SUNRISE
ENGINEERING

NEPHI CITY CULINARY WATER SYSTEM MASTER PLAN

August 2013

NEPHI CITY

WATER MASTER PLAN

August 28, 2013

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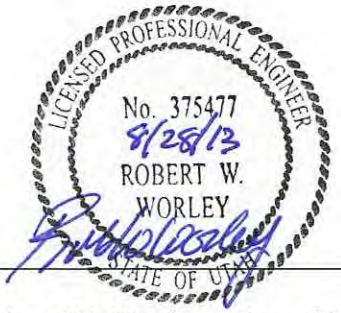

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OUTLINE

SECTION 1.0
INTRODUCTION

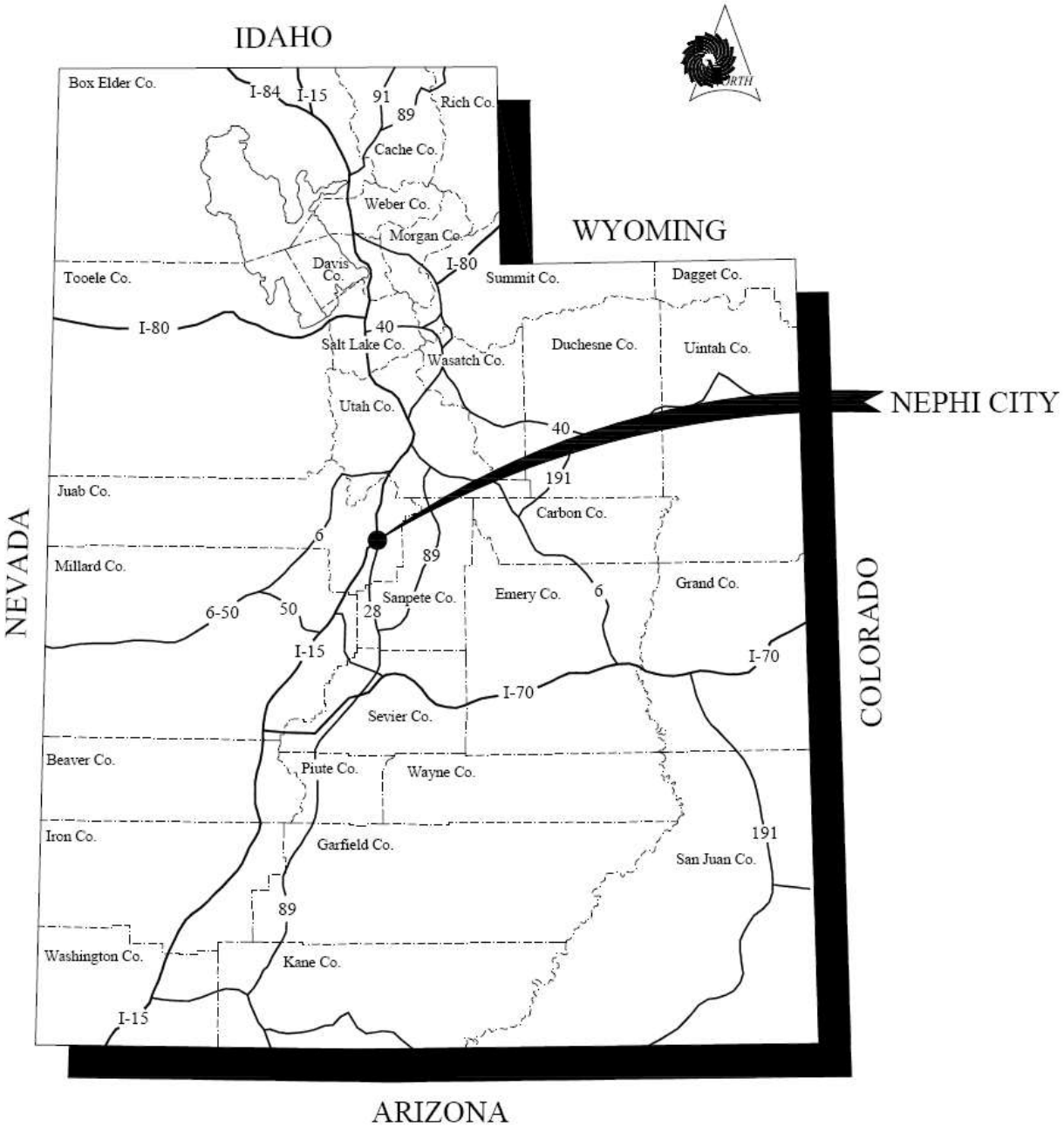
Nephi City is a steadily growing community, which is located in Juab County near the geographical center of the State of Utah. An increase in growth over the last ten years has created a need for the City to analyze its infrastructure and create this water master plan. An area map, showing the location of Nephi, has been provided on page 2.

Nephi City is growing, with new homes and subdivisions being added to accommodate the growth. The 2000 census established the population of Nephi City at 4,733. The 2010 census data shows the population of Nephi to be 5,389. As time passes, and growth takes place, the City's infrastructure, including the culinary water system, must be maintained and upgraded to support the growth that occurs and to meet updated *State of Utah Rules for Public Drinking Water Systems*. Section R309-510-4 of these rules states that data, collected by the public water system, which meets the required confidence level may allow for a reduction of the State Requirements. A waiver was requested from the Executive Director, which would allow Nephi City to use a calculated indoor use value of 251 gallons per day per connection, but the request was denied. The State would not allow the City to use indoor use values without having actual peak daily flow records meeting the required confidence level. The State issued a letter explaining that indoor use values are higher in the summer, and actual peak day usage totals of indoor use over a longer time frame would be required to approve the reduction. As a result, the State minimum values of 400 gallons per day (gpd) per connection will be used in this report.

This water master plan is based on a five-point analysis of the City's culinary water system. The five points include water right, source capacity, treatment, storage capacity, and distribution. Water Rates, Connection Fees and Impact Fees have also been analyzed in the formulation of this plan. This plan will analyze each aspect of the City's water system and identify deficiencies in each of the areas. Options for improving the system have been identified, and recommendations for these improvements are included. A detailed cost estimate of the recommendations has been included as well as a potential financing plan to support the recommended improvements. The Nephi City Water Conservation and Management Plan was also prepared in 2011 but is on record as a separate document at the City offices.

Significant changes have been made in 2011 regarding Impact Fees. Title 11, Chapter 36, of the Impact Fees Act, of the Utah Code Annotated 1953, is now amended to Chapter 36a. An impact fee facilities plan (IFFP) will be performed in this study. The adoption of the fees calculated in the IFFP would help the City to maintain the level of service required of public water systems.

AREA MAP


IDAHO
WYOMING
NEVADA
COLORADO
ARIZONA
NEPHI CITY
Box Elder Co.
Rich Co.
Cache Co.
Weber Co.
Morgan Co.
Davis Co.
Summit Co.
Dagget Co.
Tooele Co.
Salt Lake Co.
Wasatch Co.
Duchesne Co.
Uintah Co.
Utah Co.
Juab Co.
Carbon Co.
Millard Co.
Sanpete Co.
Emery Co.
Grand Co.
Sevier Co.
Beaver Co.
Piute Co.
Wayne Co.
Iron Co.
Garfield Co.
San Juan Co.
Washington Co.
Kane Co.
I-84
I-15
I-80
I-70
91
89
40
191
6
6-50
50
28

SECTION 2.0

SYSTEM USERS ANALYSIS

2.1 RECOMMENDED GROWTH RATE

An essential element in development of a culinary water system master plan is the projection of the system growth rate. The population growth rate gives the planner a glimpse of future demands that may need to be accommodated by the City's culinary water system. The table below shows the City's historic growth rate from 1970 through 2010.

TABLE OF NEPHI CITY POPULATION GROWTH

Year	**Census Population**	**Growth Rate**	
1970	2,699		
1980	3,285	1970 - 1980	1.98% per year
1990	3,515	1980 - 1990	0.68% per year
2000	4,733	1990 - 2000	3.02% per year
2010	5,389	2000 - 2010	1.31% per year

Growth rates fluctuate over the years. However, it seems reasonable to assume that Nephi City will continue to grow at its recent historic growth rate. The City is also currently working on a general plan that has more detailed information on growth rate projections. This study is utilizing the growth rate projections from that General Plan as the basis for projections; therefore, a 2.73% annual residential growth rate and a 2.00% commercial growth rate are used in this study.

It is important to understand that the rate of growth is not necessarily as important as total growth. If the rate of growth varies, and if the projected maximum number of connections is reached earlier than projected, or later than projected, then future improvements to support growth may come earlier or later. If growth is faster, system revenue is collected at a more rapid rate, and debt service can be retired earlier, making additional improvements possible. System fees are set at an amount to allow payment of system debt service under low-growth conditions. Therefore, user fees, connection fees, or impact fees will not be significantly affected if the actual rate of growth varies from 2.73% used in this study.

2.2 LENGTH OF PLANNING PERIOD

This master plan update is for a 20-year planning period, beginning in the fiscal year ending June 2011 and running through the fiscal year ending June 2031, to evaluate system improvements. User fees, connection fees, and impact fees should be carefully monitored annually as the city council sets budgets and anticipates system improvements and expansion. The City should review the study at least every 5 years.

2.3 CULINARY WATER CONNECTIONS

2.3.1 Existing Culinary Water Connections and ERC's

According to Nephi City data, the number of existing culinary connections in fiscal year 2011 is 1,989. It is assumed that this is the number of connections that are served at the start of the planning period. The 1,989 existing connections include 1,810 residential connections, 178 commercial connections, and 1 industrial connection. In this report, the industrial category consists of the largest water user, which uses approximately 5 million gallons per month.

In this plan, reference is made to Equivalent Residential Connections (ERC's). One ERC is defined as the amount of culinary water required by an average residential connection for indoor use. Because an ERC relates to the amount of water required for the average residential connection, use of this term allows commercial, industrial, or other large water users to be equated to a residential connection. ERC's are factored into calculations for impact fees, user rates, and other analyses where required for design purposes.

Records of water usage provided by Nephi City were analyzed to estimate average residential indoor use. Based on the State minimum values, the average indoor residential use is 12,000 gallons per month. Although the average indoor winter usage amounts in Nephi City are approximately 7,537 gallons, it is likely that the indoor use value is higher in the summer months, and the State minimum value of 12,000 gallons per month will be used in this report. From the water usage data supplied by Nephi City, the average indoor use for all commercial connections is 36,789 gallons per connection, per month. If 12,000 gallons represents 1 ERC, then 1 commercial connection represents approximately 3.1 ERC's, and the 1 industrial connection represents 417 ERC's. These values of 12,000 gallons per residential connection and 36,000 gallons per commercial connection will be used in the Cash Flow Projection in Appendix A as the average use value for calculating the required water base rate.

Nephi City staff estimated that 700 out of 1,810, or 40% of the residential connections have secondary water available for their irrigation needs. These 700 connections were removed from the culinary outdoor use connections, but all future connections have been accounted for using culinary water for outdoor use.

