Appendices

APPENDIX 1: ATTACHMENT A (SCOPE OF WORK) FOR BOR AGREEMENT 5-FC-30-00440 AS REVISED 11/19/98

APPENDIX 2: MULTIVARIATE MODEL DETAILS

Note: Detailed definitions of variables and units for with each variable for both of the below models appear in the corresponding sections within *Sources of Significant Variability in Single-Family Residential Consumption.*

TABLE 19: Multivariate Regression Model of Annual Single-Family Residential Consumption

Regression Summary
Dependent Variable: MAINMETE (i.e., annual consumption registered through mainmeter)
R^2=0.80889235; Adjusted R^2=0.80046113
F(9,204) = 95.940; p<0.0001
Std. Error of Estimate=76890

Variable	Beta	Std. Error of Beta	B	Std. Error of B	*t*(204)	p - level
Intercept			-90852.6	25413.77	-3.57494	0.000437
POOL	0.060698	0.035627	51.3	30.13	1.70371	0.089959
TOTALTUR	0.622464	0.041887	59.1	3.98	14.86045	0.000000
TOTALLAN	-0.145252	0.102765	-5.5	3.90	-1.41344	0.159051
APPROXINC	0.073217	0.033839	0.3	0.14	2.16370	0.031649
FESCUE	0.068672	0.032854	25756	12322.71	2.09020	0.037839
TOTVAL	0.281661	0.051686	2.1	0.39	5.44950	0.000000
PARCELSI	0.214206	0.119536	5.9	3.28	1.79197	0.074620
NLTHOMEA	0.117091	0.043809	1600.6	598.85	2.67274	0.008132
TOTALOCC	0.52416	0.032356	8860.4	5469.42	1.61999	0.106780

TABLE 20: Multivariate Regression Model of Annual Xeric Study Area Consumption

Regression Summary
Dependent Variable: SUBMETER (i.e., annual consumption registered through submeter)
R^2=.64787230; Adjusted R^2=.41973852
F(7,178) = 18.394; p<0.0001
Std. Error of Estimate=32272

Variable	Beta	Std. Error of Beta	B	Std. Error of B	*t*(178)	p - level
Intercept			-7697.6	8973.436	-0.85782	0.392144
STUDYA	0.211132	0.068633	6.4	2.087	3.07623	0.002427
TOTALCAN	0.299352	0.069467	9.2	2.126	4.30934	0.000027
DONTKNOW	0.122082	0.57381	10922.2	5133.663	2.12756	0.034750
TOTVAL	0.213746	0.072592	0.4	0.137	2.94447	0.003667
PARCELSI	-0.211758	0.076239	-1.5	0.524	-2.77756	0.006064
AVGFLOWR	0.265679	0.064116	3637.4	877.802	4.14372	0.000053
DRIP	-0.133730	0.058997	-13615	6006.406	-2.26674	0.024609

APPENDIX 3: RAW DATA

Raw data for possible further analysis is included in the file "BORdata.mdb." A copy of this Microsoft Access database file is being included on disk with submission of this report to BOR. Below is the data description and dictionary for the file (this is also saved on disk).

Xeriscape Conversion Study Data Description

1. **tblCustomerList – 716 Records,** basic customer information.
    a. ClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. Program – Indicates if the property is a xeriscape or turf study site
        i. Text – 50
        ii. XS = Xeriscape Study, TS = Turf Study
    c. FirstName – Property occupant's first name
        i. Text – 50
    d. LastName – Property occupant's last name
        i. Text – 50
    e. Address – Address of property
        i. Text – 50
    f. City
        i. Text – 50
    g. Zip – Postal code
        i. Text – 5
    h. HomePhone
        i. Text – 50
    i. WorkPhone
        i. Text – 50
    j. Comments – Optional comment field
        i. Memo
    k. OwnerChange – Indicates if there has been a change in the ownership of the property.
        i. Boolean
    l. FollowupMonth – Number of the month the property has been assigned to schedule an annual follow-up site visit.
        i. Text – 2
    m. AccountNum – LVVWD / SNWA account number assigned to the property
        i. Number – Long Integer
    n. ServiceArea – Indicates if the customer receives service from LVVWD or one of the other entities.
        i. Text – 50
        ii. S = LVVWD Service, O = Outside Entity.

o. Agreement – Date the customer signed the agreement to become a participant in the study.
    i. Date/Time
p. FinalReview – Date final inspection site visit was conducted after the installation of the submeter.
    i. Date/Time
q. Status – File quality status indication.
    i. Text – 50
r. FileQuality – Quality rating of file information
    i. Text – 50

2. **tblAllSubmeterData – 2667 Records,** customer's submetered consumption data.
    a. nltClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. nitYear
        i. Number – Integer
        ii. Primary Key
    c. txtEntity – Indicates which water provider services the customer
        i. Text – 5
    d. txtProgram – Indicates if the property is a xeriscape or turf study site
        i. Text – 2
        ii. XS = Xeriscape Study, TS = Turf Study
    e. nstJan – January submeter consumption in gallons
        i. Number – Single Precision
    f. nstFeb – February submeter consumption in gallons
        i. Number – Single Precision
    g. nstMar – March submeter consumption in gallons
        i. Number – Single Precision
    h. nstApr – April submeter consumption in gallons
        i. Number – Single Precision
    i. nstMay – May submeter consumption in gallons
        i. Number – Single Precision
    j. nstJun – June submeter consumption in gallons
        i. Number – Single Precision
    k. nstJul – July submeter consumption in gallons
        i. Number – Single Precision
    l. nstAug – August submeter consumption in gallons
        i. Number – Single Precision
    m. nstSep – September submeter consumption in gallons
        i. Number – Single Precision
    n. nstOct – October submeter consumption in gallons
        i. Number – Single Precision
    o. nstNov – November submeter consumption in gallons
        i. Number – Single Precision

p. nstDec – December submeter consumption in gallons
    i. Number – Single Precision
q. nstTotal – Total yearly submeter consumption in gallons
    i. Number – Single Precision

