.1: Create a multi-purpose, 24-hour self-sustaining marketplace environment sufficient to attract residents, workers and visitors to the "Downtown" and increase the duration and economic impact of a visit to the area.

Program B3.2: Improve the "Downtown's" functional and physical linkage to the "Strip" including enhancing its physical built environment and overall aesthetic ambiance.

Program B3.3: Ensure that adequate infrastructure is provided to serve new and existing "Downtown" development and that transportation/circulation is improved, particularly access from the west and the south.

Program B3.4: Discourage piecemeal development of Union Pacific property by actively participating in the planning and development process.

Program B3.5: Attract financial institutions, insurance and residential real estate development to the downtown area.

Program B3.6: Initiate a clean-up/beautification program for the downtown.

Program B3.7: Make use of State and local laws and programs such as the Community Redevelopment Law, tax increment financing and zoning laws to implement the downtown development plan.

Program B3.8: Initiate changes in enforcement of applicable laws (i.e. redevelopment, economic development, zoning, etc.) to ensure that strong laws are maintained.

Program B3.9: Provide direct Redevelopment Agency participation in specific projects which will return jobs and business activity to the "Downtown" area to achieve downtown redevelopment.

Objective C: Assist local business leaders and organizations, and the real estate and development industries in efforts to improve economic opportunities for residents in low and moderate income or economically distressed areas.

Policy C1: Encourage commercial and industrial development and public improvements in economically distressed areas which will provide employment and economic vitality and create an environment where people of varying social, economic, and ethnic backgrounds can work and live.

Program C1.1: Assist in the development or redevelopment of property which could retain jobs and maintain the economic vitality of the immediate area.

Program C1.2: Assist, through the Redevelopment Agency, economic development in the expanded "West Las Vegas" portion of the "Downtown" Las Vegas Redevelopment Plan Area.

Program C1.3: Create a town center on Owens Boulevard between "H" and "J" streets and incorporate it with the Las Vegas Business Center into the Owens Neighborhood Corridor Plan.

Policy C2: Provide areas and access for regional-serving support businesses along both sides of Martin L. King Boulevard.

Program C2.1: Request selected areas of the City be federally designated Enterprise Zones by the Department of Housing and Urban Development.

6.4.1 Evaluation and Implementation Matrix

The following Economic Development Evaluation and Implementation Matrix (EIM - see next page) was prepared as a measurable summary of the above Economic Development Policies and Program. The EIM is to be used:

- as a method of measuring the implementation progress of the General Plan
- as a budgeting document for specific Economic Development programs
- as a tool for further developing work programs

The following abbreviations apply to the Evaluation and Implementation Matrix

City Departments

CA City Attorney
CM City Manager
CP Community Planning
ED Economic & Urban Development
FN Finance
PW Public Works

Other Agencies/Jurisdictions
CC Clark County
NDA Nevada Development Authority
UPP Union Pacific Property

Definitions

Absorption Rates: The rate at which vacant space is filled.

Commercial Uses: Refers to office space.

Comparison Share Analysis: A technique to compare economies. The economy is broken into sectors and then compared to others.

Consumer durables: Goods that last more than one year.

Consumer non-durables: Goods that last less than one year.

Consumer Prices: An aggregate of consumer goods. Used in a year to year comparison.

Disposable Income: Net income after essential living expenses are subtracted.

Economic Growth: Continued expansion of a nations output of goods and services.

Establishment Base Employment: A fixed location that employees a workforce.

Gaming: Refers to the gaming industry of casinos.

Gross National Product: Total value of all goods and services produced by the national economy in one year.

Hi-Tech firms: Modern, non-polluting firms. Usually associated with the electronics or computers.

Industrial/Manufacturing Uses: Refers to the traditional industrial uses.

Real GNP: The GNP expressed in constant dollars with an adjustment for inflation.

Retail Uses: Refers to the space used for providing shopping.

Tourism: An industry devoted to the well being and entertainment of visitors.

Visitor Volume: The number of non-residents that visit an area.

7.4 EVALUATION AND IMPLEMENTATION MATRIX: ECONOMIC DEVELOPMENT

Policy Program	Summary	Responsible Departments	Date	Action Product	Remarks
	ECONOMIC DIVERSIFICATION				
A1.1	Preparation of an overall plan for economic development	ED	1993	Develop a plan that will focus current and future efforts into a comprehensive program for economic development	A stated strategy is critical for development
a.	Establish a Retention and Expansion program for the City	ED	1993	A policy assisting local firms growth which will providing more jobs and increased tax revenues	Established policies are needed
b.	Establish a Business Creation program	ED	1993	Assist new firms which are in their developmental stage. Study and implement an incubator program.	Established policies are needed
c.	Continue Attraction efforts	ED	1993	Continue to pursue firms in locating in the City	Established policies are needed
A1.2	Develop an economic/financial database that is periodically updated (GIS a tool for use)	ED CP	1993	Develop and maintain a database of critical information that a prospective firm would need information about.	Track key information * Select data * Time frame
A1.3	Develop regular on-going communication with the business sector	ED Businesses	Ongoing	Regularly attend and participate in communication with business	
A1.4	Conduct a target study to focus the City's development efforts.	ED CP	1993	Study local economy to determine the best business opportunities for the City to attract.	
A1.5	Use the bonding power of the City to aid business (IRB)	ED	Ongoing	Develop criteria for using the revenue bond tool to make development possible.	IRB Program
A1.6	Cooporate on combined public/ private redevelopment	ED	Ongoing	Create special districts in the effort to redevelop area jointly	Leverage public money
A1.7	Cooporate with the private sector to promote redevelopment	ED	Ongoing	Continued public and private work	

7.4 EVALUATION AND IMPLEMENTATION MATRIX: ECONOMIC DEVELOPMENT

A1.8	Support modification of laws at State and local leels to aid in the development process	ED CA	Onging	Review legislation and City Council resolutions to legislative committee	
A1.9	Support tax changes	ED	Ongoing	Review City Council resolution to appropriate taxing authority	
A1.10	Use the City's low debt level to build needed infrastructure	ED FN	Ongoing	Develop strategy and suggested areas for use of bonds to promote develpment	City below debt level requirement (GOs)
A3.1	Establish areas in the City that are avaliable for various business	CP ED	1993	Select, analyze, and map areas that are compatable for business park development	Zone accordingly
A3.2	Encourage corporate and research centers to locate in the City	ED	Ongoing	Promote the City as a place to locate headquarters and research facilities	
A4.1	Continue support of area economic development organizations	ED NDA	Ongoing	Maintain the marketing of the Southern Nevada area	Still must compete individually for jobs
A4.2	Maintain close contact with UNLV to develop research capability	ED	Ongoing	Close contact to emphasis the expansion of the Engineering school.	
A4.3	Monitor the defense industry to locate contracts for the area economy	ED	Ongoing	Locate contract for area businesses	
A5.1	Support the efforts to provide job training throughout the area	ED NV.Labor	Ongoing	Job training programs need to be pursued to educate the workforce	Use federal, state and local programs
A6.1	Secure federal aid to promote economic development	ED	Ongoing	Pursue federal funding for various programs	
A6.2	Designate some areas of the City to be federal enterprise zones	ED	Ongoing	Zone areas under this federal designation	
A7.1	Participate in the Nuclear Repository Project currently underway	CP, CC DOE	Ongoing	Attend Steering Committee meetings	
A7.2	Support data collection efforts for DOE	DOE	Ongoing	Help coordinate the collection of socio-economic data	

7.4 EVALUATION AND IMPLEMENTATION MATRIX: ECONOMIC DEVELOPMENT

A7.1	Participate in the Nuclear Repository Project being conducted	CC DOE	Ongoing	Attend Steering Committee meetings	
A7.2	Support data collection efforts for DOE	DOE	Ongoing	Help coordinate the collection of socio-economic data	
	DOWNTOWN REDEVELOPMENT				
B1.1	Adopt the Downtown Redevelopment Plan to revitalize downtown	ED	1993	Accomplish the process of adopting Laventhol & Horwath Study	
B1.2	Complete an update of the Downtown Plan	ED CP	1993	Update anlaysis with new numbers, since study is over 5 years old.	A selected update of certain sections
B1.3	Attract industry to the redevelopment area	ED	Ongoing	A program to assist in the location of businesses in the downtown	
B1.4	Cooperate with the private sector to promote redevelopment	ED	Ongoing	Create special districts in the effort to redevelop an area jointly	Leverage public monies
B1.5	Provide land area to accomodate the development of gaming uses	ED	1993	Designate areas through zoning to be developed as gaming areas	
B1.6	Provide assistance through the Redevelopment agency	ED	Ongoing	Various incentives for the revitalization of the area	
B1.7	Coordinate with Union Pacific to see that new casino development is compatable with downtown	ED UPP	Ongoing	Close contact with the Union Pacific property to develop compatable uses	
B1.8	Locate and expand development in the downtown, including housing, retail and theme attractions	ED	Ongoing	Attract to the downtown a variety of uses	A traditional downtown
B2.1	Maintain close contact with the area business community	ED Business	Ongoing	Carry on discussions on a regular basis to obtain information	

7.4 EVALUATION AND IMPLEMENTATION MATRIX: ECONOMIC DEVELOPMENT

B2.5	Encourage public-private sector partnerships to enhance the benefit of public resources	ED Private	Ongoing	Provide needed site improvements and infrastructure and transportation	
B3.1	Develop the downtown into an area that attracts visitors and residents	ED	Ongoing	A revitalization of the basic functions and a increase in attractions	
B3.2	Improve the physical link between the downtown and the "Strip"	ED DD	Ongoing	Design emphasizing connectivity between the two areas	Visual link between both
B3.3	Develop adequate infrastructure for development in the area	ED PW	Ongoing	The construction and upgrade of facilities in the downtown	Need infrastructure to promote development
B3.4	Discourage piecemeal develop-ment of the Union Pacific property	ED UPP	Ongoing	Encourage planning of the site rather than many small developments	Compatable land use, intergrated transportation
B3.5	Attract financial, real estate and insurance firms to the downtown	ED	Ongoing	Attract a specific type of business to the area	
B3.6	Continue a downtown beautification program to clean-up the area	ED Other	Ongoing	Select areas and implement a program for beautifying the downtown area	
B3.7	Use the State and local laws for the development of the area	ED CA	Ongoing	Use such laws as the Community Redevelopment Law	
B3.8	Initiate changes to existing laws	ED CA	Ongoing	Review and send resolutions to change statutes	
B3.9	Participation in projects to return jobs and business to the downtown	ED	Ongoing	Redevelopment action to aid in projects to increase jobs and business	

7.4 EVALUATION AND IMPLEMENTATION MATRIX: ECONOMIC DEVELOPMENT

C1.1	EMPLOYMENT OPPORTUNITY Aid in the redevelopment of property to retain jobs and economic vitality	ED	Ongoing	Assist revitalization in specific areas	
C1.2	Assist development efforts in the newly added "West Las Vegas" area	ED	Ongoing	Promote development in the area	
C1.3	Create a town center in the Owens and "H" and "J" areas	ED	Ongoing	Develop a plan for this center of activity	
1.3	Provide areas for regional businesses along Martin L. King Boulevard	CP ED	Ongoing	Designate areas for regional business	
C2.1	Select areas of the City to be designated as Enterprise Zones	ED	Ongoing	Determine areas for the Zones	

VIII. Housing

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VIII. HOUSING

8.1 Background

8.1.1 Purpose of the Housing Element

Growth in the City of Las Vegas has been phenomenal over the last decade. In 1980, approximately 67,100 dwelling units housed 164,700 people and by 1990 109,400 dwelling units housed 258,300 people (a 63 percent increase in dwelling units and a 57 percent increase in population). The large number of new housing units constructed are in a variety of types and price ranges; however, what the market has not been able to do is provide lower cost housing for the approximately 45,000 households at or below the Clark County median income range. In 1989 only about 10 percent of the residential resale market was for homes costing $60,000 and below; nearly 80 percent of the rental households could afford a monthly rental of $450 or lower, but only 43 percent of the available apartments had rents in this range. Thus it appears that a large segment of the Valley households are not being adequately served in price ranges they can afford.

The purpose of the Housing Element is to examine the existing housing situation. Due to the high mobility of area citizens, the entire Las Vegas Valley must be considered in this evaluation, as data permit. Household numbers, based on population projections, were estimated for 1995 and 2000. Current housing needs were projected into the future and comparisons were made to determine affordable housing needs. These needs are expressed as housing objectives, policies and programs.

8.1.2 Housing Availability

An important consideration in a housing study is availability, especially as to type and tenancy; these factors play an important part in how much money a household must provide for shelter. The City of Las Vegas provides a variety of housing opportunities to its residents. Generally older city housing stock is located east of Decatur Boulevard, while newer housing stock is found to the west where the majority of new growth has occurred.

Total existing dwelling units can be divided into five major types:

- Single-family
- Plexes (two to four separate dwelling units within a single structure)
- Mobile homes
- Apartments
- Townhomes/condominiums (units are privately owned - townhomes include ownership of land on which the dwelling is located; condominiums consist of the ownership of unit airspace).

Table 1

Existing Las Vegas Valley Housing by Type 1990

	Single Family	Plexes	Mobile Homes	Apartments	TH/ Condos	Totals
City of Las Vegas	56,310	7,987	3,319	34,536	7,242	109,394
	51.47%	7.30%	3.03%	31.57%	6.62%	100%
Henderson	17,568	533	1,523	6,583	2,050	28,257
	62.17%	1.69%	5.39%	23.30%	7.25%	100%
North Las Vegas	n/a	n/a	n/a	n/a	n/a	n/a
East Las Vegas	1,997	47	465	762	320	3,591
	55.61%	1.31%	12.95%	21.22%	8.91%	100%
Enterprise	4,119	15	309	12	947	5,402
	76.25%	0.28%	5.72%	0.22%	17.53%	100%
Lone Mountain	1,432	0	144	0	0	1,576
	90.86%	0.00%	9.14%	0.00%	0.00%	100%
Paradise/Winchester	20,426	3,271	4,273	36,871	14,070	78,911
	25.88%	4.15%	5.41%	46.72%	17.83%	100%
Spring Valley	10,933	464	1,230	2,580	3,912	19,099
	57.24%	2.43%	6.44%	13.40%	20.48%	100%
Sunrise Manor	14,981	3,015	11,267	3,546	2,353	35,162
	42.61%	8.57%	32.04%	10.08%	6.69%	100%
*Valley Totals**	*127,772*	*15,332*	*22,530*	*84,871*	*30,895*	*281,400*
% of Valley Totals	*45.41%*	*5.45%*	*8.01%*	*30.16%*	*10.98%*	*100%*

** Rounding errors exist*

Source: City of Las Vegas, Dept. of Community Planning & Development; Clark County, Dept. of Comprehensive Planning; Henderson Planning Dept.; North Las Vegas no data available

GP.HS Table 1 Exist valley house;HN;pnv9-26-91

Table 1 compares the number of existing units in the City to other jurisdictions in the Valley to determine the specialization and deviation from Valley-wide averages of housing types in the various governmental jurisdictions. Based on the percentages of the Valley totals for each type, the City appears to provide an average number of plexes and apartments, while it provides more single family homes and is lacking in townhomes/condominiums and mobile homes.

Availability of Housing Accessible to Transit

The Las Vegas Valley is heavily dependent on the individual automobile for home to work trips, with an average trip of less than 20 minutes in most parts of the Valley. If a household does not own a vehicle there is great dependence on transit to provide transportation to work. Figure 1 identifies the major employment centers and the areas containing the households least likely to own vehicle transportation. Currently, with the exception of the area north of Cheyenne Ave., households have, at worst, access within a one-half mile to mass transit routes which serve or will serve all of these major employment centers.

Vacant Residential Land

In addition to evaluating existing Valley-wide housing data by type and jurisdiction, an analysis of vacant land throughout the Valley planned for single family (0-6 dwelling units per acre), and multi-family (more than 6 dwelling units per acre) use is important. Table 2 indicates that there are over 81,500 vacant acres planned for single family development in the Las Vegas Valley and over 5,000 acres planned for multi-family development, excluding Henderson and North Las Vegas. Refer to Appendix Volume for a more detailed discussion of Valley-wide vacant land available for single family and multi-family use.

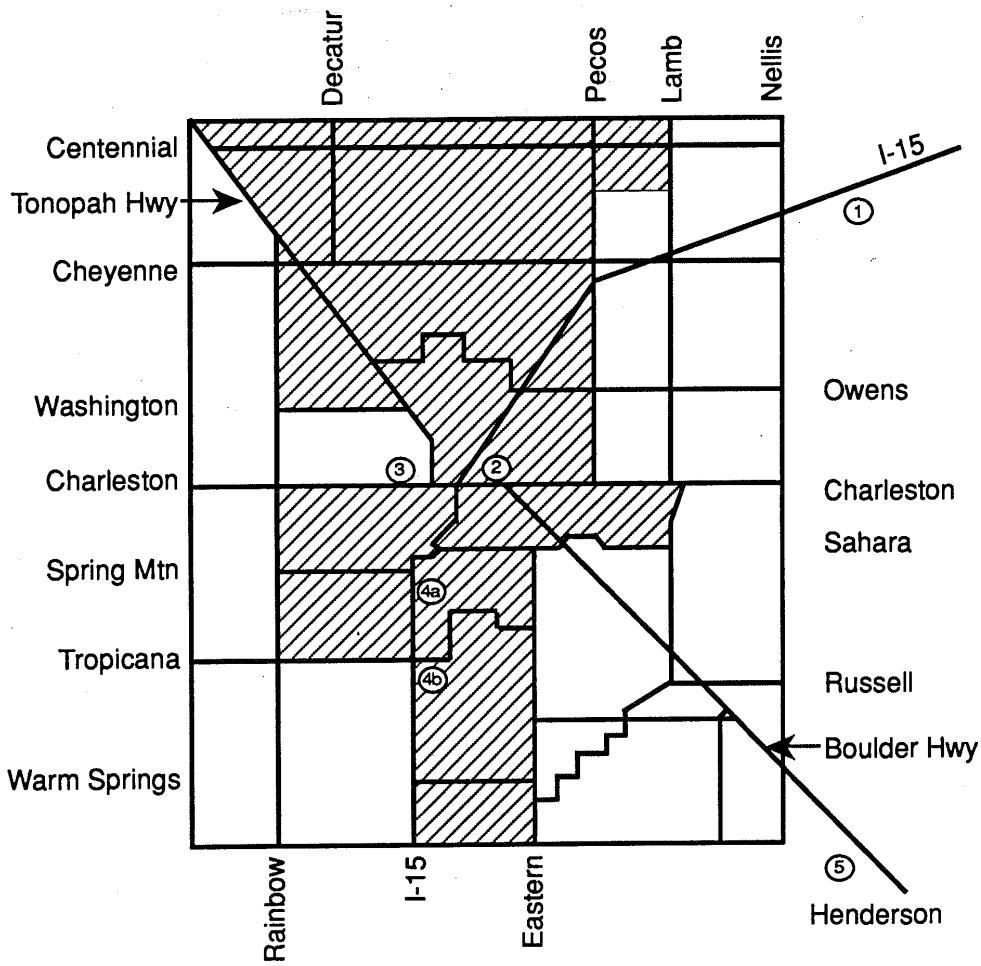
Residential Product Mix

This section is intended to provide a brief description of the residential land use densities found in the three sectors comprising the City of Las Vegas (refer to fold out Land Use Sector maps). The residential densities, which can be generally equated with dwelling unit types, are:

- **R (Rural Density Residential)**: 0-3 dwelling units per acre (includes single family units)
- **L (Low Density Residential)**: 3-6 dwelling units per acre (includes

Figure 1

Car Ownership and Major Employment Centers



Area containing households least likely to own vehicle transportation (15 plus percent of valley households with less than $10,000 annual income and/or with 30 plus percent of households owning zero or one car.)

1 Nellis AFB
2 Downtown Las Vegas
3 W. Charleston Medical Center
4 a Las Vegas "Strip"
b McCarran Airport
5 Basic Industries

Source: SR Associate-Interim Report on Transit Technical Study 3.91

GP.HS Fig 1 Employ cntr;HN;fh/8-26-91

Table 2

Vacant Las Vegas Valley Residential Land
by Acreage and Potential Dwelling Units

	SINGLE FAMILY				MULTI-FAMILY			
	Acres	%	Units	%	Acres	%	Units	%
City of Las Vegas[1]	23,066	28	133,240	63	1,600	31	28,160	42
City of Henderson*								
City of North Las Vegas*								
East Las Vegas	26	>1	52	>1	176	3	2,312	3
Enterprise	35,374	43	41,138	19	148	3	2,560	4
Lone Mountain[2]	9,266	11	9,266	4	-	-	-	
Paradise/Winchester	2,132	3	2,584	1	946	19	9,878	15
Spring Valley	9,220	11	22,496	11	1,088	21	10,844	16
Sunrise Manor	2,465	3	3,628	2	1,142	23	13,089	20
Valley Totals	*81,549*	*100***	*212,404*	*100***	*5,100*	*100*	*66,843*	*100*

* No Data
[1] Includes County Islands [2] Area west of Hualapai Way ** Rounding errors exist

Source: City of Las Vegas Community Profiles and Clark County Town Plans.

GPJHS Table 2 Vacant valleyJHN.prn/4-14-92

single family units and mobile homes on their own lots)

- ***ML (Medium Low Density Residential)**: 6-12 dwelling units per acre (includes single family units, two-unit plexes, lower density townhouses/condominiums, and mobile home parks.)
- **M (Medium Density Residential)**: 12-20 dwelling units per acre (includes apartments, 3 and 4 unit plexes, and higher density townhouses/condominiums.)
- **H (High Density Residential)**: 20+ dwelling units per acre (includes high density apartments)

The NW Sector contains the most "R" density and the least "L", "ML" and "M" densities. The SW Sector contains some "R", a considerable amount of "L" and "M", the most "ML" and some "H". The SE Sector is comparable to the SW Sector but has less "ML" and more "H" residential density.

Refer to the Appendix Volume for a more detailed description of residential land use densities in the three city sectors.

8.1.3 Housing Affordability

Household Income Distribution

To estimate a range of households having incomes at or below 50 percent of median household incomes, the University of Nevada at Las Vegas, Center for Business and Economic Research (CBER) used two sources of median household incomes. The first, developed by Department of Housing and Urban Development (HUD), excludes single-person households and those of unrelated persons which tends to overestimate an area's median household income. Typically, households with household income levels at or below 50 percent of HUD's area median household income qualify for housing assistance. The second source of median household income is based on data by CBER and is lower than the HUD median income. Table 3 shows the number of households in Clark Co. which are at 50% or below the area median income for all households, renter households and elderly households.

Table 4 shows the distribution of households in Clark County , by size and household income, while Tables 5 and 6 show the distribution of households by tenure and household income for all households and elderly households.[1] Some important points to note from these tables are:

- Approximately 33 percent of the households in Clark County have a level of income less than $25,000. (Table 4)
- Large households with low household incomes are particularly vulnerable to being excluded from the private open housing market. Approximately 4,174 (1.5%) households in Clark County have five or more members and household incomes less than $25,000. (Table 4)
- In Clark County the portion of renter households with income less than $25,000 is significantly greater than the portion of owner households below $25,000. (Table 5)
- Approximately 33 percent of elderly renter households (age 62 or older) in Clark County have incomes of less than $15,000. (Table 6)

Used Housing Supply for Sale

The supply of used residential housing units for sale in Clark County, based on price range, is shown in Table 7. Important points to note from this data are:

* *Generally, single family compact lots are the predominant use in the "ML" land use density with some two-unit plexes in the Southeast Sector of the City.*

Table 3

Households at or below 50% of Area Median Income

Clark County,1990

	CBER	HUD
All Households	42,103	45,052
% of Total	15.18%	16.56%
50% of Median	$16,100	$16,586
Renter Households	26,126	29,004
% of Total	24.30%	26.97%
50% of Median	$16,100	$16,586
Elderly Households	11,891	14,564
% of Total	32.79%	37.09%
50% of Median	$16,100	$16,586

Source: Center for Business and Economic Research University of Nevada, Las Vegas

GP.HS Table 3 House-med income;HN;pm/9-26-91

Table 4

Distribution of Households

By Size and Household Income (Clark County 1989)

Income	1 person	2	3	4	5	6	7+	Total	Cumulative Total
<$10,000	8,777	6,775	2,311	610	364	177	84	19,097	19,097
$10,000 - 14,999	6,403	5,874	1,675	686	921	426	0	15,985	35,082
$15,000 - 19,999	10,894	12,822	4,173	2,777	904	263	75	31,907	66,989
$20,000 - 24,999	7,236	10,311	4,087	2,145	525	166	269	24,739	91,728
$25,000 - 34,999	13,366	24,058	10,139	7,057	2,559	798	626	58,620	150,348
$35,000 - 49,999	8,367	25,980	11,277	8,764	4,138	1,045	835	60,407	210,755
$50,000 - 74,999	3,794	17,464	8,852	8,810	3,592	961	614	44,087	254,842
$75,000 +	1,672	8,960	5,039	4,316	1,680	516	335	22,516	277,358
Total	*60,509*	*112,243*	*47,554*	*35,182*	*14,683*	*4,351*	*2,837*	*277,359*	*1,116,521*
Percent By Size:									
<$10,000	14.51	6.04	4.86	1.73	2.48	4.06	2.96	6.89	6.89
$10,000 - 14,999	10.58	5.23	3.52	1.95	6.27	9.79	0.00	5.76	12.65
$15,000 - 19,999	18.00	11.42	8.78	7.89	6.15	6.04	2.65	11.50	24.15
$20,000 - 24,999	11.96	9.19	8.59	6.10	3.58	3.81	9.49	8.92	33.07
$25,000 - 34,999	22.09	21.43	21.32	20.11	17.43	18.34	22.05	21.13	54.21
$35,000 - 49,999	13.83	23.15	23.71	24.91	28.18	24.02	29.43	21.78	75.99
$50,000 - 74,999	6.27	15.56	18.62	25.04	24.47	22.09	21.63	15.90	91.88
$75,000 +	2.76	7.98	10.60	12.27	11.44	11.85	11.79	8.12	100.00
Total	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*	*100%*

Source: Center for Business and Economic Research, University of Nevada, Las Vegas

GP.HS Table 4 House-size;HN;pm/9-26-91

- Approximately 17.8 percent of resale residential units in Clark County sold for more than $150,000.
- Approximately 10.6 percent of resale residential units in Clark County sold for $60,000 or less.

Rental Rates

Rental rates by size of unit and price range are provided in Table 8. Note that the sample of apartment complexes used as the basis for this table does not include rental information for individually owned and managed rental units such as condominiums, plexes, single family homes, etc.[2] Table 8 provides the following important points regarding rental rates:

- Rental rates in Clark County generally range in price from $250 to $800 a month.
- In Clark County starting monthly rental rates for apartments generally increase $50 for each additional bedroom.
- Approximately 43 percent of rental units in Clark County rent for $450 a month or less.
- The majority of two and three bedroom rental units in Clark County rent for $400 a month or higher.

Affordability Index

This study uses a ratio of 30 percent mortgage/rental cost to total income as the point above which a family would have a financial burden or an affordability problem. By using FHA qualifying criteria, household incomes can be matched with the residential housing unit sales prices and rental housing unit rental rates available in the 1989 housing market.

In upper income households the housing expense-to-income ratio can often exceed the 30 percent and not create a financial burden for the household. For instance, consider that a household earning $15,000 annually and spending 30 percent of monthly income on housing would have a maximum monthly payment of $375 and $875 remaining to pay for food, clothing, living expenses, etc. A household earning $50,000 annually would have a maximum monthly payment of $1,250 and have $2,900 remaining to pay for food, clothing, living expenses, etc.

The availability of affordable residential housing units in Clark County is extremely limited. Figure 2 indicates that over 75 percent of all households in the County could afford a $60,000 house but sales in this price range or lower amounted to slightly more than 10 percent of total residential sales. A further consideration are renter households who could become first time home buyers. Figure 3 indicates over 62 percent of renters could afford a $60,000 house but again

Table 5

Distribution of Households

By Tenure and Household Income (Clark County 1989)

Income	Owner Households	% of Owner	Renter Households	% of Renter	Total	Percent of Total	Cumulative Percent
<$10,000	5,384	3.17	13,713	12.76	19,097	6.89	6.89
$10,000 - 14,999	7,656	4.51	8,329	7.75	15,985	5.76	12.65
$15,000 - 19,999	13,380	7.88	18,528	17.24	31,907	11.50	24.15
$20,000 - 24,999	11,954	7.04	12,785	11.89	24,739	8.92	33.07
$25,000 - 34,999	33,283	19.59	25,337	23.57	58,620	21.13	54.20
$35,000 - 49,999	40,938	24.10	19,469	18.11	60,407	21.78	75.98
$50,000 - 74,999	36,904	21.72	7,184	6.68	44,087	15.90	91.88
$75,000 +	20,337	11.97	2,183	2.03	22,520	8.12	100.00
Total	*169,837*	*100.00*	*107,526*	*100.00*	*277,359*	*100.00*	

Source: Center for Business and Economic Research University of Nevada, Las Vegas

GP.HS Table 5 House-tenure;HN;pm/8-26-91

Table 6

Distribution of Elderly* Households

By Tenure and Household Income (Clark County 1990)

Income	Owner Households	% of Owner	Renter Households	% of Renter	Total	Percent of Total	Cumulative Percent
<$10,000	2,448	9.80	3,348	23.45	5,796	14.76	14.76
$10,000 - 14,999	3,480	13.93	1,362	9.54	4,842	12.33	27.09
$15,000 - 19,999	4,032	16.14	1,719	12.04	5,751	14.65	41.74
$20,000 - 24,999	3,443	13.78	761	5.33	4,204	10.71	52.44
$25,000 - 34,999	4,907	19.64	5,302	37.13	10,209	26.00	78.45
$35,000 - 49,999	2,986	11.95	1,432	10.03	4,418	11.25	89.70
$50,000 - 74,999	2,926	11.71	296	2.07	3,222	8.21	97.90
$75,000 +	760	3.04	129	0.90	889	2.26	100.00
Total	*24,984*	*100.00*	*14,279*	*100.00*	*39,263*	*100.00*	

* 62 or Older

Source: Center for Business and Economic Research University of Nevada, Las Vegas

GP.HS Table 6 Elderly House;HN;pm/9-26-9

Table 7

Residential Resales by Type of Unit and Price

Clark County 1989

Price Range	Single Family	Condominium/ Townhouse	Mobile Homes	Total Residential	Cumulative % Residential
<$10,000	0.00	0.00	0.00	0.00	0.00
$10,000 - 20,000	0.00	0.00	11.53	0.64	0.64
$20,000 - 30,000	0.00	0.00	17.35	0.96	1.60
$30,000 - 40,000	0.00	0.38	21.16	1.26	2.86
$40,000 - 50,000	1.53	3.04	19.26	2.88	5.74
$50,000 - 60,000	4.59	3.80	13.44	4.89	10.63
$60,000 - 70,000	4.59	10.65	11.53	6.44	17.07
$70,000 - 80,000	9.49	10.27	3.81	9.36	26.43
$80,000 - 90,000	10.70	13.31	0.00	10.74	37.17
$90,000 - 100,000	14.68	14.45	1.91	13.92	51.09
$100,000 - 110,000	11.93	10.65	0.00	10.96	62.05
$110,000 - 120,000	6.12	7.22	0.00	6.05	68.10
$120,000 - 150,000	16.82	12.55	0.00	14.85	82.95
$150,000 +	19.51	13.64	0.00	17.80	100.75
Total	100%	100%	100%	100%	0

Source: Center for Business and Economic Research University of Nevada, Las Vegas

GP,H6 Table 7 Res Resale-type;HN,pm/9-26-91

Table 8

Rental Rates by Size of Unit and Price Range

Clark County 1989

Rental	Studio	One Bdr.	Two Bdr.	Three Bdr.	Four Bdr.	Total	Cumulative %
<$100	0.00	0.00	0.00	0.00	0.00	0.00	0.00
$100 -150	0.80	0.00	0.00	0.00	0.00	0.80	0.80
$150 -200	0.80	1.30	0.00	0.00	0.00	0.50	1.30
$200 -250	8.40	4.30	0.80	0.00	0.00	2.60	3.90
$250 -300	17.60	7.70	1.70	1.40	0.00	5.50	9.40
$300 -350	20.20	12.30	5.60	1.40	0.00	8.60	18.00
$350 -400	18.50	17.90	8.10	4.10	0.00	11.40	29.40
$400 -450	17.60	15.30	14.50	6.10	0.00	13.60	43.00
$450 -500	6.70	12.80	16.20	11.60	0.00	13.20	56.20
$500 -550	3.40	11.50	16.20	9.50	0.00	12.00	68.20
$550 -600	4.20	6.80	10.90	8.20	0.00	8.40	76.60
$600 -650	0.80	4.70	10.60	9.50	0.00	7.40	84.00
$650 -700	0.00	0.90	4.70	14.30	0.00	4.50	88.50
$700 -750	0.80	0.90	2.80	12.20	0.00	3.50	92.00
$750 -800	0.00	0.40	1.10	8.20	0.00	2.00	94.00
$800+	0.00	3.40	6.70	13.60	0.00	6.00	100.00
Total	100%	100%	100%	100%	0.00%	100%	

Source: Center for Business and Economic Research University of Nevada, Las Vegas

GP,H6 Table 8 Res Resale-size;HN,pm/9-2(

just over 10 percent of residential sales have been in this price range or lower.

Nearly 80 percent of the rental households in Clark County could afford a rental rate of $450 or lower (Figure 4). In the apartment complex surveys conducted in the County only 43 percent of the apartment rentals were $450 or lower. Although the overall supply of rental units appears to be adequate, in the majority of two and three bedroom units surveyed the starting rental rate is $400 or greater a month (Table 8) At this rental rate, rental households at or below 50 percent of the County medium income ($402/mo.) cannot afford the price of a two or three bedroom unit. As a result low income families often need to pay more than 30 percent of their income for rental housing.

Table 9 indicates maximum affordable rental rates and home prices for households with an income level at 50 percent of the County's medium household income. In 1989 the maximum affordable rental rate was $402 and the maximum house price a household at 50 percent of the median area income could afford in Clark County was $40,500. As indicated in Figure 2 only about three percent of the residential sales in 1989 were at this amount or less. Thus, the limited availability of affordable housing units on the market indicates that home ownership is not a reasonable option for most low income households.[3]

City Codes and Ordinances

Housing, building and related codes are designed to provide minimum building standards that will produce a safe and habitable structure and do not contribute to excessive housing costs. During a recessionary period in the early 1980's the subdivision code was amended to reduce the cost of off-site construction by permitting roll curbs, smaller sidewalk width, sidewalk reduced to one side of local streets, and a narrower street width. The City's Zoning Ordinance was also amended to

provide a R-CL (Residential) single-family Compact Lot District wherein a portion of the lots on each block could be reduced to as low as 3,000 square feet with 30 foot frontages.[4] (Refer to the Appendix Volume for fees exacted by the City which add to housing costs.)