A comparison is made between the culinary water connections and ERC's in Table 1-A. Nephi City's connections are classified into 3 categories; residential, commercial, and industrial. The residential is the largest category including all homes on the system. The commercial connections include all other types of uses for business purposes, and the one industrial connection is the largest water user on the system. The number of connections listed in the table is as of the start of the planning period. The 546 commercial ERC's equal 178 commercial connections times 3.1 ERC's per connection.

TABLE 1-A			
CLASSIFICATION	**CONNECTIONS**	**ERC/Con.**	**ERC's**
Residential	1,810	1	1,810
Commercial	178	3.1	546
Industrial	1	417	417
TOTAL	**1,989**		**2,773**

2.3.2 Projected Culinary Water Connections and ERC's

The number of either culinary water connections or ERC's expected at the end of the planning period can be calculated using the compound interest formula and inserting the projected growth rate, the existing number of culinary water connections or ERC's, and the 20 year planning period for culinary water improvements.

The projected number of culinary water connections is calculated using the compound interest formula for the projected 20 years as follows: F = # of Connections times $(1 + \text{rate})^{20 \text{ years}}$ where F is the projected number of connections, and the rate of growth is 2.73% per year for residential and 2.00% for commercial connections. The current City economic development plan supports a large industrial growth rate in the community in order to promote job growth in the area.

As a result, at the direction of City officials, a 5.00% growth rate has been assigned as the industrial growth rate, which would provide a total of 3 industrial connections at the end of the planning period.

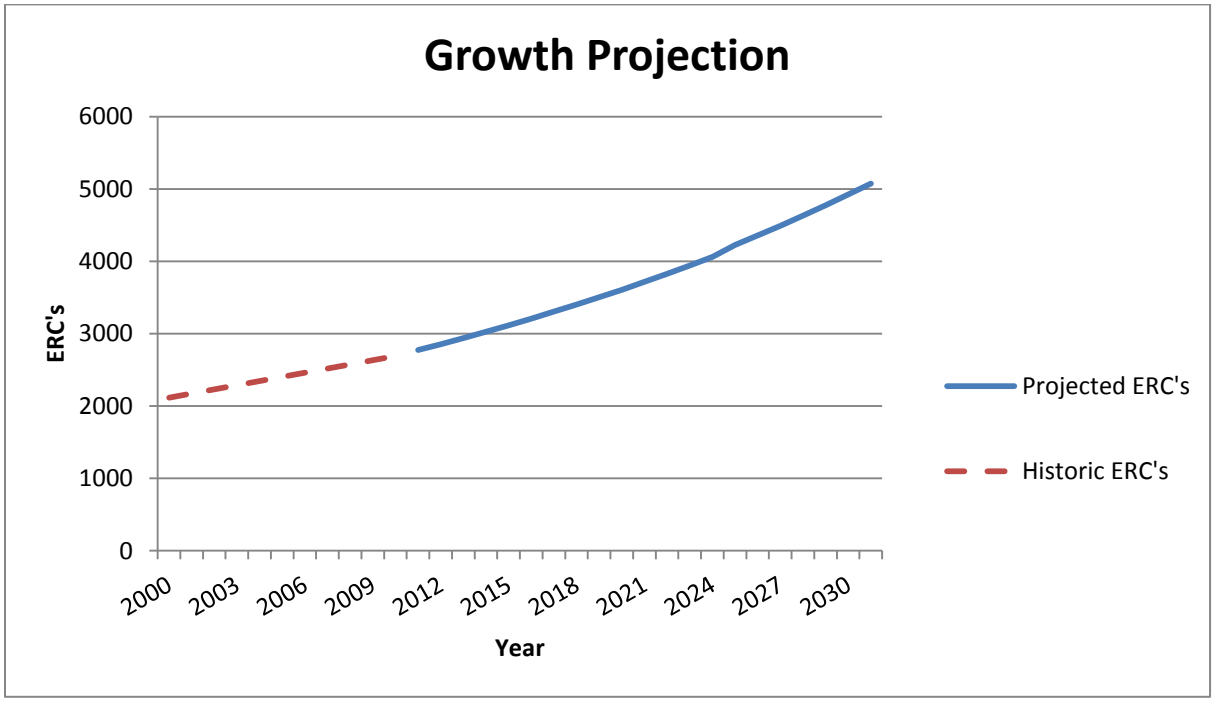
Residential:	$F = 1{,}810 \text{ conns.} \times (1 + 0.0273)^{20}$	=	3,099 connections
Commercial:	$F = 178 \text{ conns.} \times (1 + 0.0200)^{20}$	=	266 connections
Industrial:	$F = 1 \text{ conns.} \times (1 + 0.0500)^{20}$	=	3 connections
	TOTAL:	=	**3,368 connections**

The projected number of ERC's is calculated as follows:

Residential:	F = 3,099 conns. x 1 ERC/conn.	=	3,099 ERC's
Commercial:	F = 266 conns. x 3.1 ERC's/conn.	=	815 ERC's
Industrial:	F = 3 conns. x 417 ERC's/conn.	=	1,161 ERC's
	TOTAL:	=	**5,075 ERC's**

The total number of culinary water connections projected at the end of the 20-year planning period is 3,368. The graph below shows the number of connections projected over the planning period. Of these connections, it is projected that the City will add 1,289 new residential connections, 88 new commercial connections, and 2 new industrial connections. The total number of culinary water ERC's projected at the end of the planning period is 5,075. It is recommended that Nephi City size all future culinary-water-related infrastructure improvements for a minimum of 5,075 ERC's. It is recommended that the City analyze its water rights over a forty-year period as allowed by the State of Utah. Because this study is for a 20-year period, the water rights are only analyzed for that period of time. Please refer to the separate 40-year water rights master plan for an in-depth look at Nephi City water rights.

Figure 2.1



SECTION 3.0

WATER RIGHT ANALYSIS

3.1 EXISTING WATER RIGHT

Existing Nephi City water rights potentially used for culinary water are identified below.

Table 3.1

Water Right Number	Source	Ac-Ft (Calculated from cfs value)	CFS Flow (Taken From Water Rights Website)	GPM Flow (Calculated from cfs value)
53-00	Marsh Spring	562.42 ac-ft.	0.78 cfs	348.68 gpm
53-2	Rowley's Spring	83.00 ac-ft.	0.11 cfs	51.46 gpm
53-35	Monument Springs 1,2,3	488.68 ac-ft.	0.68 cfs	302.97 gpm
53-53	Underground, Airport well	57.92 ac-ft.	0.08 cfs	35.91 gpm
53-63	Underground, Salt Creek Well, Rocky Ridge Well, Blake Garrett Well, Airport Well	2,628.04 ac-ft.	3.63 cfs	1,629.28 gpm
53-64	Industrial Waste	200.00 ac-ft.	0.28 cfs	123.99 gpm
53-65	Underground, Jones Well & Bradley Spring	4,343.87 ac-ft.	6.00 cfs	2,693.02 gpm
53-80	Bradley Spring Winter	1092.48 ac-ft.	3.63 cfs	1,629.29 gpm
53-87	Underground, Fire Station Well	3,062.42 ac-ft.	4.23 cfs	1,898.58 gpm
53-88	Underground, Shop Well	3,663.33 ac-ft.	5.06 cfs	2,271.12 gpm
53-1516	Underground, Shop Well	839.82 ac-ft.	1.16 cfs	520.65 gpm
TOTAL:		**17,021.98 ac-ft.**	**25.64 cfs.**	**11,504.94 gpm**

3.2 EXISTING REQUIRED WATER RIGHT

Required water right is divided into two categories, indoor and outdoor. The *State of Utah Rules for Public Drinking Water Systems*, Section 5, state that a community should have adequate water right to supply each culinary connection with 400 gallons per day for indoor water use. This is the value that will be used within this report for indoor water use.

For outdoor water use, Nephi City staff estimated that 700 of the current residential connections have secondary water available for their irrigation needs. This equates to 1,110 out of 1,810 of existing ERC's using culinary water for irrigation purposes. The City is currently leasing excess water from the springs and water from Jones well to the Irrigation Company through a water use agreement. The agreement allows the City to use the Irrigation Company's spring water for culinary purposes in the summer months, and the City in turn provides the Irrigation Company with water from the well sources.

The amount of water exchanged with the Irrigation Company should remain at its current state due to the fact that additional secondary irrigation shares aren't being permitted. Based on this fact, the 700 irrigation users are not included in the outdoor water requirements.

It is also assumed that all irrigation is applied by sprinklers, and an efficiency factor of 70% is used in the calculations. Source capacity, storage, and distribution calculations also include these assumptions.

According to the *State of Utah Rules for Public Drinking Water Systems*, Utah has 6 climate zones (excluding non-arable lands), which correspond with consumptive use and annual precipitation. In the northern mountains, outside watering requirements are quite low (Zone 1), compared with the southern part of the state where the climate is usually very warm (Zone 6). As a result, these zones have different outside watering requirements. Rule R309-510 provides minimum recommended requirements for outside consumptive use for each zone.

Nephi City is located in Zone 4, which is listed as moderately high for consumptive use. According to the rule, Nephi requires 1.87 acre-ft per irrigated acre as the demand to be used in calculations which determine required water right for residential irrigation. Using this value of 1.87, the 70% sprinkler efficiency, and knowing the annual outdoor usage for residential connections from metered usage data, the average irrigated area was determined as 1/5 of an acre. This acreage amount has been used throughout the study as the average irrigated area per residential connection for Nephi City. The summer commercial outdoor use value of 46,200 gallons per month was derived from annual meter data from commercial connections.

The 2.47 ac-ft per irrigated acre used to calculate the water necessary for the parks, cemetery, and golf course was taken from actual usage for the golf course. It was assumed that the cemetery and parks would take a similar amount of water for irrigating.

It was also determined that approximately 1,057 ac-ft of water is leased to the Irrigation Company. This number was calculated by averaging the amount of water pumped from Jones Well, and the spring and tank overflows, during the irrigation season for the years of 2009 and 2010. This number will fluctuate from year to year, and data on leased water needs to be recorded annually.