3. **tblAOX2 – 702 Records,** parcel information from Assessor's database
    a. ClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. PLDECKSQF – Pool decking square footage
        i. Number – Single Precision
    c. STORAGESQF – Storage area square footage
        i. Number – Single Precision
    d. PAVE1SQF – Paved area one square footage
        i. Number – Single Precision
    e. PAVE2SQF – Paved area two square footage
        i. Number – Single Precision
    f. PATIO1SQF – Patio one square footage.
        i. Number – Single Precision
    g. PATIO2SQF – Patio two square footage
        i. Number – Single Precision
    h. PATIO3SQF – Patio three square footage
        i. Number – Single Precision
    i. GARAGE1SQF – Garage area 1 square footage
        i. Number – Single Precision
    j. GARAGE2SQF – Garage area 2 square footage
        i. Number – Single Precision
    k. CARPORTSQF – Carport area square footage
        i. Number – Single Precision
    l. FIRSTFLSQF – First floor footprint square footage
        i. Number – Single Precision
    m. TOTALHS – Total of all hardscape areas
        i. Number – Single Precision
    n. PARCEL – Assessor's parcel number
        i. Text – 11

4. **tblETDatawithCustomerIDs – 716 Records,** total monthly and annual evapotranspiration rates for 2001 by month correlated with SNWA client identification numbers.
    a. ClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. ETType
        i. Text - 50
    c. JanET
        i. Number – Single Precision

d. FebET
    i. Number – Single Precision
e. MarET
    i. Number – Single Precision
f. AprET
    i. Number – Single Precision
g. MayET
    i. Number – Single Precision
h. JunET
    i. Number – Single Precision
i. JulET
    i. Number – Single Precision
j. AugET
    i. Number – Single Precision
k. SepET
    i. Number – Single Precision
l. OctET
    i. Number – Single Precision
m. NovET
    i. Number – Single Precision
n. DecET
    i. Number – Single Precision
o. TotalET
    i. Number – Single Precision

5. **tblETDatawithCustomerIDsAvg – 716 Records,** average monthly and annual evapotranspiration rates for 2001 by month correlated with SNWA client identification numbers.
    a. ClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. ETType
        i. Text – 50
    c. JanAvgET
        i. Number – Single Precision
    d. FebAvgET
        i. Number – Single Precision
    e. MarAvgET
        i. Number – Single Precision
    f. AprAvgET
        i. Number – Single Precision
    g. MayAvgET
        i. Number – Single Precision
    h. JunAvgET
        i. Number – Single Precision

i. JulAvgET
    i. Number – Single Precision
j. AugAvgET
    i. Number – Single Precision
k. SepAvgET
    i. Number – Single Precision
l. OctAvgET
    i. Number – Single Precision
m. NovAvgET
    i. Number – Single Precision
n. DecAvgET
    i. Number – Single Precision
o. TotalAvgET
    i. Number – Single Precision

6. **tblInstalledCanopy – 447 Records,** total of square feet of plant coverage of xeriscape participants upon installation of the landscape.
    a. ClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. InstCanopyArea – Installed plant canopy square feet.
        i. Number – Single Precision

7. **tblParcelInfo – 702 Records,** Information from Clark County Assessor's office database extracted November 2002.
    a. ClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. ParcelNum – Assessor's office parcel number
        i. Text – 11
    c. ParcelSize – Size of parcel in square feet
        i. Number – Single Precision
    d. CONSTYR – Construction year
        i. Number – Integer

    SALEPRICE – Last Sales price
        ii. Number – Long Integer
    e. LYTOTAL – Last years assessed value land and improvement
        i. Number – Long Integer
    f. SALEDATE – Last sales date (Year)
        i. Text - 6
    g. nltHomeAge – Age of home calculated by construction year from the year 2001.
        i. Number – Long Integer

8. **tblResults – 603 Records,** collection of landscape areas, yearly water consumption data, other site, and customer information
    a. nltClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. Program – (TS = Turf Study Participant, XS = Xeriscape Study)
        i. Text – 50
    c. Converted – Area converted if XS participant
        i. Number – Single Precision
    d. Pool – Square footage of pool surface if present
        i. Number – Single Precision
    e. GardenMon – Square footage of garden area where the irrigation is monitored by the submeter
        i. Number – Single Precision
    f. GardenUnmon – Square footage of garden area where the irrigation is not monitored by the submeter
        i. Number – Single Precision
    g. Other – Square footage of other undeveloped property area. No irrigation, plants, or hardscape present.
        i. Number – Single Precision
    h. Study – Total xeriscape area where irrigation is monitored by the submeter. Applies to XS participant only.
        i. Number – Single Precision
    i. TurfMon – Square footage of turf grass where irrigation is monitored by the submeter.
        i. Number – Single Precision
    j. TurfUnmon – Square footage of turf area where the irrigation is not monitored by the submeter
        i. Number – Single Precision
    k. XeriMon – Square footage of xeriscape where irrigation is monitored by the submeter. (Applies to Turf Study Group)
        i. Number – Single Precision
    l. XeriUnmon – Square footage of xeriscape area where the irrigation is not monitored by the submeter.
        i. Number – Single Precision
    m. TotalLandscape – Total of all landscapable area on the property.
        i. Number – Single Precision
    n. TotalEvaporative – Total of all landscapable area with pool area added.
        i. Number – Single Precision
    o. dtt2001SR – Date of final annual visit conducted in 2001.
        i. Date/Time
    p. AgeOfXeriscape – Age of xeriscape in days calculated by the difference in days between the post submeter installation inspection and the final 2001 follow-up site visit.
        i. Number – Long Integer