Land Values

A general statement can be made that raw land costs have risen in the Las Vegas Valley. How much and whether this increase is consistent throughout the Valley cannot be readily ascertained and should be the subject of a separate study. However, since land costs contribute anywhere from 16 to 22 percent of the selling price of a house, it is important that increased emphasis be placed on effectively reducing the costs of raw land and off site improvements such as streets, sidewalks and utilities.[5]

Energy Features

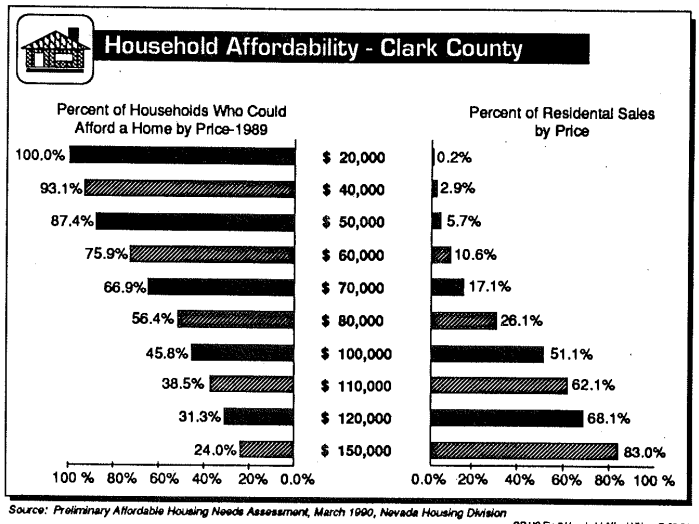
Current energy conservation features and code requirements are not adding significantly to the cost of a new home. Home buyers are demanding many conservation items; in many respects they have become marketing features. Some features offered are R-11, R-19 and R-30 insulation, high energy efficiency ratings on heating and cooling units, dual pane windows, weather-stripping and water efficient plumbing fixtures. Many builders are also supplying gas appliances with pilotless ignitions. Today, the variable cost associated with energy efficiency is a result of the appliance models being purchased.[6]

Manufactured Housing

Manufactured or modular housing consists of factory built homes which are moved as components and assembled at the site. These mobile homes or modular units are inspected and code approved at the factory.

Considering that Las Vegas has few new site built homes for under $70,000,

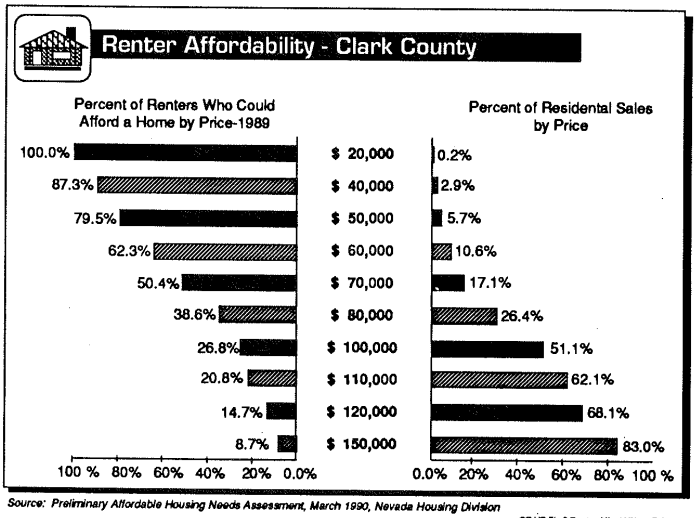
Figure 2



Source: Preliminary Affordable Housing Needs Assessment, March 1990, Nevada Housing Division

GP.HS Fig 2 Household Afford-HN.gpm/8-26-91

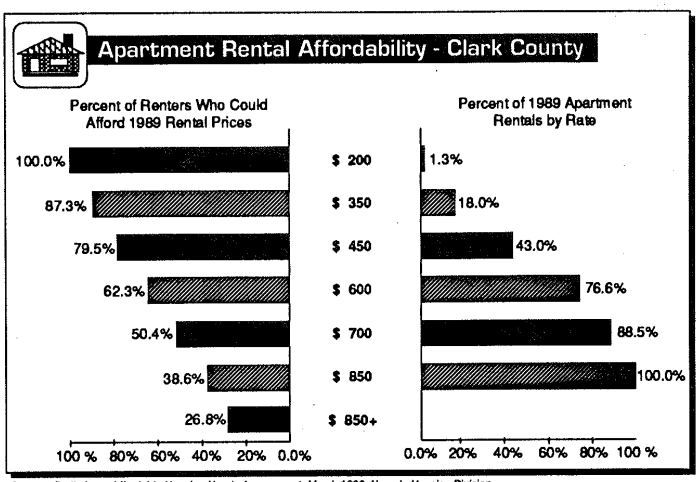
Figure 3



Source: Preliminary Affordable Housing Needs Assessment, March 1990, Nevada Housing Division

GP.HS Fig 3 Renter Afford-HN.gpm/8-26-91

Figure 4



Source: Preliminary Affordable Housing Needs Assessment, March 1990, Nevada Housing Division

GP.HS Fig 4 Apartment rent;HN;pm/9-26-91

Table 9

Maximum Affordable Rental Rates and Housing Prices

For Household Incomes at 50% of Median Area Income - Clark County 1989

**Median Household Income*	*50% of Median Income*	*Maximum Rental Rate*	*Maximum House Price*
$32,200	$16,100	$402	$40,500

*U.S. Department of Housing and Urban Development

Source: U.S. Department of Housing and Urban Development, and Bureau of Business and EconomicResearch, University of Nevada, Reno

GP.HS Table 9 Max afford;HN;pm/9-26-91

manufactured homes may be one important answer to providing affordable homes. A 1,500 square foot model using the same materials as on site housing, with three bedrooms, two bathrooms, central heat and air conditioning, and set up would cost about $40,000. If placed on an improved lot with a pad, the total cost would be approximately $60,000. Without some of the amenities these homes can cost much less.[7]

Another type of portable housing is mobile homes. One consideration in selecting mobile home living is where to locate the unit. There are 24 existing mobile home parks within the City of Las Vegas (Map 1). Twelve parks are located in the four square miles east of Pecos Road. There is only one mobile home development west of Decatur Boulevard; Jade Park is the only mobile home estate development in the City with homeowner owned lots. It appears the most vexing problem is the uncertainty over rent increases for lots in mobile home parks, which creates friction between tenant associations and the park owners; many tenants are senior citizens on fixed incomes.

If the problem of housing affordability is going to be addressed by the City, potential developers should be made aware that mobile home estates development will be encouraged to locate throughout the City.

8.1.4 Housing/Neighborhood Conditions

1990 Housing Quality

It is important that housing should not only be available for all family income levels, but that this housing be structurally sound. The Central Action Office was created within the Department of Building and Safety and given the responsibility of enforcing Las Vegas city ordinances involving structures and the environment. As such, it enforces the City Housing Code and handled about 450 complaints of code violations in 1989. The office is responsible for the securing of dangerous buildings and administering complaints about dangerous and illegal structures and signs. The Central Action Office has undertaken a rigorous "Dangerous Structures Abatement Program," in which dilapidated buildings, and those which have become havens for crime and gang activity, are being restored to usefulness or demolished, thus contributing to neighborhood redevelopment. These problems are found in all four wards of the City, but tend to be concentrated in older subdivisions approved before 1965 (Map 2).[8]

Neighborhood Environment

Providing affordable and adequate housing is important, but to maintain housing value neighborhoods must be stabilized and maintained as well. Thus, the City's Central Action Office must not only oversee housing code enforcement, but must be instrumental in promoting attractive neighborhoods. As such, it administers many environmental complaints such as street pot holes, water running in streets, illegal outside storage, junk and abandoned vehicles, illegal vehicle repair, and trash and debris.[9]

8.1.5 Housing Programs

To be eligible for subsidized housing an individual or family must qualify as a "family" and the annual income for the family may not exceed the federally determined income limit for the number of family members in the household. An individual qualifies as a "family" if 62 years of age or older, or if disabled or handicapped regardless of age. Total family income cannot exceed the maximum gross income limits for specific programs (Table 10).[10] Refer to the Appendix Volume for a list of specific housing programs.

Previous sections dealing with the existing housing situation in the Valley have discussed distribution of housing, its affordability, and its conditions. This section will explain briefly what programs the City, the State of Nevada and the federal government have in place, or in process, to address existing problems of affordability.

City Housing Programs

The Residential Rehabilitation Assistance Program is administered by the Urban Development Division of the Department of Economic and Urban Development. The purpose of the program is to improve (revitalize) housing by assisting owners in correcting housing code violations within the city limits of Las Vegas with special emphasis placed on targeted low income census tracts (Map 3). There are two basic programs available for owner-occupied residential dwellings. (Refer to the Appendix Volume for a statement of project eligibility.)

- **Residential Rehabilitation Program** - The purpose of this program is to assist low to moderate income property owners by offering rehabilitation loans. All applicants must be owner occupants of the property and have an annual family income not to exceed the approved lower income limits shown in Table 10.

  City Council may waive the 80% limitation on the estimated cost of the "after rehab" appraised value, on a case by case basis, where it is necessary to achieve the objective of rehabilitating the structure. The loan shall not exceed ten years and will bear a 3% interest rate. Loan payments are returned to the Residential Rehabilitation Assistance Revolving Loan Account.

- **Deferred Loans** - These are interest free loans which do not need to be repaid unless the owner ceases to reside in the house or transfers title to the property. The owner must meet the very low income limits shown in Table 10. The total indebtedness against the property cannot exceed 80% of the "after rehab" value of the property. However, City Council may increase the 80% limitation on a case by case basis.

There is also one program for rental dwellings.

- **HUD Deferred Loans** - The City of Las Vegas will provide 25 per-

Table 10

Income Limits

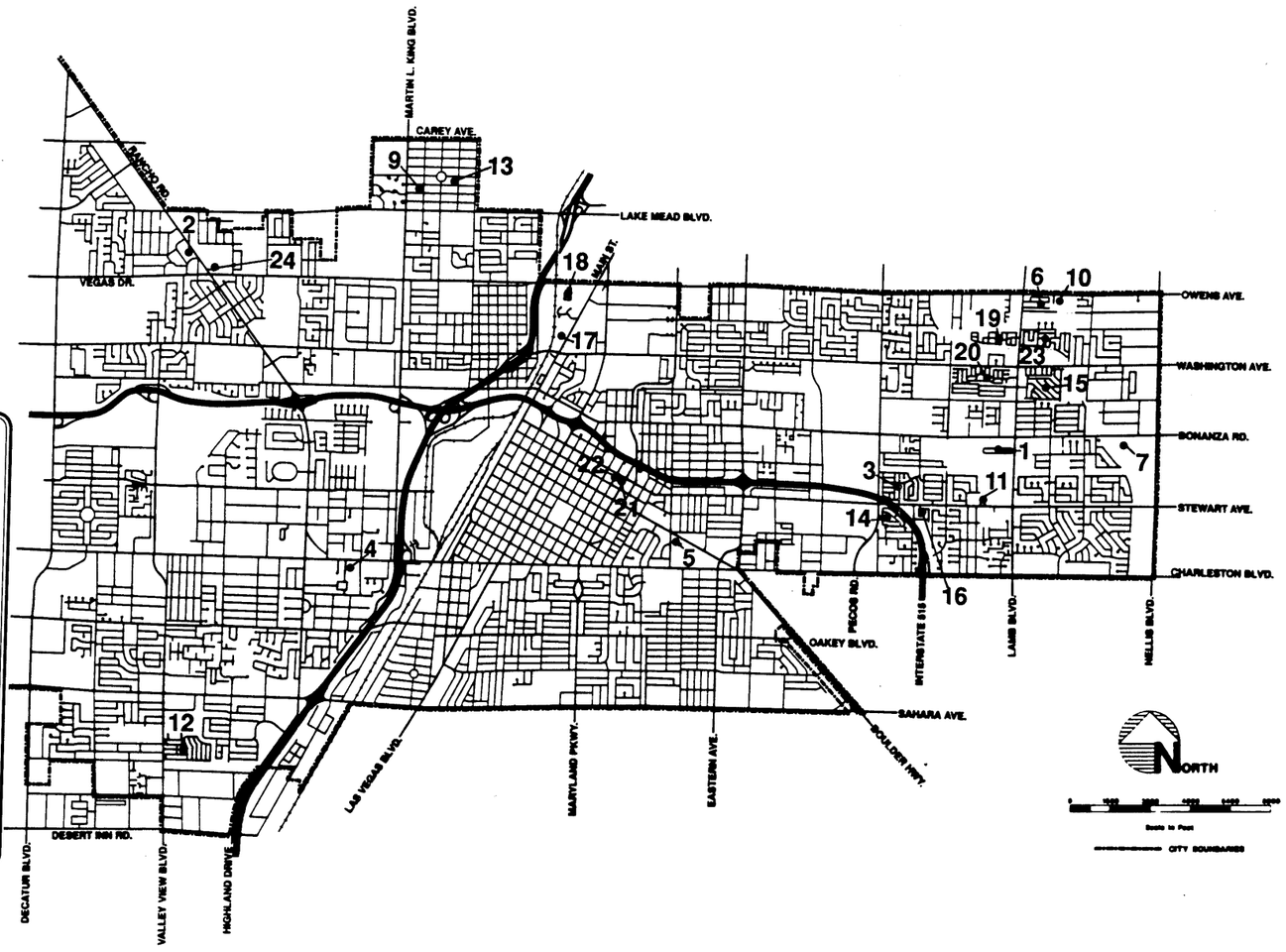
Lower Income Limits		Very Low Income Limits	
*1 Per	$20,800	*1 Per	$13,000
*2 Per	$23,750	*2 Per	$14,850
*3 Per	$26,700	*3 Per	$16,700
*4 Per	$29,700	*4 Per	$18,550
*5 Per	$32,050	*5 Per	$20,050
*6 Per	$34,450	*6 Per	$21,500
*7 Per	$36,800	*7 Per	$23,000
*8 Per	$39,200	*8 Per	$24,500

* Total Family Members

Source: State of Nevada 2-1-91

GP.HS Table 10 income Limits;HN;pm/9-26-91

Existing Mobile Home Parks and Spaces



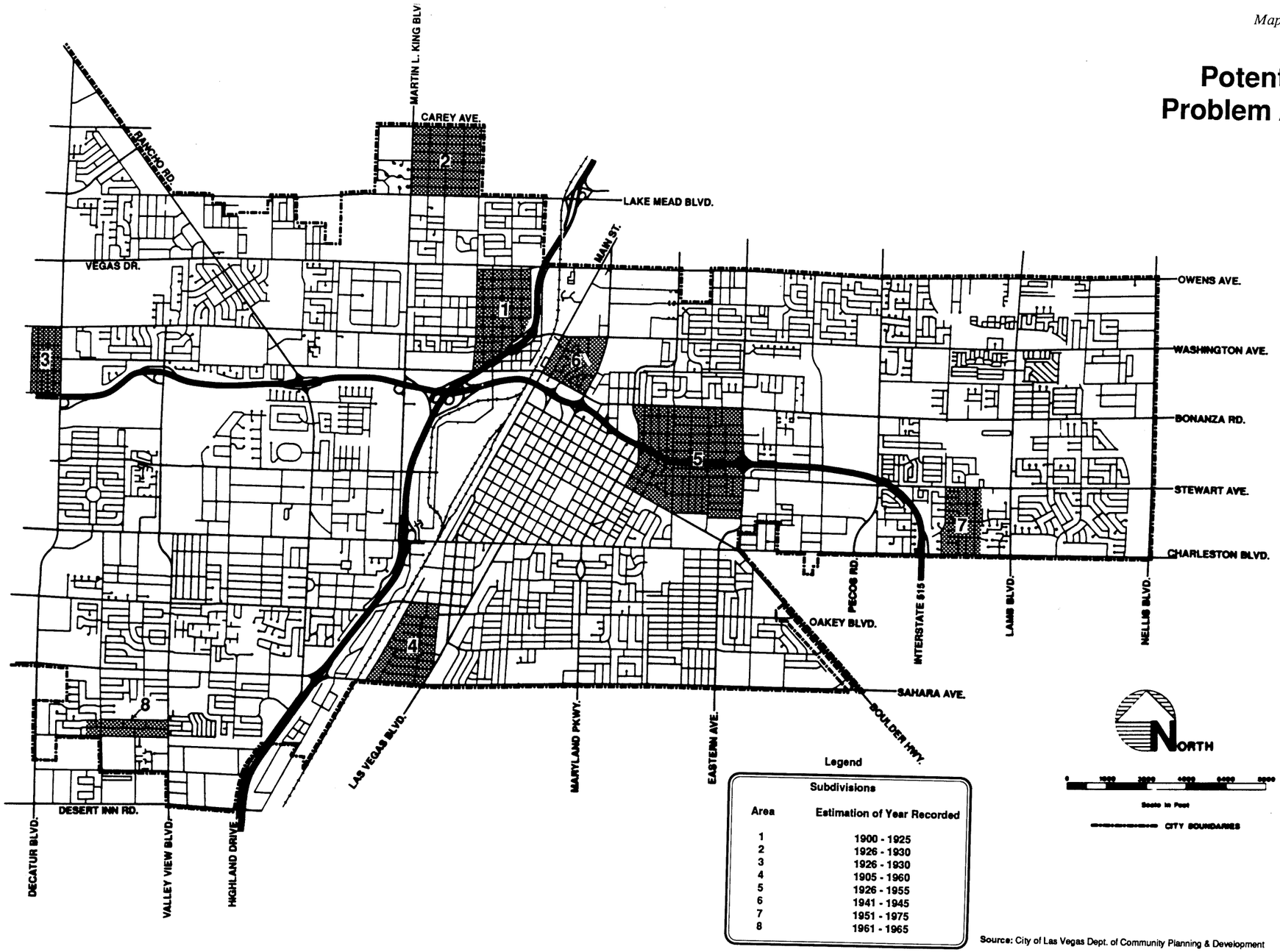
Legend

Number	Name	Address	Number of Spaces
1	Arrow Palms M.H. Comm.	543 N. Lamb Blvd.	86
2	B-N Rentals	1735 N. Rancho Dr.	14
3	Bonanza Village	3700 E. Stewart Ave.	364
4	Charleston Trailer Park	1823 W. Charleston Blvd.	44
5	Clark Mobile Home Inn	1800 E. Freemont St.	33
6	Desert Mobile Home Park	1500 N. Lamb Blvd.	86
7	El Capitan Mobile Park	4900 E. Bonanza Rd.	72
8	Jade Park	4325 Jadestone Ave.	368
9	Kemp's Trailer Park	1340 Hassell Ave.	18
10	Lambo Inn Mobile H.P.	4541 E. Owens Ave.	15
11	Leisure Living Mobile Park	4221 E. Stewart Ave.	12
12	Meadows M. H. Community	2900 S. Valley View Blvd.	338
13	Millage Trailer Park	964 Lawry Ave.	6
14	Pecos Park Coach Club	200 N. Pecos Rd.	135
15	Rancho Vegas Mobile H.P.	825 N. Lamb Blvd.	370
16	Rulon Vegas Mobile H.P.	3901 E. Stewart Ave.	71
17	Shady Acres Trailer Park	1001 N. Main St.	200
18	Sky Vue Mobile Park	15 W. Owens Ave.	101
19	Sunrise Oaks Limited	1200 N. Lamb Blvd.	186
20	Three Crowns Mobile C.C.	867 N. Lamb Blvd.	262
21	Trailer Terrace Mobile H.P.	225 N. Maryland Pkwy.	14
22	Vegas Court	231 N. 11th St.	7
23	Villa Borega M. H. Comm.	1111 N. Lamb Blvd.	288
24	Willow Inn Trailer Court	1610 N. Rancho Dr.	17

Source: City of Las Vegas Dept. of Community Planning & Development

Map 2

Potential Problem Areas



Legend

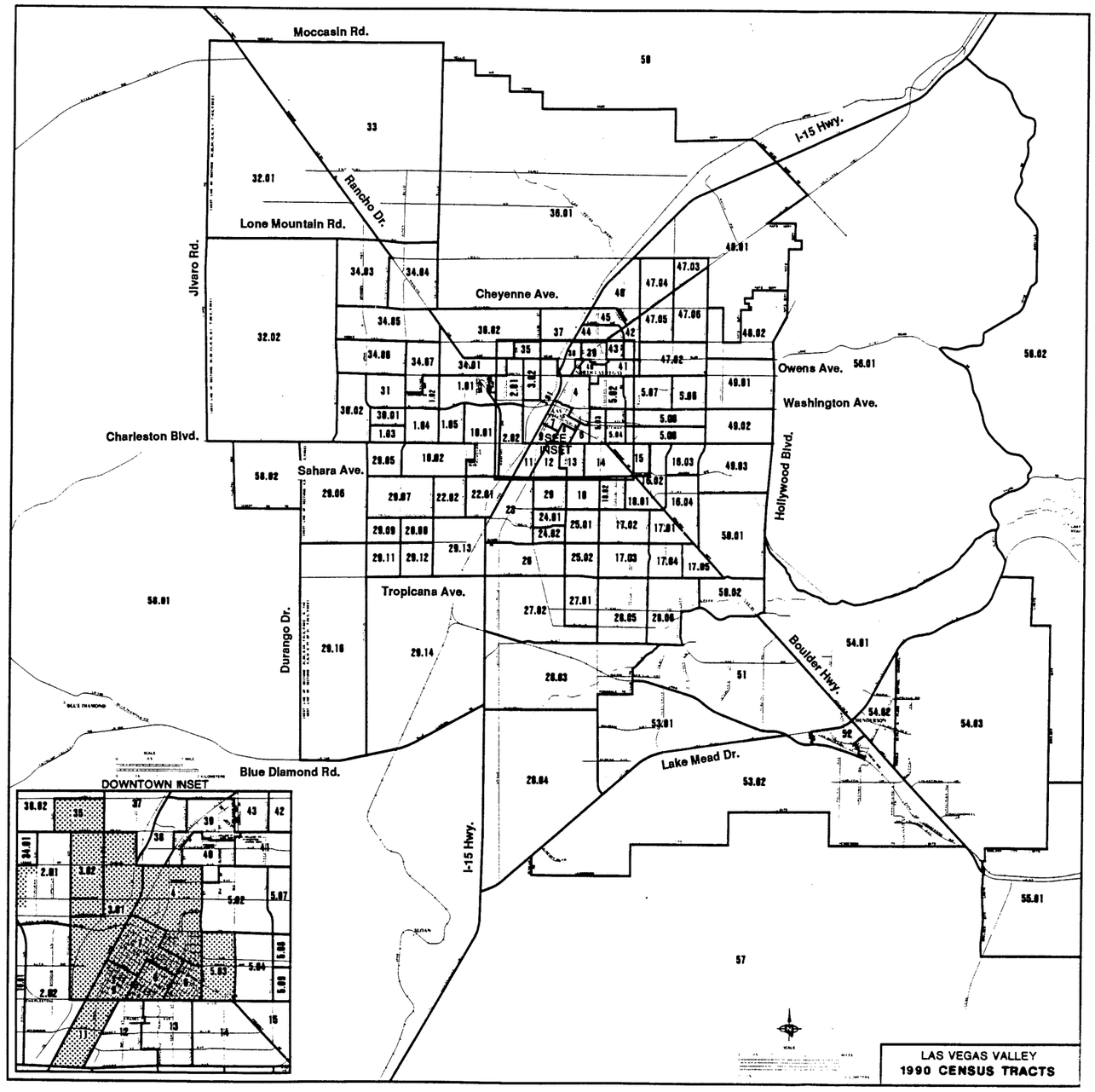
Subdivisions

Area	Estimation of Year Recorded
1	1900 - 1925
2	1926 - 1930
3	1926 - 1930
4	1905 - 1960
5	1926 - 1955
6	1941 - 1945
7	1951 - 1975
8	1961 - 1965

Source: City of Las Vegas Dept. of Community Planning & Development

Map 3

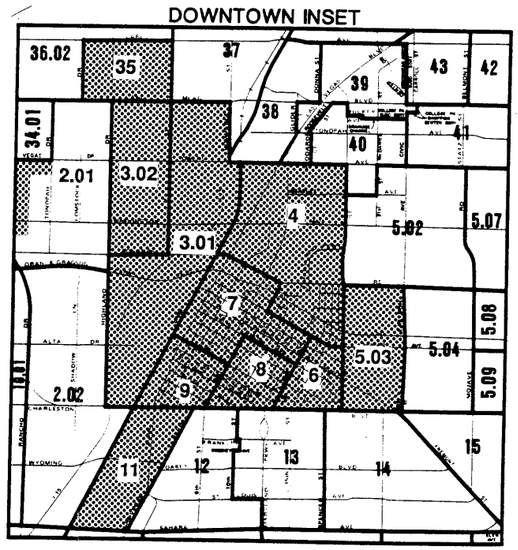
Low Income Census Tracts



Legend

Represents Boundaries of Low Income Census Tracts:
2.01 blocks 203 and 204
3.01,3.02,4,5.03,7,8,9,11 and 35

Source: City of Las Vegas Dept. of Community Planning & Development



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cent of the rehabilitation cost of a rental rehab project using HUD Rental Rehab funds. The owner must execute a ten year Regulatory Agreement; each year on the loan anniversary if the owner is in compliance with the Agreement, City Council will reduce the loan balance by ten percent. The owner is required to provide 75% matching funds for the project. This money must come from the owner's cash or from a lending institution. The City is working on an agreement with a group of four local lending institutions to provide the 75% matching funds which are to be loaned at 10% interest for a maximum of ten years.

The City formerly provided 25% of the rehabilitation cost of a rental rehabilitation project, in the form of a ten year deferred Loan, from Community Development Block Grant funds. The City's Deferred Loan portion was forgiven at the rate of 10% per year if the owner was in compliance with the rental Rehab Regulatory Agreement. The remaining funds were provided by the property owner.

The City has also sponsored and administered direct loans under the HUD 312 program to promote rehabilitation of single family dwellings in target areas. Loans were made available at an interest rate of three percent and priority given to low and moderate income residents.

As a result of these programs, a total of 725 dwelling units have been rehabilitated (brought up to code), for the period June 1, 1977 to February 4, 1991, at a total cost of $4,946,725 (Table 11).[11]

State Housing Programs

The Nevada Housing Division of the State of Nevada administers three housing programs in the Las Vegas Valley; the Nevada Single Family Housing Bond Program, the Multi-unit Rental Housing Finance Program, and the Low Income Housing Tax Credit Program. Refer to the Appendix Volume for a discussion of these State administered programs.[12]

Federal Housing Programs

- **Section 8 Certificate/Voucher Program** - The last federally owned housing was built in Las Vegas in 1984 and since then the Las Vegas Housing Authority has been participating in this program. Under this program the applicant, who is issued a certificate/voucher, looks for rental housing in the open market. The unit the applicant finds must pass HUD inspection to determine that the unit is safe and sanitary. The amount of the certificate/voucher is based on a housing survey conducted every ten years with an annual inflation factor built in. In addition, the Housing Authority can ask for an increase in the fair market rent of up to 20 percent in unusual market situations. A certificate must be used within the jurisdiction of the issuing housing authority or in a contiguous housing authority area. The Section 8 Certificate Voucher Program has maximum rent ceilings by bedroom size which are referred to as Fair Market Rents. The certificate holder must find a unit within the Fair Market

Table 11

Housing Assistance Programs
6/1/77 - 2/4/91 City of Las Vegas

OWNER OCCUPIED PROGRAM (101 UNITS REHABED)	
Direct Loans (Re-Payable @ 3% Interest 10 Year Term)	$400,484.63
Deferred Loans	$337,245.68
Grants (Not active)	$21,379.90
TOTAL	***$759,110.21***
MULTI-FAMILY RENTAL PROGRAM (516 UNITS REHABED)	
CDBG Direct (Re-Payable @ 5% Interest 10 Year Term) (Discontinued)	$1,595,775.13
HUD Rental Deferred (10% Per Year written off in compliance with Regulatory Agreement)	$1,056,890.00
TOTAL	***$2,652,665.13***
HUD SECTION 312 PROGRAM (108 UNITS REHABED)	
Multi-Family (Tenant Occupied)	$655,150.00
TOTAL	***$655,150.00***
TOTAL UNITS REHABED	***725***
TOTAL GOVERNMENT FUNDS	***$4,066,925.34***
TOTAL PRIVATE FUNDS	***$879,800.00***
	$4,946,725.34

Source: City of Las Vegas Dept. of Economic and Urban Development

GP.HS Table 11 House assist;HN;pm/9-26-91

Rent limit of the bedroom size for which he/she is eligible. The family must contribute 30% of monthly adjusted family income towards the rent. The Certificate voucher program does not have unit rent or family rent contribution ceilings. There is a limitation, however, on the subsidy contribution towards rent. The subsidy contribution limit is referred to as the Payment Standard. The Certificate voucher program permits the family to determine the level of his/her rent contribution, which will vary dependent on the rent of the unit selected. As of January 1991, the Housing Authority had issued a total of 667 certificates and vouchers (Table 12). Refer to Map 4 for location of specific projects and to the Appendix Volume for a list of other programs administered by the Las Vegas Housing Authority.

There is a large unmet demand beyond the 4,425 units administered by the Authority. For January 1991 there were a total of 3,724 active applications on file with 517 applications received (Table 13). Actually the demand is probably much greater since the waiting list may be frozen when applications for certificates/vouchers cannot be processed within one year from being received. The Authority estimates that the total demand is probably twice the applications received.

- **Community Development Block Grants** - This is a HUD program intended to promote sound community development which is directed toward neighborhood revitalization, economic development and improved community services. All CDBG activities must benefit low and moderate income persons or aid in the prevention of neighborhood blight. Funds are allocated to metropolitan cities and urban counties by statutory formulas.[13]

Table 12

Housing Unit Inventory (January 1991)

Units	
Low Rent Public Housing	2613
Section 8 Substantial Rehabilitation (Madison Terrace)	100
Section 8 New Construction (Rayson Manor)	57
Section 8 Moderate Rehabilitation (Baltimore Gardens, Cleveland Gardens, Granada Apartments)	217
Section 8 Existing Vouchers and Certificates	667
Non-Federally Aided Program (Authority Owned)	461
Section 8-202 (Privately Owned/Authority Managed)	310
Total	***4425***
Units Under Construction	
Low Rent Public Housing	0
Section 8 Substantial Rehabilitation	0
Section 8 New Construction	0
Section 8 Moderate Rehabilitation	0
Non-Federally Aided Program (Authority Owned)	0
Section 8-202 (Privately Owned/Authority Managed)	0
Total	***0***

Source: Housing Authority of City of Las Vegas

GP.HS Table 12 House Inventory;HN:pm/9-26-91

Table 13

Housing Authority of the City of Las Vegas

Application Department Status Report- January 1991

	Applications Received	***Active Applications on file***
Public Housing Family	155	769
Public Housing Senior	5	205
Non-Aided Family (8 Houses)	41	134
Non-Aided Housing Senior	76	308
Non-Aided Housing (Rayson Manor Annex)	2	23
Section 8 Existing Cert/Voucher Senior	0	214
Section 8 Existing Cert/Voucher Family	0	652
Section 8 Moderate Rehabilitation	128	482
Section 8 New Const. (Rayson Manor)	0	238
Section 8 Subst. Rehab. (Madison Terr.)	110	522
Section 8/202	0	177
Totals	***517***	***3724***
Summary of Case Activity		
Completed cases returned, loss of preference	11	
Withdrawn by Applications Department	15	
Completed, submitted to Managers	80	
Verifications in progress	85	
Completed verifications	46	

Source: Housing Authority of City of Las Vegas

GP.HS Table 13 Housing authority;HN:pm/9-26-91

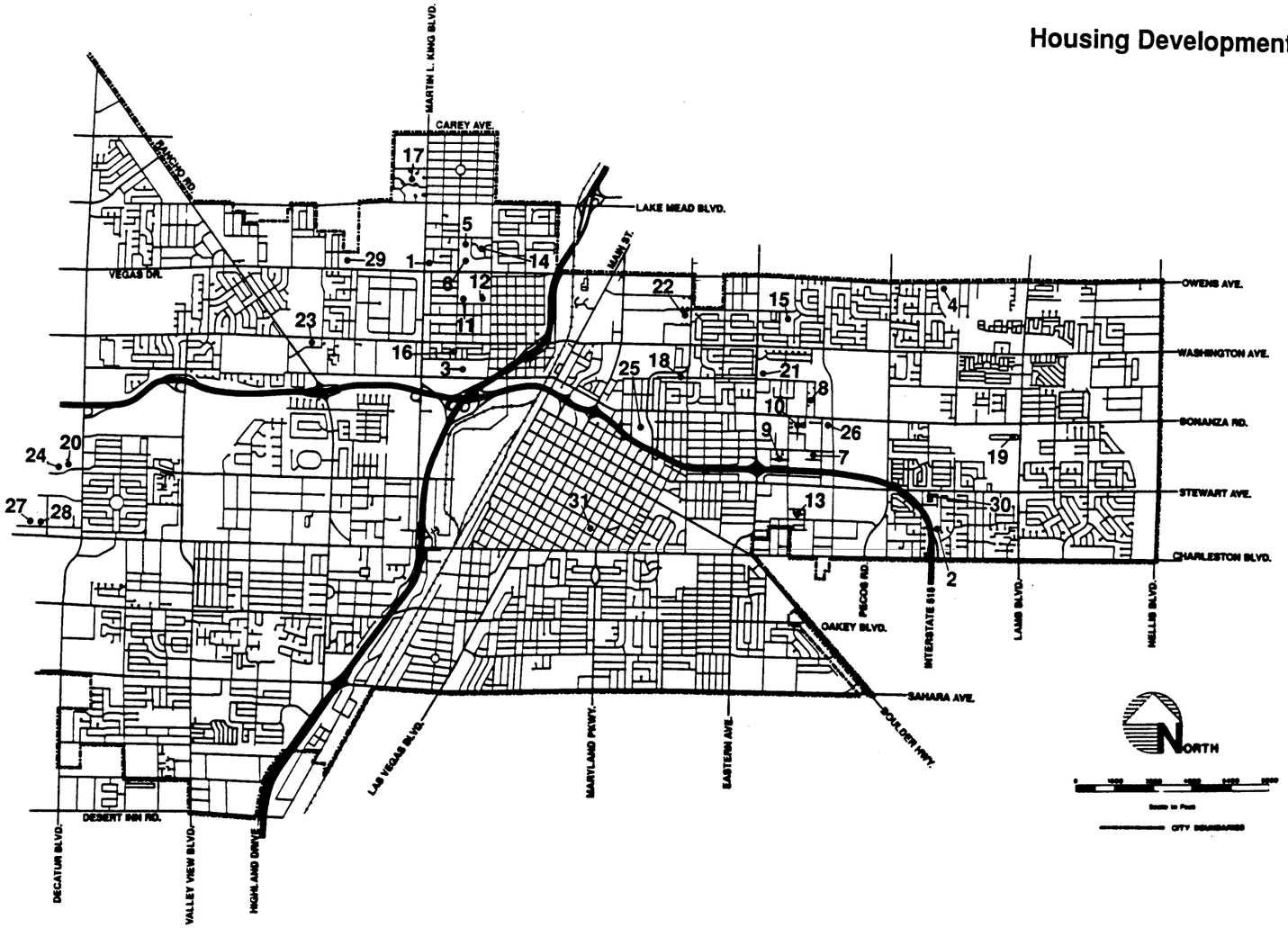
Housing Developments

Legend

Number	Name and Address	Units
1	**Marble Manor Annex** N. Highland & Wyatt	20
2	**Ernie Cragin Annex #3** E. Charleston & Honolulu	54
3	**Westwood Park** 1001 W. McWilliams	56
4	**Rayson Manor** Sandhill & Owens	57
5	**Villa Capri** 1801 N. J St.	60
6	**Sherman Gardens** 1701 N. J St.	80
7	**Cedar Gardens** 2904 Cedar	80
8	**Ernie Cragin Annex #4** E. Bonanza & Manning	81
9	**Ernie Cragin Annex #2** N. 28th St. & Cedar	84
10	**Ernie Cragin Annex #1** E. Bonanza & N. 28th St.	86
11	**Evergreen Arms** N. J St. & Monroe	56
12	**Madison Terrace** N. H St. & Monroe	100
13	**Ernie Cragin Terrace** 2810 Ambler Pl	125
14	**Sherman Gardens Annex** H St. & Doolittle	160
15	**Weeks Plaza** 2704 Searles Ave.	184
16	**Marble Manor** 811 N. I St.	235
17	**Herbert Gerson Park** 2020 McGuire Dr.	300
18	**Vera Johnson Manor** N. Bruce & Maryland Pkwy.	76
19	**Vera Johnson Manor** N. Lamb & Bonanza	112
20	***Stella Fleming Towers** 400 S. Brush St.	115
21	***Arthur McCants Terrace** 800 N. Eastern	115
22	***Archie C. Grant Park** 1720 Searles Ave.	125
23	***Harry C. Levy Gardens** 2525 W. Washington	150
24	***James H. Down Towers** 5000 W. Alta Dr.	200
25	***Robert J. Gordon Plaza** 450 N. 11th St.	356
26	***CCSN Mojave Project** Bonanza & Mojave Rd.	50
27	***Arthur D. Santini Plaza Annex** 5200 Alpine St.	39
28	***Arthur D. Santini Plaza** Brush & Alpine	220
29	***Aida Brents Gardens** 2120 Vegas Dr.	24
30	***Rulon A. Earl Mobile Manor** 39001 E. Stewart	71
31	***Dr. James M. Jones Gardens** 519 S. 11th St.	64

* Represents Senior Citizen's Units

Source: Housing Authority of the City of Las Vegas, Nevada



Refer to the Appendix Volume for a list of federally administered programs.