Based on the information above, the current required water right is calculated as follows:

Residential Use:

Indoor: $$1{,}810 \text{ ERC} \times \frac{400 \text{ gpd} \times 365 \text{ day} \times 1 \text{ ft}^3}{\text{ERC} \quad 1 \text{ year} \quad 7.48 \text{ gal}} \times \frac{1 \text{ ac-ft}}{43{,}560 \text{ ft}^3} = 811 \text{ ac-ft}$$

Outdoor: $$1{,}110 \text{ ERC} \times \frac{1/5 \text{ ir.-acre} \times 1.87 \text{ acre-ft} \times 1 \text{ (efficiency)}}{\text{ERC} \quad \text{ir.-acre} \quad 0.7} = 593 \text{ ac-ft}$$

Commercial Use:

Indoor: $$546 \text{ ERC} \times \frac{400 \text{ gpd} \times 365 \text{ day} \times 1 \text{ ft}^3}{\text{ERC} \quad 1 \text{ year} \quad 7.48 \text{ gal}} \times \frac{1 \text{ ac-ft}}{43{,}560 \text{ ft}^3} = 245 \text{ ac-ft}$$

Additional Commercial Summer Use

Outdoor: $$546 \text{ ERC} \times \frac{46{,}200 \text{ gal} \times 6 \text{ month} \times 1 \text{ ac-ft}}{\text{ERC month} \quad 1 \text{ year} \quad 325{,}851 \text{ gal}} = 464 \text{ ac-ft}$$

Industrial Use:

$$417 \text{ ERC} \times \frac{400 \text{ gpd} \times 365 \text{ day} \times 1 \text{ ft}^3}{\text{ERC} \quad 1 \text{ year} \quad 7.48 \text{ gal}} \times \frac{1 \text{ ac-ft}}{43{,}560 \text{ ft}^3} = 187 \text{ ac-ft}$$

Parks & Golf Course Use:

Parks & Cemetery: $$\frac{40 \text{ ir.-acre} \times 2.47 \text{ acre-ft} \times 1 \text{ (efficiency)}}{\text{ERC} \quad \text{ir.-acre} \quad 0.7} = 141 \text{ ac-ft}$$

Golf Course: $\frac{35 \text{ ir.-acre}}{\text{ERC}} \times \frac{2.47 \text{ acre-ft}}{\text{ir.-acre}} \times \frac{1 \text{ (efficiency)}}{0.7} = 124$ ac-ft

Leased Water to the Irrigation Co: **=** 1,057 ac-ft
(This number was averaged from records over 2009 and 2010)

TOTAL EXISTING REQUIRED WATER RIGHT = 3,621 ac-ft
EXISTING WATER RIGHT SURPLUS = 13,401 ac-ft

3.3 PROJECTED REQUIRED WATER RIGHT

The number of projected ERC's at the end of the planning period is 5,075. As noted above, all new ERC's will use culinary water for irrigation purposes. Despite having the total ERC value, each category of ERC's is listed below in order to better distinguish where the greatest needs are. It is estimated that by the end of the planning period the parks, cemetery, and golf course irrigated acreages will each increase by 25 acres.

Based on the information above and the total number of ERC's, the projected required water right is calculated as follows:

Residential Use:

Indoor: $3{,}099 \text{ ERC} \times \frac{400 \text{ gpd} \times 365 \text{ day} \times 1 \text{ ft}^3}{\text{ERC} \quad 1 \text{ year.} \quad 7.48 \text{ gal}} \times \frac{1 \text{ ac-ft}}{43{,}560 \text{ ft}^3} = 1{,}389$ ac-ft

Outdoor: $2{,}399 \text{ ERC} \times \frac{1/5 \text{ ir.-acre}}{\text{ERC}} \times \frac{1.87 \text{ acre-ft}}{\text{ir.-acre}} \times \frac{1 \text{ (efficiency)}}{0.7} = 1{,}282$ ac-ft

Commercial Use:

$815 \text{ ERC} \times \frac{400 \text{ gpd} \times 365 \text{ day} \times 1 \text{ ft}^3}{\text{ERC} \quad 1 \text{ year.} \quad 7.48 \text{ gal}} \times \frac{1 \text{ ac-ft}}{43{,}560 \text{ ft}^3} = 365$ ac-ft

Additional Commercial Summer Use (Outdoor)

$815 \text{ ERC} \times \frac{46{,}200 \text{ gal} \times 6 \text{ month} \times 1 \text{ ac-ft}}{\text{ERC month} \quad 1 \text{ year.} \quad 325{,}851 \text{ gal}} = 694$ ac-ft

Industrial Use:

$1{,}161 \text{ ERC} \times \frac{400 \text{ gpd} \times 365 \text{ day} \times 1 \text{ ft}^3}{\text{ERC} \quad 1 \text{ year.} \quad 7.48 \text{ gal}} \times \frac{1 \text{ ac-ft}}{43{,}560 \text{ ft}^3} = 520$ ac-ft

Parks & Golf Course Use:

Parks & Cemetery: $\frac{65 \text{ ir.-acre}}{\text{ERC}} \times \frac{2.47 \text{ acre-ft}}{\text{ir.-acre}} \times \frac{1 \text{ (efficiency)}}{0.7} = 229$ ac-ft

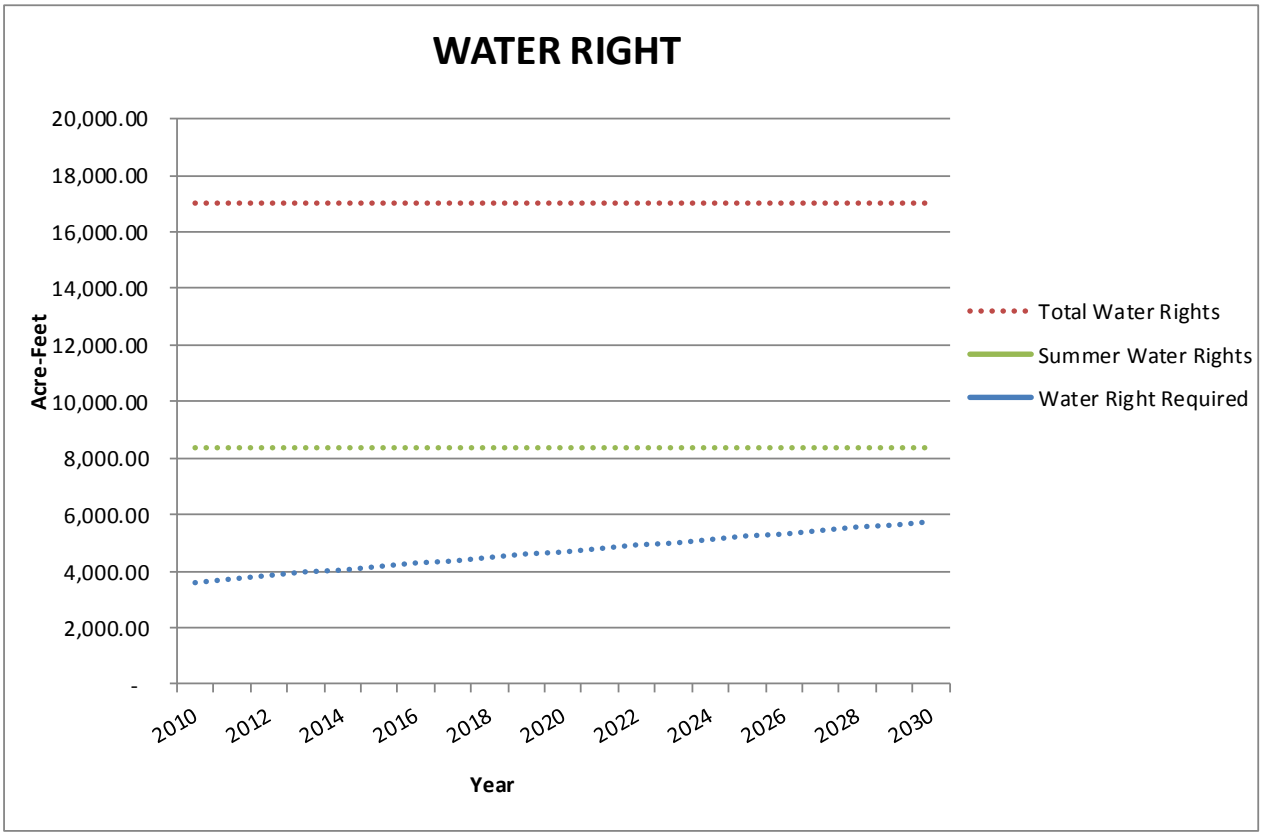
Golf Course: $\frac{60 \text{ ir.-acre}}{\text{ERC}} \times \frac{2.47 \text{ acre-ft}}{\text{ir.-acre}} \times \frac{1 \text{ (efficiency)}}{0.7} = 212$ ac-ft

Leased Water to the Irrigation Co: **=** 1,057 ac-ft

TOTAL PROJECTED REQUIRED WATER RIGHT = 5,748 ac-ft
PROJECTED WATER RIGHT SURPLUS = 11,274 ac-ft

Calculations of required water right in the above section show a projected water right surplus of 11,274 acre feet at the end of the planning period. These water right projections are commonly shown as measured by acre-feet. That is how the comparisons above have been made. However, all of Nephi City's water rights have been appropriated with cfs (flow) limitations. Thus with the current limitations on the water right, as recorded with the State Engineer, Nephi City can only draw up to 25.64 cfs at any given time throughout the year. This is a problem because the water demand in the summer is much higher than in the winter. Figure 3.2 below shows the water right need over time.

Figure 3.1



3.4 RECOMMENDED WATER RIGHT IMPROVEMENTS

As can be seen from the figure above, Nephi City has a significant amount of surplus water and needs to protect as much of it as possible. Current flow records of leased water should be kept in order to continue to quantify how much water is being leased to the Irrigation Company. A new metering system should be implemented in order to account for all of the water delivered to the Irrigation Company. This metering system should be part of a future SCADA system, which will log the data automatically and allow the City to better manage its water sources. The amount of water not being leased to the Irrigation Company will need to be protected through a water right master plan or through additional lease agreements. The State of Utah currently allows municipalities to protect water rights through a 40-year, water-right projection, which has been prepared in a separate document in conjunction with this report. Please refer to this plan for an in-depth look at Nephi City water rights.

Based upon the projections used in the 40-year water right projection analysis, Nephi City could reach its maximum summer use diversion in the year 2038. In order to maximize utilization of this water and withdraw it at the times that demand requires it, the flow limitation needs to be redefined to acre-feet. If this cannot be accomplished, the cfs flow limitation currently on the water right will force the City to acquire additional summer-use water rights. The following

recommendations for managing Nephi City's water rights are taken from the 40-year, water-right projection analysis. Please refer to that document for an in-depth look at this matter.

1. Make application to change current water rights from cfs-flow limitation to ac.-ft. limitations. It is not guaranteed that the State Engineer will approve this, however it has recently been approved in other areas. It is recommended that the City submit this type of change application on a smaller right to determine if the State Engineer accepts or rejects this method.
2. After it is confirmed that the water can be converted to ac.-ft. flow limitations, a means to protect any of the water in excess of the projected 40 year needs should be identified and implemented.
3. Make application to obtain a water right for the Marsh Spring. This water is currently decreed without a water right filing through the State and thus could be questioned by the State Engineer.
4. Continually update the 40-year projected water right needs to represent actual conditions.

3.5 SUBDIVISIONS AND ANNEXATIONS

As new subdivisions are created within the municipal service areas, it is sometimes reasonable to require future developers to provide all improvements required to support the new development. This may include municipal-use water right that may be required for the development.

If the recommendation above is successful to change water from flow limitation to ac.-ft. limitation, Nephi City will have sufficient water right for the near future. If this change is not successful, the City of Nephi will not have sufficient water right for the 40 year projection and therefore should require those annexing property into Nephi City to bring sufficient water rights for their needs. In the event that the change is not successful, the City should re-address this issue and consider ordinances to maintain the currently level of service.

SECTION 4.0

SOURCE CAPACITY ANALYSIS

4.1 EXISTING SOURCE CAPACITY

At the time of this writing, City staff estimated that Nephi City's springs provide a reliable minimum flow rate (during low flow conditions) of 1,900 gpm, and the other culinary source, the equipment shed well, is estimated to flow at 2400 gpm. The *State of Utah Rules for Public Drinking Water Systems* require that the minimum flow from spring sources be used as the source capacity from that source in determining system source capacity. Therefore, 5,400 gpm will be used as the available source capacity to calculate existing and projected required source needs.