q. TotalXeriArea – Total of all xeriscape areas, monitored and unmonitored.
    i. Number – Single Precision
r. Status – File quality status indication.
    i. Text - 50
s. TotalCanopy – Total of all plant canopy areas as of the 2001 annual site visit.
    i. Number – Single Precision
t. nitYear
    i. Number – Integer
u. txtEntity – Water agency that services the customer.
    i. Text - 5
v. Submeter2001 – Total gallons used in the year 2001 through the submeter
    i. Number – Single Precision
w. Mainmeter2001 – Total gallons used in the year 2001 through the main meter
    i. Number – Single Precision
x. pctGarden – Percent of total landscape area in garden
    i. Number – Single Precision
y. pctXeri – Percent of total landscape in xeriscape
    i. Number – Single Precision
z. pctTurf – Percent of total landscape area in turf
    i. Number – Single Precision
aa. pctOther – Percent of total landscape in other non-landscaped area
    i. Number – Single Precision
bb. pctPool – Percent of total landscape area in pool
    i. Number – Single Precision
cc. pctXeriRank – Xeriscape study participants were divided into ten percent ranges based upon percentage of landscape in xeriscape and given a ranking.
    i. Number – Single Precision
dd. XeriDensity – Percent of plant coverage per square foot of xeriscape.
    i. Number – Single Precision
ee. TurfType – Type of turf (Bermuda, Fescue, etc.) on property if present.
    i. Text – 50
ff. BarrierType – Type of weed barrier present if Xeriscape study participant.
    i. Text – 50

9. **tblSurveyInfoOfInterest – 603 Records,** Responses to survey questions. Each possible response is listed as a separate field. The responses are grouped where appropriate.
    a. CLIENTID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. SurveyAnswered – "Yes" or "No" Indicates if the customer answered any of the questions on the survey.
        i. Text – 3
    c. CLOCKADJ – How many times per year the irrigation clock was adjusted
        i. Number – Byte

d. INCBILL – How much of an increase in the monthly bill would produce conservation?
    i. Number – Integer
e. RESPAGE – Respondent's age
    i. Number – Byte
f. Respondent's gender
    i. MALE
        1. Number – Byte (1 = Yes, 0 = No)
    ii. FEMALE
        1. Number – Byte (1 = Yes, 0 = No)
g. Respondent's marital status
    i. MARRIED
        1. Number – Byte (1 = Yes, 0 = No)
    ii. SINGLE
        1. Number – Byte (1 = Yes, 0 = No)
    iii. WIDOWED
        1. Number – Byte (1 = Yes, 0 = No)
h. RETIRED – Indicates if respondent is retired or not
    i. Number – Byte (1 = Yes, 0 = No)
i. NATIVE – Native to southern Nevada?
    i. Number – Byte (1 = Yes, 0 = No)
j. AGE65PLS – Number of residents at the property age 65 and older
    i. Number – Byte
k. APROXINC – Median of a range of household income
    i. Number – Long Integer
l. Respondent's opinion on Water Waste enforcement
    i. DONTKNOW
        1. Number – Byte (1 = Yes, 0 = No)
    ii. GOOD
        1. Number – Byte (1 = Yes, 0 = No)
    iii. LAX
        1. Number – Byte (1 = Yes, 0 = No)
    iv. STRICT
        1. Number – Byte (1 = Yes, 0 = No)
m. Highest Education Level
    i. ASSOCDEG – Associate's degree
        1. Number – Byte (1 = Yes, 0 = No)
    ii. BACHDEG – Bachelor's degree
        1. Number – Byte (1 = Yes, 0 = No)
    iii. GRADDEG – Graduate degree
        1. Number – Byte (1 = Yes, 0 = No)
    iv. HSDEG – High school degree
        1. Number – Byte (1 = Yes, 0 = No)

v. SOMECOLL – Some College
    1. Number – Byte (1 = Yes, 0 = No)
vi. SOMEGRAD – Some graduate education
    1. Number – Byte (1 = Yes, 0 = No)
vii. TECHTRAD – Technical or trade school
    1. Number – Byte (1 = Yes, 0 = No)
viii. ADTECTRN – Advanced technical training
    1. Number – Byte (1 = Yes, 0 = No)

n. Type of Grass at residence
    i. BERMUDA
        1. Number – Byte (1 = Yes, 0 = No)
    ii. FESCUE
        1. Number – Byte (1 = Yes, 0 = No)
    iii. BUFFALO
        1. Number – Byte (1 = Yes, 0 = No)
    iv. BFMIX – Bermuda / Fescue Mix
        1. Number – Byte (1 = Yes, 0 = No)
    v. UNKNOWN
        1. Number – Byte (1 = Yes, 0 = No)
    vi. NONE
        1. Number – Byte (1 = Yes, 0 = No)

10. tblSurveryTotBath – 623 Records, total number of bathrooms on the property
a. ClientID – SNWA Customer identification number
    i. Number – Long Integer
    ii. Primary Key
b. Bathrooms
    i. Number – Single Precision