- **Cranston-Gonzalez National Affordable Housing Act** - The purpose of the Act is:
  - to assist families to become first-time homebuyers
  - to retain affordable housing units developed with federal assistance
  - to produce and operate affordable housing for low-income and moderate income families through public-private partnerships.
  - to expand and improve federal rent assistance for very low income families, and
  - to increase the supply of supportive housing for persons with special needs.

The Act continues authorization for Community Development Block Grants and Housing programs while authorizing several new programs to assist states and local governments to achieve these objectives. The new HOME Investment Partnership and HOPE programs are currently being developed. However, in order to continue receiving federal funding the state and local governments must develop Comprehensive Housing Affordability Strategies (CHAS). It is expected that CHAS will incorporate and then supersede elements of the current Housing Assistance Plan and the Comprehensive Homeless Assistance Plan. Further, the CHAS must be approved by HUD and is required to be submitted by October 31, 1991.[14]

Housing Assistance Consultation

Poor People Pulling Together (PPPT) is the approved HUD Counseling Agency for the State and is the only non-profit organization in the city which provides housing consultations. This organization, located at 1801 N. 'J' Street, assists households who want to purchase or who already own their own homes and it represents actual and potential homeowners at assignment hearings for FHA insured loans. This organization also advises new persons and households in the area or persons needing immediate housing information where they can apply for subsidized housing and the basic information they will need to provide when they fill out applications. It acts as an informal mediator in disputes between renters and housing owners or managers.[15]

8.1.6 Analysis of Future Housing Needs

Housing Demographics

Population in the Las Vegas Valley is expected to increase from 751,931 in 1990 to over 947,400 persons in the year 2000. As shown in Table 14, there will be an estimated need for 350,717 dwelling units in 1995 and 394,757 units by the year 2000 based on projected populations.

Table 14

Las Vegas Valley Dwelling Units

Unit Needs	*1990*	*1995*	*2000*
Population	751,931	859,256	947,416
P.P.H.H.	2.55	2.45	2.40
Estimated DU Needs			
Total[1]	294,875	350,717	394,757
Single Family	133,873	159,226	179,220
Multi-Family	161,002	191,491	215,537
Existing DU's			
Total	281,400	281,400	281,400
Single Family	127,756	127,756	127,756
Multi-Family	153,644	153,644	153,644
Unmet Unit Needs			
Total	13,475	69,317	113,357
Single Family	6,118	31,470	51,464
Multi-Family	7,357	37,847	61,893
Unit Potential			
Potential DU's Based on Vacant Residential Acreage			
Total	278,378	278,378	278,378
Single Family	207,628	207,628	207,628
Multi-Family	70,750	70,750	70,750
Potential Excess (Needed) DU's			
Total	264,903	209,061	165,021
Single Family	201,510	176,158	156,164
Multi-Family	63,393	32,903	8,857

[1] Single family dwellings estimated to be 45.4% of total Valley units

Source: U.S. Census, CLV Dept. of C.P.&D. & Clark Co. Dept. of C.P. Projections
Clark Co. Town Plans, CLV Community Profiles GP.HS Table 6a LVV Dwelling;HN:pm/4-14-92

Anticipated Housing Needs

As of 1990 there were an estimated 281,400 existing dwelling units in the Valley, breaking down into 127,758 single family and 153,644 multi-family units. Table 14 indicates that in 1995, the combined figures for total existing and potential DU's subtracted from total estimated DU needs will produce a potential excess of 209,061 DU's; in 2000 excess single family units will be reduced to 156,164 and the multi-family units to 8,857. There is a projected City dwelling unit need of 136,344 in 1995 and 180,416 units projected in the year 2000. Existing and potential City dwelling units total 270,794 units. Thus, in 1995, Las Vegas can provide its share of total valley housing in both single family and multi- family units. By 2000 the City will still meet its single family needs but will be deficient in multi-family by over 6,300 units.

It is important to not only know total City housing needs but to determine the allocation of housing by type throughout the City. Table 15 estimates the total number of units needed by type in 1995 and 2000 based on their percentage of total housing existing in 1990. Subtracting the existing dwelling unit types from the projected dwelling unit types for 1995 and 2000 provides the number of needed units by type. It should be noted that single family is as its name implies, the remaining types are all considered multi-family. The next consideration is to distribute these needed housing units in each of the three city planning sectors based on the potential dwelling units per net acre of vacant land and its designated land use category (Table 16). Land use categories "R", "L" and "ML" generally permit single family units whereas "M" and "H" permit multi-family units. Thus, comparing Tables 15 and 16, the Southeast Sector could provide for about 59 percent of the single family needs by 1995. The Southwest Sector can meet single family needs in 1995 but not by the year 2000, while the Northwest Sector can absorb all single family housing needs thru the year 2000. Multi-family needs cannot be handled alone by any individual sector in 1995, and by the year 2000 the three sectors together will not have sufficient vacant land to provide for multi-family housing needs; there will be a need for over 6,300 additional units to provide for all the multi-family dwellings proposed for the year 2000.

Anticipated Housing Affordability

Subsequent to a determination of future housing needs by type and location, additional analysis is needed to find out if household income will be sufficient to purchase future housing. Table 17 indicates that there is expected to be a drop of 11 percent in the number of households with income of less than $20,000, and a rise of 9 percent for households with incomes between $25,000 to $50,000. Over time this change should produce a larger number of qualifying households if inflation is held constant.

It is assumed a household can afford to buy a home with a 20 percent down payment and that an appropriate amount of income will be used to cover the debt service, property taxes, and insurance on the home. As a general rule household income spent on housing can range

Table 15

Potential Housing Needs by Unit Type
City of Las Vegas

DWELLING UNITS PROJECTED BY TYPE -		*%*	*1990*	*1995*	*2000*
Total		100%		136,344*	180,416*
Single Family	S.F.	51%		70,176	92,860
Plexes	M.F.	7%		9,451	12,510
Mobile Homes	"	3%		4,049	5,362
Apartments	"	32%		43,217	57,174
Townhouse/Condos	"	7%		9,451	12,510
DWELLING UNITS EXISTING BY TYPE -					
Total		100%	109,394		
Single Family		51%	56,310		
Plexes		7%	7,987		
Mobile Homes		3%	3,319		
Apartments		32%	34,536		
Townhouse/Condos		7%	7,242		
DWELLING UNITS NEEDED BY TYPE -					
Total		100%		26,950	71,022
Single Family	S.F.	51%		13,866	36,550
Plexes	M.F.	7%		1,464	4,523
Mobile Homes	"	3%		730	2,043
Apartments	"	32%		8,681	22,638
Townhouse/Condos	"	7%		2,209	5,268

* *Rounding errors exist*

Source: City of Las Vegas, Dept. of Community Planning and Development, Population & Dwelling Unit Estimates & Projections

GP.HS Table 15 Potential needs;HN;pm/9-26-91

Table 16

Potential DU's/Net Acre of Vacant Land
by Sector and Land Use Category
City of Las Vegas

Sector	Land Use Category	Dwelling Units		%
SE		Total	18,222	100
	R, L, ML	Single Family	8,181	45
	M, H	Multi-Family	10,041	55
SW		Total	42,937	100
	R, L, ML	Single Family	31,927	74
	M, H	Multi-Family	11,010	26
NW		Total	100,249	100
	DR, R, L, ML	Single Family	93,140	93
	M, H	Multi-Family	7,109	7
		City Total	***161,408***	***100***
		Single Family	***133,248***	***83***
		Multi-Family	***28,160***	***17***

Source: City of Las Vegas Dept. of C.P.&D., Community Profile Maps 1990-91

GP.HS Table 16 Potential DU;HN;pm/9-26-91

Table 17

Annual Household Income

Income Group From $	To $	1990 Percent	1995 Percent	2000 Percent
0	9,999	7%	5%	4%
10,000	19,999	18%	13%	10%
20,000	24,999	9%	11%	11%
25,000	34,999	21%	23%	24%
35,000	49,999	21%	24%	26%
50,000	+	24%	24%	25%
Total # of Households		269,300	350,717	394,757
Median HH Income		$32,862	$43,288	$56,022

Source: Las Vegas Perspective 1990 & CLV Dept. of C.P. & D. projections

GP.HS Table 17 annual income;HN;pm/9-26-91

from 25 to 35 percent. Table 18 indicates, within these ranges, the purchase price of housing at various income levels and interest rates with a 25-year fixed rate mortgage. For example, assuming 30 percent of income is spent by a household with an income level of $20,000 and at an interest rate of 10 percent, that household could afford to purchase a $60,000 home.

In 1989, Center for Business and Economic Research, UNLV, indicated that the median sales value of a single family home was $96,128 or a 44 percent increase in value from the median value of a home in Clark County ($66,800) as reported in the 1980 Census. If housing value increases another 44 percent from now to the year 2000, the median house value will be $138,424. If housing value does increase by this percentage and assuming 30 percent of household income is spent for housing, then in the year 2000 only about 34 percent of the total households could afford a median priced house.

Figure 5 indicates the percentages of households which can afford various priced homes in the years 1995 and 2000. Comparing household affordability in 1989 (Figure 2) with Figure 5 indicates a 19 percent increase between 1989 and 1995 in the households which could afford a $60,000 home. There is a 25 percent increase in the households which could afford a $100,000 home. However, these percentage increases are nearly unchanged between 1995 and the year 2000.

Anticipated subsidized housing

In 1991 there were 4,425 subsidized housing units. These units represent about 4 percent of the City of Las Vegas households. If this percentage is applied to households (dwelling units) expected in 1995 and 2000 we can expect to provide 5,454 and 7,217 subsidized units, respectively.

Table 18

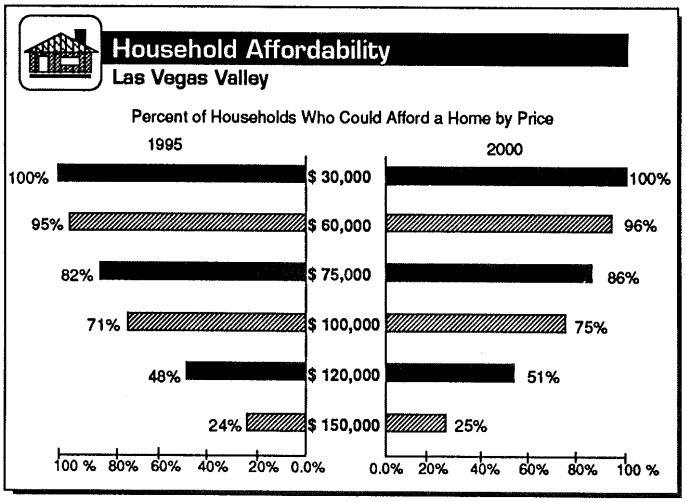
Affordability
Incomes Compared to Purchase Price

35% OF INCOME	INCOME LEVEL	PURCHASE PRICE AT 10%	PURCHASE PRICE AT 12%
	10,000	34,600	30,742
	20,000	69,233	61,484
	25,000	86,542	76,854
	35,000	121,159	107,596
	40,000	138,467	122,967
	50,000	173,084	153,709
30% OF INCOME			
	10,000	29,663	26,350
	20,000	59,343	52,701
	25,000	74,179	65,875
	35,000	103,850	92,225
	40,000	118,686	105,400
	50,000	148,358	131,751
25% OF INCOME			
	10,000	24,726	21,958
	20,000	49,452	43,917
	25,000	61,815	54,896
	35,000	86,541	76,854
	40,000	98,905	87,833
	50,000	123,631	109,792

Source: Downs, Anthony Housing Affordability

GP.HS Table 18 Affordability;HN:pm/9-26-91

Figure 5



Source: Preliminary Affordable Housing Needs Assessment, March 1990, Nevada Housing Division

8.2 Issues

Issue 1: The City's proportionate share of housing types in respect to the Valley-wide need

Population in the Las Vegas Valley is projected to reach 947,400 persons by the year 2000. This growth will equate to a need for 350,700 total dwellings in 1995 and 394,750 units in the year 2000. Based on land planned for residential development, there will still be room for an additional 156,164 single family units and 8,857 multi-family units above the 394,750 units projected for the Valley by the year 2000. It is expected that the City of Las Vegas will need 180,400 units in the year 2000. Vacant land in the City's planning area proposed for residential use will provide 133,240 single family units and 28,160 multi-family units; thus by the year 2000 the City will fall short of its housing unit needs by over 6300 multi-family units. Thus, the City should determine if it is desirable to accept an increasing portion of the Valley's housing especially since it is currently meeting the overall Valley percentage of apartment units but is providing a higher percentage of single family dwellings.

Issue 2: A City plan for sufficient land at the proper densities to meet future housing needs

A major consideration is the distribution of needed housing units in each of the City's three planning sectors based on the potential number of units per net acre of planned vacant land. The Southeast Sector, which is largely developed, can only accommodate about 22 percent of the single family and less than one-third of the multi-

family development proposed for the year 2000. Much of the multi-family demand would need to be placed as infill development. The Southwest Sector is characterized as developing with much of the area in planned communities with approved land use plans. This sector cannot absorb the single family housing needs in the year 2000, and can provide for only slightly over one-third of the multi-family demand. A consideration in this sector is whether to permit higher density land use inside and/or outside of planned communities. The Northwest Sector, which is presently rural in character, contains the largest vacant area suitable for single family development. It could contain about two and one half times the year 2000 single family needs, but only about one fifth of the multi-family dwellings. The concern in this sector is how to increase the amount of multi-family units without compromising the rural quality of life.

Issue 3: The City's ability to plan for a suitable range of housing types and prices is affected by the existing lack of an effective mass transit system in the Valley

In May 1990 SR Associates submitted to the Regional Transportation Commission of Clark County an interim report that dealt with transit considerations in the Valley. This report made the observation that the greatest concentration of transit (bus) riders was from households with low (less than $10,000) and medium ($10,000 to $35,000) incomes, with elderly (persons 65+ years), and having zero or one vehicle. Low income households (15 percent and higher) are concentrated in an area generally bounded by Centennial Parkway on the north; Tonopah Highway and I-15 to the west; Tropicana Avenue on the south; and Pecos and Eastern on the east. The greatest concentrations of elderly (300 households and higher per square mile) are located in the City's "Downtown" and "Westside" areas and in an area between Charleston and Tropicana, east of Rainbow Boulevard and generally west of Pecos Road and Eastern Avenue. Households with zero car ownership (6 percent or more) are again concentrated in the City's "Downtown" and "Westside" areas and in a corridor along the "Strip" extending from Sahara Avenue south to Warm Springs and southward, between I-15 and Eastern Avenue. Fortunately, these areas are where the existing bus routes are located, and most of these households are within a one half mile walking distance. However, if the transit rider doesn't work on the "Strip" or "Downtown," traveling to the transportation center before a transfer can be made is difficult and very time consuming.

There will be little opportunity to expand homeownership for low and moderate income families unless housing costs can be reduced. While there are no overall available figures on land costs "Downtown" and along the "Strip" one can safely assume that they would be very high because of the concentration of high value commercial property. In fact, the residential area south of the Central Business District has been converting to offices thereby removing this area for affordable housing. Unless the existing transportation system can be extended, areas where land costs will permit affordable housing will be extremely limited.

Issue 4: The construction of sufficient housing to meet the market demands of middle to low income households

The Las Vegas Valley appears to have few problems in providing housing for the 45 percent of its households which can afford a $100,000 or higher cost house. This area, because of its temperate climate and relatively low taxes, is attracting affluent retirees, among others, predominately from the west coast. Although this portion of the housing market is being accommodated something must be done to build affordable housing for the approximately 45,000 households at or below the County's median income range. Further, the residential resale market is almost entirely confined to housing sales above $60,000. In 1989 only about 10 percent of the residential resale market was for homes costing $60,000 and below. It appears that the limited amount of housing in this cost range is not being resold due to the difficulty of acquiring these homes. The same problem of affordability also occurs in the apartment rental market. Nearly 80 percent of the rental households in Clark County could afford a rental of $450 or lower. In 1989, however, only 43 percent of the available apartments had rents in this range. Current market conditions do not appear sufficient to encourage the development of housing affordable to lower and middle income families. The City needs to take the opportunity to encourage lower land costs, more efficient construction techniques and more compact development design to lower housing costs.

Issue 5: The provision of sufficient subsidized housing to meet the demands of low income households

Household income is one measure used to determine if a family qualifies for subsidized housing, family size is another. The Las Vegas Housing Authority indicates that a very low income household would range from one person with an income of $13,000 to eight or more persons with a total income of $24,500. The lower income range starts at a maximum of $20,800

for one person to a maximum of $39,200 for a household of eight or more persons. The Department of Housing and Urban Development indicated the median household income for Clark County in 1989 was $32,200, which equates to 42,103 Clark County households having income at or below this figure. The Las Vegas Housing Authority (LVHA) currently administers 4,425 units which is about 11 percent of this total. The LVHA currently participates in the Section 8 Certificate/Voucher Programs. The amount of the certificate/voucher is based on a housing survey conducted each ten years with an annual inflation factor built in. However, considering the rapid rise in housing prices and that only about 43 percent of apartment rentals are $450 or less in price, it would appear that a much larger allocation of federal funds will be needed to meet demand. In addition, increased funding is needed for the City administered Residential Rehabilitation Assistance Programs which are used to provide rental units for the Certificate/Voucher program.

Issue 6: Maintaining the integrity of residential neighborhoods during a program of in-fill development

Neighborhood in-fill or rehabilitation programs must be carefully considered in terms of planning and design coordination, regulatory control, and land use transitions. This is particularly important when a variety of housing types, including higher density uses, are proposed in order to maintain or improve the quality and integrity of existing neighborhoods.

Issue 7: Maintaining the housing quality and livability of residential neighborhoods

Las Vegas is a relatively young city and as such most of the existing housing has not aged into disrepair. Some older neighborhoods, however, are showing signs of housing disrepair and deteriorating environmental conditions and need to be brought up to code. The Central Action Office has been created to enforce the housing code and correct environmental complaints. Community Development Block Grant funds are used to administer the Residential Rehabilitation Assistance Programs in designated target areas to repair existing homes. The City needs to continue to participate and increase these programs to promote maintenance of homes whose owners cannot afford these repairs. The City must continue to use land use regulations and to introduce planning at the neighborhood level in order to promote good design and maintain property values. It is also suggested that neighborhood councils be created to serve as monitoring bodies calling problems to the City's attention. It is suggested that resident pride is the most effective antidote to neighborhood deterioration.

The update to the City of Las Vegas General Plan began in January 1989 when the Mayor, the City Council and the County Commission Chairman brought together a citizen committee of over 300 Las Vegas Valley residents to prepare the Las Vegas 2000 and Beyond Strategic Planning Program. The 2000 and Beyond Program produced action statements in eight selected areas of study. These actions, along with initial revisions to the 1985 General Plan Policy Document made by City department directors were then incorporated into a draft update of the 1985 policy document. The Actions relating to Housing which were incorporated are:

- Provide affordable housing and medical services for seniors.
- Investigate creative new neighborhood - scale planning and development approaches, including but not limited to, the Traditional Neighborhood Development (TND) and Neighborhood Pocket concepts.

In July 1990 City Council appointed a Citizens General Plan Advisory Committee to work with City staff on the General Plan update. At this time a General Plan Technical Advisory Committee composed of City department heads and other key City representatives was also formed. By January 1991 the General Plan Advisory Committee had produced a final draft of the Goals, Objectives, Policies and Programs.

8.3 Goal, Objectives, Policies and Programs

The following hierarchy of the overall Goal, and supporting Objectives, Policies and Programs, reflect applicable "actions" of the "Las Vegas 2000 and Beyond" citizen's strategic planning program, and subsequent review by the General Plan Citizens Advisory Committee of the 1985 General Plan Goals, Objectives, Policies and Programs, revised to address current conditions and issues.

Goal: Provide diverse housing types and costs located within a variety of living environments.

Objective A: Provide an adequate housing supply to serve existing and future populations of the City which will include Valley-wide housing considerations.

Policy A1: Encourage new housing development and ensure timely and equitable provision of public facilities and services to accommodate this development.

Program A1.1: Increase housing stock by 1994 in qualified city census tracts by building housing developments on large vacant lots and selected in-fill housing on smaller lots.

Program A1.2: Encourage estate homes and other quality development throughout the City with emphasis in the northwest and southwest sectors of the City.

Policy A2: Cooperate and coordinate with other Valley entities regarding availability of vacant land for a variety of housing types and price ranges.

Program A2.1 Cooperate in initiating and maintaining a Valley-wide data base on existing and potential housing by number of units and price ranges.

Program A2.2 Coordinate with other Valley jurisdictions to allocate housing needs for Valley-wide consumption.

Program A2.3 Cooperate in initiating and conducting a study of major employment locations in regard to the availability of vacant land for a variety of housing types and prices.

Program A2.4 Cooperate by 1994 in initiating and conducting a study pertaining to the interrelationships and effects of land costs on the availability of housing.

Objective B: Develop diverse, high quality housing stock with price ranges affordable to all income levels.

Policy B1: Utilize and involve the Nevada Community Reinvestment Corporation in considering housing market conditions, income and employment levels, housing prices, and other quantity measures to ensure an adequate supply of housing for all income levels.

Program B1.1: Continue to encourage residential development that provides affordable housing.

Sub-Program 1: Designate compatible land use categories on the Proposed Future Land Use sector maps which foster affordable housing.

Sub-Program 2: Incorporate innovative techniques in the zoning and subdivision regulations which will stabilize or reduce housing costs.

Program B1.2: Establish a mechanism to increase approved manufactured (modular) home developments in the Valley by 1993.

Program B1.3: By 1993, conduct a study to determine appropriate locations for affordable housing including appropriate Bureau of Land Management land which can be served by an efficient and effective transit system.

Program B1.4: Work with the State's Congressional Delegation for its support of special legislation to provide Bureau of Land Management land grants or low cost land for locating entry level and affordable housing.

Policy B2: Augment efforts to increase the availability of affordable home financing and low cost housing assistance.

Program B2.1: By 1993 provide assistance to projects which conserve or expand low income housing stock through the Federal Community Development Block Grant Program, the federally funded HOME program and the Nevada Housing Bond Program.

Sub-Program 1: Ensure maximum efficiency and effectiveness of federal housing programs by lobbying for an enlargement of the local HUD office.

Program B2.2: Continue to support local efforts of the Las Vegas Housing Authority and/or public non-profit housing organizations to provide below market housing to lower income groups or special needs groups.

Program B2.3: Utilize the Community Reinvestment Act to leverage private sector participation in funding low-moderate income housing.

Objective C: Encourage development of a variety of housing types, for both rental and ownership, which contribute to overall quality of life and economic vitality of the City.

Policy C1: Guide community growth and development in a manner which will encourage good neighborhood and community design.

Program C1.1: Encourage residential development in appropriate locations convenient to employment centers.

Policy C2: Evaluate individual development or redevelopment proposals in terms of design which adequately accommodates the needs of prospective residents.

Program C2.1: By 1993 develop stability, improvement (revitalization) and redevelopment programs for existing residential and commercial neighborhoods.

Policy C3: Establish and subsequently re-examine Proposed Future Land Use Sector maps which delineate residential product mix opportunity areas within existing and future neighborhoods.

Policy C4: Evaluate development and redevelopment proposals and require adequate design features to mitigate potential conflicts with residential areas.

Program C4.1 Provide by 1994 appropriate design guidelines to achieve compatible transitions around residential areas.

Program C4.2 By 1994 provide land use design plans to preserve existing residential neighborhoods abutting developing or redeveloping business areas.

Sub-program 1: By 1993 implement the Owens Neighborhood Corridor Plan as part of the West Las Vegas Development Program.

Policy C5: Provide for housing development which contributes to overall community quality, creates jobs and generates additional revenues, in addition to providing an environment whereby a socially balanced community can live and work.

Program C5.1: Revise the zoning ordinance by 1993 to expand density bonus approaches to residential development in affordable ranges as well as to reward quality design.

Sub-program 1: Designate substantial single family, small lot development opportunities on Proposed Future Land Use Sector maps.

Sub-Program 2: By 1994 evaluate Neotraditional planning including the Pedestrian Pocket and Traditional Neighborhood design concepts for appropriate areas throughout the City.

Objective D: Provide a well preserved and habitable stock of housing.

Policy D1: Incorporate approved design and safety features in new housing, and maintain existing housing in a safe and healthful condition in stabilized neighborhoods.

Program D1.1: Continue to update building and related codes to accommodate new construction techniques and to provide adequate enforcement of these codes.

Program D1.2: Continue enforcement of existing zoning, health, safety and nuisance laws in accordance with City Code.

Program D1.3: By 1993 redefine and encourage increased city-wide participation in the City Housing Loan Program.

Program D1.4: By 1993 expand the repair of substandard housing thru the Residential Assistance Loan Program to remove blight in city neighborhoods.

Program D1.5: Enforce existing city codes thru the Central Action Office in order to demolish or rehabilitate substandard housing and promote the enhancement of neighborhood environments.

Program D1.6: Undertake planning at the neighborhood level by 1993.

Policy D2: Encourage private property maintenance.

Program D2:1: Continue Community Development Block Grant assistance and initiate HOME programs by 1993 to enhance neighborhood improvement efforts.

Program D2.2: Explore by 1993, opportunities to expand neighborhood improvement advisory services to provide technical and administrative resources to those who wish to initiate neighborhood improvement efforts.

8.4 Evaluation and Implementation Matrix

The following Housing Evaluation and Implementation Matrix (EIM - see next page) was prepared as a measurable summary of the above Policies and Programs. The EIM is to be used:

- as a method of measuring the implementation progress of the General Plan
- as a budgeting document for specific Land Use programs
- as a tool for further developing work programs

The following abbreviations apply to the Evaluation and Implementation Matrix

City
BS - Building and Safety
CM - City Manager
CP - Community Planning and Development
DD - Design & Development
ED - Economic Development

8.4 Housing: Evaluation and Implementation Matrix

Policy (Program)	Program Summary	Responsible Departments	FY of Implementation	Specific Action/Product	Remarks
A1.1	Increase housing stock in qualified City census tracts.	ED	1994	Research and prepare a list of City census tracts where 51% of the households are of low and moderate income and land is available for new housing.	Housing to be built by the private sector and public non-profit housing organizations.
A1.2	Plan for large lot development in the Northwest and Southwest Sectors of the City	CP	November '91	Incorporation of Northwest Interim Plan into General Plan. Retain "R" Rural Land Use whenever feasible	Most of this R-E zoned land in the Southwest Sector is located in CP-7, Sec. 2,3 & 4.
A2.1	Help to initiate and maintain a Valley-wide housing data base	CP	1993	Annual publication of a Valley-wide housing data base	See A2.2, A2.3 & A2.4.
A2.2	Coordinate with Clark County, North Las Vegas and Henderson to allocate housing needs	CP	1994	Housing plan to allocate housing, based if possible, on lot size	City would initiate study. See A2.1, A2.3 & A2.4.
A2.3	Conduct a study to see if vacant residential land around major employment centers will provide for single and multi-family units in a variety of price ranges	CP	1993	Valley-wide study relating vacant land and housing needs to employment centers	See A2.2
A2.4	A study needs to be conducted on how land costs relate to housing affordability	CP ED	1994	Valleywide study on how land costs affect housing affordability	This study will need to be conducted by the private sector. See A2.2.
B1.1(1)	Designate land use categories on the Proposed Future Land Use Plan maps which permit affordable housing	CP ED	1993	Provide lot sizes sufficient to permit affordable housing	Zoning reclassifications will need to follow land use designations
B1.1(2)	Stabilize and/or reduce housing costs thru new zoning and subdivision regulations	CP	1993	Reduce housing costs thru innovative land development	See C5.1(2)
B1.2	Find out how to increase manufactured home subdivisions in the Valley	CP ED	1993	Report detailing what is keeping mobile home estates out of the Valley	
B1.3	Determine which areas of the valley suitable for affordable housing can be served by bus routes	CP ED	1993	Map of potential affordable housing areas which are or can be served by mass transit	This study should tie into A2.2

Policy (Program)	Program Summary	Responsible Departments	FY of Implementation	Specific Action/Product	Remarks
B1.4	Have Congress enact special legislation so that Valley entities can receive BLM land either as a grant or at low cost for affordable housing developments	ED CP	1994	Petition/resolution to the Congressional Delegation regarding BLM legislation	See A2.4
B2.1	Increase the amount of rehabilitated housing by expanding number of direct and deferred loans	ED	1993	Participation in the federally funded HOME program.	Current funding for existing housing programs not available after September 30, 1991.
B2.1(1)	Lobby for enlargement of the Las Vegas HUD field office	ED CM	Flexible	Resolution requesting increase in HUD office size	Provide opportunity for special HUD studies and demonstration projects.
B2.2	Increase housing stock of Las Vegas Housing Authority and public non-profit housing organizations	ED	1993	Program to support efforts of Las Vegas Housing Authority and public non-profit housing organizations to obtain funds under HOPE 1-2-3	Additional funds dependent on federal allocations See B2.1.
B2.3	Utilize consortium of local lending institutions which will provide owners portion of loan for rental rehabilitation and new construction projects	ED	1992	Institute and expand agreement with local lending institutions	See B2.1
C1.1	Indicate appropriate residential land use in conjunction with employment centers	CP ED	1993	Provide adequate number of residential land use categories in conjunction with employment centers on the Proposed Future Land Use Sector maps	Employment centers outside the City sector maps will need to be studied as part of a Valley-wide program See A2.3.
C2.1	Determine the proper program to improve residential and commercial neighborhoods	CP ED	1993	Select neighborhood, study land use, and apply appropriate program	This study will tie into neighborhood program.
C3.	Study Land Use Sector maps to determine residential availability needs in existing and future neighborhoods	CP	1993	Study will provide areas for specific neighborhood housing needs	The study will tie into neighborhood program.
C4.1	Provide design guidelines to achieve compatible separations between both residential and other uses	CP DD	1994	Set of design guidelines developed by an appropriate task force.	This study will tie into neighborhood program
C4.2	Provide appropriate transitions between existing residential neighborhoods and abutting business areas	CP ED	1994	Land Use and design plans to protect designated neighborhoods	This program will tie into neighborhood program
C4.2(1)	Implement the Owens Neighborhood Corridor Plan	ED	1993	Implementation of the Owens Neighborhood Corridor Plan	Boundaries of the "West Las Vegas" Neighborhood need to be defined

Policy (Program)	Program Summary	Responsible Departments	FY of Implementation	Specific Action/Product	Remarks
C5.1	Revise zoning ordinance to permit density bonuses in zoning classifications permitting affordable housing	CP ED	1993	Revised zoning ordinance with a section on density bonuses	
C5.1(1)	Review Future Land Use Sector. maps to determine availability of small sized lots conducive to affordable housing	CP	1993	Provide properly sized lots thru zoning regulations to permit affordable housing	See A2.2 B1.1(1)
C5.1(2)	Determine possibility of using Pedestrian Pocket and Traditional Neighborhood Design concepts in future neighborhoods	CP	1994	Pilot neighborhood design incorporating use of Pedestrian Pocket and/or Traditional Neighborhood concepts	See B1.1(2)
D1.1	Update and enforce building and related codes	BS	Flexible	Code revisions to incorporate new construction and conservation techniques	
D1.2	Continue to enforce zoning, health, safety and environmental codes	BS	Flexible	Provide neighborhood stabilization and improvement	
D1.3	Redefine the City's Housing Loan programs	ED	1993	Produce neighborhood stabilization	See B2.1
D1.4	Expand the repair of substandard housing thru the Residential Assistance Loan Program	ED	1993	Produce neighborhood revitalization through efforts of the City and public non-profit housing organizations	See C2.1
D1.5	Demolish or rehabilitate substandard housing to enhance neighborhood environment	BS ED	Flexible	Promote neighborhood environment thru redevelopment	See C2.1
D1.6	Provide planning at the neighborhood level	CP ED	1993	Produce neighborhood plans	See C4.2
D2.1	Encourage maintenance of private property by continuing Community Development Block Grant and HOME assistance	ED	1993	Produce neighborhood stabilization and improvement through efforts of the City and public non-profit housing organizations.	See C2.1
D2.2	Provide technical and administrative resources to expand neighborhood improvement advisory sources, where needed.	ED CP	1993	Program that increases use of advisory services to foster maintenance of and new construction on private property	This is a requirement of the HOME program

Endnotes

1. Center for Business and Economic Research; University of Nevada, Las Vegas, "Preliminary Housing Needs Assessment, State of Nevada," March 1990.

2. Ibid.

3. Ibid.

4. Memorandums and telephone interviews with, City of Las Vegas, Department of Building and Safety and the Traffic Engineering Division, April 1991.

5. Letter from Terry Murphy, Development Specialist, Southern Nevada Home Builders Association, 10 April 1991.

6. Ibid.

7. Michael Dunn, "They Aren't Trailers Anymore," Plant City Tribune, Plant City, Florida.

8. Memorandum from the City of Las Vegas Central Action Office, April 1991.

9. Ibid.

10. Interview with Thomas Gholson, Deputy Executive Director, Housing Authority of the City of Las Vegas, April 1991.

11. Interview with Gene Amberg, Supervisor, Developmental Programs Section, Department of Economic and Urban Development, City of Las Vegas, April 1991.