4.2 NEPHI SOURCES

The water quality of Nephi City's wells and springs is generally good. Both wells have the capability of producing a large source of water for Nephi City, but only the Equipment Shed Well is routinely used for culinary purposes.

TABLE 4-A

Wells/ Springs	
Name	Rate (gpm)
Upper& Lower Marsh Springs	600
Upper and Lower Bradley Springs	1,300
Equipment Shed Well	2,400
Jones Well (2,400 gpm) Irrigation Water	1,100
Airport Well (36 gpm)	0
Total	5,400

The flow from Jones Well is estimated at 2,400 gpm but is used primarily for irrigation purposes in trade for the Bradley Spring water in the summer months. A copy of the exchange agreement is included in Appendix H. Jones Well has the capacity to flow at 2,400 gpm but only 1,100 gpm is included in the Table above where the 1,300 gpm difference represents the water acquired through the exchange agreement with the irrigation company through Bradley Springs. Although the Jones Well is accounted for in the Table above, it is not calculated in the source capacity calculations in Sections 4.3 and 4.4 due to the fact that the Jones Well is currently used for irrigation purposes only. If the City determines they would like to use a portion of the Jones Well for culinary purposes, then these Sections in the report could be updated.

The amount of water pumped through Jones Well needs to be accounted for in order to protect the water right being traded. City records show the well typically operates from 8:00 p.m. to 10:00 a.m. during the irrigation season. That equates to approximately 1,320 ac-ft per year. This is slightly higher than the 1,057 ac-ft of exchanged water accounted for from averaged flow records from 2009 and 2010.

The Equipment Shed Well produces 2400 gpm and operates approximately 14 hours a day in the summer months. A portion of this water can be diverted to the irrigation pond in the summer when the culinary system does not require the entire amount. The current pump was installed in 2005, and the well appears to be in good operating condition.

The water from the mountain springs is the main source of water for the system. The current spring sources consist of Upper and Lower Marsh Springs, and Upper and Lower Bradley Springs. Historically the springs have produced approximately 3 million gallons per day during drought years (2008-20010) while during peak years historically as well as in 2012 flows of 6 million gallons per day and up have been recorded. Although these fluctuations could be attributed various items, it is likely that drought vs. wet years plays the major role in the fluctuation. The numbers listed above reflect the low flows recorded from the springs (drought years). State regulations require that Nephi City provide adequate source in both the drought years as well as the wet years, therefore planning in this study will be reflected on the worse case situation.

Other spring sources no longer utilized include Monument Spring and Rowley Spring. The Monument Spring collection system was damaged due to natural conditions and has never been replaced or upgraded. These damages were caused most likely by sliding conditions due to the steepness of the terrain. Rowley (Ord) Spring was historically used for outdoor irrigation, but is now used for stock and wildlife purposes. This spring is said to include large amounts of lime, which caused build-up in the piping system. A plan needs to be developed to utilize these sources of water. These water rights are currently protected under non-use until August of 2015.

The overflow from the usable spring sources is used to exchange with water owned by the Irrigation Company in the summer months. The overflow amount is metered during the irrigation season, but it is not metered during winter months. According to actual usage data, approximately 5,341 ac-ft of water was metered and used in 2009. The water source volume recorded by the City over that timeframe is approximately 5,712 ac-ft. The difference in these two numbers is 371 ac-ft.

Flow records from the Jones Well, and the Spring Overflow for 2009 and 2010 were averaged to estimate the amount of water leased to the irrigation company. Based on these two years of data, 1,057 ac-ft per year of water per year is exchanged to the company.

4.3 EXISTING REQUIRED SOURCE CAPACITY

Existing source capacity requirements are separated into indoor and outdoor use. The *State of Utah Rules for Public Drinking Water Systems* state that a community should have an adequate water source capacity to supply a peak demand of 800 gallons per day per connection for indoor use. The regulations also require the source to be capable of meeting peak-day irrigation demands, where no secondary source of irrigation water is available.

Nephi City staff estimated that 700 out of 1,810 residential connections have secondary water available for irrigation needs. Because the irrigation system is not expanding, it is understood that all future connections will use culinary water for their irrigation needs.

Outdoor usage records were determined by taking annual usage totals and reducing the total by the calculated indoor usage amount. The indoor usage amount was determined by taking the amount of water used during the winter months, when no irrigation was occurring, and calculating the same usage for the entire year. It is assumed that all irrigation is applied by sprinklers, and an efficiency factor of 70% is used in the calculations. Water right, storage, and distribution calculations also include these assumptions.

According to the *State of Utah Rules for Public Drinking Water Systems*, Utah has 6 climate zones (excluding non-arable lands), which correspond with consumptive use and annual precipitation. Nephi City is located in Zone 4, which is listed as moderately high for consumptive use. According to the rule, Nephi requires 3.96 gallons per minute per equivalent residential connection as the peak day demand to be used in calculations to determine required source capacity for residential irrigation. A value of 5.23 gpm was used in the calculations below for areas involving the parks, cemetery, and golf course. This number was derived from actual usage records for these outdoor connections. The additional commercial summer use value of 1540 gpd was calculated by dividing the average outdoor use value of 46,200 gallons by 30 days in the month.

Based on the information above, the existing required source capacity is calculated as follows:

Residential Use:

Indoor: $\frac{1{,}810 \text{ ERC} \times 800 \text{ gal} \times 1 \text{ day}}{\text{day-ERC} \quad 1440 \text{ min.}} = 1{,}006 \text{ gpm}$

Outdoor: $\frac{1{,}110 \text{ ERC} \times 1/5 \text{ ir acre} \times 3.96 \text{ gpm} \times 1 \text{ (efficiency)}}{\text{ERC} \quad \text{ir. acre} \quad 0.7} = 1{,}256 \text{ gpm}$

Commercial Use:

$\frac{546 \text{ ERC} \times 800 \text{ gal} \times 1 \text{ day}}{\text{day-ERC} \quad 1440 \text{ min.}} = 303 \text{ gpm}$

Additional Commercial Summer Use:

$\frac{546 \text{ ERC} \times 1540 \text{ gal} \times 1 \text{ day}}{\text{day-ERC} \quad 1440 \text{ min.}} = 584 \text{ gpm}$

Industrial Use:

$\frac{417 \text{ ERC} \times 800 \text{ gal} \times 1 \text{ day}}{\text{day-ERC} \quad 1440 \text{ min.}} = 231 \text{ gpm}$

Parks & Golf Course Use:

Parks & Cemetery: $\frac{40 \text{ ir acre} \times 5.23 \text{ gpm} \times 1 \text{ (efficiency)}}{\text{ir. acre} \quad 0.7} = 299 \text{ gpm}$

Golf Course: $\frac{35 \text{ ir acre} \times 5.23 \text{ gpm} \times 1 \text{ (efficiency)}}{\text{ir. acre} \quad 0.7} = 262 \text{ gpm}$

TOTAL EXISTING REQUIRED SOURCE CAPACITY = 3,940 gpm
EXISTING SOURCE CAPACITY SURPLUS = 1,460 gpm

As shown in the calculations above, Nephi City currently has surplus culinary water source capacity in accordance with the *State of Utah Rules for Public Drinking Water Systems*.

4.4 PROJECTED REQUIRED SOURCE CAPACITY

The number of ERC's projected at the end of the planning period is 5,075. No additional secondary irrigation water is currently available to the City, so the number of connections using culinary water for irrigation will increase to 1,999 at the end of the planning period. The calculation of projected required source capacity is provided below.

Residential Use:

Indoor: $\frac{3{,}099 \text{ ERC} \times 800 \text{ gal} \times 1 \text{ day}}{\text{day-ERC} \quad 1440 \text{ min.}} = 1{,}722 \text{ gpm}$

Outdoor: $\frac{2{,}399 \text{ ERC} \times 1/5 \text{ ir acre} \times 3.96 \text{ gpm} \times 1 \text{ (efficiency)}}{\text{ERC} \quad \text{ir. acre} \quad 0.7} = 2{,}714 \text{gpm}$

Commercial Use:

$\frac{815 \text{ ERC} \times 800 \text{ gal} \times 1 \text{ day}}{\text{day-ERC} \quad 1440 \text{ min.}} = 453 \text{ gpm}$

Additional Commercial Summer Use:

$$\frac{815 \text{ ERC} \times 1540 \text{ gal} \times 1 \text{ day}}{\text{day-ERC} \quad 1440 \text{ min.}} = 872 \text{ gpm}$$

Industrial Use:

$$\frac{1{,}161 \text{ ERC} \times 800 \text{ gal} \times 1 \text{ day}}{\text{day-ERC} \quad 1440 \text{ min.}} = 645 \text{ gpm}$$

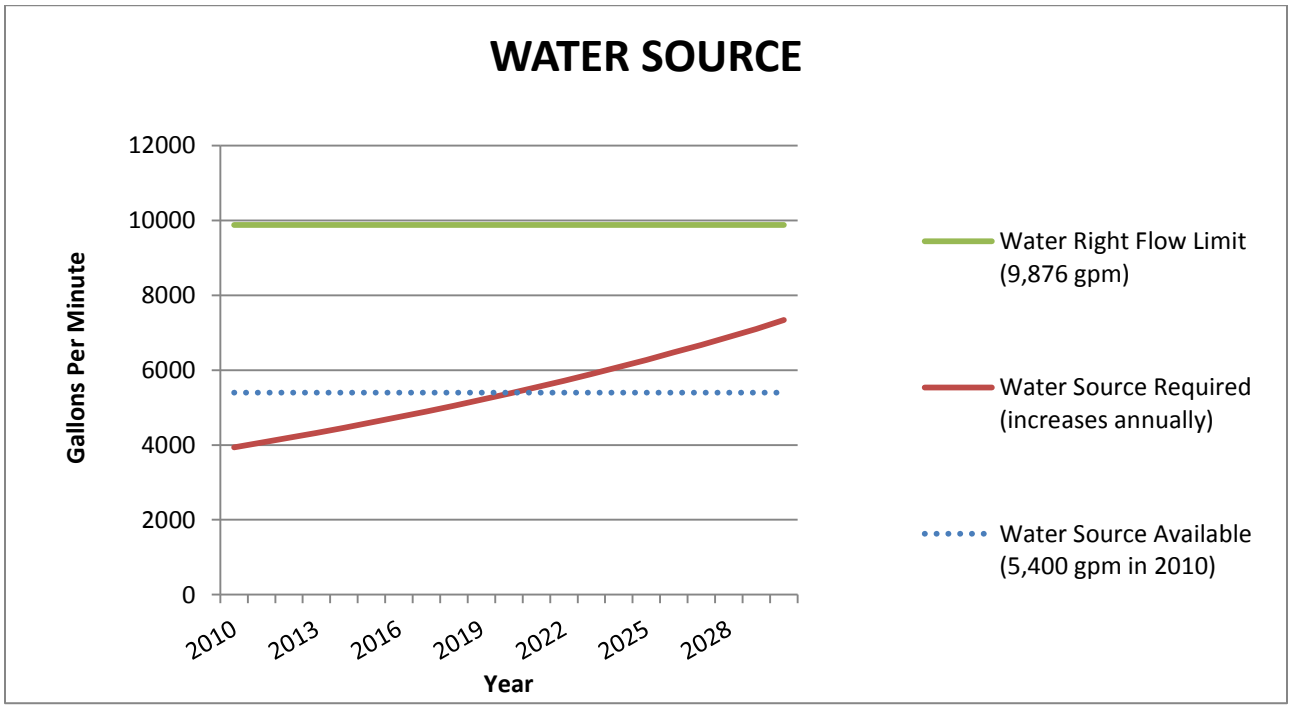
Parks & Golf Course Use:

Parks & Cemetery: $\frac{65 \text{ ir acre} \times 5.23 \text{ gpm} \times 1 \text{ (efficiency)}}{\text{ir. acre} \quad 0.7} = 486 \text{ gpm}$

Golf Course: $\frac{60 \text{ ir acre} \times 5.23 \text{ gpm} \times 1 \text{ (efficiency)}}{\text{ir. acre} \quad 0.7} = 448 \text{ gpm}$

TOTAL PROJECTED REQUIRED SOURCE CAPACITY = 7,340 gpm
ESTIMATED PROJECTED SOURCE CAPACITY DEFICIT = (1,940) gpm

Figure 4.1



4.5 RECOMMENDED SOURCE CAPACITY IMPROVEMENTS

Calculations in this section show that Nephi City will have a source capacity deficit in the year 2020 and a 1,940 gpm deficit by the end of the 20-year planning period. An additional source needs to be developed before the conditions resulting in the deficit are realized.