11. tblSurveyTotOccupants- 341 Records, total number of occupants in the household at the time of the survey.
a. nltClientID – SNWA Customer identification number
    i. Number – Long Integer
    ii. Primary Key
b. TotalOccupants
    i. Number – Integer

12. tblIrrigationData – 355 Records, Irrigation system components for each property were assessed, and each property assigned to one of the following categories.
a. ClientID – SNWA Customer identification number
    i. Number – Long Integer
    ii. Primary Key
b. AvgFlowRate – Average flow rate of all stations
    i. Number – Single Precision
c. BubblerDrip – Irrigation system is composed of bubbler and drip systems
    i. Number – Integer (1 = Yes, 0 = No)

d. BubblerDripSpray – Irrigation system is composed of bubbler, drip, and spray systems
    i. Number – Integer (1 = Yes, 0 = No)
e. Bubblers – Irrigation system is composed of bubblers
    i. Number – Integer (1 = Yes, 0 = No)
f. BubblerSpray – Irrigation system is composed of bubbler and spray systems
    i. Number – Integer (1 = Yes, 0 = No)
g. Drip – Irrigation system is composed of drip systems
    i. Number – Integer (1 = Yes, 0 = No)
h. DripOff – Irrigation system is composed of drip systems with one or more other irrigation zones turned off
    i. Number – Integer (1 = Yes, 0 = No)
i. DripMicro – Irrigation system is composed of drip and micro-spray systems
    i. Number – Integer (1 = Yes, 0 = No)
j. DripPopup – Irrigation system is composed of drip and popup spray systems
    i. Number – Integer (1 = Yes, 0 = No)
k. DripSpray – Irrigation system is composed of drip and spray systems
    i. Number – Integer (1 = Yes, 0 = No)
l. Hose – Irrigation is done with a hose
    i. Number – Integer (1 = Yes, 0 = No)
m. Microspray – Irrigation system is composed of micro-spray systems
    i. Number – Integer (1 = Yes, 0 = No)
n. Sprays – Irrigation system is composed of spray systems
    i. Number – Integer (1 = Yes, 0 = No)
o. BubblerDripPopup – Irrigation system is composed of bubbler, drip, and popup spray systems
    i. Number – Integer (1 = Yes, 0 = No)
p. DripMicroPopup – Irrigation system is composed of drip micro-spray and popup spray systems
    i. Number – Integer (1 = Yes, 0 = No)
q. DripPopupSpray – Irrigation system is composed of drip, popup spray, and spray systems
    i. Number – Integer (1 = Yes, 0 = No)
r. DripPopupRotor – Irrigation system is composed of drip, popup spray, and rotor systems
    i. Number – Integer (1 = Yes, 0 = No)
s. DripLaser – Irrigation system is composed of drip and laser tube systems
    i. Number – Integer (1 = Yes, 0 = No)
t. DripSoaker – Irrigation system is composed of drip and soaker hose systems
    i. Number – Integer (1 = Yes, 0 = No)
u. DripTurfBubbler – Irrigation system is composed of drip and turf bubbler systems
    i. Number – Integer (1 = Yes, 0 = No)
v. DripFountain – Irrigation system is composed of drip systems, and a fountain refill is controlled with the irrigation clock
    i. Number – Integer (1 = Yes, 0 = No)

13. **tblMulches – 715 Records,** mulch and weed barrier information
    a. ClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. txtMulch – Typical type of mulch
        i. Text - 18
    c. txtMulchSize – Typical size of mulch
        i. Text - 50
    d. txtMulchColor – Typical color of mulch
        i. Text - 6
    e. nstMulchDepth – Depth of mulch in inches
        i. Number – Single Precision
    f. yntWeeds – Indicates if excessive weeds are present
        i. Boolean
    g. yntSlope – Is a steep slope present?
        i. Boolean
    h. yntTraffic – Is there heavy traffic in landscape?
        i. Boolean
    i. yntAlkali – Indicates if excessive alkali deposits present at surface.
        i. Boolean
    j. txtBarrierType – Type of weed barrier
        i. Text – 20
    k. txtBarrierColor – Color of weed barrier
        i. Text – 6
    l. yntBarrierShowing – Is the barrier showing at surface?
        i. Boolean
    m. txtWear – Extent of wear
        i. Text – 6
    n. txtLocationType – Wear location type
        i. Text – 16

14. **tblMainmeterConsumption – 4318 Records,** Gallons used per customer per month as measured by the property's main service meter.
    a. nltClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. nitYear
        i. Number – Integer
        ii. Primary Key
    c. txtEntity – Indicates which water provider services the customer
        i. Text – 5
    d. nstJan – January consumption in gallons
        i. Number – Single Precision
    e. nstFeb – February consumption in gallons
        i. Number – Single Precision

f. nstMar – March consumption in gallons
    i. Number – Single Precision
g. nstApr – April consumption in gallons
    i. Number – Single Precision
h. nstMay – May consumption in gallons
    i. Number – Single Precision
i. nstJun – June consumption in gallons
    i. Number – Single Precision
j. nstJul – July consumption in gallons
    i. Number – Single Precision
k. nstAug – August consumption in gallons
    i. Number – Single Precision
l. nstSep – September consumption in gallons
    i. Number – Single Precision
m. nstOct – October consumption in gallons
    i. Number – Single Precision
n. nstNov – November consumption in gallons
    i. Number – Single Precision
o. nstDec – December consumption in gallons
    i. Number – Single Precision
p. nstTotal – Total annual consumption in gallons
    i. Number – Single Precision