12. Letter from Mamie Chinn, Deputy Administrator, Nevada Department of Commerce, April 1991.

13. U. S. Department of Housing and Urban Development, *HUD information Bulletin*, March 1, 1991.

14. Amberg, op.cit.

15. Telephone interview with Mary Gunn, Housing Specialist for Poor People Pulling Together, April 1991.

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IX. URBAN DESIGN

9.1 Background

9.1.1 Urban Design Definition and Purpose

Urban Design refers broadly to the design of cities. It is involved with the physical and environmental quality of cities. Urban design is concerned primarily with the visual and other sensory relationships between people and their environment, both the built and the natural environment, and offers a discipline for analyzing and solving problems of the environment.

Urban design is a discipline which blends the skills of, primarily, comprehensive urban planning, architecture, landscape architecture and civil engineering. However, urban design is directly affected by the social, economic, ecological, political, legal and aesthetic forces that are influential in shaping the urban environment.

The purpose of urban design is to improve the quality of the physical environment by:

- understanding the interactions of the above disciplines and forces, and
- applying this knowledge to the urban planning process by setting guidelines and standards through which :
  - existing development is maintained and/or altered, and
  - future development is guided, to achieve an aesthetically pleasing and functionally successful environment.

Urban design is both
(1) process and
(2) product oriented.

The urban design **process** involves design coordination at scales greater than that of individual buildings. It embodies design coordination at the project scale, neighborhood scale, city-wide scale or metropolitan/regional area scale. Design at this scale is often complex and difficult because the client is multiple, the program is indeterminate, control is only partial, and there is no certain date of completion. The urban design process is influenced and determined by: public attitudes toward design; legislative mandates (guidelines and regulations) on design; and incentives and financial devices for achieving improved design.

Urban design **products** include:

- urban design guidelines and regulations, including elements of the zoning ordinance and subdivision regulations;
- specific urban design plans for, or urban design elements of:
  - area plans (such as the Downtown Las Vegas Development Plan)
  - neighborhood plans
  - historic and/or environmental preservation plans
  - corridor plans
  - parks plans
- urban design details, including:
  - building relationships and massing
  - transitional buffers
  - streetscape concepts involving landscaping, signage systems, and coordinated benches, planters, kiosks and newspaper racks

The quality of the entire urban fabric of Las Vegas is related in a large measure to its urban design policies and requirements, and urban quality is closely linked to the success of its economic development programs. Better urban design can be achieved by a better understanding and partnership between private investment and

government, and between the design profession and the decision-makers.

9.1.2 Quantifying Urban Design: The Visual Image of Las Vegas

The Overall Visual Image of Las Vegas

An important first step in the urban design process for Las Vegas is to identify the existing physical environment of the City, both positive and negative elements. A very effective process to depict the form of any city, as perceived by its residents and visitors, is one developed by urban designer and educator Kevin Lynch[1] which has been applied in urban design studies and plans for many cities. Lynch's approach depicts the form, or visual image, of a city by using five basic elements which comprise the structure of the city: paths, edges, districts, nodes and landmarks. Figure 1, The Image of Las Vegas, applies these elements to the City of Las Vegas and adjacent jurisdictions in the Las Vegas Valley. It gives an overall, generalized picture or image of the structure of the metropolitan area, and helps put in focus the following elements and subsequent urban design issues.

- **Paths** are routes along which the observer moves and observes the city. Examples are streets, roads, walkways, railroads or rivers. For many people, paths are the predominant element in a city's structure. The Oran K. Gragson and I-15 Freeways form major paths in Las Vegas, as will be the proposed Outer Beltway system when constructed. Many arterial roads in the Valley are minor paths.
- **Edges** are linear boundaries. They may be barriers which obstruct movement between two areas or districts, or they may be seams along which two areas are joined. Examples are walls, shore lines, riverbeds and edges of specific development types. Freeways, which are major paths, may also form major edges or barriers. Segments of Las Vegas freeways form major edges between adjoining land use districts. There is a distinctive edge at the periphery of existing Downtown development and the adjacent vacant Union Pacific yards. On the metropolitan scale, the eastern and western mountain ranges are formidable edges which define the Las Vegas Valley.
- **Districts** are distinctive areas of the city having some common identifying character such as architectural style, activity or use, condition of maintenance, inhabitants and/or topography. Districts may include downtown areas, neighborhood areas, and other distinctive residential, commercial, office or industrial areas. Well known Las Vegas districts include Downtown Las Vegas, the Las Vegas Strip, Green Valley, Spring Valley, the West Side, and a number of new planned residential communities in the west and southwest area. Downtown Las Vegas and the Las Vegas Strip are unique, as they are not only world renowned districts, but are major paths, traversed by thousands daily, and they contain a series of major activity nodes, as described below.
- **Nodes** are areas of concentrated activity to and from which people travel. Often they are located at the intersections of major paths, or where there is a break in transportation systems. Examples include airports, railroad stations, universities, regional shopping centers and major parks. In Las Vegas, McCarran International Airport, UNLV, Nellis Air Force Base, the three enclosed malls, and some concentrations of hotel/casinos function as major nodes.
- **Landmarks** are prominent and distinct reference points used for identification and, importantly, for orientation. They may be natural or man-made, and range from local to regional in scale. Examples include towers, tall buildings and mountains. Major landmarks in Las Vegas which form a Valley-wide point of reference include Lone Mountain in the northwest and Frenchmans' Mountain in the east. Tall buildings which stand alone, not lost in a group, form local landmarks. Such local landmarks include the First Interstate tower in the southeast and the Valley Bank tower in the northwest. Landmarks change with new development: a former major landmark along the Strip in earlier years, the Sands Hotel, is now dwarfed by the adjacent new Mirage Tower.

Elements Which Form the Existing Visual Image of Las Vegas

Las Vegas has an attractive natural setting formed by the surrounding mountains and foothills. These provide a pleasant distant vista and background, as well as landmarks for orientation, from all parts of the Valley. At this broad scale the visual image of Las Vegas is very positive. At a closer scale, however, the quality of the visual image varies throughout the City and Valley. Many older neighborhoods, as well as newer planned residential communities and commercial developments, exhibit an excellent quality of planning and urban design, while other areas and neighborhoods present a less positive image and are in need of improvement.

Las Vegas retains its reputation and image as the entertainment and gaming capital of the world. The urban design of Downtown Las Vegas and the Las Vegas Strip are important elements of that image. Fremont Street Downtown presents an exciting and well designed entertainment and gaming environment of signage - neon and supergraphics - and pleasant streetscape amenities.

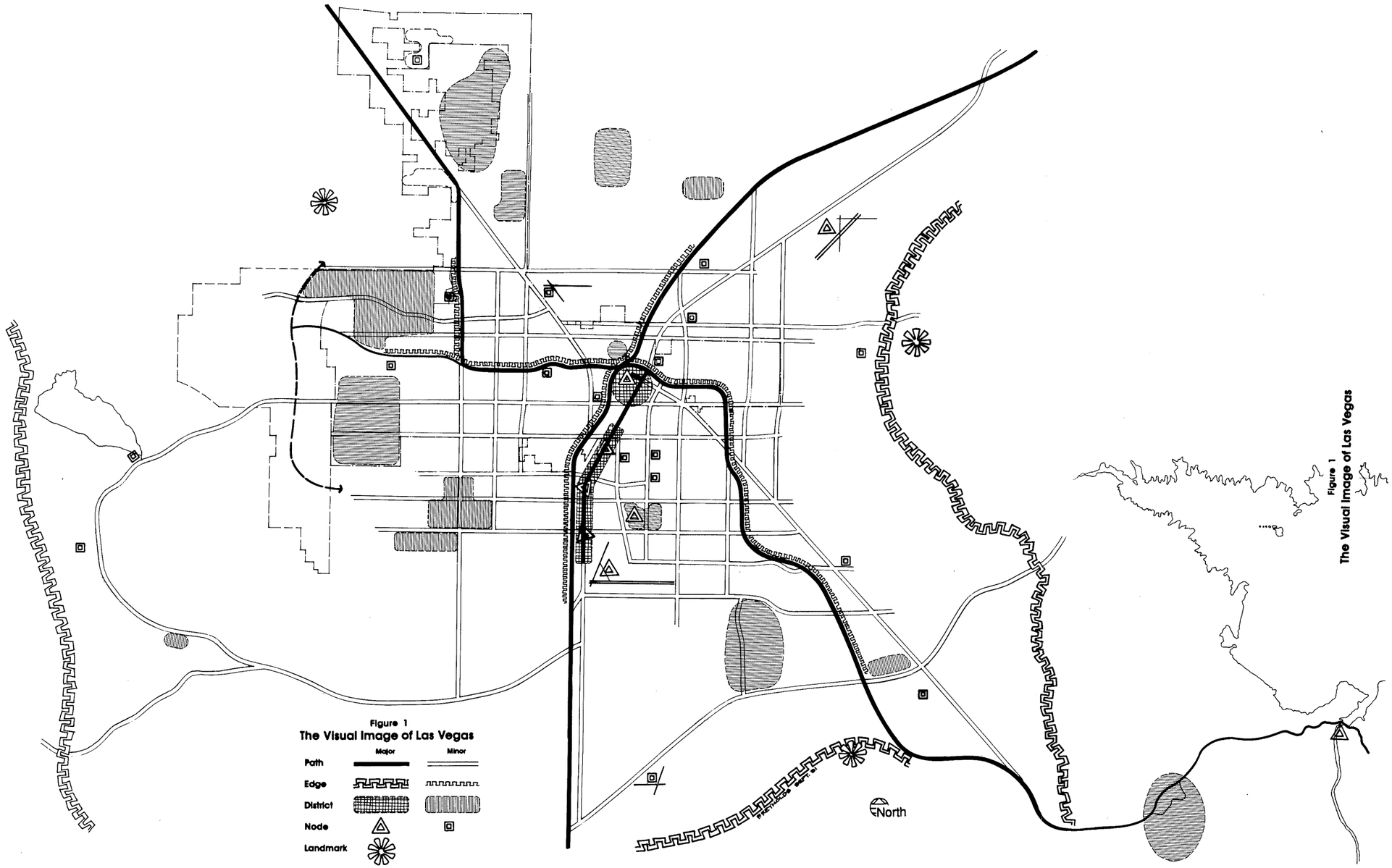


Figure 1
The Visual Image of Las Vegas

Away from Fremont Street and the Downtown core the image of some areas diminishes to one of lackluster shops and visual clutter. However, new Downtown development and redevelopment exhibits excellent examples of urban design, such as the City's Downtown Transportation Center, and new streetscape amenities for many hotel/casinos including the Fremont, the Golden Nugget, and the new Main Street Station festival marketplace, with superb streetscape amenities which connect it to the Downtown core.

The Downtown Development Plan[2] places strong emphasis on urban design which will apply to an expanded function of Downtown beyond that of the entertainment and gaming core, to include a regional commercial and office center with high density residential development, an expanded civic core, a family-oriented vacation destination, and cultural/park and leisure facilities. A draft set of Downtown Design Standards and a draft Las Vegas Boulevard Urban Design Plan were developed by the Downtown Design Program Committee comprised of members of several City departments. With the adoption of the Downtown Development Plan, these documents need to be reviewed, refined and updated, and adopted as implementation tools for the Plan.

Emphasis on urban design is also evident in the many new planned residential communities throughout the City, (and Valley), which include The Lakes at West Sahara, Peccole Ranch, Canyon Gate Country Club, Desert Shores, South Shores, Painted Desert, Los Prados and Sun City Summerlin, the first phase development of an ultimate 23,180 acre planned satellite new town, Summerlin. Summerlin is a unique and important prototype for the urban design process in the Valley as it was developed under a new Planned Community (PC) District of the City's Zoning Ordinance which requires the preparation of a Master Concept Plan[3] and sophisticated Development Standards with strong urban design requirements prior to approval of the PC zoning district designation.

There is a need to improve some negative examples of urban design and planning in other parts of the City. This includes some older commercial areas which are lacking in amenities including landscaping, and which have parking directly adjacent to sidewalks, inadequate building setbacks, and a variety of uncoordinated signs and other visual clutter. Older storm drainage systems are often weed-lined, open concrete ditches behind unmaintained chain-link fences, or are unfenced, debris filled open channels. The streetscapes of many major and secondary thoroughfares present a cluttered visual image of: excessive and uncoordinated signage; a disarray of poles, wires, banners; curb cuts for an excessive number of driveways in commercial segments; and a general lack of landscaping. The views from some segments of freeways present a negative vista and impression (sometimes the first impression of visitors arriving from McCarran International Airport) of cluttered back and side yards of commercial and industrial facilities.

9.2 Issues

Urban design is a factor, both City-wide and Valley-wide, which importantly affects all facets of urban growth and development. It is a major component which relates to both the quality of life for its residents and the success of its business community, including its continuing role as a center of entertainment and gaming, and its growing role as a retirement community and a family-oriented vacation destination. Urban design issues have a close relationship with, and affect on, all elements of the General Plan, but most importantly with the following: Land Use, Community Facilities, Infrastructure, Circulation, Housing, and Historic Preservation.

Issue 1: Urban Design Considerations in Land Use and Community Facilities

It is important that an overall urban design concept be developed for the City, in coordination with Land Use and Community Facilities Plans, to assist in improving the visual image and efficiency of the City, including pleasant and functional physical transitions between land uses of differing types and intensities, and in the design and site planning of all public and quasi-public buildings and facilities, and park, recreation and open space facilities.

New programs for creative planned development concepts and mixed use development concepts are dependent upon effective urban design for their success. The Development Intensity Level (DIL) land use classification process (see Land Use Element, Section 2.1.5) which is being implemented by the City requires strong urban design regulations and design review procedures to ensure the compatibility and physical quality of all future land development.

Issue 2: Urban Design Considerations in Infrastructure and Circulation Systems

Urban design considerations are important in both the broad locational decisions and detailed design elements of Valley-wide infrastructure and circulation systems including: utility

distribution systems and facilities; flood control detention basins and connecting channels; sewage treatment and solid waste collection facilities; and street and highway systems, mass transit facilities and systems, and pedestrian/equestrian/bike trail systems. The visual image of the "streetscape" and "roadscape" environments is perhaps the most important single factor in the perception of the quality of life for both the resident and the visitor to Las Vegas.

Issue 3: Urban Design Considerations in Housing

Urban design considerations are important in the development of attractive and efficient housing, ranging from individual housing developments to entire residential neighborhoods. This applies to the full spectrum of housing, from large lot, low density rural housing, to affordable housing development, to high density and/or mixed use urban development, to provide site development which is energy and water efficient, cost effective and visually attractive.

Issue 4: Urban Design Considerations in Historic and Environmental Preservation

Urban design considerations are basic to the successful preservation of historical and cultural buildings, structures, sites and districts, including site planning to successfully integrate new development with existing historic facilities. Similarly, urban design considerations are vital to the protection and preservation of natural environmental resources, including coordination with new development proposals.

9.3 Goal, Objectives, Policies and Programs

Goal: Provide a visually attractive, functionally successful and environmentally sensitive community for residents, while maintaining the original and distinctive visitor environment.

Objective A: Include urban design considerations in Land Use and Community Facilities planning.

Policy A1: Provide urban design guidelines, regulations, plans and incentives to assist in developing attractive and efficient residential neighborhoods, commercial, office and/or light/research industrial districts, and community facilities, including public safety facilities and park, leisure and cultural facilities

Program A1.1: Review, and amend as appropriate, the City's Zoning Ordinance, Subdivision Regulations, and other applicable ordinances and regulations, to ensure they provide appropriate urban design considerations, including attractive and effective physical buffers and transitions between differing land use districts and pleasant streetscape environments along City streets and highways.

Program A1.2: Review and expand the City's adopted Landscape and Wall Buffer System Guidelines to incorporate broader aspects of urban design.

Program A1.3: Establish developer incentives for providing community amenities in connection with proposed development projects. These may include bonus incentives such as increased density, floor area ratios and/or site coverage in return for provision of streetscape amenities, centralized open space, art/sculpture in public places, public art galleries or museums, and other amenities for public use and benefit.

Program A1.4: Develop urban design guidelines, regulations and design review procedures to implement the City's Development Intensity Level (DIL) land use classification system.

Program A1.5: In the implementation of the City's Downtown Development Plan, incorporate:

- an overall urban design concept to include entertainment/gaming, high density residential, general and service commercial and office land uses, as well as a civic/cultural/recreational/leisure core;
- a program to refine and adopt the draft Downtown Design Standards developed by the Downtown Design Program Committee;
- a program to refine and adopt the Las Vegas Boulevard Urban Design Plan developed by the Downtown Design Program Committee; and
- a program to establish a Downtown Design Review Committee.

Program A1.6: In the preparation of future neighborhood scale land use plans, corridor plans and community facilities plans include an urban design element and plan, to be prepared with the input of appointed area residents to identify local issues and concerns.

Objective B: Include urban design considerations in Infrastructure and Circulation planning.

Policy B1: Provide urban design mechanisms and techniques for the planning and implementation of all City infrastructure systems.

Program B1.1: Develop urban design guidelines, regulations and plans to assist in developing attractive and efficient utility distribution systems, flood control channels and detention basins, and solid waste collection sites. This will include a study to investigate the feasibility, including funding, of retrofitting existing above-ground electric and telephone distribution systems to underground systems.

Policy B2: Provide urban design mechanisms and techniques for the planning and implementation of all City circulation systems.

Program B2.1: Develop urban design guidelines, regulations and/or plans to assist in developing attractive and efficient City street and highway systems, pedestrian/equestrian/bicycle trail systems, and transit and parking facilities. This will include development of a streetscape/roadscape plan to:

- identify key arterials along tourist oriented routes, for improvement of the visual image, including signage, poles and other visual clutter (see Program A1.4 [Las Vegas Boulevard] above).
- Identify key entry points or "gateways" into the City along tourist oriented routes for improving the City identity and image.

Objective C: Include urban design considerations in Housing planning.

Policy C1: Provide urban design mechanisms and techniques for the planning and implementation of the City's housing programs.

Program C1.1: Develop urban design elements with resident input for all City housing programs.

Objective D: Include urban design considerations in Historic and Environmental Preservation planning.

Policy D1: Provide urban design mechanisms and techniques for the planning and implementation of the City's Historic Preservation Plans.

Program D1.1: Develop urban design guidelines, regulations and/or plans for specific districts or sites, as specified by the Historic Preservation Commission.

Policy D2: Encourage urban design which is sensitive to, and appropriate for, the desert environment.

Program D2.1: Develop landscape programs which provide attractive plant materials which are also desert tolerant and low water users.

9.4 Evaluation and Implementation Matrix

The following Urban Design Evaluation and Implementation Matrix (EIM - see next page), was prepared as a measurable summary of the above Urban Design Policies and Programs. The EIM is to be used:

- as a method of measuring the implementation progress of the General Plan
- as a budgeting document for specific Urban Design Programs
- as a tool for further developing work programs

The following abbreviations apply to the Urban Design Evaluation and Implementation Matrix:

City

BS Building & Safety
CM City Manager
CP Community Planning and Development Department
DD Design and Development Department
ED Economic and Urban Development
FN Finance Department
PL Parks and Leisure Department
PW Public Works Department

Other Agencies/Jurisdictions

HPC Historic Preservation Commission

9.4 URBAN DESIGN ELEMENT: EVALUATION AND IMPLEMENTATION MATRIX

POLICY (PROGRAM)	PROGRAM SUMMARY	RESPONSIBLE DEPARTMENT*	FY OF IMPLE-MENTATION	SPECIFIC ACTION/PRODUCT
A1 (A1.1)	Review the City's Zoning, Subdivision and other applicable regulations for urban design considerations	CP, PW	1991/92	Report
A1 (A1.2)	Review and expand adopted Landscape and Wall Buffer System Guidelines to incorporate broader urban design considerations	CP	1991	Revised document
A1 (A1.3)	Establish developer incentives for providing community amenities in proposed development projects	CP, DD, ED, PL, PW	1991/Ongoing	Report, guidelines, and revisions to applicable regulations (Zoning Ord., Subdiv. Regs, RFP's etc.)
A1 (A1.4)	Develop urban design guidelines, regulations and review procedures to implement the Development Intensity Level (DIL) system	CP, BS, PW	1991/Ongoing	Guidelines, regulations and procedures
A1 (A1.5)	Include in Downtown Dev. Plan implementation: • overall urban design concept • refinements to Downtown Design Standards • refinements to L.V. Blvd Urban Design Plan • Downtown Design Review Committee	CM**, BS, CP, DD, ED, PL, PW	1991/92/93	Concept plan, revised plans and regulations, design review board
A1 (A1.6)	Include urban design element with resident input in neighborhood plans, corridor plans and community facility plans	CP, BS, DD, PL, PW	1991/Ongoing	Urban design element with resident input
B1 (B1.1)	Develop urban design guidelines, regulations and plans for utility distribution and flood control systems and solid waste collection sites	CP, BS, DD, PW, Nev. Pwr., Centel, LVFCC	1991/ongoing	Urban design guidelines, regulations and plans, including initial study of retrofitting utility distribution lines underground
B2 (B2.1)	Develop urban design guidelines, regulations and plans for street, highway and trail systems, and transit and parking facilities	CP, BS, DD, PW	1991/ongoing	Urban design guidelines, regulations and plans, including streetscape/roadscape and gateway plans
C1 (C1.1)	Develop urban design elements for all City housing programs	CP, BS, ED	1991/ongoing	Urban design element with resident input
D1 (D1.1)	Develop urban design guidelines, regulations and plans for historic districts and sites specified by the Historic Preser. Commission	CP, HPC	1991/ongoing	Urban design guidelines, regulations and plans
D2 (D2.1)	Develop landscape programs which provide attractive but low water usage plant material	CP, DD, PL	1991/ongoing	Revised landscape guidelines and regulations

* First entry denotes lead department

** Reestablish Downtown Design Review Committee under Assistant City Manager

Endnotes

[1] Lynch, Kevin. The Image of the City. Cambridge: The MIT Press, 1985.
[2] See Land Use Element, Section 2.5.1
[3] Ibid

X. Environmental Quality & Natural Resource Conservation

Introduction

Nevada Revised Statutes 278.150, 3. requires that any jurisdiction with a population of 100,000 or greater, which adopts only a portion of a master plan shall include in that portion a conservation plan. The conservation plan herein is titled the "Environmental and Natural Resource Conservation Element".

According to NRS 278.160 1.(b), the subject matter of this element shall consist of a plan for "...the conservation, development and utilization of natural resources, ... the reclamation of land and waters, flood control... regulation of the use of land in stream channels...prevention and correction of erosion..." The plan must also indicate the maximum tolerable air pollution level.

Characteristics of the Las Vegas Valley Natural Environment

The Las Vegas Valley environment has been developed rapidly since the 1985 General Plan was adopted by the City Council. Since that time, development has consumed land and water, created more air pollution and generated funding and construction challenges for flood control. The environment of the valley has been altered by development. This portion of the General Plan Update will inventory the changes and issues associated with growth. The result of this analysis will be the recommended direction for the City to take in order to manage its scarce natural resources.

The Las Vegas Valley has an arid climate characterized by little precipitation, low humidity, abundant sunshine, and wide extremes in daily temperatures. The following is a summary of local climatic conditions provided to the Soil Conservation Service by the National Climatic Center, Asheville, North Carolina:

> In winter, the average temperature in Las Vegas is 47 degrees Fahrenheit (F) and the average daily minimum temperature is 35 degrees F.

Of the total annual precipitation falling on the Las Vegas Valley, 2 inches, or 50 percent, usually falls in April through September. In two years out of ten, the rainfall in April through September is less than 7 inches.

Snowfall is rare. In seventy five percent of the winters, there is no measurable snowfall. In fifteen percent, the snowfall, usually of short duration, is more than two inches.

The average relative humidity in mid-afternoon is about twenty percent. Humidity is higher at night and the average at dawn is about forty percent. The prevailing wind is from the southwest, averaging eleven miles per hour in the spring.

10A. Water Quality

10A.1 Background

10A.1.1 Groundwater Supply

The Las Vegas Valley lies within the Colorado River Basin hydrographic region. Within this region there are several significant watersheds, one of which is the Las Vegas Valley watershed that encompasses all of the Las Vegas Valley urbanized area, the cities of Las Vegas, North Las Vegas, Henderson, and portions of unincorporated Clark County. Within this watershed, the ground water basin is generally defined by the topography of the valley (Map 1).

Water entering the groundwater basin comes primarily from precipitation falling on the Spring Mountains on the west and the Sheep Range on the northeast of the Las Vegas Valley. Precipitation in excess of 25 inches per year falls in these mountain areas resulting in as much as 25,000-35,000 acre-feet per year of recharge to the groundwater aquifers of the Valley basin.[1] An acre-foot covers one acre of ground one foot deep, equaling 325,851 gallons.

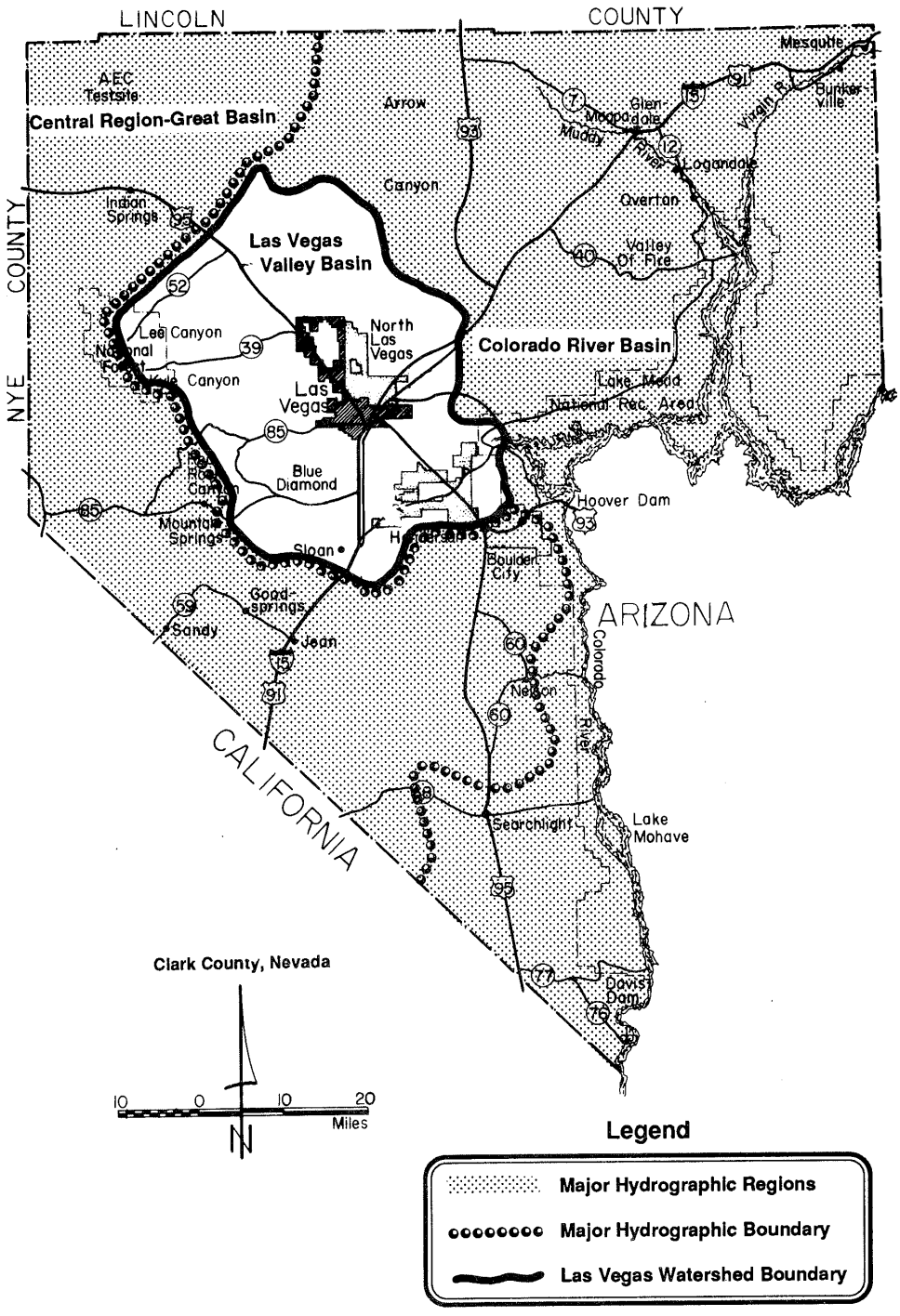
The aquifer system consists of two major subdivisions: the "Near-surface Reservoir" and the "Principal Aquifers".[2] The Near-surface Reservoir (generally 50-100 ft. depth, but sometimes is also found to depths of 300 ft.) is the first water encountered upon drilling. Under natural conditions, the water in this reservoir occurs primarily from upward leakage from lower aquifers. This situation has changed due to urbanization and heavy pumping of the Shallow and Middle Zones of the Principal Aquifers (see description below). Infiltration of stormwater run-off, industrial effluents, and urban irrigation waters have now become the main source of its recharge. This reversal of historic aquifer recharge characteristics presents a potential problem to groundwater quality of the Near-surface Reservoir.

In some areas the depth of the Near-surface Reservoir has increased due to pumping from the Principal Aquifer resulting in the lowering of the water table to such a degree that spring flow has ceased and some shallow wells (principally domestic) have failed to yield water. In other areas the water table has risen due to increased infiltration of "used" water[3] resulting in such problems as infiltration of sewer lines and increased cost of construction due to the raised water table.[4] (Map 2)

The Principal Aquifers underlie the Near-surface Reservoir. In the central part of the Valley, the Principal Aquifers can be subdivided into three zones: the Shallow Zone, the Middle Zone

Map 1

Las Vegas Valley Watershed Boundary



Source: Maxey and Jameson, 1948 and the Comprehensive Plan of Clark County, Nevada November, 1982

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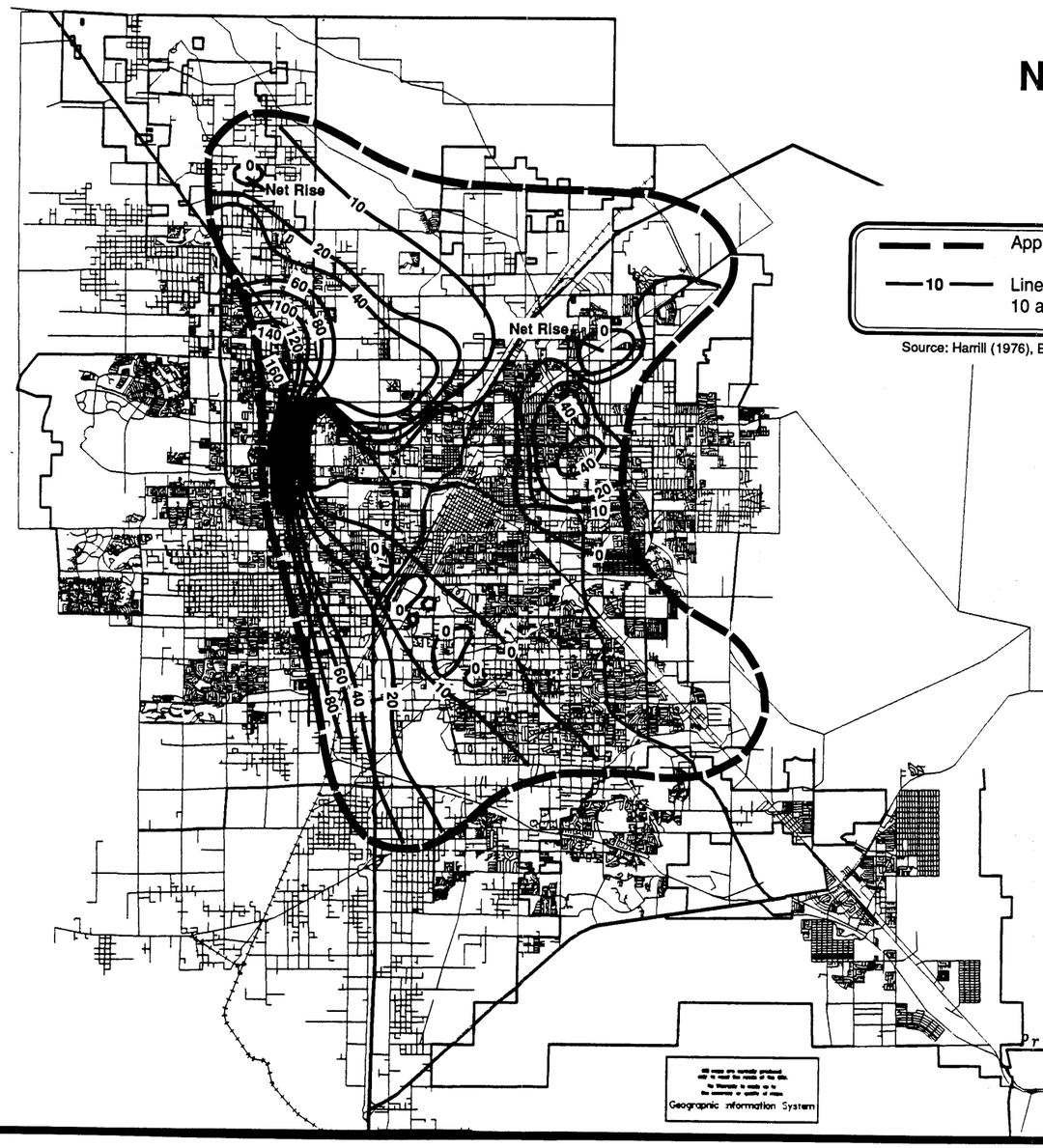
Map 2

Changes in Near Surface Reservoir Water Levels



Legend

Approximate boundary near-surface reservoir

10 — Line of equal net water level decline. Interval 10 and 20 feet.