It is understood that in 2011 the spring sources for Nephi City are flowing at lower flow rates than recorded in some previous years. It is recommended that further investigation be conducted for the springs and the collection systems in order to determine if re-developing the springs would increase water supply for the City. If the lower flows are due to leaking pipes, or to inefficient spring collection zones, then a redevelopment may be necessary. If the spring flow reductions are attributed to natural occurrences such as drought conditions, then the spring development may not be warranted.

If the City determines that the existing springs and spring lines are in good condition, it is recommended that the City develop a well source to meet future needs. There are essentially 5 well options for the City to explore. Option 1 would be to drill a new culinary-grade well. Option 2 would be to convert the existing Jones Well to the culinary water system, and replace it with a new irrigation well. An irrigation well needs to be maintained in order to continue exchanging water from Bradley Spring. Option 3 would be to upgrade the Fire Station Well to meet the source needs of the City. Option 4 below represents the costs associated with extending the spring line to the south end of the system. This allows the City to drink spring water over well water, but does not actually increase the source capacity of the system. The last source alternative would be to purchase an existing well.

A preliminary cost estimate for each of the options has been created in order to determine which of the options might be most cost effective. These costs are construction costs only and do not include any legal, engineering, or non-construction costs associated with the options. The costs are only estimates, and actual bid prices would be needed in order to determine actual construction costs. Option 1 includes drilling a well near the south interstate 15 interchange relatively close to the proposed 2 million gallon tank site. Option 2 includes drilling a well west of interstate 15, and the piping and appurtenances necessary to connect the new irrigation well to the existing irrigation pond. Option 3 includes upgrading the Fire Station Well, as well as placing the pipe necessary to connect the well to the new storage facility near the South Interchange of I-15 or to the existing storage tank. The table below shows total cost estimates, where a more detailed estimate is included in Appendix D. For particular items relative to each of the first 4 options, please refer to Appendix D.

TABLE 4-B

SOURCE IMPROVEMENT OPTIONS	
Option 1 – Drill a New Culinary Well Near the South Interchange of I-15.	$786,200
Option 2 – Drill a New Irrigation Well and Install New Piping.	$780,800
Option 3 – Upgrade the Fire Station Well and Install Pipe to South Tank.	$755,120
Option 4 – Supply Line East of Freeway	$852,000
Option 5 – Purchase Existing Well, and Install Piping	To be negotiated

The purchase of an existing well was recently offered to City officials, but a purchase price has not yet been negotiated. Prior to negotiating a purchase of the well, the City should first verify that the well can be used for culinary purposes, and gain approval from the Division of Drinking Water (DDW). The following would need to be provided prior to DDW approval: certification of well seal, well driller log, results of the aquifer drawdown tests (both step drawdown and constant rate test), and full chemical analysis of the water. It is recommended that during negotiations, these costs be considered, and possibly borne by the seller. The well would not need to be approved by the DDW prior to negotiations, but should be a condition of final purchase if negotiations get that far. If this particular well pumped 2,270 gpm, the DDW would allow a maximum pumping rate of 1,513 gpm, which is 2/3rds of the maximum test-pump rate.

Option 4 consists of the improvements necessary to extend a supply line from the canyon spring line to a point near the future storage location on the south end of the City. This would include a pressure sustaining valve to build pressure in the spring line sufficient to flow into the south tank, and minimize the size of the pipe needed to make the connection, and also allow the new tank to be constructed at the same elevation as the existing tanks. This benefit allows the majority of the system to remain under one pressure zone.

Although these improvements are expensive, they do provide a supply of the City's spring source to the future storage facility. A new source still needs to be developed before the end of the planning period based on the current situation of Nephi City. One way to alleviate the source need would be to reduce the amount of outdoor source currently dependent on the culinary water system. If the required source were reduced, this option becomes more beneficial to the City due to the fact that the more of the spring water would be available for culinary usage instead of secondary purposes.

Of the five options, Option 3 of upgrading the Fire Station well would likely be the most economical, but it may not be the most beneficial to the City. The main reason for the high expense on Option 3 is due to the large amount of pipe and road surface improvements required to connect the existing well with the new storage facility if it is constructed. There is a large cost in road surface improvements due to the alignment necessary to join the two points. The shortest alignment would run along Main Street. It would be shorter to connect this well to the existing 2-million-gallon tank, but it would be beneficial for a new source to feed the new tank on the south end of the system directly, rather than back feeding to the new tank from the existing tanks through a booster station. Therefor this option is not recommended due to the connection requirements with the new storage facility suggested in Section 5.0.

The main reason Option 2 is so expensive is the long distance from the new well to the existing irrigation pond location. Local officials suggested that a well could not be drilled near the pond east of the interstate, and that it would have to be placed further west near the existing wells. If this is the case, additional piping would be necessary to connect the new well to the irrigation pond because the existing piping on the Jones Well would be used to supply the tanks for culinary purposes. One of the major draw-backs with this option is there would be no direct line feeding the new storage facility on the south end of the City, and the system would have to back-feed to the new tank.

Because of the benefits associated with drilling a new culinary grade well near the new storage facility, it is recommended that the City pursue Option 1. Additional storage is needed to provide sufficient flows near the south end of the City. The well could possibly be drilled within 1,500-3,000 feet of the tank site, and this option would minimize piping required to improve both the source and storage for the system. In addition, minimal road improvements would be affected by this option. A well-siting study and a well preliminary evaluation report would need to be conducted prior to drilling the well to identify the exact location. However, a preliminary evaluation of well logs in the area shows that a well could likely be drilled near the south interchange.

If City officials find that Option 5 can be pursued at a reasonable price, and that the DDW will accept it as a culinary water source, the City may want to purchase the water to feed storage facilities on the north end of the system. If this is the case, Option 1 would still need to be implemented in order to feed the proposed storage tank on the south end of the system.

A temporary source improvement to the culinary water system may be to utilize the existing Jones Well for culinary and irrigation purposes. This would provide an additional 2,400 gpm in the winter and possibly 1,100 gpm in the summer to the City's sources until a new storage facility is constructed on the south end of the system. At that point, the City would need to decide whether a new well will be drilled, a new spring line and pressure sustaining valve constructed, or a booster station installed to efficiently fill the new storage tank. The main problem with this scenario is that the quality of this water source may not meet the standards of the City of Nephi.

SECTION 5.0

STORAGE CAPACITY ANALYSIS

5.1 EXISTING STORAGE CAPACITY

Nephi City currently has 2 steel storage tanks, with a total storage volume of 2.6 million gallons. Tank #1 has a storage volume of 2 million gallons, and Tank #2 has a storage volume of 600,000 gallons. Tank #1 feeds Tank #2 through an altitude-control valve on the system. Tank #1 was constructed in 1972, and Tank #2 was constructed in 1966. A recent inspection of Tank #1 revealed some corrosion on the floor and ceiling. Once a new tank is in place, Tank #1 will need to be drained, blasted, and painted. Observations on Tank #2 in recent years showed minor thinning to the tank walls. Some reconditioning was performed at that time, and Tank #2 is still in good operating condition. Once Tank#1 is refurbished, both tanks should last beyond the 20-year planning period, and therefore no replacement of either tank is recommended at this time.

TABLE 5-A

STORAGE CAPACITY	
Tank 1 (Blue Tank)	2,000,000 gallons
Tank 2 (Silver Tank)	600,000 gallons
Total	2,600,000 gallons

5.2 EXISTING REQUIRED STORAGE CAPACITY

Water storage capacity requirements are separated into three categories, indoor, outdoor, and fire protection. *State of Utah Rules for Public Drinking Water Systems* require a minimum of 400 gallons per day per connection for indoor culinary water storage.

Because Nephi Irrigation Company is not likely to increase the number of secondary user connections in the City, it is assumed that all new ERC's will use culinary water as their only source of yard and garden irrigation. Therefore the total number of ERC's at the end of the planning period using culinary water for irrigation would be 2,399. Based on actual usage totals and State irrigation values, it is assumed that the average irrigated area per ERC is 1/5 of an acre. Finally, it is assumed that all supplemental irrigation is applied by sprinklers, and an efficiency factor of 70% is used in the calculations. Water right, source capacity, and distribution calculations also include these assumptions.

According to the *State of Utah Rules for Public Drinking Water Systems*, Utah has 6 climate zones (excluding non-arable lands), which correspond with consumptive use and annual precipitation. Nephi City is located in Zone 4, which is listed as moderately high for consumptive use. According to the rule, Nephi requires 2,848 gallons per irrigated acre as the storage capacity to be used in calculations of storage for residential and commercial irrigation. As in other calculations relative to the parks and the golf course, the actual usage value for these connections is slightly higher at 3,700 gallons per irrigated acre.

Storage requirements for fire protection vary from system to system. In general, fire flow requirements are based on building size and type of construction. The Rules require 1,000 gpm for one-family and two-family dwellings with an area less than 3,600 square feet and 1,500 gpm or greater for all other structures. The statewide minimum fire flow is 1,000 gpm at a fire hydrant. However, Nephi City's Fire Marshall has suggested a minimum flow of 1,500 gpm for the majority of the City, and 3,000 gpm in a few of the industrial zones. A value of 1,500 gpm is used in the existing calculations, and 3,000 gpm is used for projected figures for storage calculations. Fire protection storage assumes a continuous fire flow for two hours.

A large portion of the storage volume required is attributed to outdoor irrigation. Approximately 3.5 million gallons of projected required storage volume is a result of outdoor irrigation needs.

Based on the information above, and the total number of existing ERC's, the existing required storage capacity is calculated below. Rounded ERC values shown below provide a slightly different number than the calculated gallon figure below. These ERC values are shown as rounded, but are actual decimal values in the calculations.