15. tbl2001PropAreasOK4 – 673 Records, Property area information as recorded for the year 2001.

a. nltClientID – SNWA Customer identification number
    i. Number – Long Integer
    ii. Primary Key
b. Converted – Area converted from turf to xeriscape. Refers to "XS" Participants only.
    i. Number – Single Precision
c. Pool – Pool area if applicable
    i. Number – Single Precision
d. GardenMon – Garden area where irrigation is being monitored by the submeter
    i. Number – Single Precision
e. GardenUnmon – Garden area where irrigation is unmonitored by the submeter
    i. Number – Single Precision
f. Other – Square footage of other undeveloped property area. No irrigation, plants or hardscape present.
    i. Number – Single Precision
g. Study – Total xeriscape area where irrigation is monitored by the submeter. Applies to XS participant only.
    i. Number – Single Precision
h. TurfMon – Square footage of turf grass where irrigation is monitored by the submeter.
    i. Number – Single Precision

i. TurfUnmon – Square footage of turf area where the irrigation is not monitored by the submeter
    i. Number – Single Precision
j. XeriMon – Square footage of xeriscape where irrigation is monitored by the submeter. (Applies to xeriscape study Group)
    i. Number – Single Precision
k. XeriUnmon – Square footage of xeriscape area where the irrigation is not monitored by the submeter.
    i. Number – Single Precision
l. TotalEvaporative – Total of all landscape areas plus pool area.
    i. Number – Single Precision
m. TotalLandscape – Total of all landscape areas.
    i. Number – Single Precision
n. dtt2001SR – Date of 2001 follow-up site visit
    i. Date / Time
o. AgeOfXeriscape – Age of xeriscape in days calculated by the difference between the post submeter installation inspection and the final 2001 follow-up site visit.
    i. Number – Long Integer
p. TotalXeriArea – Total of all xeriscaped areas
    i. Number – Single Precision
q. TotalGarden – Total of all garden areas
    i. Number – Single Precision
r. TotalTurf – Total of all Turf areas
    i. Number – Single Precision
s. PctGarden – Percent of total landscape area in garden
    i. Number – Single Precision
t. PctXeri – Percent of total landscape in xeriscape
    i. Number – Single Precision
u. PctTurf – Percent of total landscape area in turf
    i. Number – Single Precision
v. PctOther – Percent of total landscape in other non-landscaped area
    i. Number – Single Precision
w. PctPool – Percent of total landscape in pool
    i. Number – Single Precision
x. PctXeriRank – Xeriscape study participants were divided into ten percent ranges based upon percentage of landscape in xeriscape and given a ranking.
    i. Number – Long Integer

16. **tblTurfOnlySubMonthly – 107 Records,** monthly submeter consumption data and per square foot usage for turf study group of participants. Note – this usage is limited to those TS participants where ONLY turf was irrigated with submeter-monitored usage.
    a. ClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. Year
        i. Number – Integer

c. Entity – Water purveyor that serves the customer
    i. Text – 5
d. FileQuality – Quality rating of file information
    i. Text – 10
e. Status – Customer status
    i. Text – 7
f. TurfMon – Square feet of grass where irrigation is monitored by the submeter
    i. Number – Single
g. JanCons – January submeter consumption in gallons
    i. Number – Single
h. FebCons – February submeter consumption in gallons
    i. Number – Single
i. MarCons – March submeter consumption in gallons
    i. Number – Single
j. AprCons – April submeter consumption in gallons
    i. Number – Single
k. MayCons – May submeter consumption in gallons
    i. Number – Single
l. JunCons – June submeter consumption in gallons
    i. Number – Single
m. JulCons – July submeter consumption in gallons
    i. Number – Single
n. AugCons – August submeter consumption in gallons
    i. Number – Single
o. SepCons – September submeter consumption in gallons
    i. Number – Single
p. OctCons – October submeter consumption in gallons
    i. Number – Single
q. NovCons – November submeter consumption in gallons
    i. Number – Single
r. DecCons – December submeter consumption in gallons
    i. Number – Single
s. JanGalSF – Gallons used per square foot of turf in January
    i. Number – Single
t. FebGalSF – Gallons used per square foot of turf in February
    i. Number – Single
u. MarGalSF – Gallons used per square foot of turf in March
    i. Number – Single
v. AprGalSF – Gallons used per square foot of turf in April
    i. Number – Single
w. MayGalSF – Gallons used per square foot of turf in May
    i. Number – Single
x. JunGalSF – Gallons used per square foot of turf in June
    i. Number – Single
y. JulGalSF – Gallons used per square foot of turf in July
    i. Number – Single

z. AugGalSF – Gallons used per square foot of turf in August
    i. Number – Single
aa. SepGalSF – Gallons used per square foot of turf in September
    i. Number – Single
bb. OctGalSF – Gallons used per square foot of turf in October
    i. Number – Single
cc. NovGalSF – Gallons used per square foot of turf in November
    i. Number – Single
dd. DecGalSF – Gallons used per square foot of turf in December
    i. Number – Single

17. **tblTurfOnlySubYearly – 107 Records,** yearly submeter consumption data and per square foot usage for turf study group of participants. Note – this usage is limited to those TS participants where ONLY turf was irrigated with submeter-monitored usage.
    a. ClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. Year
        i. Number – Integer
        ii. Primary Key
    c. Entity – Water purveyor that serves the customer
        i. Text – 5
    d. TurfMon – Square feet of grass where irrigation is monitored by the submeter
        i. Number – Single
    e. GalSqFt – Gallons used per square foot of turf per year
        i. Number – Single
    f. YearlyCons – Total submetered consumption for the year.
        i. Number – Single
    g. FileQuality – Quality rating of file information
        i. Text - 8
    h. Status – Customer status
        i. Text – 7