Source: Harrill (1976), Bell (1981), Nevada Bureau of Mines and Geology

Scale: 1" - 10521'

June 17, 1991

CITY OF LAS VEGAS NEVADA

Produced by: City of Las Vegas, Nevada

Geographic Information System

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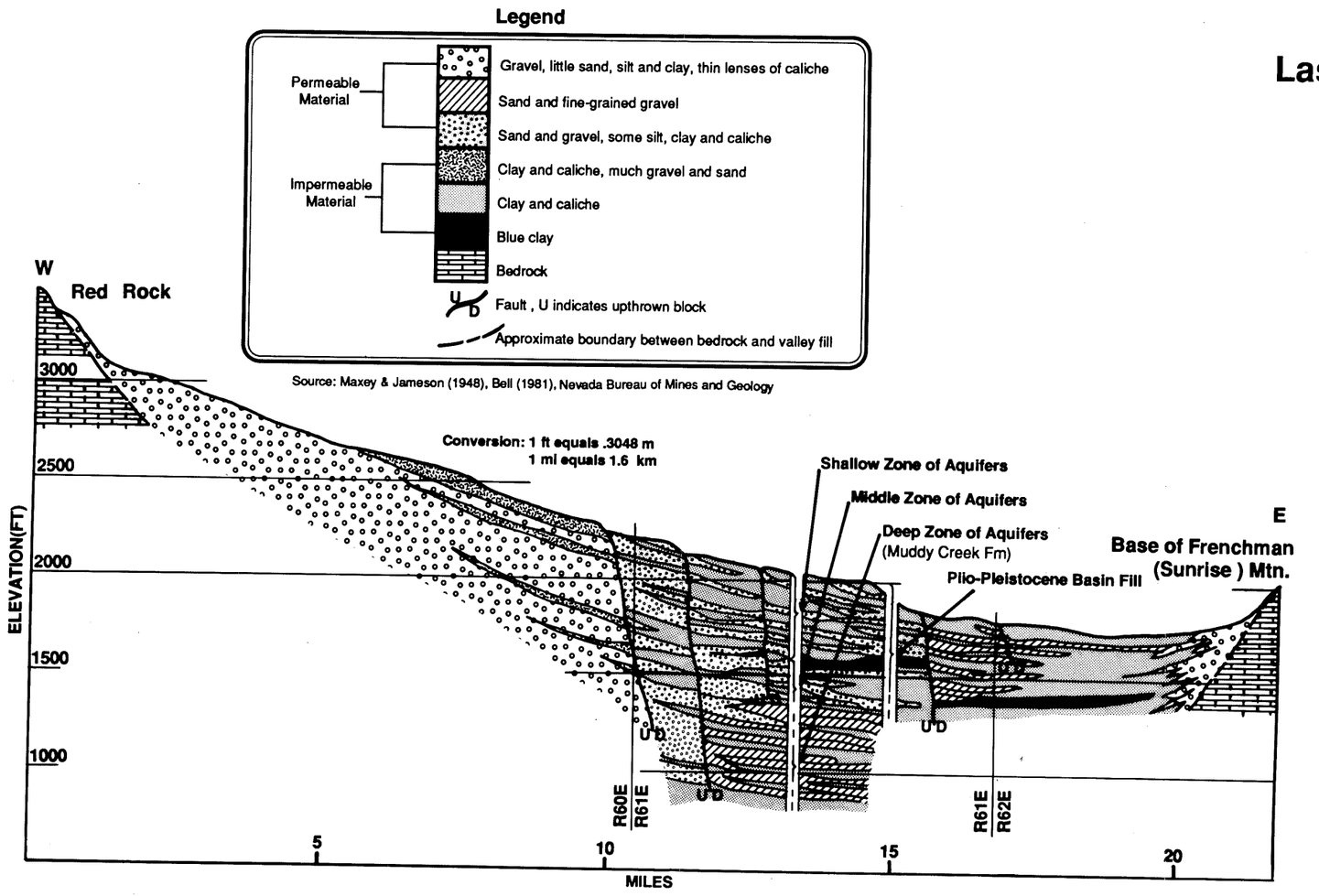
Map 3

Generalized Geologic Cross-Section of the Las Vegas Valley



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and the Deep Zone (Map 3). The Shallow Zone, generally 200-450 ft., is composed of permeable sand and gravel layers. Prior to 1940 this zone was the principal groundwater source. The Middle Zone, 450-700 ft., contains numerous, random, permeable sand and gravel layers. This zone coupled with the Shallow Zone are presently the main source of pumped water. Below 700 ft. the sediments do not readily yield water, however, a few wells have tapped gravelly areas containing water. This zone is referred to as the Deep Zone.

Since major pumping activities began in the valley, the annual discharge from the Principal Aquifers has consistently exceeded annual recharge (Table 1). When groundwater discharge exceeds recharge, there is a loss in the volume of stored water in the aquifer; that is, a certain volume of water is removed from the aquifer that is not replaced.[5] This can result in the compaction of sediments and land subsidence.

10A.1.2 Surface Water Supply

In 1942 a pipeline was constructed from Lake Mead to serve the Basic Management, Inc. (BMI) complex in Henderson. In 1955, the Las Vegas Valley Water District (LVVWD) began using some of the BMI water and continued to do so until 1971, when the Southern Nevada Water Project brought Lake Mead water directly to the main part of the valley.[6] The LVVWD supplies water to unincorporated urban areas of Clark County, the City of Las Vegas, and the unincorporated areas of Jean, Searchlight, and Mt. Charleston. The cities of North Las Vegas, Henderson, and Boulder City, as well as Nellis Air Force Base, all maintain their own separate water distribution systems. Currently, 80% of the water used annually in Southern Nevada comes from the Colorado River (Lake Mead) with the remaining 20% coming from groundwater supply.[7]

Colorado River water is shared between the seven basin states; California, Arizona, Nevada, Utah, New Mexico, Colorado and Wyoming. Drought

Table 1

Las Vegas Valley Groundwater Pumpage

Year	Pumpage Acre Ft./Year	Year	Pumpage Acre Ft./Year
1955	40,000	1969	87,000
1956	43,000	1970	86,000
1957	44,000	1971	85,000
1958	43,000	1972	70,000
1959	46,000	1973	70,000
1960	48,000	1974	78,000
1961	52,000	1975	73,000
1962	54,000	1976	70,000
1963	59,000	1977	69,000
1964	69,000	1978	69,000
1965	73,000	1979	72,000
1966	78,000	1980	70,000
1967	81,000	1989	67,000
1968	88,000	1990	60,000

Source: Katzer, 1977: State Engineer's Records

GP.EQ Table 1 LVV Grndwater;JS;pm/7-24-91

conditions in California coupled with population growth and corresponding increased demand for water in numerous Southwestern cities has put a strain on water resources including Colorado River water. Many urban areas are looking for ways to mitigate water shortages. The Las Vegas Valley has not experienced a water shortage as yet, but in anticipation of limited water resources in the future, local water purveyors are pursuing methods to avoid a water shortage.

As a possible method to avoid water shortage in the Las Vegas Valley, the LVVWD and other Southern Nevada water purveyors have applied to the federal government for the remaining allocation of river water to the State of Nevada. The State is currently appropriated 210,000 acre-feet annually, from a total federal allocation of 300,000 acre-feet. In October, 1989, LVVWD filed applications for unappropriated ground and surface water estimated to be less than 300,000 acre-feet annually from Clark, Lincoln, Nye, and White Pine Counties. If the applications are approved by the State Engineer, experts estimate that it will take up to thirty years to complete a delivery system for the importation of water at a potential cost of approximately two billion dollars. Controversy surrounds the importation solution. Representatives of the National Park and Wildlife Service claim that fragile wildlife and plant species in the national parks are likely to suffer, among these are the Moapa dace and the Death Valley National Monument's pupfish. Residents of the northern counties fear that the project will threaten agriculture and limit the growth and expansion capabilities of the Northern Counties in the future. To allay these fears, local water purveyors point out that Nevada has strong groundwater laws to prevent damages to wildlife and existing water users and that the rural counties may benefit by sharing the developed groundwater.

10A.1.3 Alternative Water Supplies

The Water District is in the process of artificially recharging the water table by injecting treated Colorado River water into the groundwater system during times of low demand. The water is then pumped out during peak times to meet high demands or it is left in the ground for future use. In 1989, the amount of water injected was 3,676 acre-feet. The goal is to inject up to 40,000 acre-feet annually.[8]

Another source of water is wastewater effluent. Wastewater effluent is important for return flow credits to the Colorado River (Lake Mead). Diversion of Colorado River water can exceed the current allocation as long as the diversion minus the return flow does not exceed 300,000 acre feet per year. However, the amended Clark County 208 Water Management Plan recommended the increased reuse of treated wastewater effluent. It also recommended the construction of satellite wastewater treatment plants to provide water reuse opportunities in urban areas, such as the northern and western portions of the valley. The 208 Plan points out that even though effluent reuse would result in a reduction of total return flow credit, it would not decrease the Las Vegas Valley's total available water supply because the reuse water would be used in place of potable water supplies. However, the plan is careful to point out that if a new significant non-replacement reuse demand were created in the Las Vegas Valley and the reuse water was totally consumed, the Las Vegas Valley's total available water supply would decrease by more than the amount of the reuse water provided.[9]

10A.1.4 Conservation

Reduction of consumptive use through conservation seems to be the most viable immediate solution. The Water District has initiated a public awareness program to educate the general public, businesses, and municipal governments on ways to reduce water usage. The goal of the program is to reduce consumptive water use 20-25% by 1994. Per capita usage in the Las Vegas Valley is currently higher than most western cities (Table 2). Conservation measures, coupled with effective water management, could allow the present water supply to last until about the year 2006.[10]

Table 2

Water Use Calculation

Area	AR*	PC*
LAS VEGAS	199	370
TUSCON	150	190
PHOENIX	180	258
LOS ANGELES	110	181
SANTA BARBARA	105	140
RENO	193	300

*AR Average residential use in gallons per day
**PC Per capita use of all water divided by all people, including tourists

Area	RAIN*	TOUR**
LAS VEGAS	4	24.8
TUSCON	11	2.8
PHOENIX	7	4.3
LOS ANGELES	12	N/A
SANTA BARBARA	12	N/A
RENO	8	28.9

* Annual Rainfall
**Ratio of annual tourist volume to permanent population

Source: Las Vegas Sun 12/90, Neal C. Lauron/Staff

GP.EQ Table 2/3 Water use;JS;pm/7-24-91

Methods of conserving water vary from region to region. Coastal areas in California that have been subject to severe drought in the last five years have adopted very stringent regulations and heavy fines, as in the case of fugitive (runoff) water. In addition, rate structuring is such that over a certain usage the rate is much higher for residential and commercial users. Recently, a number of California counties enacted mandatory rationing. For example, in Marin County, 50 gallons per person per day is the limit for residential use. Presently, the residential use of water in the Las Vegas area averages 199 gallons per person per day. The North Marin Water District enacted an incentive program of lower hook-up fees for voluntary turf use limits. The incentives have resulted in a 40% reduction of turf area normally seen in new construction. Many entities have amended ordinances and building codes to require water conserving fixtures in new construction. In areas experiencing severe water resource constraints, law makers are considering regulations that would require new developments to create their own water supply (referred to as "offsets"). This would be accomplished by retrofitting older construction with water saving fixtures or landscaping in an amount that saves as much water as the new construction would use.

The LVVWD's public awareness program has disseminated information to the general public on ways to conserve water. These include retrofitting high water using fixtures in the home and business. The LVVWD suggests retrofitting with low-flow shower heads, low flush toilets, flow restrictors, or cutoff valves (allows user to shut off water at shower head for "ship board" showers). These methods can cut water use by as much as 4.5 gallons per minute. In addition, the Water District suggests the use of water efficient landscaping. As much as 64% of the water provided by the water district goes to residential water users (Table 3). Of this amount, 40 to 60% is used on landscaping outside the home. The Desert Demonstration Gardens was created by the Water District to demonstrate the use of water-efficient landscaping.

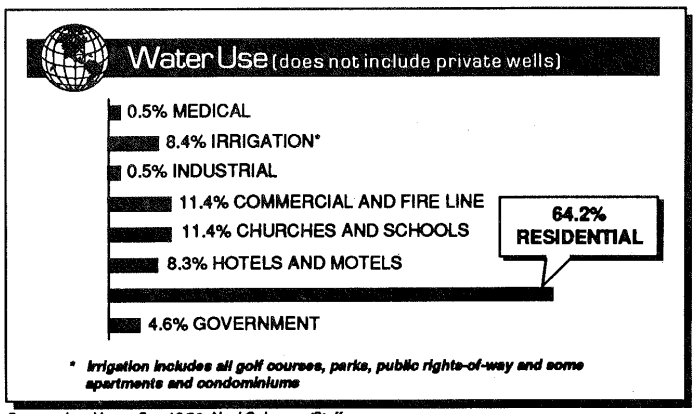
The LVVWD has restructured rates to encourage water conservation. Large individual water users, such as golf courses and hotels constituting approximately 15% of the water provided by the District, are subject to a higher rate. However, residential use, at 64% of the water provided, is not significantly affected by the rate change unless the customer's use is in excess of the average for their service size. In some cases, individual residential bills have decreased because monthly service charges were reduced as a part of the rate restructuring. This action has been criticized by some because of the high percentage of water provided to residential use. Critics state that there is little pricing incentive to conserve unless you exceed the ample allotment for your service size.

In addition to the public awareness program, a cooperative water conservation action plan was put forth by the LVVWD, Clark County, the Clark County Sanitation District, and the cities of Las Vegas, North Las Vegas, Henderson, and Boulder City in an effort to encourage conservation practices. The *Clark County Water Resource Strategy Conservation Action Plan* makes a number of recommendations, such as requirements for water saving devices in new residential construction, replacement of fixtures in existing residences for private use, and in commercial and industrial facilities for public use. The plan recommends that all jurisdictions in the Valley adopt guidelines containing specific recommendations for water efficient landscape designs. There are several other recommendations including the restriction of artificial lakes and the suggestion that regulations pertaining to fugitive run-off be enacted and enforced.

As a result of the *Clark County Water Resource Strategy Conservation Action Plan* , Clark County and the City of Las Vegas have implemented the following ordinance actions:

1. Prohibition of man-made lakes.
2. Wastewater reduction.
3. Limitation on man made water features.
4. Building water conservation measures.
5. Lawn watering hours.

Table 3



Source: Las Vegas Sun 12/90, Neal C. Lauron/Staff

GP.EQ Table 2/3 Water use;JS:pm/7-24-91

In addition, the County has adopted turf limitations. The County has also amended its 208 Water Quality Management Plan. The amendment calls for the reuse of reclaimed wastewater and construction of satellite wastewater treatment plants to provide water reuse in outlying urban areas.

The City has adopted Landscape and Buffer Guidelines which include water conservation measures based on xeriscape principles. Such principles include soil type, lot slope, limited turf areas, drought-tolerant plants and soil management measures to improve its capacity to retain water. The guidelines also stress water conservation techniques at three levels: Planning and design, construction and installation and operation and maintenance.

The State of Nevada passed Assembly Bill 360, which goes into effect on October 1, 1991. It requires water suppliers to adopt conservation plans, including low flow shower heads and toilets with a restricted flow. The water suppliers, which include public and private utilities, local governments and water districts, must have their plans approved by July 1, 1992.

10A.1.5 Water Quality

Las Vegas water exceeds national drinking water standards for total dissolved solids. This condition is generally not harmful to humans. In the case of "hardness", a term used to describe calcium, magnesium, iron, and manganese in the water, there may be some inconveniences to household plumbing and irrigation systems, a bathtub ring, or soap without suds. One of the more important issues where salt concentration is concerned is the fact that by treaty with Mexico, the United States is obligated to deliver 1.5 million acre feet of water suitable for irrigation down the Colorado River.[11] High salt concentration is not desirable in irrigation water and would have to be removed before use.

Stormwater run-off and wastewater effluent enters Lake Mead from the Las Vegas Valley via the Las Vegas Wash. This water enters Lake Mead with high salt concentrations partly due to highly saline Near-surface Reservoir groundwater emerging into the wash and from water flow percolating through adjacent salty soils. Under the Federal Clean Water Act, the Clark County Commission was designated the 208 planning agency responsible for coordination of water quality management strategies in the Las Vegas Valley. At the time the *208 Water Quality Management Plan* was adopted and subsequently revised in December of 1979, it was estimated that the Las Vegas Wash was adding approximately 150,000 tons of dissolved solids to the Colorado system annually. The Bureau of Reclamation had developed plans for the construction of desalinization facilities to reduce the discharge of saline waters to the Las Vegas Wash. Termed the "Las Vegas Wash Salinity Control Project", it was originally proposed that facilities be constructed to collect water flows in the wash and transport them to evaporative ponds. The second stage of the project called for construction of a reverse osmosis desalinization plant.[12]

The Bureau's project was never implemented. However, the Bureau did construct dikes in the Las Vegas Wash in an attempt to impede salt transport into Lake Mead. The project was declared a failure and abandoned in 1988. Presently the salinity of the Wash is being reinvestigated as a part of the *Clark County Las Vegas Wash Integrated and Comprehensive Management Program* .[13] The primary goal of this program is to control ongoing erosion of the Wash caused by the interactive influences of flooding, wastewater discharges, stream bed channelization, soil instability, and the resulting loss of wetlands.

The Environmental Protection Agency (EPA) is pressuring local governments to protect their wetland areas. In 1988, EPA proposed regulations that required cities with populations of 100,000 or more to apply for National Pollution Discharge Elimination System (NPDES) permits for controlling stormwater discharges to water ways, such as; rivers, streams, lakes, etc. An EPA study indicated that 38 states reported urban runoff as a major cause of water quality impairment in the United States. Stormwater runoff can pick up such contaminants as pesticides and fertilizers from lawns; oil, grease, and fuel from gas stations; and other contaminants from construction sites, restaurants, dry cleaners, lumberyards, landfills, junk yards, and industrial sites.[14] These contaminants find their way directly into bodies of water without going through sanitary treatment first (Refer ***to page 13*** for additional information on stormwater management as well as objectives, policies, and programs addressing this issue). Chemical contamination is one of the major causes of wetland loss and degradation in the United States. Protection and restoration of the Las Vegas Wash wetland area will in part depend on the success of regional stormwater management and discharge regulation. The City has received its NPDES permit and is implementing its measures through the Flood Control Division of the Public Works Department.

This General Plan springs from several requirements. Among them are the requirement for timely data, to keep up with changing issues and their focus and to develop strategic planning for resources. This last requirement was addressed in the 1990 "Las Vegas 2000 and Beyond Strategic Plan", which is described in the Plan Introduction section. The '2000' document contained "Actions" specified to be accomplished ("the process is not over... We must put these plans into action"). The actions supported by this portion of the element are:

- Increase the use of homeowner, business and golf course water management.
- Develop public information and incentive programs to encourage conservation through xeriscape and funding mechanism for water conservation programs.
- Review engineering codes to reduce runoff from yard irrigation.
- Develop program for artificial recharge for unused surface water allocation.
- Develop a long range water plan and a comprehensive water management program for Southern Nevada.
- Explore opportunities for gray water projects.

10A.2 Issue

The City of Las Vegas sits in a very large desert. Water is its most precious resource. In the past, water in the valley has been used largely without regard for a possible water shortage. Due to the rapid population growth in this region, it is necessary to efficiently use and conserve water and its quality.

10A.3 Goal, Objectives, Policies, and Programs

The following hierarchy of the overall Goal, and supporting Objectives, Policies and Programs, reflect applicable "actions" of the "Las Vegas 2000 and Beyond" citizen's strategic planning program, and subsequent review by the General Plan Citizens Advisory Committee of the 1985 General Plan Goals, Objectives, Policies and Programs, revised to address current conditions and issues.

Goal: To participate in the protection of the environmental quality of the Las Vegas valley and to promote the conservation of our natural resources.

Objective A: Provide acceptable water quality and the conservation of water as a limited resource.

Policy A.1: Improve and expand the City's wastewater treatment capability while maintaining water quality standards.

Policy A.2: Continue City coordination and cooperation with the Las Vegas Valley Water District with the benefits and savings of water conservation.

Program 1: Encourage the Water District to adopt incentive programs such as lower hook-up fee charges to new development for voluntary turf use limits and incorporation of water efficient landscape design.

Policy A.3: Participate in water conservation efforts by initiating or intensifying city administrative programs that demonstrate this commitment.

Program 1: Retrofit, as practical, using self-closing faucets and low water use plumbing in City Hall, fire stations, and park and recreation facility buildings.

Program 2: Incorporate water reduction concerns in the Department of Fire Services hydrant testing schedule.

Program 3: Have city garage and fire station personnel be cognizant of water reduction in their vehicle cleaning schedules.

Program 4: Have the Department of Parks and Leisure Activities incorporate, when practical, water reduction measures in their swimming pool facilities, which include, but are not limited to: Retrofitting, automatic shutoff and pool covers.

Program 5: Have landscape designs for city facilities incorporate water efficient plant materials and drip irrigation systems for all plants; turf areas are to be designed to retain water.

Program 6: Provide an on-call irrigation maintenance person to shut down systems when lines break, automatic systems malfunction or when it rains.

Program 7: Establish irrigation schedules that are cognizant of daily and yearly temperatures and other weather conditions.

Policy A.4: Amend or establish sections in city codes and ordinances to require the use of water conservation measures.

Program 1: Amend the City's Zoning Ordinance to include requirements for the use of water efficient plants, efficient irrigation systems, turf reduction and other xeriscape concepts in landscaping of new development and modification to existing development.

Program 2: Amend grading plan requirements to provide for water detention-retention in landscaped areas.

Program 3: Continue to enforce the code provision that makes it a civil infraction to allow the escape of water from any private property onto public property.

Program 4: Require multi-family and commercial uses to have a separate water meter for outside irrigation.

Program 5: Explore possible opportunities for effluent reuse projects.

Program 6: Amend the City's Uniform Plumbing code to be consistent with Nevada Revised Statutes.

Program 7: Establish regulations that would require developers to create their own water supply (referred to as "offsets") by installing water saving fixtures in existing construction equal to the amount proposed to be developed. Policy exceptions may be made in order to achieve an agreed upon public purpose.

Policy A.5: Support and/or initiate revisions to state statutes to require coordination of water conservation measures.

Program 1: Support state legislation to have all retention basins equipped so as to facilitate storm water induction into the uppermost groundwater aquifer.

Program 2: Support state legislation requiring a higher rate structure for excessive water use by residential, commercial, industrial and governmental consumers. Set standard water use figures consistent with those established in other southwestern coastal and inland cities presently enacting water conservation programs.

Program 3: Encourage programs to protect the Principal Aquifers of the Las Vegas Valley from net loss through programs such as artificial recharge

Program 4: Develop policies for adoption by appropriate regional agencies which encourage reuse of treated effluent and provide incentives for reuse by the private sector.

Program 5: Encourage the construction of satellite wastewater treatment plants in outlying urbanizing areas in accordance with the Southern Nevada Water Authority Agreement.

Policy A.6: Cooperate with federal, state and other local governmental agencies in mutual efforts to improve and maintain water quality in Southern Nevada.

Program 1: Coordinate water quality activities with Clark County and in conformity with the latest Clark County 208 Water Quality Management Plan Amendment.

10A.4 Evaluation and Implementation Matrix

The following Water Quality Evaluation and Implementation Matrix (EIM-see next page) was prepared as a measurable summary of the above Policies and Programs. The EIM is to be used:

- as a method of measuring the implementation progress of the General Plan
- as a budgeting document for specific Environmental Quality and Natural Resources programs of the General Plan
- as a tool for further developing work programs

The following abbreviations apply to each Evaluation and Implementation Matrix

City

BS	Building and Safety
CM	City Manager
CP	Community Planning & Development
DD	Design and Development
FS	Fire Services
GS	General Services
PL	Parks and Leisure
PW	Public Works

Other Agencies/Jurisdictions

CC	Clark County
ENGR	State Engineer
LVMPD	Las Vegas Metropolitan Police Department
RFC	Clark County Regional Flood Control District
WRMI	Water Resource Management, Inc.

10A. Evaluation and Implementation Matrix: Water

Policy Program	Summary	Department	Implementation	Action/Product (Related Program)	Remarks
1.1	Improve and expand the City's wastewater treatment capability while maintaining water quality standards.	PW	On-going; relative to growth.	Continue to meet E.P.A. standards for water quality.	Funding Should be earmarked due to EPA regulations getting stiffer with little federal assistance.
1.2	Continue City coordination and cooperation with the Las Vegas Valley Water District (LVVWD) efforts to initiate and conduct a public information and education program to acquaint citizens with the benefits and savings of water conservation.	CP, PW, CM	Ongoing	Net consumptive use water savings.	May require interlocal agreement.
1.2(1)	Encourage the Water District to adopt incentive programs such as lower hook-up fee charges to new development for voluntary turf use limits and incorporation of water efficient land design.	CP, CM	1993	Revise city landscape guidelines to include turf limitations and water efficient design concepts, i.e., xeriscape.	
1.3	Participate in water oonservation efforts by initiating or intensifying city administrative programs that demonstrate this commitment.	CP, PW, FS, PL, CM, GS	1993	See Programs 1-7, publish results in annual report.	Encourage private industry and residential development to conserve by setting an example.
1.3(1)	Retrofit, as practical, using self-closing faucets and low water use plumbing in City Hall, fire stations, and park and recreation facility buildings.	PW	1993	Annual report on progress and savings.	This will implement newly adopted State Legislation.
1.3(2)	Incorporate water reduction concerns in the Department of Fire Services hydrant testing schedfule	FS	1993	Annual report on progress and savings.	
1.3(3)	Have city garage and fire station personnel be cognizant of watr reduction in their vehicle cleaning schedules	FS	1993	Annual report on progress and savings.	
1.3(4)	Have the Department of Parks and Leisure Activities incorporate, when practical, water reduction measures in their swimming pool facilities.	PL	1993	Annual report on progress and savings.	
1.3(5)	Have landscape designs for city facilities incorporate water efficient plant materials and drip irrigation systems for all plants; turf areas are to be designed to retain water.	PL, DD	1993	Annual report on progress and savings.	Designs could demonstrate xeriscape concept as presented in Desert Demonstration Gardens.

Policy Program	Summary	Department	Implementation	Action/Product (Related Program)	Remarks
1.3(6)	Provide an on-call irrigation maintenance person to shut down systems when lines break, automatic systems malfunction, or when it rains.	PL	1993	Abate excessive runoff in the case of equipment failure.	
1.3(7)	Establish irrigation schedules that are cognizant of daily and yearly temperatures and other weather conditions.	PL	1992	Annual report on progress and savings.	
1.4	Amend or establish sections in city codes and ordinances to require the use of water conservation measures.	CP, PW, CM	1992	Adoption of amended ordinance; code to require water conservation measures.	As new development occurs, less water waste will result to offset additional demand.
1.4(1)	Amend the City's Zoning Ordinance to include requirements for the use of water efficient plants, efficient irrigation systems and other xeriscape concepts in landscaping of new development and modification to existing development.	CP	1992	Amend Code.	
1.4(2)	Amend grading plan requirements to provide for water detention-retention in landscaped areas.	PW	1993	Amend Code	Use water for on-site landscaping that would otherwise run off.
1.4(3)	Continue to enforce the code provision that makes it a civil infraction to allow the escape of water from any private property onto public property.	BS (Central Action Office) LVMPD	Ongoing	Continued Enforcement	
1.4(4)	Require multi-family and commercial uses to have a separate water meter for outside irrigation.	BS	1993	Amend Code	
1.4(5)	Explore possible opportunities for effluent reuse projects.	PW, CP	Ongoing	Select sites, fund, monitor	County 208 Water Quality Amendment, June 1990 recommends effluent reuse.
1.4(6)	Amend the City's Uniform Plumbing code supplement that requires the use of water saving fixtures in new construction and in the replacement or repair of existing construction. Reduce shower heads to a maximum of 2.5 gallons per minute; toilets a maximum of 1.6 gallons per flush consistent with newly adopted State of Nevada standards.	BS	1992	Amend Uniform Plumbing Code	This action will implement newly adopted State legislation.

Policy Program	Summary	Department	Implementation	Action/Product (Related Program)	Remarks
1.4(7)	Consider regulations that would require developers to create their own water supply (referred to as "offsets") by installing water saving fixtures in existing construction that does not already have it in an amount hat saves as much water as their new buildings will use (Exceptions should be made to assure that development intended to provide affordable housing or other low and moderate income needs, not be subject to this regulation.)	BS, CP	1993	Joint review and report on feasibility and savings of retrofit trade offs.	This program may seem extreme at this time, however.
1.5	Have the City support and/or initiate revisions to state statutes to require coordination of water conservation measures.	CM, CP	1993 (next Legislative Session)	Resolution to Legislature outlining and supporting changes to statutes	Promotes Enabling Legislation that would encourage comprehensive management.
1.5(1)	Support state legislation to have all retention basins equipped so as to facilitate storm water induction into the uppermost groundwater aquifer.	CM, CP, PW, RFC	1993 (next Legislative Session)	Investigate and report on potential for groundwater recharge	Important that point-source stormwater quality management be implemented concurrent with this program.
1.5(2)	Support state legislation requiring a higher rate structure for excessive water use by residential, commercial, industrial and governmental consumers. Set standard water use figures consistent with those established in other southwestern coastal and inland cities presently enacting water conservation programs.	CM, CP	1993 (next legislative session)	Analyze average usage amount by service size in other Southwest cities with water conservation programs to assure that our averages are not excessive and that our rate structure is adequate.	Standard waste usage in Las Vegas is higher than other Southwest urban areas. We need a rate structure that discourages excessive water use, especially in residential development
1.5(3)	Encourage programs to protect the Principal Aquifers of the Las Vegas Valley, i.e., artificial recharge efforts to the aquifer that are more in balance with current pumpage from the aquifer or natural conditions such as winter vs. summer and drought. In addition, encourage the use of District water, where available, rather than individual well use so that groundwater withdrawal may be monitored.	CM, CP, ENGR	1993 (next legislative session)		See sub-element 4.0: Geologic Hazards; Policy 1.5.
1.5(4)	Develop policies for adoption by appropriate regional agencies which encourage reuse of treated effluent and provide incentives for reuse by the private sector.	WRMI, CP	1993	Policy document to be presented to City Council and County Commission for adoption and implementation.	Clark County 208 Water Quality Management Plan (Amended June 1990) recommends increased reuse of treated waste water effluent.

Policy Program	Summary	Department	Implementation	Action/Product (Related Program)	Remarks
1.5(5)	Encourage the construction of satellite wastewater treatment facilities in outlying urbanizing areas, i.e., Summerlin and the Northwest Sector to facilitate wastewater effluent reuse opportunities.	PW, CP	1993	Develop policy regarding future sewage treatment expansion specifically encouraging satellite treatment facilities.	
1.6	Cooperate with federal, state and other local governmental agencies in mutual efforts to improve and maintain water quality in Southern Nevada	CC, CP, PW	1992	Include in annual report on water conservation efforts; see Water Policy 1.3, Programs 1-7.	Issues concerning water supply and water quality are regional in nature, not jurisdictional. All of the governmental agencies in Southern Nevada need to coordinate mutual effort.
1.6(1)	Coordinate water quality activities with Clark County and in conformity with the Clark County 208 Water Quality Management Plan Amendment, June, 1990.	CP, PW, CC	1992	Include in annual report on water conservation efforts; see Water Policy 1.3, Programs 1-7.	

10B Drainage and Flood Control

10B.1.1 Flood Hazards and Planning

Flooding is one of the most severe environmental hazards affecting the Las Vegas Valley area, despite an annual precipitation of only four inches. Winter storms cover a large area and historically have not produced major flooding. The summer high-intensity thunderstorms produce most of the flooding in the area. Washes fill quickly and overflow onto the surrounding area.

Natural and man-made factors contribute to flooding. The natural factor is the presence of predominantly shallow soils overlaying hardpan, a hardened or cemented soil horizon, that inhibits the infiltration of rainfall into the underlying soils. Also, there is a lack of natural ground cover; shrubs, trees, grasses, that would slow this runoff. The resulting water builds in velocity and quantity as it flows down the washes creating the danger of downstream flooding. The man-made factor is contributed through paved roads, roofs, parking lots, etc. These provide hard surfaces that prohibit the percolation of water into the area where it falls and collects. The collection and concentration of runoff caused by urbanization can result in an increase in downstream flooding. Development in flood plains without adequate flood control facilities has also resulted in flood damage.

The Clark County Regional Flood Control District (CCRFCD) was created in 1985, in an effort to enhance regional flood control planning in Clark County. By December, 1986, the CCRFCD published the Clark County Flood Control Master Plan. Clark County and each of the incorporated cities within the County adopted the Master Plan. NRS Chapter 543 also requires that all the local governments in the CCRFCD adopt drainage regulations. The regulations restrict new development in areas known to flood, require drainage studies on proposed new developments to address localized flooding, and require CCRFCD review of all new developments in areas of regional flood control significance.

10B.1.2 Stormwater Management

In 1988, EPA proposed regulations that required cities with populations of 100,000 or more to apply for National Pollution Discharge Elimination System (NPDES) permits for controlling stormwater discharges to water ways, such as; rivers, streams, lakes, etc. An EPA study indicated that 38 states reported urban run-off as a major cause of water quality impairment in the United States. Stormwater runoff can pick up such contaminants as pesticides and fertilizers from lawns; oil, grease, and fuel from gas stations; and other contaminants from construction sites, restaurants, dry cleaners, lumberyards, landfills, junk yards, and industrial sites.[15] These contaminants find their way directly into bodies of water without going through sanitary treatment first.

Rather than requiring additional treatment plants or expansions to existing plants in order to accommodate end-of-pipe treatment of stormwater, EPA appears to be favoring non-structural best management practices (BMPs) and stormwater management plans to control pollutants at their source.[16] BMPs include the following:

- finding and removing illicit connections to storm sewers instead of sanitary sewers
- developing and implementing local ordinances to reduce pollutants from construction sites, new development sites, and new industrial sites,
- public education on the use of chemical fertilizers and pesticides,
- encouraging proper disposal and the recycling of used oil and hazardous wastes from households,
- improving operation and maintenance practices of commercial enterprises.

The City of Las Vegas has a current NPDES permit. Maintenance and implementation of this permit will require a comprehensive Stormwater Quality Plan. Within this plan, an inventory of existing stormwater facilities will be completed and encoded with land use information on the City of Las Vegas Geographic Information System (GIS). Locating industrial nonpoint sources by Standard Industrial Codes should also be completed.

This General Plan Update springs from several requirements. Among them are the requirement for timely data, the requirement to keep up with changing issues and their focus and the requirement to develop strategic planning for resources. This last requirement was addressed in the 1990 "Las Vegas 2000 and Beyond "strategic plan" which is described in the Plan introduction section. The '2000' document contained "Actions" specified to be accomplished ("the process is not over... We must put these plans into action")

Develop City flood control...facilities in conjunction with optimal regional systems.

10 B.2 Issue

The Las Vegas Valley is susceptible to flash floods affecting the safety and quality of life of the Valley residents. Flooding occurs due to heavy localized rainfall combined with the natural topography and soil conditions found in the valley. However, the adverse effects of flooding to Valley residents is due partly to poor planning in the

past and to the lack of flood control facilities preceding urbanization. The resulting stormwater runoff picks up contaminants such as pesticides and fertilizers from lawns, trash and debris, oil, grease and gasoline, etc. These contaminants discharge to the Las Vegas Wash and Lake Mead without sanitary treatment. Appropriate stormwater management and discharge regulation will be necessary to abate polluted runoff.

10 B.3: Goal, Objectives, Policies and Programs

Goal: To participate in the protection of the environmental quality of the Las Vegas valley and to promote the conservation of our natural resources.

Objective A: Provide a diversified, efficient flood control system to protect life and property from severe flood damage at a reasonable cost.

Policy A.1: Develop a two-tiered flood control system which will include an appropriate mix of large regional and smaller city neighborhood flood control facilities.

Program 1: Provide stormwater channel and drain improvements in accordance with the adopted stormwater management program for the City.

Policy A.2: Continue to have the City cooperate in the implementation of the adopted Master Plan of the Clark County Regional Flood Control District. This Plan provides for construction and maintenance of the large regional component of the City's flood control system, including detention basins, drainage channels and storm drains.

Policy A.3: Develop neighborhood master plans consisting of relatively small city drains and other flood control facilities to safely convey flood and nuisance flows to the larger regional facilities. These plans shall be prioritized as part of the capital facilities programming process.