Residential Use:

Indoor: 1,810 ERC x $\frac{400 \text{ gal.}}{\text{ERC}}$ = 724,000 gal.

Outdoor Use: 1,110 ERC x $\frac{1/5 \text{ ir ac} \times 2{,}848 \text{ gal.} \times 1 \text{ (efficiency)}}{\text{ERC} \quad \text{ir. ac} \quad 0.7}$ = 903,223 gal.

Commercial Use:

Indoor: 546 ERC x $\frac{400 \text{ gal.}}{\text{ERC}}$ = 218,281 gal.

Additional Commercial Summer Use:

Outdoor Use: $\frac{546 \text{ ERC} \times 1540 \text{ gal}}{\text{day-ERC}}$ = 840,383 gal.

Industrial Use:

417 ERC x $\frac{400 \text{ gal.}}{\text{ERC}}$ = 166,667 gal.

Parks & Golf Course Use:

Parks & Cemetery: $\frac{40 \text{ ir acre} \times 3{,}700 \text{ gal} \times 1 \text{ (efficiency)}}{\text{ir. acre} \quad 0.7}$ = 211,429 gal.

Golf Course: $\frac{35 \text{ ir acre} \times 3{,}700 \text{ gal} \times 1 \text{ (efficiency)}}{\text{ir. acre} \quad 0.7}$ = 185,000 gal.

Fire Protection:

1,500 gpm x 120 minutes = 180,000 gal.

TOTAL EXISTING REQUIRED STORAGE CAPACITY = 3,428,983 gal.
EXISTING STORAGE CAPACITY DEFICIT = (828,983) gal.

The calculations show that the existing Nephi City storage capacity is 828,983 gallons below the minimum that is required by the *State of Utah Rules for Public Drinking Water Systems*.

5.3 PROJECTED REQUIRED STORAGE CAPACITY

The number of ERC's projected at the end of the planning period is 5,075. No additional secondary irrigation water will be available to the City, so the number of connections using culinary water for irrigation will increase to 2,399 at the end of the planning period. A target fire flow rate of 3,000 gpm for a 2 hour period has been set by the City in order to provide fire protection for large industrial users now and in the future. The calculation of projected required storage capacity is provided below.

Residential Use:

Indoor: 3,099 ERC x $\frac{400 \text{ gal.}}{\text{ERC}}$ = 1,239,600 gal.

Outdoor Use: 2,399 ERC x $\frac{1/5 \text{ ir ac} \times 2{,}848 \text{ gal.} \times 1 \text{ (efficiency)}}{\text{ERC} \quad \text{ir. ac} \quad 0.7}$ = 1,952,101 gal.

Commercial Use:

815 ERC x $\frac{400 \text{ gal.}}{\text{ERC}}$ = 326,196 gal.

Additional Commercial Summer Use:

$\frac{815 \text{ ERC} \times 1540 \text{ gal}}{\text{day-ERC}}$ = 1,255,854 gal.

Industrial Use:

1,161 ERC x $\frac{400 \text{ gal.}}{\text{ERC}}$ = 464,327 gal.

Parks & Golf Course Use:

Parks & Cemetery: $\frac{65 \text{ ir acre} \times 3{,}700 \text{ gal}}{\text{ir. acre}} \times \frac{1 \text{ (efficiency)}}{0.7}$ = 343,571 gal.

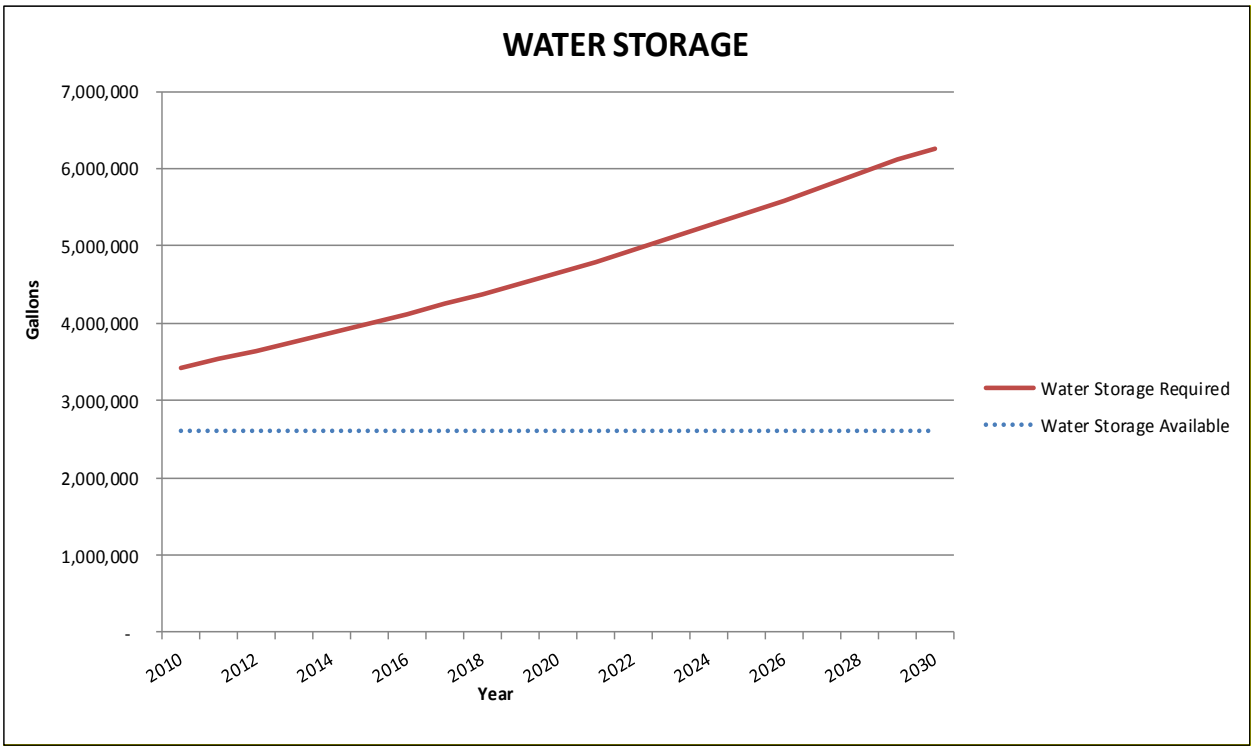
Golf Course: $\frac{60 \text{ ir acre} \times 3{,}700 \text{ gal}}{\text{ir. acre}} \times \frac{1 \text{ (efficiency)}}{0.7}$ = 317,143 gal.

Fire Protection:

3,000 gpm x 120 minutes = 360,000 gal.

TOTAL PROJECTED REQUIRED STORAGE CAPACITY = 6,258,792 gal.
PROJECTED STORAGE CAPACITY DEFICIT = (3,658,792) gal.

Figure 5.1



5.4 RECOMMENDED STORAGE CAPACITY IMPROVEMENTS

As defined by the requirements of the *State of Utah Rules for Public Drinking Water Systems*, Nephi City currently has a storage deficit of 828,983 gallons. The projected storage capacity calculation shows that the deficit would expand to 3,658,792 gallons at the end of the planning period. Since the existing tanks are in good condition, it is likely that they will operate throughout the planning period, with proper maintenance, and no additional storage for tank replacement will be accounted for. It is therefore recommended that the City construct an additional 3,700,000 gallons of storage over the planning period. Preliminary evaluations suggest that the optimum location for a storage tank would be on the south east part of the City. This would provide water from another end of the system and benefit the average flow in the distribution system.

It is recommended that a 2-million-gallon tank be constructed near the south interchange, as shown on Appendix G, and that an additional 2-million-gallon tank be constructed in 10 years near Tank #2. At that time the City should determine whether a larger tank would be warranted to replace any of the other tanks in service, or to meet any change in actual growth rates. Future residential growth in the City may tend to creep above the required pressure zone for the existing tank elevations of the water system. The City will want to determine if constructing the new tank at a higher elevation would be more beneficial than providing citizens with adequate pressures with booster stations.

The map in Appendix G shows the location for the new tank on the south end of the system. If City officials would like to provide sufficient pressures to those future annexation areas identified on the map, the City should place the new tank at a sufficient elevation to provide adequate pressures to these areas. The 100' contour line on the map in Appendix G, with the elevation labeled at 5,220 feet, represents a line where 43 psi of static pressure would be available. Any location above this contour line is at risk of not meeting State of Utah minimum pressure requirements. If the City determines that the tank should be placed high enough to service these areas, a pressure reducing valve would then be necessary to match the existing pressure zone in the City.

The other option would be to match the new tank elevation with the existing tanks and operate those zones above the 100-foot contour with a booster pump system, as the current service area on the north end of the system operates. The issue with this option is that these users rely on a mechanical system to provide adequate pressures to certain zones.

It is recommended that the tank be placed at the same elevation as the existing tanks, because this allows the majority of the system to work on the same pressure zone and will reduce pumping costs, where the majority of the connections will be served in the lower zone. This will minimize the number of locations relying on a mechanical system for adequate pressures. It is likely that the tank could be constructed on private property, which will require the City to acquire the appropriate land and easements to construct the tank and appurtenances. If the tank needs to be constructed on public lands, additional planning and funding will be necessary to meet environmental requirements.

It is also recommended that the City explore secondary irrigation options and determine whether a system-wide irrigation system would be economical to pursue. The required storage volume could be reduced by nearly 50% with a system-wide irrigation system in place. A feasibility study would need to be performed to determine whether it is more economical to provide additional storage, or to install a new irrigation system.

SECTION 6.0
DISTRIBUTION SYSTEM ANALYSIS

6.1 EXISTING DISTRIBUTION SYSTEM ANALYSIS

The *State of Utah Rules for Public Drinking Water Systems* require that distribution systems equipped with fire hydrants "shall be designed to insure that a minimum of 20 psi exists at all points within the system when needed fire flows are imposed on peak day demand flows of the system." Peak-day demands are calculated to determine required source capacity. Because Nephi City has fire hydrants in its distribution system, the peak-day demands are used in its computer models. The existing peak-day demand is equal to the existing required source capacity of 3,940 gpm in Section 4.3. The projected peak-day demand was calculated to be 7,340 gpm in Section 4.4.

In January of 2007 the *State of Utah Rules for Public Drinking Water Systems* were revised to require the minimum dynamic pressure under peak-day demands to be 40 psi, and 30 psi under peak-instantaneous demands in new systems. The State encourages existing systems to meet the new rule requirements whenever possible.

It is recommended that distribution system pressures be maintained between 40 and 80 psi during normal system operations. Based on elevations within the City, most system pressures are within the recommended range. The highest static pressures in the system are about 95 psi.

There is currently only 1 pressure zone within the Nephi City culinary water system. A small booster pump feeds one of the subdivisions, and a second booster station feeds the irrigation system for the golf course. The remainder of the system is within the same zone. This simplifies the analysis and the improvements required in the system.