18. **tblXeriOnlySubMonthly – 1550 Records,** monthly submeter consumption data and per square foot usage for xeriscape study group of participants. Note – this usage is limited to those XS participants where ONLY xeriscape was irrigated with submeter-monitored usage.
    a. ClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. Year
        i. Number – Integer
        ii. Primary Key
    c. Entity – Water purveyor that serves the customer
        i. Text – 5

d. ConvNew – Indicates if the property's xeriscape was a new installation or a conversion of grass to xeriscape.
    i. Text – 4
e. Status – Customer status
    i. Text – 7
f. FileQuality – Quality rating of file information
    i. Text – 10
g. XeriMon – Square feet of xeriscape where irrigation is monitored by the submeter
    i. Number – Single Precision
h. JanCons – January submeter consumption in gallons
    i. Number – Single Precision
i. FebCons – February submeter consumption in gallons
    i. Number – Single Precision
j. MarCons – March submeter consumption in gallons
    i. Number – Single Precision
k. AprCons – April submeter consumption in gallons
    i. Number – Single Precision
l. MayCons – May submeter consumption in gallons
    i. Number – Single Precision
m. JunCons – June submeter consumption in gallons
    i. Number – Single Precision
n. SepCons – September submeter consumption in gallons
    i. Number – Single Precision
o. OctCons – October submeter consumption in gallons
    i. Number – Single Precision
p. NovCons – November submeter consumption in gallons
    i. Number – Single Precision
q. DecCons – December submeter consumption in gallons
    i. Number – Single Precision
r. JanGalSF – Gallons used per square foot of xeriscape in January
    i. Number – Single
s. FebGalSF – Gallons used per square foot of xeriscape in February
    i. Number – Single
t. MarGalSF – Gallons used per square foot of xeriscape in March
    i. Number – Single
u. AprGalSF – Gallons used per square foot of xeriscape in April
    i. Number – Single
v. MayGalSF – Gallons used per square foot of xeriscape in May
    i. Number – Single
w. JunGalSF – Gallons used per square foot of xeriscape in June
    i. Number – Single
x. JulGalSF – Gallons used per square foot of xeriscape in July
    i. Number – Single
y. AugGalSF – Gallons used per square foot of xeriscape in August
    i. Number – Single

z. SepGalSF – Gallons used per square foot of xeriscape in September
    i. Number – Single
aa. OctGalSF – Gallons used per square foot of xeriscape in October
    i. Number – Single
bb. NovGalSF – Gallons used per square foot of xeriscape in November
    i. Number – Single
cc. DecGalSF – Gallons used per square foot of xeriscape in December
    i. Number – Single

19. **tblXeriOnlySubYearly – 1550 Records,** yearly submeter consumption data and per square foot usage for xeriscape study group of participants. Note – this usage is limited to those XS participants where ONLY xeriscape was irrigated with submeter-monitored usage.
    a. ClientID – SNWA Customer identification number
        i. Number – Long Integer
        ii. Primary Key
    b. Year
        i. Number – Integer
        ii. Primary Key
    c. Entity – Water purveyor that serves the customer
        i. Text – 5
    d. ConvNew – Indicates if the property's xeriscape was a new installation or a conversion of grass to xeriscape.
        i. Text – 4
    e. XeriMon – Square feet of xeriscape where irrigation is monitored by the submeter
        i. Number – Single Precision
    f. YearlyCons– Total submetered consumption for the year.
        i. Number – Single
    g. GalSqFt – Gallons used per square foot of monitored xeriscape per year
        i. Number – Single
    h. FileQuality – Quality rating of file information
        i. Text – 10
    i. Status – Customer status
        i. Text – 7

20. **tblPlantList – 538 Records,** list of plants used to verify xeriscape participant's compliance with minimum canopy standards for program participation and classification of landscape plants in subsequent follow-up visits.
    a. PlantID
        i. Number – Long Integer
        ii. Primary Key
    b. Genus
        i. Text - 50
    c. Species
        i. Text - 50

d. Var/Cult – Variety or cultivar of plant
    i. Text - 50
e. Common Name
    i. Text - 50
f. Width – Expected mature width of the plant
    i. Number - Single
g. Height – Expected mature height of the plant
    i. Number - Integer
h. Plant Habit – Type of plant (shrub, tree, etc.)
    i. Text - 50
i. H20Use – Rated plant water needs.
    i. Text – 50

21. tbl2001HomeSales – 45 Records, data provided by SalesTraq. Information related to home sales in Southern Nevada area in the year 2001 by zip code.

a. Zipcode
    i. Text – 5
    ii. Primary Key
b. NumberSold – Number of homes sold in zip code
    i. Number – Single Precision
c. MedianPrice – Median price of homes sold in zip code
    i. Number – Single Precision
d. AvgPrice – Average price of homes sold in zip code.
    i. Number – Single Precision
e. AvgPricePerSqFt – Average Price per square foot of homes sold in zip code.
    i. Number – Single Precision
f. AvgSize – Average size of homes sold in zip code.
    i. Number – Single Precision
g. Volume – Total value of homes sold in zip code
    i. Number – Single Precision
h. AvgAge – Average age of homes sold in zip code
    i. Number – Single Precision