Policy A.4: Review plans for new development of property under zoning and subdivision regulations to ensure property drainage in accordance with City Uniform Regulations for the Control of Drainage and the Clark County Regional Flood Control District's Hydrologic Criteria and Drainage Design Manual.

Program 1: Review development plans to incorporate, where required, the neighborhood storm drain system plans for the City and the master plan for Clark County Regional Flood Control District.

Policy A.5: Investigate and, where necessary, implement funding mechanisms for city neighborhood stormwater capital programs. Funding sources may include, but not be limited to, special improvement districts or stormwater utility fees.

Policy A.6: Inspect and maintain existing stormwater facilities to provide for the safe and efficient passage of flood water.

Policy A.7: Maintain a broadly based Flood Hazard Reduction Program which meets the requirements of the National Flood Insurance Program (NFIP). The City shall also participate in the federal Community Rating System, thus assuring the availability of flood insurance to city residents and businesses at the least possible cost.

Policy A.8: Continue to update Flood Insurance Maps for existing city areas and to create new maps for developing areas, subject to FEMA review.

Policy A.9: Investigate land development grading requirements to determine if nuisance flows and first storm runoff should be retained on site.

Objective B: The City shall continue to participate in a multi-jurisdictional effort to develop, implement and monitor water quality standards for stormwater discharge.

Policy B.1: Develop a comprehensive Stormwater Quality Management Plan in accordance with our NPDES stormwater quality permit.

Program 1: Meet first year requirements of the permit.

Program 2: By 1992, detail implementation program for Stormwater Quality Management Plan.

Program 3: By 1993, inventory existing stormwater facilities and locate industrial nonpoint sources by Standard Industrial Code; encode with land use information on City Geographic Information System (GIS) in coordination with Clark County GIS.

Program 4: By 1994, establish a monitoring program to evaluate Stormwater Quality Management Plan effectiveness.

Policy B.2: Modify City regulations as needed in order to implement stormwater quality discharge standards as they are developed by the State and the U.S. Environmental Protection Agency.

Program 1: Have the City arrange and hold a meeting by the end of fiscal year 1991-92 with all appropriate entities and agencies in the Valley. The outcome of the meeting will be to establish individual stormwater quality responsibilities and to prepare a funding strategy.

10B.4 Evaluation and Implementation Matrix

The following Drainage and Flood Control Hazards Evaluation and Implementation Matrix (EIM-see next page) was prepared as a measurable summary of the above Policies and Programs. The EIM is to be used:

- as a method of measuring the implementation progress of the General Plan
- as a budgeting document for specific Environmental Quality and Natural Resources programs of the General Plan
- as a tool for further developing work programs

The following abbreviations apply to each Evaluation and Implementation Matrix

City

CA	City Attorney
CM	City Manager
FN	Finance
PW	Public Works

Other Agencies/Jurisdictions

CC	Clark County
HEND	City of Henderson
LVVWD	Las Vegas Valley Water District
NLV	City of North Las Vegas
RFC	Clark County Regional Flood Control District

10B. Evaluation and Implementation Matrix: Drainage and Flood Control

Policy Program	Summary	Department	Implementation	Action/Product (Related Program)	Remarks
2.1	Develop a two-tiered flood control system which will include an appropriate mix to large regional and smaller city neighborhood flood control facilities.	PW, CM, RFC	1992	Coordinate funding via CLV, CIP, RFC an CIP.	Subject to annual review.
2.1(1)	Provide stormwater channel and drain improvements in accordance with the adopted stormwater management program for the City.				
2.2	Continue to have the City cooperate in the implementation of the adopted Master Plan of the Clark County Regional Flood Control District. This Plan provides for construction and maintenance of the large regional component of the City's flood control system, including detention basins, drainage channels and storm drains.				
2.3	Develop neighborhood master plans consisting of relatively small city drains and other flood control facilities to safely convey flood nuisance flows to the larger regional facilities. These plans shall be prioritized as part of the capital facilities programming process.	PW, FN, RFC	1992	City CIP based on CCRFCD plans and neighborhood needs	
2.4	Have the City review plans for new development of property under zoning and subdivision regulations to ensure property drainage in accordance with City Uniform Regulations for the Control of Drainage and the Clark County Regional Flood Control District's Hydrologic Criteria and Drainage Design Manual.	PW, RFC	Ongoing	Continue to require developer to incorporate neighborhood drainage improvements into development plans.	
2.4(1)	Review development plans to incorporate, where required, the neighborhood storm drain system plans for the City and the master plan for Clark County Regional Flood Control District.				
2.5	Investigate and, where necessary, implement funding mechanisms for city neighborhood stormwater capital programs. Funding sources may include, but not be limited to, special improvement districts or stormwater utility fees.	PW, CP, CA	1992	Inventory of funding sources, strategy for use, use of known sources.	

Policy Program	Summary	Department	Implementation	Action/Product (Related Program)	Remarks
2.6	Inspect and maintain existing stormwater facilities to provide for the safe and efficient passage of flood water.	PW	Ongoing	Facilities maintenance.	
2.7	Maintain a broadly based Flood Hazard Reduction Program which meets the requirements of the National Flood Insurance Program (NFIP). The City shall also participate in the federal Community Rating System, this assuring the availability of flood insurance to city residents and businesses at the least possible cost.	PW	Ongoing	Program participation and documented actions to reduce insurance costs to citizens.	
2.8	Continue to update Flood Insurance Maps for existing city areas and to create new maps for developing areas, subject to FEMA review.	PW	Ongoing	Best available maps.	
2.9	Investigate land development grading requirements to determine if nuisance flows and first storm runoff should be retained on site.	PW	1992	Amend Code to require on-site retention facilities.	
3.1	Develop a comprehensive Stormwater Quality Management Plan in a accordance with our NPDES stormwater quality permit.	PW, CC	1991	Management Plan.	
3.1(1)	Meet first year requirements of the permit.	PW, CC	1991	EPA Approval	
3.1(2)	by 1992, detail implementation program for Stormwater quality Management Plan	PW, CC	1992	Development of Implementation Plan.	
3.1(3)	By 1993, inventory existing stormwater facilities and locate industrial non-point sources by Standard Industrial Code; encode with land use information on city Geographic Information System (GIS) in coordination with clark County GIS.	PW, CC, CP	1993	Inventory of Stormwater facilities and non-point sources.	
3.1(4)	By 1994, establish a monitoring program to evaluate Stormwater Quality Management Plan effectiveness.	PW, CC	1994	Report on plan effectiveness, present to City Council.	
3.2	Modify City regulations as needed in order to implement stormwater quality discharge standards as they are developed b the State and the U. S. Environmental Protection Agency.	PW	Ongoing	EPA Approval	

Policy Program	Summary	Department	Implementation	Action/Product (Related Program)	Remarks
3.2(1)	Have the City arrange and hold a meeting by the end of fiscal year 1991-92 with all appropriate entities and agencies in the Valley. The outcome of the meeting will be to establish individual stormwater quality responsibilities and to prepare a funding strategy.				

Policy Program	Summary	Department	Implementation	Action/Product (Related Program)	Remarks
4.2(1:2)	Because of the perpetuation of subsidence problems brought on by excessive groundwater withdrawal in the Las Vegas Valley, encourage State legislation that will require local monitoring of groundwater withdrawal with the requirement that within five years local water purveyors will be prohibited from removing an amount greater than the natural recharge plus artificial recharge in any given year.	CM, CP, WRMI, State Engineer's Office	1993	Resolution by City Council to Legislature	See Water: Policy 1.5, Program 3.

10C Geologic Hazards

10C.1.1 Seismicity/Earthquake Hazards

Seismic activity in the Las Vegas Valley is related to man-made and natural causes. Man-made seismic activity results from underground nuclear testing. It is generally of short duration with the only effect being minor inconvenience to those that experience the tremor. There is no evidence that any structural damage to local buildings has resulted from nuclear testing. Between the years 1974 and 1976, there were claims that a number of wells in the Northwest part of the valley were damaged by nuclear testing and the resulting subsidence. The U.S. Department of Energy established a monitoring program in 1976 which included a number of technical surveys such as; level line, tiltmeter, hydrograph and seismic station surveys. The results of these surveys led to the conclusion that land subsidence was occurring continually with no direct correlation to nuclear events.[17]

Natural causes of seismic activity are due to shifts in the earth's crust. The movement of one piece of earth's crust in relation to another results in faulting. Tectonic faulting is found in the Las Vegas Valley and the surrounding mountains. Tectonic faults resulted from earth movement which occurred in the middle to late Pleistocene time. These faults traverse the Las Vegas Valley floor in a north-south trending series (Map 4). A famous example of a major active tectonic fault is the San Andreas Fault running up the coast of California from San Diego to San Francisco. Movement along this fault has resulted in numerous costly earthquakes.

Major earthquake activity in Nevada is concentrated along a series of faults extending in a northerly direction from the Owen's Valley in California to Winnemucca, with the greatest activity in the Reno-Winnemucca-Tonopah triangle, nearly two-hundred miles northwest of the Las Vegas Valley.[18] In Clark County there have been no major earthquakes. However, tremors of intensities ranging between VI and VII on the Modified Mercalli Scale have been felt in the Clark County area as a result of strong earthquakes in west-central Nevada and Southern California. There is also potential danger due to "liquefaction" which is a term used to describe an earthquake hazard where the support capabilities of the ground give way during intense shaking. Because of these occurrences, the Las Vegas area is classified in Seismic Zone 2 of the Uniform Building Code (UBC) so that construction will remain sound in response to Modified Mercalli Scale intensities of VII. The Nevada Bureau of Mines and Geology (NBMG) is presently half way through a study for the Nevada Department of Transportation (NDOT) that will update the seismic hazard data base for the Las Vegas area. This study was designed to reassess all sources of seismic hazard throughout the State of Nevada urban centers. Preliminary information available to date on the Las Vegas area suggests that the UBC seismic code be upgraded to Seismic Zone 3.

10C.1.2 Topography and Soil Types

The Las Vegas Valley area lies in the southwestern part of the Great Basin, within the Basin and Range physiographic province. The Valley is bound on the west by the Spring Mountains, the highest range in Clark County. This range contains Charleston Peak which is the third highest peak in Nevada at 11,918 feet. To the north the valley is bounded by the Desert, Sheep, and Las Vegas Ranges; on the east it is bounded by Frenchman and Sunrise Mountains; and on the south by the River Mountains and the McCullough Range.[19] Major drainage in the Las Vegas Valley flows through Las Vegas Wash to Lake Mead. The floor of this basin ranges from 1,800 to 2,500 feet in elevation. The basin floor is bounded on all sides by alluvial fan or aprons with slopes of 50 to 150 feet per mile and pediment surfaces (collectively called piedmont surfaces). Many of these piedmont surfaces are old and occur only as remnants, the most prominent being Whitney and Paradise Mesas in the Southern part of the valley.[20]

The sedimentary formations in the Mountain Ranges consist mainly of limestone and mixtures of sandstone, shale, dolomite, gypsum, and in some places, interbedded quartzite. The alluvial fan piedmont is composed of many coalescing fans dissected by numerous drainage channels. The upper portion of the fan piedmont, about 4,500 feet above sea level, is made up of poorly sorted gravelly, cobbly, and stony sand deposits that grade to finer textured material near the valley floor. The basin floors are depositional areas of lake-laid silt and clay and younger alluvial deposits.[21]

Soil formation and deposit characteristics are an important consideration in land use planning and land development decisions. Location of soil types can be used to identify the potentials and limitations of an area for specific land uses and to help prevent construction failures caused by particular soil properties, i.e., slope, depth, drainage, and physical characteristics. For example, impervious soil horizons are an important factor in desert flooding. Construction costs for building roads and preparing building sites are higher in shallow soils overlaying hardpan due to the need for heavy equipment such as backhoes, rippers, or trenching machines in order to penetrate the hardpan. Occasionally,

blasting is necessary. Soils that are moderately to strongly alkaline can cause corrosive chemical reactions to uncoated steel and concrete. The shrink/swell potential of soils is a factor in soil movement that could damage foundations (see also discussion on subsidence, specifically "collapsible soils"). Map 5, Soils Map, represents generalized soil units found in the Las Vegas area. A map unit represents an area dominated by one or more major kinds of soil as classified by the United States Department of Agriculture, Soil Conservation Service.

Table 4, Soil Impacts, summarizes individual soil unit suitability for a variety of purposes. The information presented in this table, as well as that in Map 5, is intended as a general representation and not for the purpose of determining hazards to construction. For example, use of this information does not substitute the need for site specific soils analysis. The following terms and characteristic ratings are used in the table.

Flooding: The temporary inundation of an area by overflowing streams or runoff from adjacent slopes. Water standing for short duration following rainfall is not considered flooding for the purposes of this analysis, nor is water in swamps or marshes. Frequency and probable dates of occurrence are estimated. Frequency is expressed as none, rare, common, occasional, and frequent. *None* means that flooding is not probable; *rare* that it is unlikely but possible under unusual weather conditions; *common* that it is likely under normal conditions; *occasional* that it occurs, on average, no more than once in two years; and *frequent* that it occurs, on average, more than once in two years. Probable dates are expressed in months; November-May, for example, means that flooding can occur during the period November through May.

Shallow Excavations: Rated by the ease of digging, filling, and compacting soils for trenches or holes dug to a maximum depth of 5 to 6 feet. The ease of digging, etc., is affected by depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The limitations are *slight* if soil properties and site features are generally favorable for excavation; *moderate* if soil properties and site features are not favorable and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where soil limitations are severe.

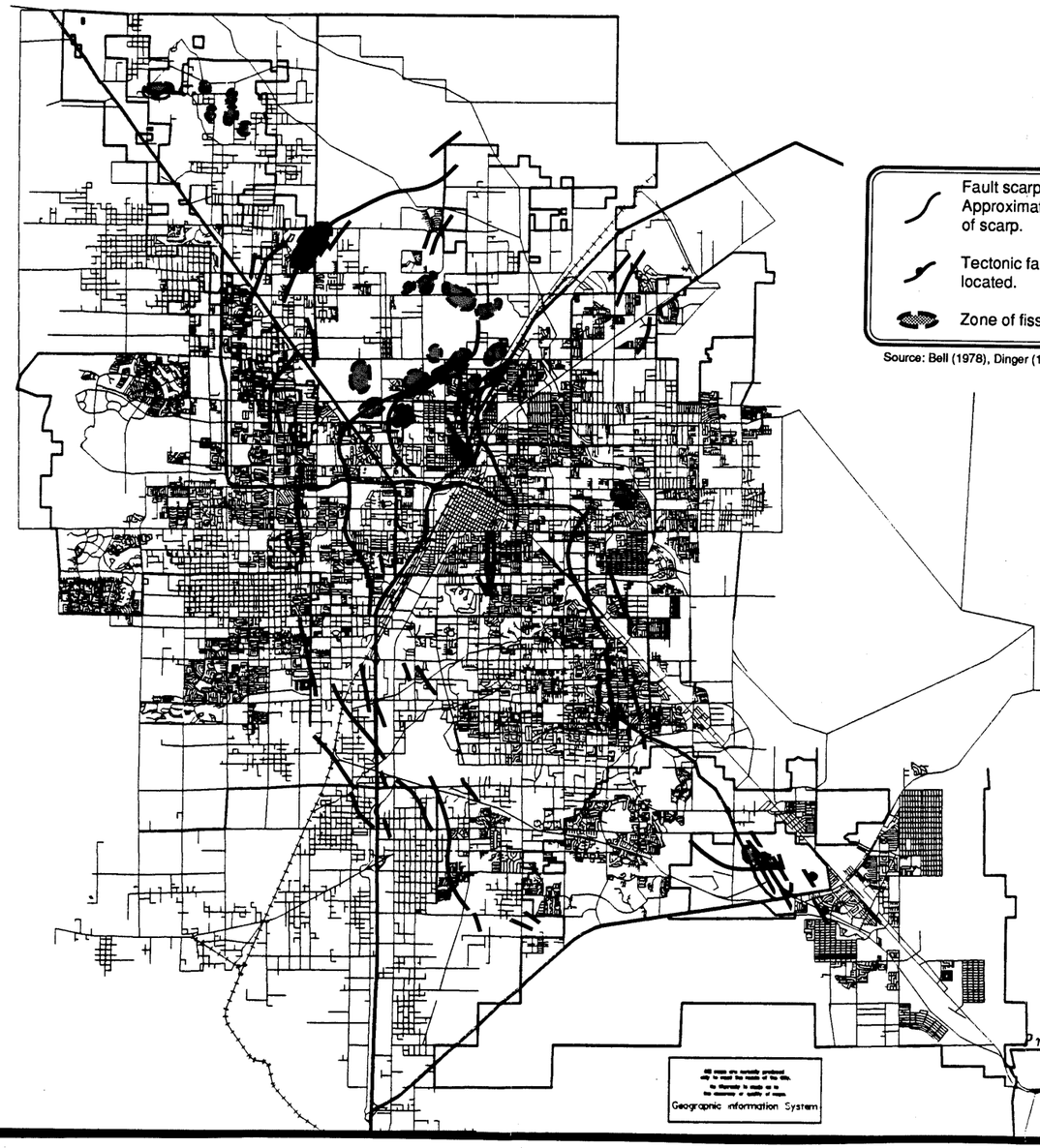
Risk of Corrosion: Pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment.

Shrink-Swell Potential: The potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed. Shrink-swell potential classes are based on the change in length of an unconfined clod (of soil) as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 milliliters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, greater than 9 percent, is sometimes used.

10C.1.3 Subsidence

Land subsidence, or the lowering of the earth's surface, can be due to natural causes or man-made processes. These causes are grouped into two categories: endogenic and exogenic subsidence.[22] The endogenic subsidence occurs within the earth, such as tectonism, volcanism, and continental drift. Exogenic subsidence occurs mainly at the earth's surface and can result from natural causes as well as man induced. Exogenic subsidence is basically the result of a loss of support. There are several processes that result in a loss of support. Fluid extraction is one process as in the case of groundwater withdrawal. Secondly, sometimes regional in scale, an increase of loading from the weight of a body of water such as a lake. Thirdly, adding water to, or saturating, a collapsible soil that has a loose grain structure. According to Don Helm, Research Hydrogeologist, NBMG, "In a desert environment, some soils have never been completely saturated before and the grains touch each other in a loose and sometimes flimsy interconnected structure. Water essentially lubricates them and they collapse possibly under their own weight and almost certainly if in addition they have been supporting a house or some other structure." This last process is referred to as "hydrocompaction".

Regional subsidence in the Las Vegas Valley was due to the creation of Lake Mead. The weight of the lake and its



Map 4

Fault Scarps and Fissures

Legend

Fault scarp; compaction and/or tectonic; downthrown to east. Approximately located; may not mark fault trace due to erosion of scarp.

Tectonic fault scarp; ball on downthrown side. Aproximately located.

Zone of fissuring; boundary approximate.

Source: Bell (1978), Dinger (1978) Patt & Maxey (1978) and Nevada Bureau of Mines and Geology

Scale: 1" - 10521'

June 17, 1991

Produced by: City of Las Vegas, Nevada

Geographic Information System

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Las Vegas General Plan
Environmental Quality & Natural Resource
Conservation Element

Map 5

Soil Types

Generalized Soils

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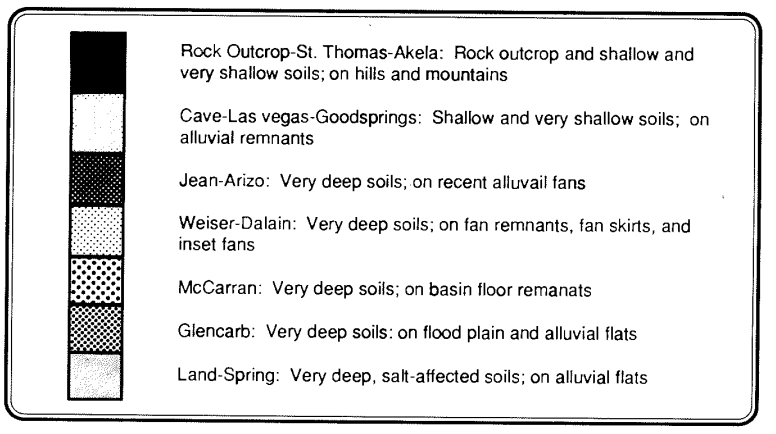

Symbol	Name
112	Arizo very gravelly loamy sand, flooded, 0 to 4 percent slopes
152	Cave gravelly fine sandy loam, 0 to 4 percent slopes
155	Cave gravelly fine sandy loam, 4 to 15 percent slopes
190	Dalian very gravelly fine sandy loam, 2 to 4 percent slopes
191	Dalian very cobbly fine sandy loam, 2 to 8 percent slopes
192	Dalian-McCullough complex, 0 to 4 percent slopes
200	Glencarb silt loam
236	Glencarb very fine sandy loam, saline
237	Glencarb very fine sandy loam, hardpan substratum
240	Goodsprings gravelly fine sandy loam, 2 to 4 percent slopes
260	Jean gravelly loamy fine sand, 2 to 4 percent slopes
263	Jean complex, 2 to 4 percent slopes
264	Jean very gravelly loamy fine sand, 2 to 4 percent slopes
270	Land silt loam, drained
282	Land silty clay loam
300	Las Vegas gravelly fine sandy loam, 0 to 2 percent slopes
301	Las Vegas gravelly fine sandy loam, 2 to 4 percent slopes
305	Las Vegas-Destazo complex, 0 to 2 percent slopes
325	McCarran fine sandy loam, 0 to 4 percent slopes
341	Paradise silt loam
360	Rock outcrop-St. Thomas complex, 15 to 30 percent slopes
380	Skyhaven very fine sandy loam, 0 to 4 percent slopes
390	Spring clay loam
400	Tencee very gravelly fine sandy loam, 2 to 8 percent slopes
501	Canutio gravelly fine sandy loam, 0 to 2 percent
502	Canutio-Cave gravelly fine sandy loams, 2 to 8 percent slopes
540	Weiser extremely gravelly fine sandy loam, 2 to 8 percent slopes
610	Pits, gravel
615	Urban land
630	Badland

SOURCE: United States Department of Agriculture and the Soil Conservation Service

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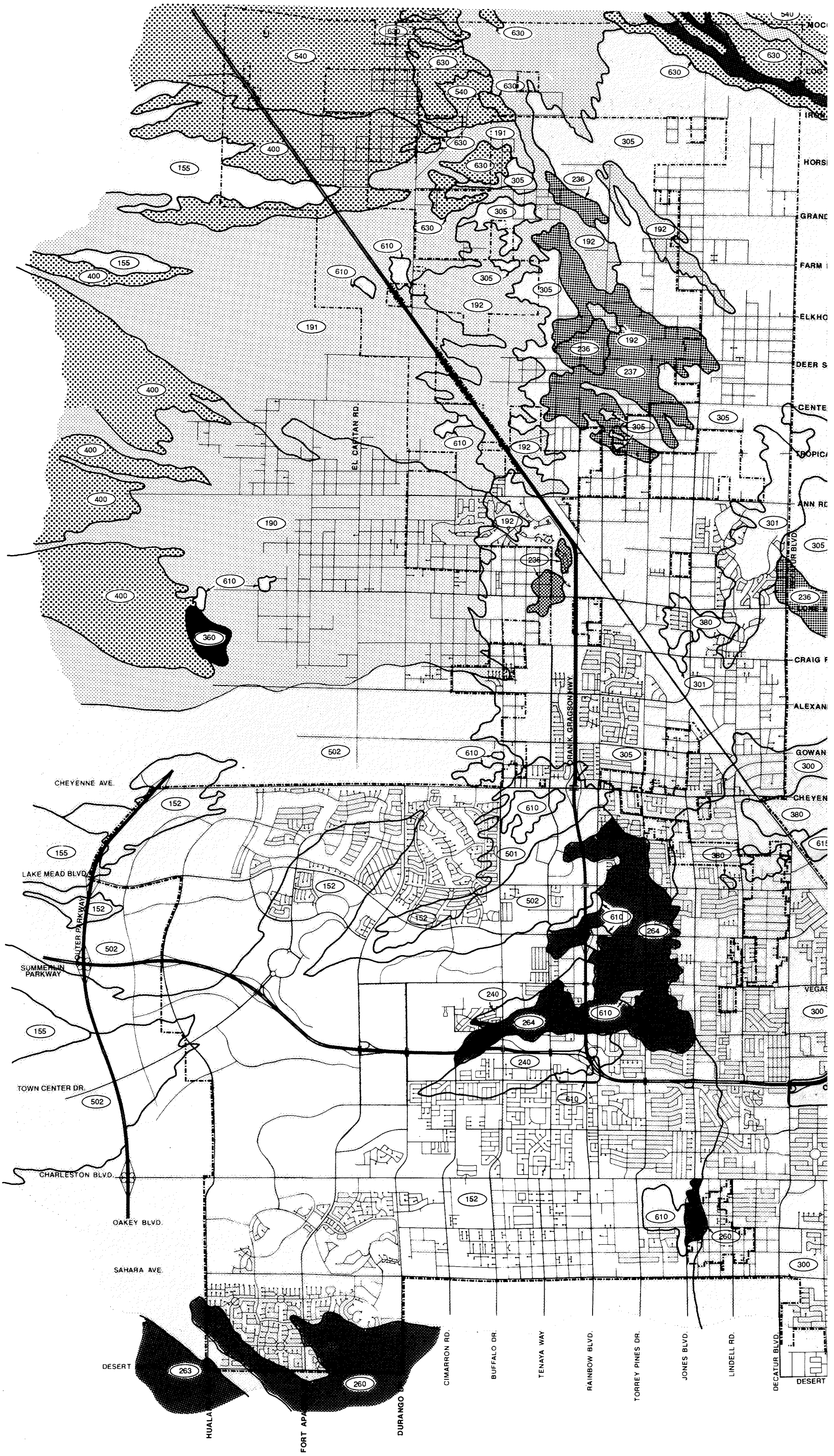

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Table 4

SOIL IMPACTS

Soil Name & Map Symbol		Flooding		Shallow Excavations	Risk of Corrosion		Shrink-Swell Potential
		Frequency	Months		Uncoated Steel	Concrete	
112	Arizo	Occasional	Mar-Sep	Severe: Cutbanks Cave	High	Low	Low
152	Cave	None	-----	Severe: Cemented Pan, Cutbanks Cave	High	Low	Low
155	Cave	None	-----	Severe: Cemented Pan, Cutbanks Cave	High	Low	Low
190	Dalian	None	-----	Slight	High	Low	Low
191	Dalian	Rare	----	Slight	High	Low	Low
192	Dalian-McCullough	Rare	----	Slight	High	Low	Low
200	Glencarb	Rare	----	Slight	High	Moderate	Low-Moderate
236	Glencarb	Rare	----	Slight	High	High	Low-Moderate
237	Glencarb	Rare	----	Moderate: Cemented Pan	High	Low	Low-Moderate
240	Goodsprings	None	----	Severe: Cemented Pan, Cutbanks Cave	High	Low	Low
260	Jean	Rare	----	Severe: Cutbanks Cave	High	Low	Low
263	Jean	Rare	----	Severe: Cutbanks Cave	High	Low	Low
264	Jean	Rare	----	Severe: Cutbanks Cave	High	Low	Low
270	Land	Rare	----	Moderate: Too Clayey, Wetness	High	High	Moderate
282	Land	Rare	----	Moderate: Too Clayey, Wetness	High	High	Moderate
300	Las Vegas	Rare	----	Severe: Cemented Pan	High	High	Low
301	Las Vegas	Rare	----	Severe: Cemented Pan	High	High	Low-Moderate
305	Las Vegas Destazo	Rare	----	Severe: Cemented Pan	High	High	Low-Moderate
325	McCarran	Rare	----	Slight	High	High	Low

GP.EQ Table4 Soil Impact;JS;pm/7-24-91

Table 4

SOIL IMPACTS *CONTINUED*

Soil Name & Map Symbol	Flooding		Shallow Excavations	Risk of Corrosion		Shrink-Swell Potential
	Frequency	Months		Uncoated Steel	Concrete	
341 Paradise	Rare	----	Moderate: Wetness	----	----	Low
360 St. Thomas	None	----	Severe: Depth to Rock, Large Stones, Slope	High	Low	Low
380 Skyhaven	Rare	----	Severe: Cemented Pan	High	High	Low-Moderate
390 Spring	Rare	----	Slight	High	High	Moderate
400 Tencee	None	----	Severe: Cemented Pan	High	Low	Low
501 Canutio	None	----	Moderate: Large Stones	High	Low	Low
502 Canutio-Cave	None	----	Moderate: Large Stones	High	Low	Low
540 Weiser	None	----	Slight	High	Low	Low
610* Pits, Gravel	N/A	N/A	N/A	N/A	N/A	N/A
615* Urban Land	N/A	N/A	N/A	N/A	N/A	N/A
630* Badland	N/A	N/A	N/A	N/A	N/A	N/A

* Pits, Gravel: Consists of open excavations from which soil material and gravel have been removed, exposing rock, a hard pan, or other material.

* Urban Land: Consists of areas covered by asphalt, concrete, and buildings or other urban structures.

* Badlands: Badland is moderately steep to very steep barren land dissected by many intermittent drainage channels that have cut into soft geologic material. The areas ordinarily are not stony. Local relief generally ranges from 25 to 100 feet. Potential runoff is very high, and erosion is active. Some small included areas of identifiable soils support vegetation.

GP.EQ Table4 Soil Impact;JS;pm/7-24-91

sediment load is over forty million tons. This weight along with tectonic activity already having occurred in the area is thought to have tilted the Las Vegas Valley four to five inches. However, this regional subsidence is thought to have had little effect on subsidence related problems in the Las Vegas Valley. These tend to be localized. Groundwater withdrawal is thought to be the most common reason for localized ground subsidence as found in the San Joaquin Valley, California; Central Arizona; Denver, Colorado; London, England and Osaka, Japan. Groundwater withdrawal is also the primary factor in localized subsidence in the Las Vegas Valley.

Land subsidence in the Las Vegas Valley has been studied for more than fifty years. In 1978, a panel of U. S. Geological Society (USGS) scientists investigated the potential hazard posed by the subsidence problem concluding that a potential hazard for fissuring and surface faulting existed due to groundwater withdrawal in the valley. The USGS released a Notice of Potential Hazard in accordance with the Disaster Relief Act of 1974. As a supplement to the USGS Notice of Potential Hazard, NBMG prepared a comprehensive overview and analysis of subsidence in the Las Vegas Valley. The report was completed in 1981. Presently, this report is being updated by several research groups with NBMG serving as the lead agency. Completion is expected in Fall of 1991.

Parallel to this update, the NBMG is spearheading an integrated modelling research project within the University System, known as *Subsidence Modelling and Prediction. Emphasis is on the poorly understood phenomenon of horizontal movement and related fissuring. Participants in the study intend to establish a reliable method of predicting fissure initiation and* propagation.

It is important to understand the distinction between "fault movement" and "fissure movement". Fault movement is associated with the release of natural forces, while fissure movement is associated with hydraulically driven forces associated with groundwater withdrawal. Fissures tend to occur near faults for very good reasons, but what causes fissure movement is very different from what causes fault movement. Thus, one can understand why exploring the causes of groundwater withdrawal related fissures and possibly discovering a method of making accurate predictions about when and where they will occur is very important in the Las Vegas Valley. The results of the study will provide a significant management tool for government agencies, public utilities and private industry in order to avoid or mitigate the potential hazards of subsidence.

According to ongoing analysis, subsidence is continuing at a rate similar to that found during the 1950s and 1960s when pumpage of groundwater was at its peak. However, the magnitude and location of the subsidence effects vary according to the hydraulic connection between geologic strata underlying areas of groundwater withdrawal. Coarse grain deposits (sand and gravel) are less susceptible to vertical compaction and recover well when recharged. In contrast, fine-grain deposits (silts and clays) are highly compressible and are not as likely to recover from groundwater withdrawal when recharge begins. Soil samples taken from basin-fill sediments show that the most compressible deposits are located in the center of the basin near Las Vegas (Map 6). The Subsidence Modelling and Prediction research plan mentioned above will help address this problem and provide the capability to quantify how ground movements at depth, such as soil compaction, are caused and eventually migrate to the surface.

Map 6 also shows areas of the Las Vegas Valley that have experienced land subsidence due to the effects of groundwater withdrawal. Consequences of the valley floor sinking include evidence of new fissuring and possible spreading of existing faults and fissures. In most cases, these were originally caused by a combination of tectonic activity and the natural dewatering and subsequent compaction of basin-fill sediments during the warm, dry Pleistocene interglacial period. Appendix 1 lists specific cases of subsidence-induced structural damage in the Las Vegas area.

Not all damage of this nature is caused by groundwater withdrawal, however. According to geologists and building officials there are localized problems associated with different types of soils and sometimes poor construction techniques. The update of the 1981 subsidence report will contain a more thorough analysis of these differences. In the meantime, some governmental entities have initiated policy that discourages the building of structures on land already documented as a subsidence area. For example, the Clark County School District currently rejects new school site locations if they are located in areas where subsidence damage has occurred in the past. Sites located on or near fissures caused by groundwater withdrawal would be expensive to build on and maintenance costs could be higher over time due to the resulting structural changes in the building. The Las Vegas office of the Department of Housing and Urban Development issued new guidelines requiring anyone building within 500 feet of a mapped fissure or fault to perform a geotechnical study as a condition for receiving federal assistance. The City of Las Vegas Department of Public Works presently requires a soils investigation on any new construction and depending on the outcome of that report construction recommendations will be stipulated.

In summary, the subsidence problem will continue to occur as long as

groundwater withdrawal exceeds annual recharge, natural or injected. The most damaging result will be the spreading of existing fissures and the likely formation of new ones. This phenomena will make such things as the enforcement of adequate construction regulations necessary. It will also require consideration of land use density restrictions on susceptible geographic areas. The NBMG study referenced above should be used by the City of Las Vegas to map high hazard areas. This can be done on a current land use parcel map. Then, policy can be made regarding the safe use of the land.

Seismic activity in the Las Vegas Valley has had significance in a geologic sense and in geologic time. Current building practices have been adequate to withstand seismic activity both man-induced through nuclear testing and natural from earthquakes. Research intending to update local seismic information may result in more stringent building standards. The pivotal issue in the valley is dealing with certain geologic deposits that are susceptible to horizontal movement and fissuring that may cause structural damage to buildings. Efforts to stabilize groundwater withdrawal practices should be prioritized locally and through State level legislation. In the meantime, two things should occur. One, continue research in this area, and provide funding to develop a new predictive capability. Two, use this information and method to determine which development opportunities and constraints exist in the Las Vegas Valley.