The *State of Utah Rules for Public Drinking Water Systems* require all fire hydrants to be supplied from 8-inch diameter or larger lines, unless it can be proven through the use of computer modeling that a smaller line will meet minimum fire flow requirements. The transmission pipelines from the tanks to the distribution system consist of 14-inch, 12-inch and 10-inch pipelines. These larger lines provide a good back bone to a large portion of the system. The distribution system is made up of 12-inch, 10-inch, 8-inch, 6-inch, 4-inch, and some 2-inch pipelines. Nephi staff believes that most of the smaller pipelines currently in use in the system are cast-iron, and many of the smaller diameter pipes may be reaching the end of their service life. These smaller pipelines are likely old enough that they are constructed of lead-jointed material. A map of the existing system is located in Appendix F-1.

6.2 COMPUTER MODEL OF THE DISTRIBUTION SYSTEM

Nephi City's existing culinary water distribution system was modeled using *"H_2O Net"*, a water system modeling program. In this process the peak day demand is spread throughout the entire system. The model then analyzes the system with a fire flow assigned in turn to each junction node. The model is adjusted so that no connection in the system can fall below 20 psi during a fire-flow event during peak-day demand, which is mandated by the *State of Utah Public Drinking Water Regulations*. A 24-hour simulation was also performed to make sure that none of the nodes falls below 30 psi under peak instantaneous demands. The existing system map and the model output data for the existing system are provided in Appendix F for reference.

Results of modeling the system show that the existing system does not meet the required minimum fire flows of 1,000 gpm at a large number of locations. These problem areas were identified using existing demands on the system. The major problems in the system are related to the smaller size of the lines predominately located in the southwest region of the system. Those junctions colored in red represent the areas flowing less than 1,000 gpm during a fire-flow event, and the other junctions are colored as defined in the legend on the map in Appendix F.

The future demands on the system were then placed in the model in order to determine the improvements necessary for the planning period. Appendix G-1 shows a map of the necessary improvements required to maintain 1,500 gpm at the majority of the nodes in the system. Appendix G-2, which reflects the water system after the recommended distribution and storage improvements are made, shows that the majority of the junctions are colored in green and will meet the minimum fire-flow requirements established in this plan.

In order to develop the water model, recently updated GIS data was incorporated into the program. The model was calibrated to specific flow readings in the system in order to reflect actual flows. Efforts were made to minimize the number of improvements necessary to optimize the flow in the system. The model shows that in order to meet minimum fire flows, a large distribution line serving as the backbone to the system should be extended to the south and west portions of the community, and then loop back to a larger line on the east side of the City. Critical nodes were identified in the model, and necessary improvements to alleviate deficiencies to these nodes are shown in Appendix G-1 and described Section 6.3 below.

6.3 RECOMMENDED DISTRIBUTION SYSTEM IMPROVEMENTS

As noted in the previous section, fire flow requirements are based on building size and type of construction. The statewide minimum fire flow, as set by the *State of Utah Rules for Public Drinking Water Systems* is 1,000 gpm at a fire hydrant. The Rules require 1,000 gpm for one and two family dwellings with an area less than 3,600 square feet and 1,500 gpm or greater for all other structures. Due to the system requirements for Nephi City, the local Fire Chief suggested that a minimum value of 1,500 gpm be obtained in local areas, and 3,000 gpm for industrial areas. This target will require upgrades for many of the distribution lines throughout the system.

In order to meet this target value, a new 8-inch line needs to be extended along 100 West Street from 100 North to 700 South Street. Then it needs to turn and run to Main Street to connect to the existing 12-inch line. These improvements will provide a large backbone for the system and allow for higher and more consistent flows throughout the system. The 3-inch line on 700 North and Main should be replaced with a 12-inch line. During the modeling process it was determined that a larger feed line from the north storage facility would alleviate flow restrictions in a large portion of the system. It is recommended that a 12-inch supply line replace the existing 10-inch line from the north storage tank to the point shown on both maps in Appendix G. An investigation of the bore-casing diameter underneath Interstate 15 needs to be conducted to determine the largest size of pipe that can be pulled through the casing. If a larger pipe than the 12-inch line proposed can be placed in the casing, it is recommended that it be installed. The table below is a tabulation of the total lengths of pipe proposed for replacement in this study. These lengths are represented by the proposed piping as shown on Appendix G-1 of this report.

TABLE 6-A

DISTRIBUTION LINES	
14-Inch	6,000 feet
12-Inch	6,800 feet
10-Inch	3,200 feet
8-Inch	57,000 feet
Total	73,000 feet

In addition, it is recommended that the smaller 4-inch and 2-inch lines be replaced with a minimum of 8-inch diameter lines so that all areas of the system have at least 1,500 gpm. It is possible to leave some of these smaller lines in place and still achieve the 1,500 gpm flow requirements, but it is recommended that all of the smaller lines be replaced in phases in order to update the age class of the pipe in the system. The replacement of these smaller pipelines was not accounted for in this study. This study provides the minimum number of improvements to bring the City's water system into compliance with the State of Utah Drinking Water Regulations.

It is recommended that a 14-inch line be constructed from the new storage facility to a point on Main Street. This will allow sufficient flow to extend in both directions along the newly constructed 12-inch line. With these improvements, 3,000 to 5,000 gpm will be available at the industrial locations on the south end of the system.

The priority in which these distribution improvements should be installed is the largest pipes first, and the smaller pipes after that. The backbone line along 100 West Street should be installed before replacing all of the smaller 2-inch and 4-

inch lines. The new line feeding the City from the north storage tank could also be replaced in the near future, although the estimated phased costs include this piping in Phase 4 of planned construction. This would provide a significant increase in flow to the City with a minimal amount of pipe installed, but the north tank would need to be taken off line to do the line replacement.

All distribution improvements were planned for Phase 1 of construction for the year 2013.

6.4 OTHER RECOMMENDATIONS

Current fire-hydrant spacing exceeds the recommended distance of 500 feet in some areas throughout the system. The map in Appendix E shows the areas not meeting the fire hydrant placement requirements. The data used to provide this illustration was provided by Nephi City, and it is assumed to be accurate. It is recommended that the City add additional fire hydrants in the empty areas on the map, so that there is a fire hydrant at each intersection or approximately every 500 feet. A preliminary evaluation shows the need for 74 new fire hydrants to provide proper spacing. It was estimated that 20 additional fire hydrants will need to be replaced because of age and service life. When the City has a more accurate inventory for replacement of fire hydrants, the estimate needs to be updated. It is also recommended that proper valve placement be pursued by City officials. Strategic valve placement typically includes a minimum of 2 valves on all tees, and 3 on any crosses. Proper valve placement allows City personnel to isolate small sections of the system without impacting a large amount of citizens. It is estimated that 120 valves could be added to the City water system.

It is recommended that the City install a SCADA system to allow remote monitoring and control for system wells, tanks, springs, and treatment systems. Installation of the SCADA system would simplify and improve safety, reliability, and operability of the culinary water system. It would also simplify the metering and records associated with managing the City's water system.

Nephi City will continue to grow as the area develops, and the City has identified probable areas for annexation. Demands were placed on the furthest boundaries of these locations, and recommended future pipe sizes are shown on the map in Appendix G. The City should require any new main-line piping installed in future subdivisions to be 8-inch diameter or larger, in accordance with the *State of Utah Rules for Public Drinking Water Systems*.

The City also requested an estimate of the costs associated with providing fire flow to the airport. A preliminary evaluation shows that the airport is within 8,000 linear feet of an existing 8" distribution line. Assuming that easements could be obtained for the extension, it is estimated that this line could be extended for approximately $200,000. It was estimated in Section 4 that a new irrigation well could be constructed for $780,800 and that a culinary well could be constructed for $786,200. However, these figures included additional costs associated with extending piping to storage locations. The actual well costs for the irrigation well were approximately $500,000, and the actual well costs for the culinary well were near $700,000. The costs associated with a new well are still more than twice the amount necessary to run a line extension to the airport. It is more economical to extend the existing distribution system to the airport, as long as easements for the shortest alignment could be obtained. Based on these figures, when the City determines it is necessary, it is recommended that the City pursue extending a line from its existing system to the airport location. There will be additional improvement costs at the airport no matter which method is used to supply water to the airport. Additional piping and fire hydrant costs would need to be designed for this construction project. The costs above only represent costs associated with reaching the airport. This is a preliminary estimate, and the City should investigate the option further if necessary.

After consulting with local water officials, it is estimated that the older 10" spring line up the canyon will need to be replaced within the next 20 years. In order to facilitate this replacement, it is recommended that the City plan for the replacement now in order to adequately fund the project later. A preliminary estimate to replace the spring line is located in Table 8B of this report. This is a preliminary estimate, and a more-in-depth look at this project is necessary. It is recommended that the City perform a feasibility study on the costs and benefits associated with replacing the existing 10" pipe versus combining all the springs into one existing pipe. The City may be able to minimize pipe costs by combining all of the flows into one pipe. It is necessary to analyze the flows to determine the capacity of the existing 16" pipeline to see if all the springs could be combined into one pipeline. If they can, the next step in the study would be to determine if the hydro turbine could operate at a lower head, and to determine if the benefits of combining all of the flows into one pipe would outweigh the costs associated with lowering the amount of power output from the hydro unit.

SECTION 7.0
WATER TREATMENT REQUIREMENTS

7.1 GENERAL SYSTEM OVERVIEW

The *State of Utah Public Drinking Water Regulations*, in accordance with the National Safe Drinking Water Act, have adopted "primary" regulations for the protection of public health, and "secondary" regulations related to taste and aesthetics. The Nephi City culinary water system currently meets all requirements.

The regulations also recommend that all culinary water sources have provisions for continuous disinfection. Nephi City currently has equipment that will allow disinfection of all of its sources using a chlorination system. If the City decides to drill a new culinary well and install the piping to carry the well water to a new storage facility, a new chlorination facility will be necessary to disinfect the water prior to reaching the storage location.

7.2 EXISTING SYSTEM

The existing chlorination system is currently used for the springs and also for the equipment shed well when necessary. The equipment is in a sump location, sitting lower than the ground elevation. This type of access location makes maintenance on the equipment very difficult. This equipment is also reaching the end of its service life and should be replaced.

7.3 RECOMMENDED IMPROVEMENTS

A new chlorination system should be installed for the new well supplying water to the new storage tank. It is also recommended that the existing chlorination system should be replaced and brought up to date so that the system has the capability to disinfect all of its sources and be remotely monitored through the SCADA system.

SECTION 8.0

SUMMARY OF RECOMMENDED IMPROVEMENTS

8.1 RECOMMENDED IMPROVEMENTS

Based on the analysis from Sections 3 through 7, it is recommended that the City proceed with construction projects to implement the following improvements, as summarized in the table below, according to the schedule outlined. The order of priority for construction is listed in Section 8.2 below and is broken into 4 phases.