22. tblMeterInfo – 716 Records

a. ClientID – SNWA Customer identification number
    i. Number – Long Integer
    ii. Primary Key
b. MeterNum – Serial number stamped on submeter by manufacturer
    i. Text – 50
c. Installed – Date submeter was installed by contractor
    i. Date/Time
d. Cost – Cost of meter installation
    i. Number – Single Precision
e. RetrofitNum – AS/400 account number assigned to submeter
    i. Number – Long Integer

f. Location – approximate location of submeter on site.
    i. Memo

APPENDIX 4: INFORMATION ON SINGLE-FAMILY RESIDENTIAL WATER BILL MODEL

A model was used to explore the differences in water consumption charges for a typical fifth decile in consumption LUC 110 property (single-family home) and one doing an average-size conversion. The model assumes the properties are in the Las Vegas Valley Water District's service area and subject to its regular service rules. A typical 5/8-inch-meter size was assumed (meter size in large part determines rate per consumption unit). Rates for each tier and the size of the tier rate block appear below in the screen shot of the actual modeling processes for the model used in this report. As demonstrated, within a given billing cycle the rate for the first 5,000 gallons is $1.05/kgal, the *next* 5,000 gallons after the initial 5000 costs $1.75/kgal, the next 10,000 gallons after these first 10,000 gallons is $2.38/kgal and so on (for billing purposes, the utility rounds to the nearest thousand gallons). In addition to the direct charges for the water, SNWA purveyor members bills commonly include a service charge, a commodity charge, and a reliability charge and these are reflected in the model below, so that the outputs are reflective of actual bills. A 30-day billing cycle was assumed.

In practical terms, the calculation of outputs in the model and the savings is derived by multiplying the expected average savings per square foot per month that would be yielded by a conversion (as calculated from Table 18) by the average-size conversion and then subtracting this from the fith-decile consumption level. This yielded the costs with having done the conversion (below called "Total Bill). In contrast, the cost without doing the conversion (i.e., "Average Fifth-Decile bill without reduction") is shown under the "did conversion" scenario. The difference between these, highlighted in red, is the anticipated monthly bill savings yielded from having completed the conversion project.

Water Bill Calculator Screen Shot

Meter Size			Residential		Percent Reduction	0%	Select Entity	LVVWD Current	Average SF WSL Conversion (n=3651)	1615.8						
5/8																
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Totals		
		10670	9369	12255	16174	21107	23447	25084	24519	21788	18112	13738	11795	208,057	5th Decile average consumption	
		1.81	2.09	2.45	4.64	7.74	8.78	9.62	7.96	6.25	4.54	3.02	1.56		Average Gallons Per SqFt Reduction	
		2925	3377	3959	7497	12506	14187	15544	12862	10099	7336	4880	2521	97691	Avg Gal / SqFt Reduction * Avg SF WSL Conversion	
Tier Rates	Tier Blocks	8	6	8	9	9	9	10	12	12	11	9	9	110366	Avg 5th Decile Cons - (Reduction * Avg WSL Conversion)	
1.05	5	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	5.25	63.00		
1.75	5	4.80	1.74	5.77	6.43	6.30	7.46	7.94	8.75	8.75	8.75	6.75	7.48	80.93		
2.38	10								3.94	4.02	1.85			9.81		
3.02	20													0.00		
	Water Cost	10.05	6.99	11.02	11.68	11.55	12.71	13.19	17.94	18.02	15.85	12.00	12.73	153.74	Price Per 1000 Gal. Annual	$ 1.39
	Service															
3.669	Charge	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	3.67	44.03		
	Commodity															
0.05	Charge	0.39	0.30	0.41	0.43	0.43	0.46	0.48	0.58	0.58	0.54	0.44	0.46	5.52		
	Reliability															
0.25%	Surcharge	0.04	0.03	0.04	0.04	0.04	0.04	0.04	0.06	0.06	0.05	0.04	0.04	0.51		
Total Bill		14.15	10.98	15.14	15.83	15.69	16.88	17.38	22.25	22.33	20.11	16.16	16.90	203.79	Price Per 1000 Gal. Annual	$ 1.85
		19.85	17.08	23.71	33.25	45.98	53.18	58.22	56.48	48.08	37.98	27.32	22.59	443.72	Average 5th Decile bill without reduction	$ 2.13
		5.70	6.09	8.57	17.42	30.29	36.30	40.84	34.23	25.75	17.87	11.17	5.68	239.92	Total Savings with Red	

APPENDIX 5: INFORMATION ON HOMEOWNER PERSPECTIVE MODEL

The model is a dynamic Net Present Value Model that calculates the NPV of the project in future years. It does this by computing the difference in the yield by converting to xeriscape to the costs (water and maintenance) incurred by keeping turfgrass over the years.

"Conversion cost" and "awarded incentive" are products of the associated rates and the square feet converted. These are onetime costs. The "interest rate" is the discount or alternative rate (i.e., the rate associated with the loss incurred by spending money on the conversion rather than placing it in an interest-bearing account). The "average yearly rate increase" is the long-time average increase in water costs. "Yearly maintenance savings" is a product of the "Labor Savings" and "Direct Maintenance" variables (which are themselves calculated in a manner similar to "awarded incentive," however, these savings are yielded each year). "Average total bill savings for a year" is not automatically calculated, but entered either by use of real data or modeled bill savings (see Appendix 4). Model Outputs are "NPV" and "Year." Year 0 is the year of the conversion.