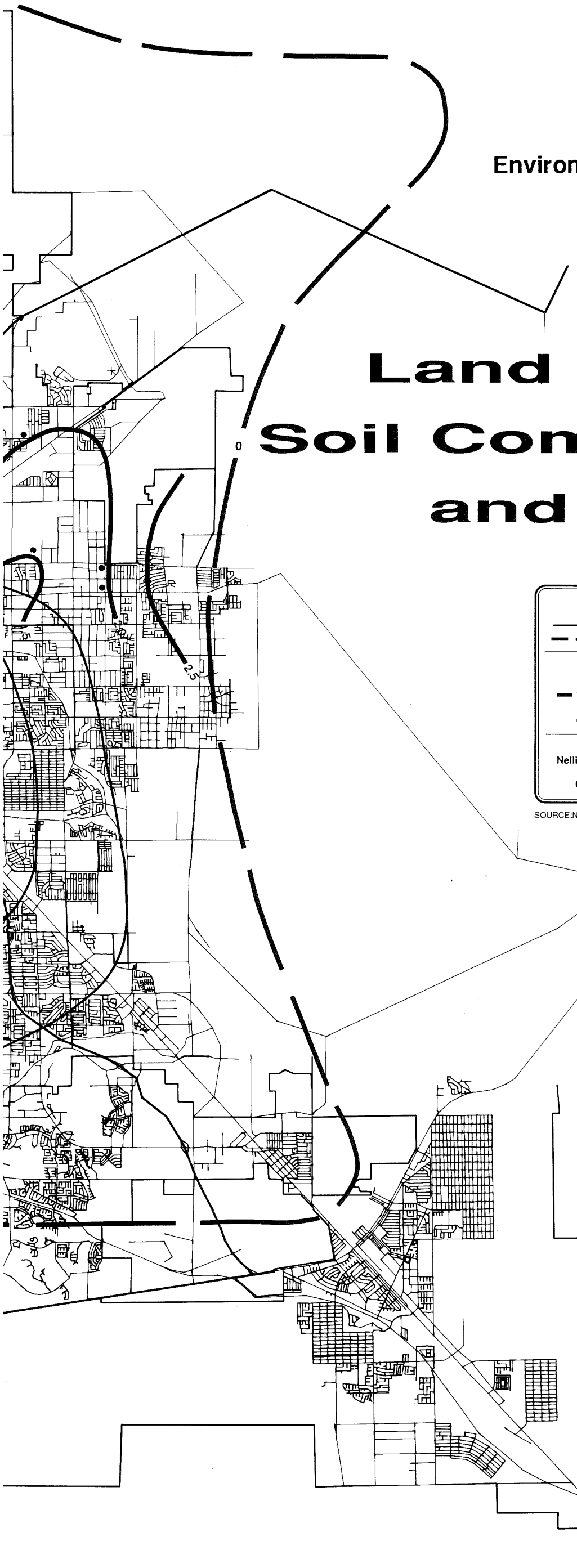
10 C.2 Issue

Existing in the Las Vegas Valley are soil and geologic conditions that are susceptible to subsidence problems. Continued withdrawal of groundwater in excess of annual recharge contributes substantially to the subsidence problem. In order to mitigate this phenomenon, efforts to stabilize groundwater withdrawal practices should have higher priority locally and through State level legislation. In the meantime, research should be funded that will develop prediction methods (especially of fissuring events) and continue to update data that can be used to determine development opportunities and constraints due to geologic hazards such as seismic hazards, collapsible soils, subsidence and related groundwater management practices in the Las Vegas Valley.

Las Vegas General Plan
Environmental Quality & Natural Resource
Conservation Element

Map 6

Land Subsidence, Soil Compressibility and Well Sites



LEGEND

Land Subsidence (between 1963 and 1980)
Contour Interval 0.2 FT.

Soil Compressibility (fine-grained sediments)
1.5 Bulk Modulus in 10^5 lbs/ft^2
Data Point

Nellis AFB **Well Site Locations**
Major Well Fields

SOURCE:Nevada Bureau of Mines and Geology

Scale: 1" - 4588'

CITY OF LAS VEGAS NEVADA

Produced by: City of Las Vegas, Nevada
Geographic Information System

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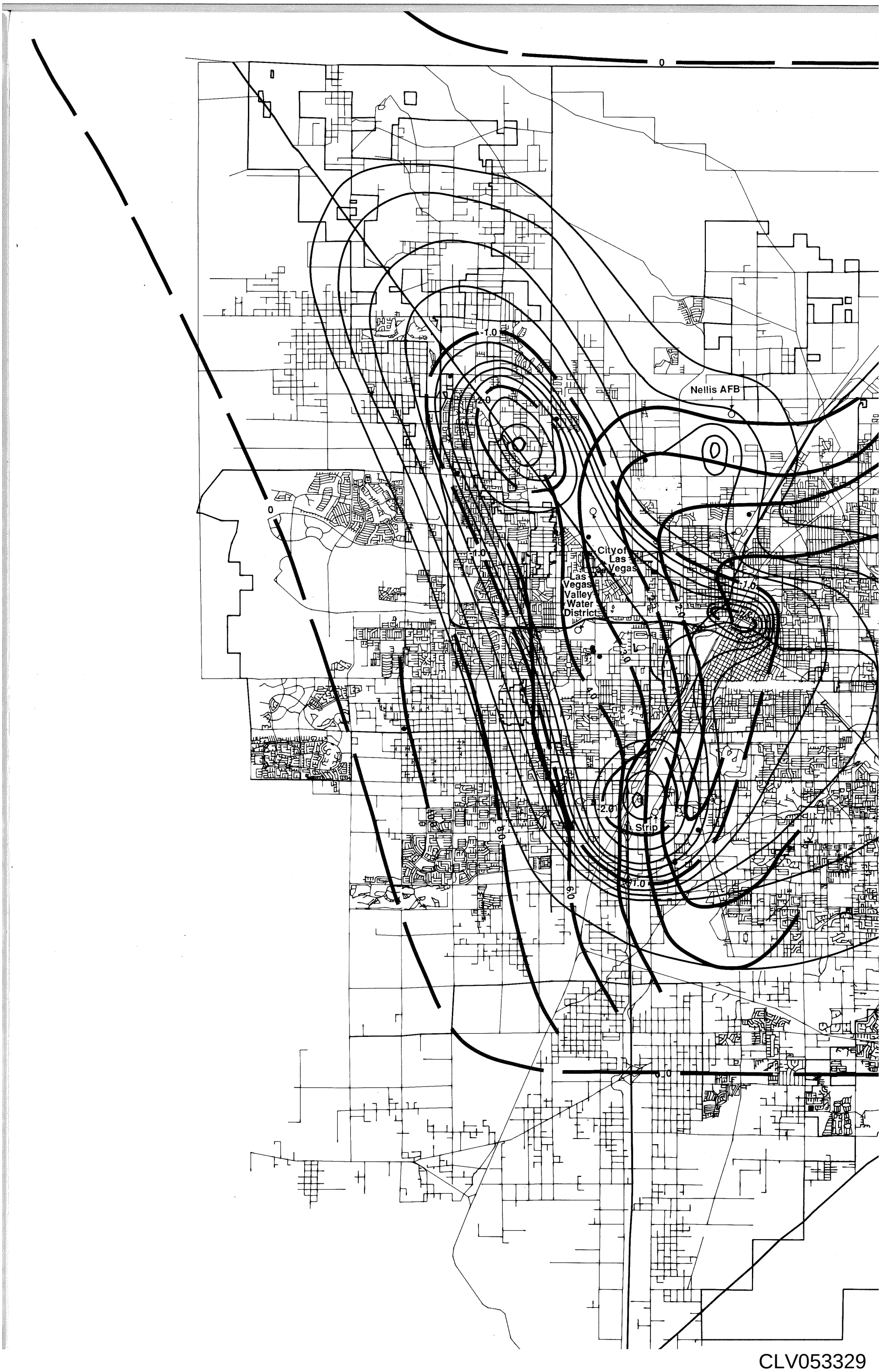

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10C.3: Goal, Objectives, Policies and Programs

Goal: To participate in the protection of the environmental quality of the Las Vegas valley and to promote the conservation of our natural resources.

Objective A: Preserve life and property from geologic hazards such as seismic hazards, subsidence and related groundwater management practices, and poor soil conditions such as collapsible soils.

Policy A.1: Review building plans for geologic hazards, i.e., collapsible soils, faults and fissuring, and subsidence.

Program 1: Pending updated analysis to be provided by the Nevada Bureau of Mines and Geology (NBMG) to Nevada Department of Transportation (NDOT) approximately Summer, 1992, consider upgrading Uniform Building Code (UBC) Seismic Zone from Zone 2 to Zone 3 in Las Vegas.

Program 2: Maintain and periodically update maps of documented areas of collapsible soils, subsidence, faulting and fissuring with latest data available from research.

Program 3: Require a geotechnical investigation report on any housing development within 500 feet of a documented fault or fissure. The report should follow current HUD guidelines for report content. (See Appendix 2; HUD Guidelines for Housing Developments Subject to Potential Effects of Ground Subsidence.)

Program 4: Require soils engineering report on non-residential development plans in order to document subsidence activity or other adverse condition and enforce appropriate mitigation.

Policy A.2: Support Nevada Bureau of Mines and Geology (NBMG) continuing research on collapsible soils, subsidence and fissuring occurrence and prediction in the Las Vegas Valley.

Program 1: Use these data to develop policy which shall include, but not be limited to, discouraging development where seismic problems cannot be mitigated, land use amendments to properly reclassify areas.

Program 2: **Investigate** the establishment of a subsidence district.

Policy A.3: Make available to the public information concerning documented areas of seismic hazard, subsidence, and poor soil conditions.

Policy A.4: Support State legislation that will require local monitoring of groundwater withdrawal with the requirement that within five years local water purveyors will be prohibited from removing an amount greater than the natural recharge plus artificial recharge in any given year.

10C.4 Evaluation and Implementation Matrix

The following Geologic Hazards Evaluation and Implementation Matrix (EIM-see next page) was prepared as a measurable summary of the above Policies and Programs. The EIM is to be used:

- as a method of measuring the implementation progress of the General Plan
- as a budgeting document for specific Environmental Quality and Natural Resources programs of the General Plan
- as a tool for further developing work programs

The following abbreviations apply to each Evaluation and Implementation Matrix

City

BS	Building and Safety
CM	City Manager
CP	Community Planning & Development
PW	Public Works

Other Agencies/Jurisdictions

ENGR	State Engineer
WRMI	Water Resource Management, Inc.

10C. Evaluation and Implementation Matrix: Geologic Hazards

Policy Program	Summary	Department	Implementation	Action/Product (Related Program)	Remarks
4.1	Review building plans for geologic hazards, i.e., collapsible soils, faults and fissuring, an subsidence.	BS	Ongoing		i.e., post tension slabs in developments located in hazard areas.
4.1(1)	Pending updated analysis to be provided by the Nevada Bureau of Mines and Geology (NBMG) to Nevada Department of Transportation (NDOT) approximately Summer 1992, consider upgrading Uniform Building Code (UBC) Seismic Zone from Zone 2 to Zone 3 in Las Vegas.	BS, CP	1992	Amend Code	More restrictive regulations.
4.1(2)	Maintain and periodically update maps of documented areas of collapsible soils, subsidence, faulting, an fissuring with latest data available from research.	CP, PW, BS	Ongoing	GIS Map	Use GIS Map to determine areas subject to HUD guidelines, program 3.
4.1(3)	Require a geotechnical investigation report on any housing development within 500 feet of a documented fault or fissure. The report should follow current HUD guidelines for reporting content (See Appendix 2.)	CP, BS	Ongoing	Use report to determine necessary mitigation.	
4.1(4)	Require soils engineering report on non-residential development plans in order to document subsidence activity or other adverse condition and enforce appropriate mitigation measures.	CPD, BS	Ongoing	Use report to update subsidence occurrence data and determine mitigation measure.	
4.2	Support Nevada Bureau of Mines and Geology (NBMG) continuing research on collapsible soils, subsidence and fissuring occurrence and prediction in the Las Vegas Valley.	CM, CP, PW, BS	Ongoing	Pursue continued funding of research.	
4.2(1)	Use these data to determine development policy and construction standards in problem areas of the City and areas of potential annexation.	CP, PW, BS	Ongoing	Amend codes as needed.	
4.2(1.1)	Make available to the public information concerning documented areas of seismic hazard, subsidence, and poor soil conditions	CP, BS	Ongoing	Maps, brochures	

10D Air Quality

Air quality is determined primarily by the type and amount of contaminants emitted into the atmosphere, the size and the topography of the air basin and the meteorological conditions. In Clark County, particularly during the winter months, stable atmospheric conditions, low mixing heights and light winds, common during nighttime and morning hours, provide opportunities for contaminants to accumulate as emissions. Atmospheric dispersion of pollutants generally improves by mid-afternoon.

Ambient air is the air that surrounds you. The effect of ambient air on people depends mainly on location, type, amount, and durations of their exposure. Air quality standards specify the point at which greater concentration may cause adverse health effects. National primary ambient air quality standards define levels of air quality, with an adequate margin of safety, to protect the public health. National secondary ambient air quality standards define levels of air quality, with an adequate margin of safety, to protect the public welfare from nuisance associated with pollutants.

Establishing ambient air quality standards in Clark County is the responsibility of the United States Environmental Protection Agency, the State of Nevada, and the Clark County Health District. Air quality is generally considered acceptable if pollutant levels are less than or equal to established standards on a continuous basis. Where differences in local and national standards exist, the more stringent standards apply. The Clark County Ambient Air Quality standards are shown in Table 5. National Ambient Air Quality Standard are shown in Table 6.

The Clark County Health District maintains a regional emissions inventory by source category (Map 7). These include combustion of fuels and specific major sources of pollutants such as power plants within Clark County. The pollutants monitored by Clark County Health District include: Carbon monoxide (CO), ozone, and fine particulates (PM10). Pollutant source emissions are regulated by the Clark County Health District Air Pollution Control Division, which is the regulatory arm for air quality in Clark County as mandated by the Clark County Commission.[29]

This section of the General Plan gives an overview of air quality planning efforts from 1978 to the present; it also identifies the major sources of pollutants and outlines policies and programs to improve the overall air quality of the Las Vegas Valley.

Table 5

Ambient Air Quality Standards
Clark County District Board of Health

The following concentrations of air contaminants shall not be exceeded at any single point in the ambient air:

Annual arithmetic mean	60	µg/M³	(0.02 ppm)
Maximum 24 hour concentration	260	µg/M³	(0.1 ppm)
Maximum 3 hour concentration	1300	µg/M³	(0.5 ppm)
Total Suspended Particulate			
Annual geometric mean	75	µg/M³	
Maximum 24 hour concentration for Las Vegas Valley	260	µg/M³	
Maximum 24 hour concentration elsewhere in Clark County	150	µg/M³	
PM-10			
Annual arithmetic mean	50	µg/M³	
Maximum 24 hour concentration	150	µg/M³	
Carbon Monoxide			
Maximum 8 hour concentration	10	mg/M³	(9.0 ppm)
Maximum 1 hour concentration	40	mg/M³	(35.0 ppm)
Ozone			
Maximum 1 hour concentration	235	µg/M³	(0.12 ppm)
Nitrogen Dioxide			
Annual arithmetic mean	100	µg/M³	(0.05 ppm)
Lead			
Arithmetic mean per calendar quarter	1.5	µg/M³	

Source: District Board of Health of Clark County

GP.EQ Table 5 Clark Co Air;JS;pm/7-31-91

Table 6

National Ambient Air Quality Standards

Pollutant	Averaging Time	Primary Standard Levels/micrograms (µg) or milligrams (mg) per cubic meter (m³) and parts per million (ppm)	Secondary Standard Levels/micrograms (µg) or milligrams (mg) per cubic meter (m³) and parts per million (ppm)
Particulate Matter	Annual (geometric mean)	50 µg/m³	50 µgm³
	24 hours*	150 µg/m³	150 µg/m³
Sulfur Dioxide	Annual (arithmetic mean)	80 µg/m³ (0.03 ppm)	-
	24 hours*	365 µg/m³ (0.14 ppm)	-
Carbon Monoxides	8 hours*	10,000 µg/m³ (9ppm)	10,000 ug/m³ (9ppm)
	1 hour	40 mg/m³ (35ppm)	40 mg/m³ (35ppm)
Nitrogen Dioxide	Annual (arithmetic mean)	100 µg/m³ (0.05 ppm)	100 µg/m³ (0.05 ppm)
Ozone	1 hour	240 µg/m³ (0.12 ppm)	240 µg/m³ (0.12 ppm)
Lead	3 months	1.5 µg/m³	1.5 µg/m³

* *Not to be exceeded more than once a year*

Source: Environmental Protection Agency

GP.EQ Table 6 Nat'l Air;JS;pm/7-31-91

10D.1 Background

The Las Vegas urban area sits in a bowl surrounded by mountains which capture and hold air pollution. The issue is further complicated by our desert environment which naturally creates background dust on windy days. We cannot avoid air pollution, but the goal of maintaining acceptable levels of air pollution is shared by all Clark County residents.

Air pollution is a seasonal occurrence. Unhealthy days of invisible carbon monoxide(CO) air pollution occur on calm winter days when warm air is trapped under layers of colder air. Conversely, photochemical ozone is created during summer months on calm sunny days. Oxides of nitrogen, hydrocarbons and volatile organic compounds react with sunlight to form ozone. Unfortunately, visible haze occurs both in winter and summer and is caused by diesel and gasoline powered motor vehicles, fireplaces and industrial pollution. On windy days, dust from natural sources and human activities may cause the valley to exceed national particulate matter(PM10) health standards.The Las Vegas Valley achieved attainment with the national ozone health standard in 1984 and has since maintained compliance. However, summer ozone levels are slowly increasing annually and are nearing the maximum acceptable limit for public health.

In March of 1978, the Governor of Nevada designated the Clark County Board of Commissioners as the Air Quality Planning Organization for Clark County. The Governor also designated the Las Vegas Valley Air Quality Non-Attainment Area (see map 8) to conform to the requirement of the Clean Air Act Amendments passed by Congress in 1977. The Clean Air Act provided an institutional framework for areas with unhealthy air pollution levels to meet prescribed air quality standards. The Clark County Commission, as the designated local air quality planning organization, is responsible for adopting Air Quality Implementation Plans (AQIP). Public participation and coordination among local entities is emphasized in the development of the AQIP. The Clark County Health District's Air Pollution Control Division administers the County's Air Pollution Control regulations and programs.

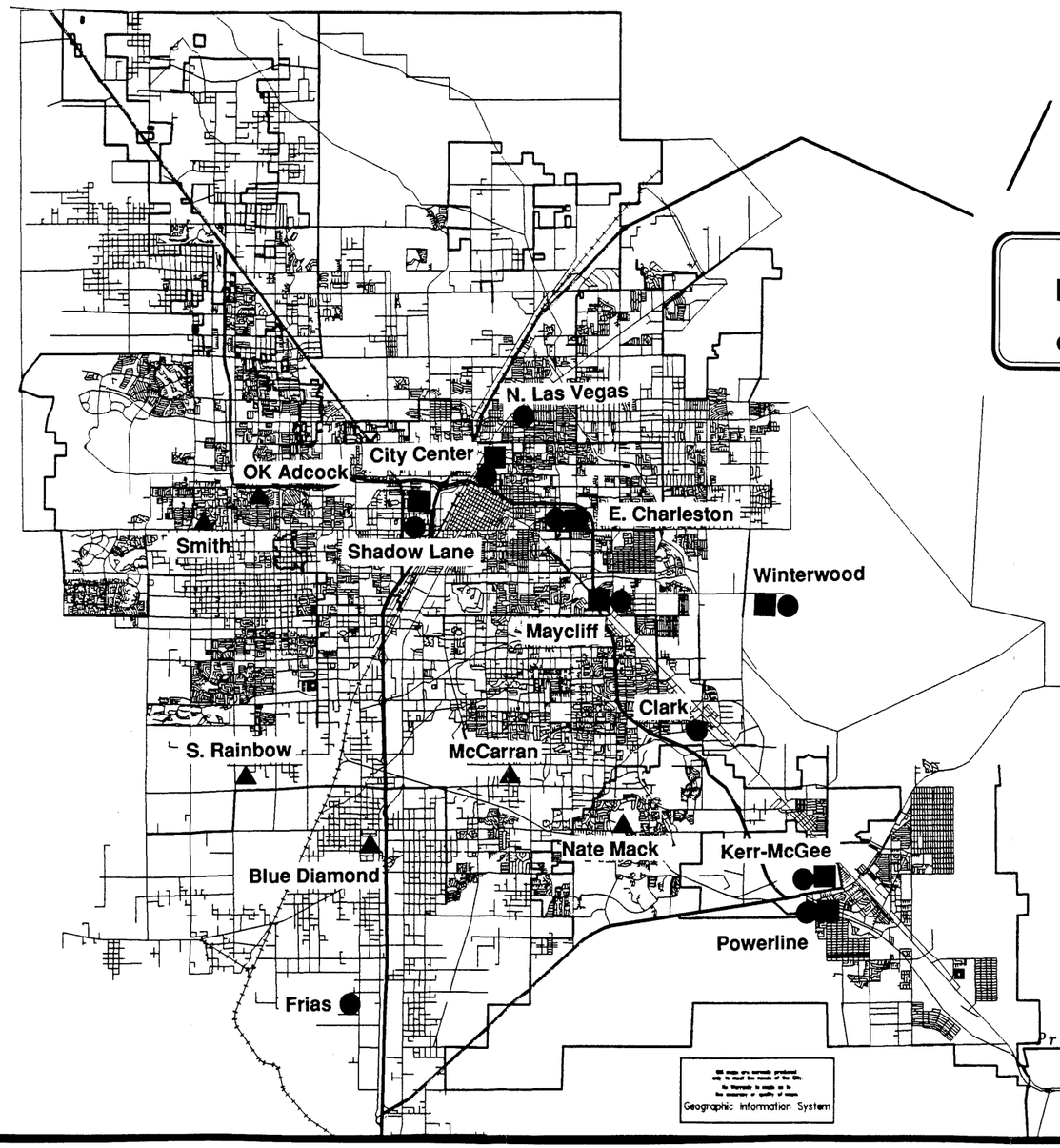
Effective air pollution control programs must include transportation planning within the air quality planning process. Federal law requires transportation planning to be consistent with air quality planning.

The following terms are useful in understanding the issue of measuring and managing air quality.

- **Carbon Monoxide(CO)**
  Carbon monoxide from automobile exhaust is the primary pollutant in the Las Vegas area (Map 9). Although the motor vehicle Inspection and Maintenance program

Map 7

APCD Gaseous/ Air Monitoring Sites



Legend

Air Monitoring Sites
■ Permanent ▲ Temporary

● **Gaseous Monitoring Sites**

Source: Clark County Health District

Scale: 1" - 10521'

June 17, 1991

CITY OF LAS VEGAS GIS NEVADA

Produced by: City of Las Vegas, Nevada

Geographic Information System

X-28a

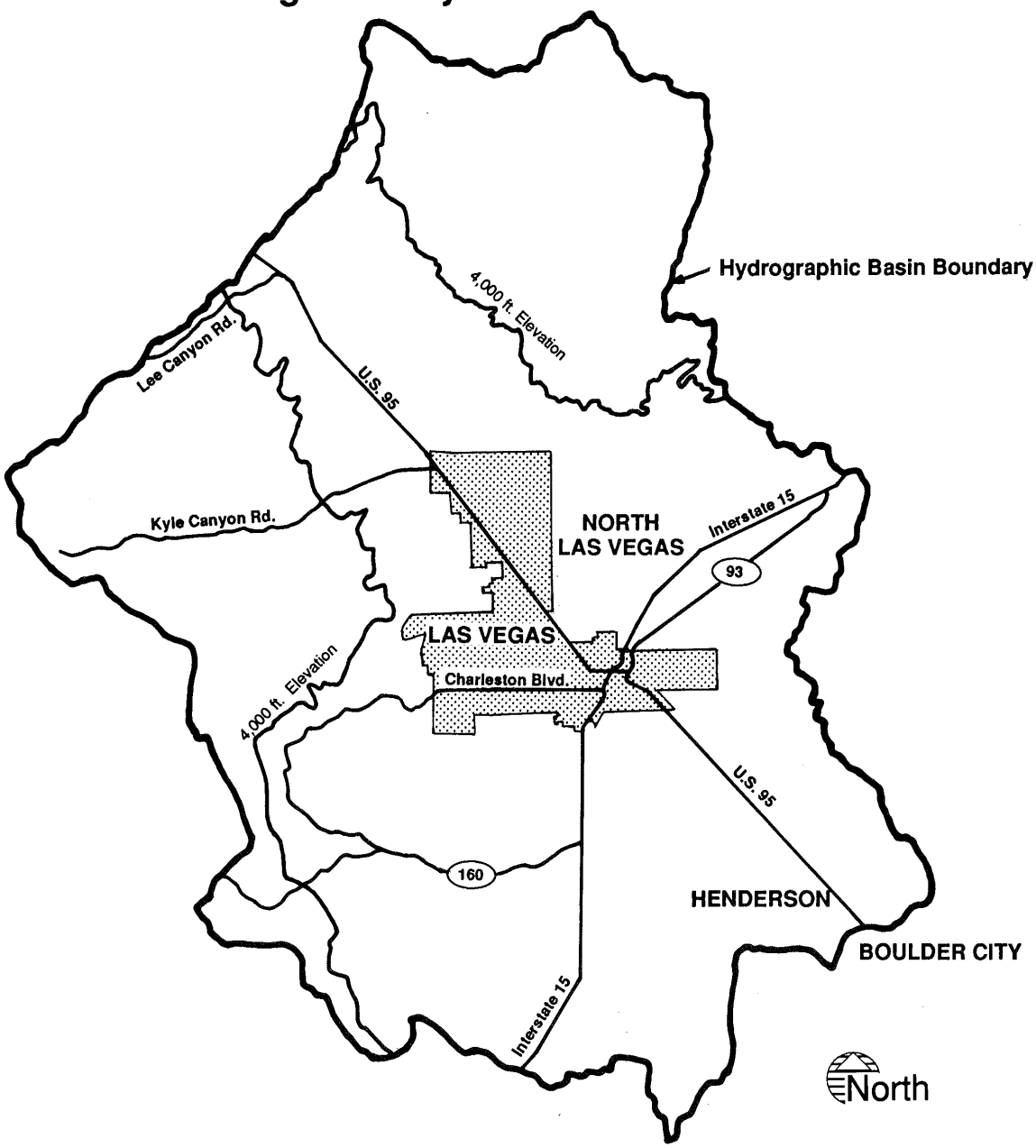
CLV053334

3152

13407

Map 8

Las Vegas Valley Non-Attainment Area



Source: Clark County Health District, Air Pollution Control Division

X-28b

CLV053335
3153

13408

Map 9

Air Quality Constraints

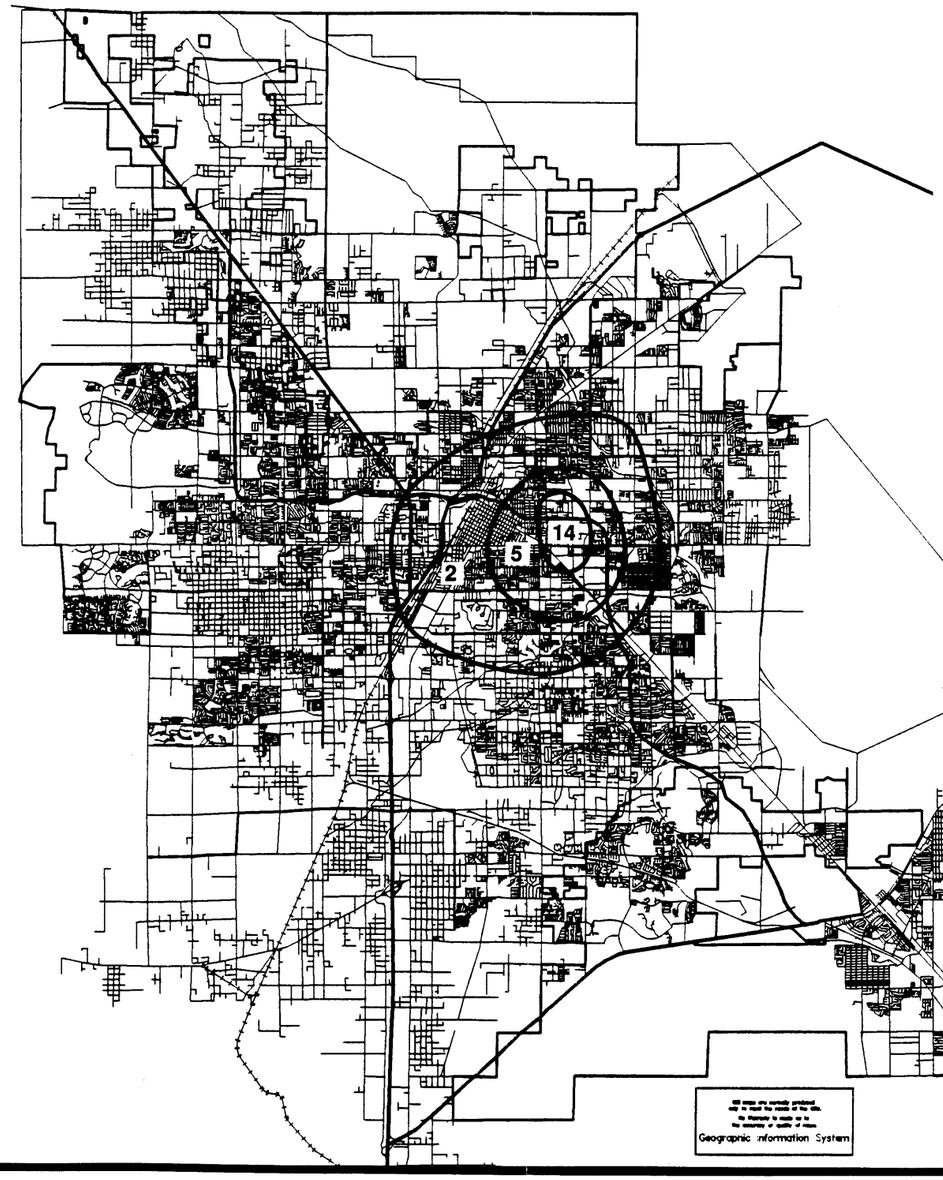
Legend

1990-1991 Winter Season

21 Estimated Unhealthful Days for Carbon Monoxide

Represents Monitoring Zone

SOURCE: Clark County Health District



Scale: 1" - 10521'

June 17, 1991

CITY OF LAS VEGAS GIS NEVADA

Produced by: City of Las Vegas, Nevada

Geographic Information System

X-28c

CLV053336

3154

13409

and oxygenated fuels presently in effect have succeeded in reducing CO levels, the valley is still in nonattainment. The county however has introduced an oxygenated gasoline program in the winter months to decrease the amount of carbon monoxide produced by automobiles. There is also discussion taking place to determine whether the oxygenated gasoline program should be extended to a year-round program for the non-attainment area.

- **Ozone**
  The Las Vegas Valley is presently in attainment for ozone. Ozone is considered a summertime pollutant and is primarily a byproduct of internal combustion engine emissions, however, there are many stationary sources such as electric power generating plants. Ozone is created when precursor (ie.. oxides of nitrogen,volatile organic compounds and hydrocarbons) react photochemically to form the ozone molecule. Although levels within the Valley have been increasing annually and may exceed national standards in the near future, Clark County and Las Vegas Valley entities are taking steps to mitigate this increase. The County's "Clean Air Action Plan" has suggested several programs that would greatly reduce the amount of pollutants in the valley(see GOPP section).

- **PM10**
  PM10 (fine particulates) emissions are from a variety of sources including construction sites, entrained road dust, disturbed vacant land, and combustion particles. Portions of the Las Vegas Valley exceed the air quality standard of 150 micrograms per cubic meter (24 hour) during some dust storms and sometimes in areas with substantial subdivision construction. The County along with the City of Las Vegas has tried to reduce the amount of dust particles around construction sites, by using water. However with the current water shortage problem in the valley, water will not be as available as in the past for dust control. Therefore, the City of Las Vegas is looking into new alternatives for dust control with products such as Road Oyl, an environmentally safe dust suppressant.

- **Visible Air Quality**
  Visual haze for the most part is composed of soot particles emitted by leaded-gasoline vehicles, diesel engines and wood burned in fireplaces. Diesel vehicles account for less than 6% of all vehicular traffic, health officials estimate they cause 29% of the urban haze and this proportion will continue to grow until diesel engines are equipped with pollution control devices. People who used leaded gasoline in cars designed for unleaded gasoline account for 10% of all urban haze. The brown haze that covers the city is the results of these pollutants being trapped in the atmosphere especially during the winter months because the prevailing winds that blow in the summer are not as active in the winter.Currently, there are no health risk-related national air quality standards for urban haze. However, the perception of poor air quality often is based on visibility. (Figure 11)

- **EQPRB/Air Quality Planning Committee**
  The Environmental Quality Policy Review Board (EQPRB) was established in 1978, to review and make recommendations to the Board of County Commissioners on matters of policy relating to issues of environmental concern. The Board is composed of one representative from the State Environmental Commission and one elected representative from Clark County, Las Vegas, North Las Vegas, Henderson, and Boulder City. The EQPRB created the Air Quality Planning Committee (AQPC) to assist the Clark County Department of Comprehensive Planning in the preparation of the AQIP's and to help identify planning issues and appropriate measures to control air pollution across political boundaries. The AQPC consists of technical staff from Boulder City, Henderson, City of Las Vegas, City of North Las Vegas, Clark County,Clark County Health District, Clark County Regional Transportation Commission, and Nevada Department of Transportation.

- **Air Quality Implementation Plan - 1978**
  The AQIP, as originally submitted, identified a set of control measures necessary for the attainment and maintenance of air quality health standards for carbon monoxide (CO), ozone and total suspended particulates (TSP). However, the plan did not adequately address motor vehicle emission controls for carbon monoxide and ozone.

- **Air Quality Implementation Plan - 1980**
  The 1978 AQIP was updated in 1980 by strengthening motor vehicle emission control programs to specifically address attainment of the CO and ozone health standards. Although concentrating upon the transportation control elements such as improved public transit, the 1980 AQIP outlined programs for controlling stationary source emissions such as industrial plant as well as those control strategies such as the installation of a flaring unit or afterburner in the exhaust gas stack at industrial plants would help meet the national ambient air quality standards for lead and total suspended particulates.

- **Air Quality Implementation Plan Update - 1982**
  The 1982 revisions to the AQIP were formulated to further clarify the CO and ozone control strategies presented in the 1980 AQIP. The 1982 AQIP recommended control measures for CO, ozone and targets mobile sources such as the automobile for those pollutants. Based on an evaluation of these control strategies, the 1982 AYIP projected that the Las Vegas Valley would reach attainment of the national standard for CO by December 31, 1987. The 1982 AQIP was overly optimistic with respect to CO. The Valley remains in nonattainment of the CO national standard.

This list of terms and events illustrates the process used to describe and manage air pollution in the Las Vegas Valley. Based on these, citizens, agencies, and officials can establish effective programs to develop and maintain good air quality.

The Clark County Board of County Commissioners determined that previous violations of the ozone standard in the Southeast portion of the Las Vegas Valley reflected an abnormal situation created by the chlorine and other pollutants being released by companies in the Henderson Industrial Complex. Further, the Board determined that stationary control measures such as upgrading of technology were already in place for resolution of that problem. The 1982 revised AQIP formally requested that the EPA place the Las Vegas Valley in attainment status for ozone.

In 1986, as a result of the 1982 revised AQIP and subsequent air quality monitoring, the Environmental Protection Agency (EPA) classified the Valley in attainment for ozone. However due to the high level of growth within the Valley in recent years, ambient levels of ozone have been increasing annually.