This model can directly yield the payback time with and without the incentive. By iterative process one can then develop what the input variables values would need to provide for a positive NPV at a given year. This is how the values for the third and fifth-year ROIs were developed for Figure 15. Example inputs and outputs are given below. In this case, at $1.00 per square foot, the conversion reached a positive NPV between years one and two.

In terms of yielding the actual data in Table 15, the following were used as data sources:

"Square Feet Converted" – This was the average conversion size for SNWA's Water Smart Landscapes Program in early 2004.

"Incentive Level" – This was the $1.00 per square foot incentive level for almost all single-family conversion projects in SNWA's Water Smart Landscapes Program in early 2004 (also see Appendix 5).

"Conversion cost" – This was the conversion cost as revealed by survey. This was one of the variables that were modified to reflect whether or not one did the conversion themselves or utilized contract assistance. Rates for each of these scenarios were developed based on compilation of receipts from both types of installations.

"average total bill savings for a year" – This was the yearly savings as provided by a model of the Las Vegas Valley Water District for a LUC 110 property in the fifth decile (mid-range) of consumption (see Appendix 4 for details on this model).

"interest rate" – This was the interest rate of a home equity loan in early February 2004.

"average yearly rate increase" – This is the average yearly rate increase for the Las Vegas Valley Water District over the long term. In practice, the District has often gone significant periods of

time without a rate increase and then increased them much more than 3%, but this was the most practical method of doing the calculation for purposes of creating the model.

"Labor Savings" – This was adapted from Hessling[12] (2001). This savings was effectively turned on or off to see the impacts of the situations when labor savings are and are not realized. See text for additional information.

"Direct Maintenance" – This rate was derived from the maintenance survey data and is per Hessling[12] (2001).

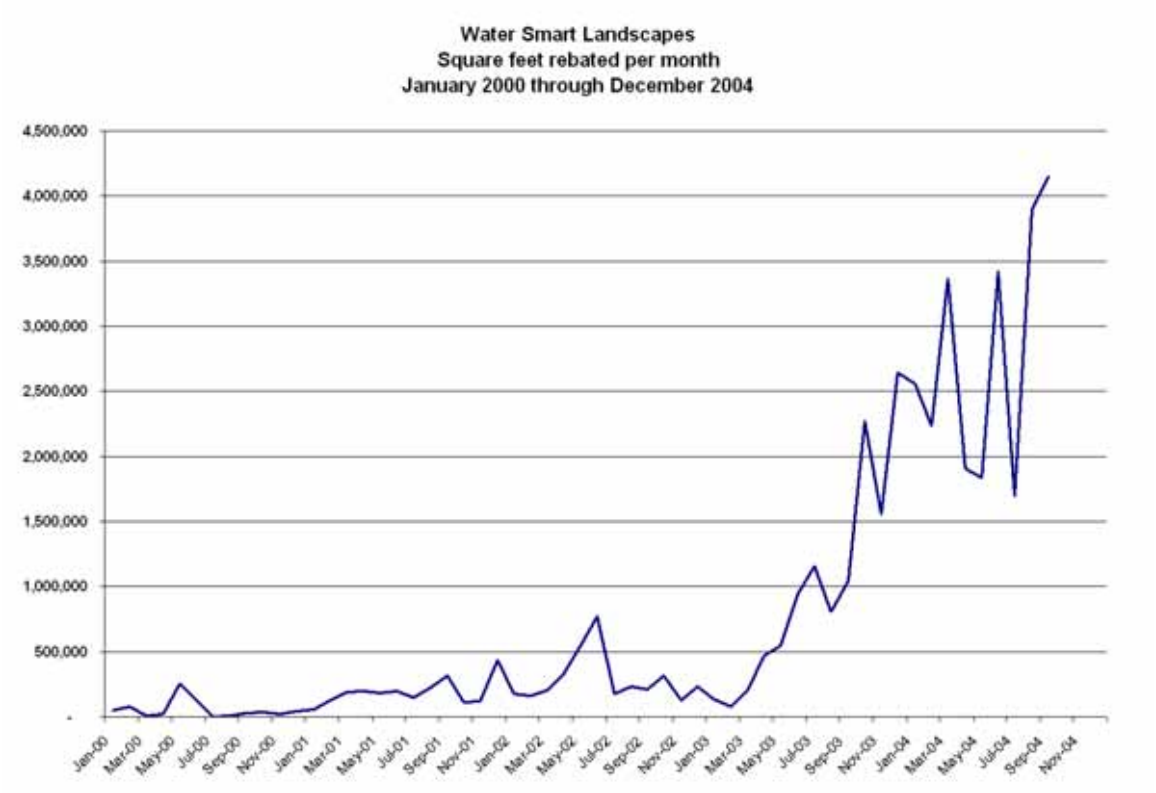
Examples of Homeowner Perspective Model Inputs and Outputs

Inputs:	Type
Square Feet Converted	1616
Incentive level	$1.00
Conversion cost:	$1.37
conversion cost:	$2,213.92
average total bill savings for a year:	$240.00
awarded incentive:	$1,616.00
interest rate:	6.32%
average yearly rate increase	3.00%
Labor Savings	$0.20
Labor Savings	$323.20
Direct Maintenance	$0.11
Direct Maintenance	$177.76
Yearly maintenance savings	$500.96

NPV	**Year**
($2,070.88)	0
($636.58)	1
$751.63	2
$2,095.24	3
$3,395.67	4
$4,654.31	5

APPENDIX 6: INFORMATION ON SNWA'S WATER SMART LANDSCAPES PROGRAM

Growth of Program:



See Program Application (following)