The concern and research regarding the health effects of inhalable particulates caused the EPA to establish new regulations and national health standards for particulate matter (PM10) which replaced those that had been previously established for TSP. As a part of this effort, the EPA identified the Las Vegas Valley as an area in nonattainment of the PM10 national standard. The Valley is presently considered moderate in terms of EPA severity category designations. [31]

This General Plan springs from several requirements. Among them are the requirement for timely data, to keep up with changing issues and their focus and to develop strategic planning for resources. This last requirement was addressed in the 1990 "Las Vegas 2000 and Beyond Strategic Plan", which is described in the Plan Introduction section. The `2000' document contained "Actions" specified to be accomplished ("the process is not over... We must put these plans into action") The actions supported by this portion of the element are:

- Expand inspection programs to reduce carbon monoxide levels by including heavy trucks and older vehicles
- Expand tampering checks to include 1975-1980 vehicles
- Regulate diesel fuel quality and inspect diesel trucks
- Require stricter regulations on fireplaces in new developments
- Expand air quality surveillance and enforcement of industrial/commercial facilities

10D.2 Issue: The Clean Air Act

The Clean Air Act (CAA) Amendments of 1990 were signed into law by President Bush on November 15, 1990. These Amendments direct the United States Environmental Protection Agency (EPA) to implement strong environmental policies and regulations to ensure cleaner air in those areas experiencing air quality problems. With respect to National Ambient Air Quality Standards (NAAQS), the Las Vegas Valley is currently in nonattainment for CO and PM10. Under the new Amendments, the following reports are required to be submitted to the EPA by the dates indicated by Clark County with assistance from all the jurisdictions in the non-attainment area:

March 15, 1991
Submit a Clark County non-attainment area boundaries for both carbon monoxide (CO) and fine particulates (PM10).

November 15, 1991
Submit a State Implementation Plan (SIP) for fine particulates including demonstration of attainment by December 31, 1994, and provisions to insure reasonable available control measures (RACM) are implemented by December 10, 1993.

November 15, 1992
Submit an enhanced Inspection/ Maintenance program for gasoline powered vehicles.

November 15, 1992
Submit a report demonstrating attainment of the national ambient air quality standard for carbon monoxide by December 31, 1995. Include vehicle miles traveled (VMT) forecasts and contingency measures to be implemented if VMT forecasts are exceeded.

The SIP will be evaluated by the Environmental Protection Agency. The SIP must eliminate or reduce the severity and number of violations of the NAAQS and achieve attainment of

these standards. The control strategies (RACM) should not cause:

1. or contribute to any new violation of any standard in any area
2. or increase the frequency or severity of any existing violation of any standard in any area
3. or delay timely attainment of any standard or any related interim emission reductions or other milestones in any area.

As already discussed, the Las Vegas Valley air quality does not meet Federal requirements of CO. The single major contributing source of carbon monoxide for the Valley is gasoline powered motor vehicles. These account for approximately 96% of all CO generated. With automobiles being the largest producer of CO in the Valley it is important to understand the critical need for coordination of air quality planning and transportation planning.

The Clean Air Act stipulates that all transportation plans and programs must be reviewed for conformity with the SIP. The State Implementation Plan should also include all estimates of emissions of motor vehicles for all transportation plans and programs and outline how these programs will meet necessary emissions reductions. No Federal agency may approve, accept or fund any transportation plan, program or project unless the plan program or project has been found to be in conformity with the SIP. Transportation Improvement Plans (TIP) must provide for timely implementation of transportation control measures consistent with schedules included in SIP. Transportation projects must meet the following requirements:

1. project must come from a conforming plan and program
2. the design concept and scope of the project cannot be significantly changed
3. the design and scope of the project at the time of approval was adequate to determine emissions.

10D.3 Goal, Objectives, Policies, and Programs

GOAL: To participate in the protection of the environmental quality of the Las Vegas Valley and to promote the conservation of our natural resources.

Objective A: Reduce the total amount of air pollutants emitted by industrial sources.

Policy A1: Participate with local governments in promoting the relocation of existing polluting industries.

Program A1.1: Develop a long range plan and identify incentives and funding sources for relocation of existing polluting industries to sites outside of the Las Vegas Valley and prioritize available funding for Apex Industrial Park infrastructure.

Program A1.2: Require consideration of environmental issues in industrial development bonds within the Las Vegas Valley.

Program A1.3: Evaluate heavy industrial land use zones and rezone to encourage non-polluting industries to locate within the Las Vegas area.

Program A1.4: Amend use permit ordinances to allow elected officials to either approve or deny use permit applications based on independent environmental and safety assessments.

Objective B: Implement a centralized diesel emissions inspection/maintenance program for the Las Vegas area and to promote other alternatives to diesel fuel vehicles to help reduce visible emissions from diesel engines.

Policy B1: Participate with local governments to promote alternatives to diesel fuel vehicles and to encourage adoption of diesel emission standards.

Program B1.1: Adopt resolutions requesting the State to require annual emissions testing for all diesel vehicles.

Program B1.2: Encourage local public and private diesel fleet operators to develop a schedule to convert diesels to cleaner fuels within ten years.

Program B1.3: Develop incentives to convert private and public vehicle fleets to use cleaner fuels, through fleet conversion contract standards requiring use of alternative fuels, tax incentives and legislative initiatives.

Program B1.4: The Board of Health should limit the non-emergency use of stand by diesel powered generators.

Policy B2: Assist in obtaining State funding to train and certify peace officers in smoke opacity identification and provide additional enforcement. NHP officers should also issue citations for such violations.

Policy B3: Assist in developing an incentive/certificate program for voluntary compliance with diesel emission standards.

Objective C: Implement an enhanced inspection/maintenance program utilizing centralized inspection station.

Policy C1: Promote the development of a State operated vehicle inspection program.

Programs C1.1: Encourage the State to consider the phased vehicle exhaust emission standards of California to reduce hydrocarbons by 75% and nitric oxides by 50% beyond emission standards set by the new Federal Clean Air Act. Regulations should require extended pollution control equipment warranties and require that new vehicles are equipped with devices to alert drivers that pollution control systems are not functioning properly.

Program C1.2: Lobby the State legislators to revise regulations to allow for transition into a centralized system of inspection stations.

Program C1.3: Revise air pollution and land use regulations in order that gasoline vehicle emissions from new developments may be identified and control measures adopted. All new large businesses should be required, as a condition of any use permit, to pay for pollution reduction measures to "offset" the number of single-occupant trips generated by the business. Existing large businesses should be required to do so over time.

Program C1.4: Initiate numerous transportation improvement projects that will increase capacity and reduce travel delay. Construct urban arterials, beltways, and other facilities in accordance with the neighborhood and regional needs.

Objective D: To reduce the source of pollutant from gasoline stations which contribute heavily to ozone levels in the Las Vegas area.

Policy D1: Promote the use of new technology to reduce the amount of vapor being released into the atmosphere.

Program D1.1: Adopt resolutions supporting improved vapor recovery systems for all gasoline stations.

Objective E: To improve engine efficiency

Policy E1: Promote expanded retail gasoline monitoring program in Clark County

Program E1.1: Obtain State funding to hire additional staff to sample and monitor gasoline quality in Clark County.

Objective F: To encourage mixed use development and the use of transportation demand management measures to reduce the single occupant vehicle and encourage the use of bicycles.

Policy F1: Promote reduction of traffic demand on area road network.

Programs F1.1: Promote and institute flex-time work scheduling for

the Las Vegas area's employers.

Program F1.2: Promote carpool, van pool and ride-sharing programs for public and private sector employers.

Program F1.3: Develop incentives and adopt ordinances which promote infill development to create additional opportunities for mass transit and ride-sharing programs.

Program F1.4: Allow mixed-use developments and allow residential and employment land uses to be developed in close proximity to each other.

Program F1.5: Amend zoning codes to require developers to provide bicycle parking facilities, bike paths and bike lanes adjacent to and through their sites.

Program F1.6: Adopt design standards conducive to promoting pedestrian use such as shading, improved lighting, seating, and pocket parks.

Objective G: To encourage dust emissions reductions and increase infill.

Policy G1: Promote dust reduction through PM10 (fine particulates) control measures.

Programs G1.1: Adopt control measures recommended in the PM10 State Implementation Plan for the Las Vegas Valley nonattainment area.

Program G1.2: Review existing goals,policies, and guidelines relating to infill development and identify deficiencies. Adopt land use master plans and ordinances which require infill developments where infrastructure is available and deny leapfrog developments.

Program G1.3: Develop technical and policy-level coordination among political jurisdictions to develop incentives for infill development.

Program G1.4: Develop incentive program to reduce emissions from existing woodburning fireplaces(4).

Objective H: To meet National Air Quality Standards in the future

Policy H1: Promote Air Quality planning for future growth and development

Program H1.1: Prepare Air Quality Implementation Plans to demonstrate Las Vegas area compliance with carbon monoxide and fine particulate matter air quality standards.

Objective I: To reduce the odor from the wastewater facility

Policy I1: Promote the use of new technology in wastewater treatment

Programs I1.1: Incorporate new technology in wastewater treatment construction projects which will decrease sewerage odor.[32]

10D.4 Evaluation and Implementation Matrix

The following Air Quality Evaluation and Implementation Matrix (EIM) was prepared as a measurable summary of the above Air Quality Policies and Programs. The EIM is to be used:

- as a method of mesuring the implementation progress of the General Plan
- as a budgeting document for specific Environmental Quality and Natural Resources programs of the General Plan
- as a tool for further developing work programs

The following abbreviations apply to each Evaluation and Implementation Matrix

City

CA	City Attorney
CM	City Manager
CP	Community Planning & Development
ED	Economic & Urban Development
PW	Public Works

Other Agencies/Jurisdictions

CCHD	Clark County Health District
EQPRB	Environmental Quality Policy Review Board

10D.4 EVALUATION AND IMPLEMENTATION MATRIX : AIR QUALITY

POLICY (PROG)	SUMMARY	RESPONSIBLE DEPARTMENTS	DATE OF IMPLEM.	ACTION/PRODUCT (RELATED PROGRAM)	REMARKS
A1(1)	Relocation of existing polluting industries and support the development of Apex Industrial Park as the relocation site	ED, CP, CM, EQPRB	1992	The creation of a evironmentally safe industrial park	
A1(2)	Require evironmental assement before industrial development bonds are issued	ED, PW, CA, CM, EQPRB	1993	Insures evironmental concern are addressed	
A1(3)	Evaluate industrial landuse needs for the city;and encourage the development of clean industry	CP, CM	1992	Prevents unwanted industrial development	
A1(4)	Use permits may be approved or denied based on environmental and safety concerns	CP, CM,EQPRB	1993	Assures environmental concerns are being addressed	
B1(1)	Lobby the State to require annual emissions testing for all diesel vehicles	CM, CA,EQPRB, CCHD	1993	To monitor pollution levels	
B1(2)	Encourage public and private diesel fleet operators to convert to cleaner fuels within the next decade	CM,EQPRB	1993	City evaluate and report on purchasing alternative fuels to reduce pollutants	
B1(3)	Encourage the use of cleaner alternate fuels for both diesel and gasoline powered fleet vehicles through the use of legislative incentives	CM,EQPRB, CCHD	1993	City evaluate and report on purchasing alternative fuels to reduce pollutants	
B1(4)	Limit non-emergency use of stand-by diesel-powered generators	CM, CA,EQPRB	1993	To help reduce the amount of pollutants produced by fossil fuel	
C1(1)	City to lobby state legislature to require reduction in amount of allowable emission and require that new vehicles be equipped with warning device to alert drivers that pollution control system is not fuctioning	CM, CA,EQPRB	1993	To help reduce the amount of pollutants produced by fossil fuel	

C1(2)	City to lobby state legislature to allow for a centralized system of inspection station	CM ,CA,EQPRB, CCHD	1993	To illimiate fraud	
C1(3)	Require new large business to pay for pollution reduction measures as a condition for a use permit	CM, CP, CA, EQPRB	1992	To offset finacial burden of maintaing good air quality	
C1(4)	The City in conjuction with RTC continue to identify and build arterials, beltways and other transportation improvement as needed	CM, CP	1992	To help reduce travel time	
D1(1)	Support vapor recovery systems for all gasoline stations by resolution	CM, CA,EQPRB	1992	To help reduce pollutant from being released into the atmosphere	
E1(1)	Seek State funding to hire additional staff to monitor gasoline quality	CM,EQPRB, CCHD	1993	To help reduce the amount of pollutants produced by fossil fuel	
F1(1)	Promote flex-time work scheduling and institute it with City;'s employee	CM	1992	To reduce pollution levels	
F1(2)	Promote car pool,van pool and ride sharing programs for public and private sector	CM	1992	To reduce pollution levels	
F1(3)	Promote infill development with incentives	CM, CP,EQPRB, CCHD	1992	To reduce PM10 levels	
F1(4)	Promote mixed-use developments that would allow residential and empolyment land uses together	CM ,CP	1992	To reduce dependency on the automoblie for transportation	
F1(5)	Ordinance that would require developers to provide bike paths,bike lanes etc. through their development	CM, CA, CP	1992	To encourage altenative forms of transportation	
F1(6)	Ordinance that would require developers to provide offsite amenities that would promote pedestrian use	CM ,CA, CP	1992	To encourage alternative forms of transportation	
G1(1)	Adopt Clark County PM10 strategy	CM, CA	1991	To reduce PM110 levels	
G1(2)	Ordinance that would promote infill development where infrastructure was availble	CM, CA, CP	1992	To reduce PM10 levels and reduce travel time	
G1(3)	Devlop intergovernmental coordination for a valley wide in-fill policy	CM ,CP	1992	To develop a uniform policy that would help to reduce PM10 levels and travel time	

G1(4)	Develop incentives to reduce use of woodburning fireplaces	CM ,CA	1991	To reduce visual haze and pollution levels	
H1(1)	Assist Clark County in the preparation of the SIP	CM ,CP, CA	1991	To develop a comprehensive plan for good air quality	
I1(1)	Decrease sewage ordor by incorporating new technology in wastewater treatment	PW	1992	To illminate foul odor originating from the wastewater treatment facility	

10E Energy Conservation and Management

10E.1 Introduction

Approximately 35% of the energy consumed in the United States heats and cools buildings. That figure could be reduced by as much as 30% using readily available technology. The Nevada Power Company, Southwest Gas Corporation, and the Las Vegas Valley Water District have shown a commitment to energy conservation by advocating conservation and offering information to the public at no cost. Nevada Power, which supplies electricity to the area, offers free home "energy audits" to residential users giving advice on how to retrofit homes to make them more energy efficient.

New construction is regulated by code to be energy efficient according to National Standards provided by the U.S. Department of Energy (DOE). Tougher codes and enforcement have resulted in marked improvement in energy efficiency in buildings in many American cities. In addition, some cities offer incentives to build energy-efficient structures. The Massachusetts Legislature is considering revenue-neutral "free-bates" for commercial buildings of 50,000 square feet or larger. Buildings that use more electricity per square foot than average would be assessed a higher hook-up fee, while those that use less would get rebates. The fees collected from inefficient buildings would go towards the rebates to the energy-efficient buildings.

Many cities have also adopted energy codes for existing structures. San Francisco, for example, now has commercial and residential conservation ordinances that require energy-saving upgrades before title transfers. Nebraska recently instituted the "Dollar and Energy Saving Loan Program" that will make $31.3 million available for low-interest energy conservation loan programs for energy improvements in existing construction.

10E.1.2 Energy Efficiency and Management

Energy efficiency is rapidly becoming a leading public policy issue of the 1990's. Many regions of the country, including the Northeast and the Northwest, and states like California, face electricity shortages or are headed in that direction. As utilities meet the additional demand, they are searching for sources that are relatively low-cost and politically acceptable. Building new power plants, the traditional response, is low on the list of options because of environmental concerns about nuclear power, coal-fired electric generating plants, and other energy sources. Increasing energy efficiency, on the other hand, is a non-polluting and relatively low-cost solution.

Large-scale energy efficiency, also called demand-side management (DSM), essentially creates new capacity by reducing the need for electricity. For example, the Sacramento Municipal Utility District (SMUD) began a DSM program this year for residential, commercial, and industrial customers. SMUD will audit buildings and offer suggestions and low-interest financing for high-efficiency lights, motors, and appliances. DSM also includes a variety of conservation measures, from energy-efficient new residential and commercial construction to more modest steps such as hot-water heater blankets. SMUD predicts that DSM could reduce demand by about 700 megawatts per year; the equivalent of a medium sized generating plant. Nevada Power currently offers a rebate program to encourage energy-efficient lighting and high-efficiency electric motor installations.

10E.1.3 Energy Alternatives

New growth and development bring opportunities to incorporate innovative and energy-efficient techniques into construction design and building siting. The City zoning ordinance regulates building setbacks and lot size and dimensions which in turn limits the potential for passive solar design in the construction of buildings. "Passive" solar design refers to the orientation of a structure to take advantage of the position of the sun in the summer and the winter. This is as opposed to "active" solar devices, such as photovoltaic cells which convert sunlight into electricity and black tubing that heats water. Both methods of using solar energy are considered "renewable energy sources" in contrast to non-renewable such as oil and other fossil fuels. Developing flexible design guidelines with provisions for solar access protection could act to encourage energy-efficient site design of new construction.

Other energy alternatives include the use of wind power, biomass and geothermal generation. California is currently spending $24 million per year to help develop these alternative fuels as well as solar. Alternative energy such as solar and wind power account for 9% of the total electrical generating capacity of the state of California. A few other states have adopted energy policies that stress some alternative energy source development. Iowa's energy policy calls on utilities to spend a minimum of 2% of their budgets on energy efficiency, conservation, and alternative source development. The state also gives tax credits to firms that have taken on solar projects.

Transportation alternatives such as better mass-transit opportunities and para-transit use by employment centers could help reduce gasoline consumption by single-occupant vehicles. The City has initiated a "ride-share" program to encourage people to carpool to

work. Also, the City Bicycle Program encourages the provision of bike lanes to enable bicyclists safe routes to work and recreation rather than using their vehicles.

The revised national energy policy cites renewable energy sources, such as thermal, solar and wind, but offers no new funding initiatives to state and local governments for the development of these sources. The national strategy also omits recycling-related programs and does not take a clear stand on conservation programs. Instead, national energy policy proposes more aggressive development of domestic oil resources.

This General Plan Update springs from several requirements. Among them are the requirement for timely data, the requirement to keep up with changing issues and their focus and the requirement to develop strategic planning for resources. This last requirement was addressed in the 1990 "Las Vegas 2000 and Beyond "strategic plan" which is described in the Plan introduction section. The '2000' document contained "Actions" specified to be accomplished ("the process is not over... We must put these plans into action") The action supported by this portion of the element is:

- Develop City...energy supply and delivery...in conjunction with optimal regional systems.

10 E.2 Issue

Energy production is of national concern. As experienced in recent confrontations in the middle east, domestic dependence on foreign oil is not desirable. National policy advocates greater production of domestic oil resources. State and local governments advocate energy-efficiency and conservation.[23]

10E.3 Goal, Objectives, Policies and Programs

Goal: To participate in the protection of the environmental quality of the Las Vegas valley and to promote the conservation of our natural resources.

Objective A: Encourage energy conservation and the use of energy-efficient technology.

Policy A.1: It is the policy of the City of Las Vegas to encourage urban design and development which conserve energy.

Program 1: Enforce regulations requiring conformance with energy conservation standards for buildings.

Policy A.2: Promote transportation improvements which contribute to energy conservation.

Program 1: Use transportation system management techniques which improve roadway traffic efficiency, particularly on major routes during peak hours.

Policy A.3: It is the policy of the City of Las Vegas to conserve energy in city administration.

Program 1: Develop an energy audit of all City buildings.

Program 2: **Implement the** recommendations of the audit as they are feasible and practical.

Program 3: Explore opportunities to use excess methane gas produced as a by-product of the anaerobic digestion process used at the wastewater treatment plant.

Policy A.4: It is the policy of the City of Las Vegas to cooperate with electrical and gas utilities and any secondary users of energy (water districts, sanitation districts, school districts, etc.) in efforts to reduce energy consumption.

10E.4 Evaluation and Implementation Matrix

The following Energy and Conservation Management Evaluation and Implementation Matrix (EIM-see next page) was prepared as a measurable summary of the above Policies and Programs. The EIM is to be used:

- as a method of measuring the implementation progress of the General Plan
- as a budgeting document for specific Environmental Quality and Natural Resources programs of the General Plan
- as a tool for further developing work programs.

The following abbreviations apply to each Evaluation and Implementation Matrix

City

BS	Building and Safety
CM	City Manager
CP	Community Planning & Development
PW	Public Works

Other Agencies/Jurisdictions

NDOT	Nevada Department of Transportation
RTC	Clark County Regional Transportation Commission

10E. Evaluation and Implementation Matrix: Energy Conservation and Management

Policy Program	Summary	Department	Implementation	Action/Product (Related Program)	Remarks
14.1	Encourage urban design and development which conserve energy.	CP	1993	Develop guidelines for urban design techniques that conserve energy.	
14.1(1)	Enforce regulations requiring conformance with energy conservation standards for buildings.	CP, BS	Ongoing	Form group to periodically review regulations for update that considers new technology.	
14.2	Promote transportation improvements which contribute to energy conservation.	CP, NDOT, RTC	1993	Report on effective transportation programs that result in energy savings.	
14.2(1)	Use transportation system management techniques which improve roadway traffic efficiency, particularly on major routes during peak hours.	CP, PW	1993	Development of implementation program; include funding estimates and schedule in City CIP.	
14.3	Conserve energy in city administration.	CM, PW			
14.3(1)	Continue city efforts to reduce energy use by city facilities and operations.	CM, PW	Ongoing	Biennial progress report should be included in General Plan Implementation Biennial Report.	
14.3(2)	Explore opportunities to use excess methane gas produced as a by-product of the anaerobic digestion process used at the wastewater treatment plan.	PW	1993	Report to City Council outlining opportunities and implementation program.	
14.4	Cooperate with electrical and gas utilities and any secondary users of energy (water districts, sanitation districts, school districts, etc.) in efforts to reduce energy consumption.	CM, CP, PW	Ongoing	Biennial progress report should be included in general Plan Implementation Biennial Report.	

10F Noise

10F.1. Introduction

The Las Vegas metropolitan area's rapid growth and its concomitant increase in roadway and air traffic have resulted in urban noise levels that could threaten the community's health, welfare, and quality of life. In addition, land use which places noise producing activities adjacent to residential or other noise sensitive uses increase the number of noise conflicts in the region.

Guidelines developed by several federal agencies including the Federal Highway Administration, the Federal Aviation Administration, the Environmental Protection Agency and the Department of Housing and Urban Development stipulate residential land use sound levels not exceed 45-55 decibels (Ldn, Leq). Schools, hospitals, lodging, and certain recreational facilities are also noise sensitive uses which should be protected from a variety of environmental and public problems.

The decibel is a unit for measuring the volume of a sound. A rating scale, dB(A), was devised to measure sound relative to the sensitivity of the human ear. The dB(A) scale is logarithmic so an increase of ten decibels is a tenfold increase in sound energy. However, measuring sound does not necessarily determine what actually constitutes noise on a community level. The Ldn scale is a sound measurement technology that was developed to measure cumulative noise exposure in the community over the twenty-four hour day (Leq). The Environmental Protection Agency recommends outdoor Ldn noise levels of 55 dB or lower and indoor levels of 45 dB or lower in residential areas with outdoor space, rural areas, and hospitals.

10F.1.2 Noise Mitigation Methods

The major sources of noise in the City of Las Vegas are from roadways, aircraft, and the railroad. Several methods can be employed to protect the public from these noises and their effects. Guiding the location of noisy activities can be accomplished through the zoning process. Other noise problems can be ameliorated by construction and design measures. Open space buffers, berm and barrier construction, placement of non-sensitive uses to buffer sensitive uses, and proper building orientation, lay out and construction are a few methods that can be used to minimize noise effects. Furthermore, evaluation of potential noise conflicts in new or expanded transportation facilities, such as airports and roadways, can incorporate noise mitigation measures in the design. Prohibiting nuisance noise as found in Chapter 9.16 in the City Code is effective and could be more effective with maximum decibel levels mandated and consistent enforcement.

10F Issue

Noise is a problem with many direct and indirect effects on the quality of life of residents. Noise above recommended levels can increase general morbidity and either induce or aggravate a gamut of health disorders such as hypertension, cardiac disease, digestive disorders and general neuropsychological disturbances. Excessive noise levels can contribute to learning disabilities in school age children. Therefore, it is an issue of great importance to the safety and well being of the community.

10F.3 Goal, Objectives, Policies and Programs

Goal: To participate in the protection of the environmental quality of the Las Vegas valley and to promote the conservation of our natural resources.

Objective A. Prohibit unacceptable community noise levels.

Policy A.1: Mandate that exterior noise levels of 55 Ldn and interior noise levels of 45 Ldn as the noise limits for residential, public and quasi-public uses in the City of Las Vegas.

Program 1: Map noise contours throughout the City using the National Cooperative Highway Research Program (NCHRP) model, particularly the areas adjacent to freeway routes, expressways, rail lines, and the North Las Vegas Airport.

Program 2: Review City Code pertaining to Noise and assess effectiveness of enforcement and abatement. Recommend revision where necessary.

Program 3: Require that development plans document noise conditions on the site and describe how excessive noise will be handled where noise sensitive uses are planned within 300 feet of a freeway, expressway, or rail line; within the approach or departure pattern for the North Las Vegas Airport; or adjacent to major thoroughfares.

Program 4: Encourage non-noise sensitive uses to locate near noise generators in the General Plan land use designations and through subsequent zoning.

Program 5: Include in the City Code provisions for noise attenuation in building design and construction.

Policy A.2: Cooperate with federal, state and local regulatory agencies in efforts to minimize noise impacts from all modes of transportation.

10F.4 Evaluation and Implementation Matrix

The following Noise Evaluation and Implementation Matrix (EIM-see next page) was prepared as a measurable summary of the above Policies and Programs. The EIM is to be used:

- as a method of measuring the implementation progress of the General Plan
- as a budgeting document for specific Environmental Quality and Natural Resources programs of the General Plan
- as a tool for further developing work programs.

The following abbreviations apply to each Evaluation and Implementation Matrix

City

BS	Building and Safety
CM	City Manager
CP	Community Planning & Development

Other Agencies/Jurisdictions

LVMPD Las Vegas Metropolitan Police Department

10F. Evaluation and Implementation Matrix: Noise

Policy Program	Summary	Department	Implementation	Action/Product (Related Program)	Remarks
15.1	Consider exterior noise levels of 55 Ldn and interior noise levels of 45 Ldn as the noise limits for residential, public and quasi-public uses in the City of Las Vegas.	CM, CP	1992	Amend City Code	
15.1(1)	Map noise contours throughout the City using the National Cooperative Highway Research Program (NCHRP) model, particularly the areas adjacent to freeway routes, expressways, rail lines and the North Las Vegas Airport.	CP	1993	Nose Contour Map on GIS	
15.1(2)	Require that development plans document noise conditions on the site and describe how excessive noise will be handled where noise sensitive uses are planned within 300 feet of a freeway, expressway or rail line, within the approach or departure pattern for the North Las Vegas Airport, or adjacent to major thoroughfares.	CP	1993	Develop guidelines for urban design techniques that abate noise.	
15.1(3)	Encourage non-noise sensitive uses to locate near noise generators in the General Plan Land Use designations subsequent zoning	CP	1992	Zone Map Amendments as deemed appropriate.	
15.1(4)	Include in the City Code provisions for noise attenuation in building design and construction	CP, BS	1992	Amend Code	
15.1(5)	Review City Code pertaining to noise and access reflectiveness of enforcement and abatement. Recommend revision where necessary.	CP, LVMPD, CM	1992	Report to City Council; Amend Code.	
15.2	Cooperate with federal, state and local regulatory agencies in efforts to minimize noise impacts from all modes of transportation.	CM, CP	Ongoing	Report progress in General Plan Biennial Report.	

10G Natural Features

10G.1.1 Land Resources

The City of Las Vegas is largely an urban environment. Large tracts of undeveloped land are predominantly part of master planned developments with some exceptions found in the Northwest Sector where individual parcels may be found in single ownership. The master planned developments incorporate topography into the project design. Often, fairways of golf courses follow the natural drainage induced terrain. Many planned developments are incorporating water efficient landscaping into project landscape design.

10G.1.2 Biological Environment

Natural vegetation found in the valley is common to that found in other areas of the southwestern United States. Generally, the vegetation consists of sparse growths of desert shrubs and grasses. Animal species are often restricted to the habitats as defined by the vegetation in an area. A wide variety of reptiles may be found in the desert shrub community. The gila monster and the desert tortoise are protected desert species. The gila monster prefers a habitat of rocky or sandy washes. The desert tortoise, an endangered species, depends on annual plants that germinate in winter and grow in spring. Both animals can be found in undeveloped areas of the Las Vegas Valley, with the highest densities in the western half.

This General Plan Update springs from several requirements. Among them are the requirement for timely data, the requirement to keep up with changing issues and their focus and the requirement to develop strategic planning for resources. This last requirement was addressed in the 1990 "Las Vegas 2000 and Beyond "strategic plan" which is described in the Plan introduction section. The '2000' document contained "Actions" specified to be accomplished ("the process is not over... We must put these plans into action") The action supported by this portion of the element is:

- Improve valley-wide coordination of zoning, building and code enforcement regulation and processing utility placement standards.

- Investigate and encourage urban form alternatives to suburban sprawl, including nodal development concepts such as urban villages and activity/service centers.

10 G.2 Issue

Urbanization in the Las Vegas Valley has resulted in the reduction of habitat area for rare and endangered animal species. Future development should be sensitive to the natural environment.

10 G.3: Goal, Objectives, Policies and Programs

Goal: To participate in the protection of the environmental quality of the Las Vegas valley and to promote the conservation of our natural resources.

Objective A: Continue the conservation of natural resources.

Policy A.1: Conserve the City's land resources.

Program 1: Require development plans to preserve unique land features, such as knolls, bluffs and out-croppings.

Program 2: Continue to require extraction rehabilitation plans, which guarantee restoration to an acceptable post-extraction condition and use.

Policy A.2: Encourage preservation of areas of environmental significance.

10G.4 Evaluation and Implementation Matrix

The following Natural Features Evaluation and Implementation Matrix (EIM-see next page) was prepared as a measurable summary of the above Policies and Programs. The EIM is to be used:

- as a method of measuring the implementation progress of the General Plan
- as a budgeting document for specific Environmental Quality and Natural Resources programs of the General Plan
- as a tool for further developing work programs.

The following abbreviations apply to each Evaluation and Implementation Matrix

City

CP Community Planning & Development

10G. Evaluation and Implementation Matrix: Natural Features

Policy Program	Summary	Department	Implementation	Action/Product (Related Program)	Remarks
16.1	Conserve the City's land resources.				
16.1(1)	Require development plans to preserve unique land features, such as knolls, bluffs and out-croppings.	CP	1992	Develop guidelines for urban design techniques that encourage preservation of natural features.	
16.1(2)	Continue to require rehabilitation plans, guaranteeing restoration to an acceptable post-extraction conditions and use, for any extraction activity authorized in the City.	CP	Ongoing	Biennial Progress Report.	
16.2	Encourage preservation of areas of environmental significance.	CP	Ongoing	Biennial Progress Report.	

Definitions

Acre-foot: The amount of water required to cover one acre of ground one foot deep, equaling 325,851gallons.

Air Pollution: The presence in the outdoor atmosphere of one or more air contaminants or any combination thereof in such quantity and duration as may tend to:

Injure human health or welfare, animal or plant life, or property;

Limit visibility or interfere with scenic, aesthetic and historic values of the State;

Interfere with the enjoyment of life or property.

Ambient Air: With respect to a Stationary Source, that portion of the atmosphere, external to buildings, to which the general public has access. Land owned or controlled by the stationary source and to which public access is precluded by a fence or other physical barriers is exempted from the ambient air.

Compaction Faults: Shifts in the ground surface due to natural prehistoric dewatering and differential consolidation of sediments.

Diesel Fuel: A low viscosity oil normally used in compression ignition engines.

Drought-tolerant: Species of plants that are able to survive prolonged dry weather. Drought-tolerant plants are not necessarily 'low-water' using plants, especially when immature.

Emission or Emit: The release or the passing into the atmosphere of a Regulated Air Contaminant.

Emission Unit: Any part of a Stationary Source or Gasoline Station which Emits any Regulated Air Contaminant through a stack, vent, machine, process equipment, or mining area.

Endogenic Subsidence: Subsidence due to changes occurring within the earth, such as natural movement of the Earth's tectonic plates, volcano activity, and continental drift.

Exogenic Subsidence: Subsidence occurring mainly at the earth's surface due to loss of support, as in the case of fluid extraction, or an increase of loading from the weight of a body of water, such as Lake Mead, or heavy irrigation.

Fuel: Any form of combustible matter (solid, liquid vapor, or gas), excluding combustible refuse.

Fuel Oil: A liquid or liquefiable petroleum product normally produced, manufactured, used, or sold for the purpose of creating useful heat.

Gas: Matter which has neither independent shape nor volume and tends to expand indefinite

Gasoline: Any petroleum distillate having a Reid vapor pressure of 4 pounds per square inch or greater.

Gasoline Station: A place capable of receiving, storing, and dispensing one or more grades of gasoline for use in motor vehicles.

Hardpan: A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Health District: The Clark County Health District.

Hydrographic Region: Natural water basin area consisting of one or more significant watersheds. The Las Vegas Valley lies within the Colorado River Basin hydrographic region.

Motor Vehicles: Every device in, upon or by which any person or property is, or may be transported or drawn upon a highway, except devices moved by human power or used exclusively upon stationary rails.

Oxygenated Gasoline: Gasoline blended with a component or components containing Oxygen, generally an alcohol or an ether.

Percolation: The passage of liquid, such as rain water, through porous substances, such as sand or silt.

PM-10: An inhalable Particulate Matter with an aerodynamic diameter less than 10 micrometers.

Particulate Matter: Any material except uncombined water, that exists in a finely divided form as a liquid or solid at referenced conditions of (25 C) and 760 mm mercury.

Stage II: Gasoline vapor recovery during motor vehicle re-fueling operations from stationary tanks.

Stationary Source: Any building, structure, facility, or installation which Emits or may Emit any Regulated Air Contaminants. A Stationary Source is composed of one or more Emission Units, is located on one or more contiguous or adjacent properties, and is under control of the same person (or persons under common control).

Tectonic Faults: Cracks in the earth, resulting from changes in the structure of the earth's crust.

Topography: Natural surface features of an area which may include mountains, valleys, rivers, hills.

Vapor: The gaseous phases of a substance which at normal temperature and pressures is a liquid or solid.

Vapor Control System: A device or combination of devices into which vapors are passed before being vented into the atmosphere.

Watershed: A ridge or stretch of land dividing the areas drained by different rivers or river systems.

Water Efficient: In context of landscaping; plant materials that do not require large amounts of water to mature or to be maintained over time.

Xeriscape: From the Greek word '*xeros*', meaning 'dry.' Applied to landscaping to describe a means of conserving water through the use of plants that are characterized by, relating to, or requiring only a small amount of moisture.