RECOMMENDED CULINARY WATER SYSTEM IMPROVEMENTS	
Description	**Recommended Upgrades/Needs Statement**
Engineering Studies **Secondary Irrigation System 2012-2014** **Spring Line/Hydro Feasibility Study 2012-2014**	It is recommended that the City work with the Irrigation company and consider expanding the secondary system to reduce the demand for irrigation from the culinary water system. It is necessary to perform a feasibility study on the costs associated with implementing a system-wide irrigation system to serve the all outdoor needs of Nephi City. The study would determine whether it is more beneficial to install this type of system or to serve the secondary needs of the community with the culinary water system. The City may want to partner with Nephi Irrigation Company, East Juab Water Conservancy District, and the Central Utah Water Conservancy District to perform this study. It is recommended that the City conduct a benefits/costs analysis on replacing the existing 10" spring line versus combining springs into the existing 16-inch pipe to determine which option would be of more benefit to Nephi City in regards to the hydro plant on the source line.
Water Rights **2012-2015**	The amount of water being traded to the Irrigation Company needs to be quantified in order to identify the amount of water right currently protected. Additional leases or a 40-year plan need to be prepared in order to protect the remaining water rights.
Source Capacity **New Well – 2017**	Source capacity needs to be increased to meet future projected needs. Additional spring development could help to increase Nephi City's water. It is unknown why current spring flow is less than the historic flow rates for the springs. It is assumed that it is due to drought conditions, but it is recommended that spring flow data over the past two years be compared with flows over the last 10 years. With two consecutive winters of above normal precipitation, the City should see an increase in spring flow. If not, there may be additional issues with the spring lines. At the completion of this study, the Spring Flow in the summer of 2011 increased significantly. However, for planning purposes, the lower spring flows will be considered in effort to be conservative. It is recommended that a new well be drilled, and that the City continue to use the Jones Well as an irrigation source. This study shows that the City will reach its source capacity when 3,300 ERC's are served. Based on the projected growth rate, this could occur in the year 2017. However, the proposed storage location could suggest making this source improvement in conjunction with the new storage facility. The new storage facility needs to be constructed as soon as possible due to the fact that the City is currently under the State minimum storage requirements, if outdoor watering needs continue to be met through the culinary water system. Improve the metering system to better account for overflow and traded water in the system.
Storage **2 million gal – 2017**	The City needs to increase the storage capacity by 3.5 million gallons to meet requirements projected within the planning period, if outdoor watering needs continue to be met through the culinary water system. It is recommended that a 2-million-gallon tank be constructed near

2 million gal - 2023	the south interchange as soon as possible, and that a 2-million-gallon tank be constructed near the existing north tank in the year 2023, or when the need arises. The size of this tank should be reanalyzed prior to construction.
Distribution **Piping/Valves/ Hydrants –2012**	The backbone of the water system should be extended throughout the City as well as the replacement of some of the undersized distribution lines stemming from the main lines. These improvements includes placing 6,000 linear feet of 14-inch pipe, 6,800 linear feet of 12-inch pipe, 3,200 linear feet of 10-inch pipe, and 57,000 linear feet of 8-inch pipe. The priority of the pipe should be in the order listed above. These improvements are necessary today, but have been scheduled to be installed in the year 2017 in order to meet phasing requests from Nephi City. It is recommended that these improvements be made as soon as possible, although shown to be constructed in the year 2017. Add valves every 500 feet along the transmission lines, and at strategic locations throughout the City at intersections (a minimum of 2 on tees, and 3 on crosses). 120 valves have been budgeted for in Phase 1. Add approximately 74 hydrants to the system where needed to improve spacing to at least every intersection or 500 feet and an additional 20 to replace any broken or damaged hydrants. Install a SCADA control system to monitor and control water system components.
Water Treatment **Chlorination 2012**	Construct a new chlorination building and system for any new source remotely located from the existing chlorination facility. Replace the existing chlorination system to allow for a more dependable and safer operation and maintenance.
Spring Transmission **Spring Line 2031**	It is possible that, due to the age of the smaller 10-inch spring line, this line supplying water to Nephi City will have to be replaced within the next 20 years. It is recommended that the line be replaced with either ductile iron or with PVC, high-pressure piping. The spring line/hydro study needs to be completed prior to planning this project.

8.2 ENGINEER'S PRELIMINARY OPINION OF PROBABLE COST

It is recommended that the secondary irrigation study be completed as soon as possible due to the effects it may have on planning the future phases of construction. It is estimated that this study would range in cost between $50,000 and $75,000 depending on the level of effort required by Nephi City. It is estimated that the spring line and hydro study could be completed for $15,000 to $20,000.

An engineer's preliminary opinion of probable cost for the recommended phases of construction are provided in TABLE 8-A. Included are all anticipated construction costs, a contingency budget, and a budget for other normal project costs such as survey, administration, engineering, construction management, legal services, fiscal costs, land acquisition, etc. The projects have been phased from most critical improvements to least critical.

Phase I consists of improving the distribution system. This phase consists of upsizing a large portion of the smaller distribution lines in the system, in order to meet the State of Utah fire flow requirements. It also includes placing additional valves and hydrants at needed locations throughout the system, and implementing SCADA management for the water system. The estimated opinion of probable total current-year costs of this phase is approximately $4.9 million dollars.

Phase II consists of constructing a new storage facility on the south end of the system and developing a new well near the storage facility. This project is being postponed for a few years to allow the City and Irrigation company to determine the feasibility of expanding/improving the citywide irrigation system currently owned by a separate irrigation company. If the irrigation system is expanded and improved, the result could decrease the City's outdoor demand on the culinary water system. If the irrigation system is not expanded, the City is in need of storage improvements at this time, and because the tank will need a method of being supplied, it is critical that the source improvements be developed in conjunction with the storage improvements. The estimated opinion of probable total current-year cost of this phase is approximately $3.5 million dollars, with an inflated construction-year cost of $4.1 million dollars.

Phase III consists of constructing a new storage facility near the north storage tank. Phase II includes a 14" pipe to be installed from the north tank to the City. The size of the current casing crossing Interstate 15 will determine how large of a pipe can be installed. If the existing casing is not large enough, it is likely that the City may have to bore a larger casing under the interstate, which would increase the cost estimate for this phase of improvements. Phase III also includes extending the distribution system to the municipal airport and providing fire protection at that location. It was determined that it would be more economical to tie the airport into the existing system than to drill a new well and have the airport be on an isolated system. The estimated opinion of probable total current-year costs of this phase is approximately $3.1 million dollars, with an inflated construction-year cost of $4.3 million dollars.

Phase IV consists of replacing the 10" spring line from the springs east of the City to the existing storage facilities. After consulting with local officials, it was agreed that the existing spring line piping would likely need to be replaced within the 20-year planning period. The estimated opinion of probable total current-year costs of this phase is approximately $2.4 million dollars, with an inflated construction-year cost of $4.2 million dollars. A more-in-depth study needs to be conducted prior to the planning of this project. The study needs to determine whether it is more beneficial to replace this pipe or to direct the flow into the existing larger pipe. The latter option will have implications for the hydro plant currently operating under conditions relative to the 10" supply line. A feasibility study needs to be performed prior to planning for the items associated with this phase of construction.

8.3 PROPOSED FINANCING PLAN

A proposed financing plan for the recommended projects is provided in TABLE 8 - B. This plan is submitted only as a guide to possible funding sources. It should be noted that an increase in water rates will be required in order to proceed with the proposed projects. The increase will be discussed in Section 11, Water Rates Analysis.

TABLE 8-A

NEPHI CITY CULINARY WATER MASTER PLAN - 2011

TABLE 8 - A
OPINION OF PROBABLE COST - PHASE I

	ITEM	QTY.	UNITS	UNIT COST	AMOUNT
	Distribution Improvement Projects				
1	Mobilization	1	LS.	$ 250,000.00	$ 250,000.00
2	Pre-Construction Video	1	LS.	$ 1,500.00	$ 1,500.00
3	Traffic Control	1	LS.	$ 30,000.00	$ 30,000.00
4	Subsurface Investigation	60	HOUR	$ 200.00	$ 12,000.00
5	14" AWWA C900 PVC SDR 18 Pipe and Fittings	6000	LN.-FT.	$ 28.00	$ 168,000.00
6	14" Gate Valve	4	EACH	$ 4,200.00	$ 16,800.00
7	12" AWWA C900 PVC SDR 18 Pipe and Fittings	6800	LN.-FT.	$ 24.00	$ 163,200.00
8	12" Gate Valve	20	EACH	$ 2,800.00	$ 56,000.00
9	10" AWWA C900 PVC SDR 18 Pipe and Fittings	3200	LN.-FT.	$ 22.00	$ 70,400.00
10	10" Gate Valve	14	EACH	$ 2,000.00	$ 28,000.00
11	8" AWWA C900 PVC SDR 18 Pipe and Fittings	57000	LN.-FT.	$ 18.00	$ 1,026,000.00
12	8" Gate Valve	120	EACH	$ 1,300.00	$ 156,000.00
13	Import Pipe Bedding	73000	LN.-FT.	$ 2.00	$ 146,000.00
14	Untreated Base Course	5,420	TON	$ 16.00	$ 86,720.00
15	3" Bituminous Surfacing for Street Crossings.	32120	SQ.-YD.	$ 18.00	$ 578,160.00
16	Boring and Jacking	400	LN.-FT.	$ 300.00	$ 120,000.00
17	New Fire Hydrant Assembly	75	EACH	$ 3,200.00	$ 240,000.00
18	Reconnect Existing Fire Hydrant	40	EACH	$ 2,500.00	$ 100,000.00
19	Replace Existing Fire Hydrants	20	EACH	$ 3,200.00	$ 64,000.00
20	3" Combination Air Valve Assembly	4	EACH	$ 3,500.00	$ 14,000.00
21	2" Combination Air Valve Assembly	4	EACH	$ 3,000.00	$ 12,000.00
22	Replace Existing Chlorination System	1	L.S.	$ 60,000.00	$ 60,000.00
23	New Flow Meters for Well and Springs	3	EACH	$ 7,500.00	$ 22,500.00
24	SCADA RTU Tanks/Chlorinator Bldg	3	EACH	$ 12,000.00	$ 36,000.00
25	SCADA RTU Well	2	EACH	$ 12,000.00	$ 24,000.00
26	SCADA HMI Town Office	1	EACH	$ 18,000.00	$ 18,000.00
				SUBTOTAL	**$ 3,499,280.00**
				Contingency:	**$ 525,720.00**
				TOTAL Construction Costs:	**$ 4,025,000.00**
	Non-Construction Services				
a.	Administration, Funding Services, Preliminary Engineering	1	L.S.	$ 30,000.00	$ 30,000.00
b.	Design Engineering	1	L.S.	$ 280,000.00	$ 280,000.00
c.	Quality Control Inspection	1	Hourly	$ 323,000.00	$ 323,000.00
d.	Survey and Mapping	1	L.S.	$ 20,000.00	$ 20,000.00
e.	Legal, Fiscal, Interim Finaning	1	Est.	$ 242,000.00	$ 242,000.00
f.	Environmental	1	LS.	$ 25,000.00	$ 25,000.00
				TOTAL Non-Construction Services:	**$ 920,000.00**
				TOTAL PROJECT COST:	**$ 4,945,000.00**

NEPHI CITY CULINARY WATER MASTER PLAN - 2011

TABLE 8 - A
OPINION OF PROBABLE COST - PHASE II

	ITEM	QTY.	UNITS	UNIT COST	AMOUNT
	Storage Improvements				
1	Mobilization	1	LS.	$ 30,000.00	$ 30,000.00
2	Tank Site Earthwork, Subgrade, and Foundation	1	LS.	$ 30,000.00	$ 30,000.00
3	Construct New 2,000,000 Gallon Concrete Storage Tank	1	LS.	$ 1,300,000.00	$ 1,300,000.00
4	Tank Piping and Appurtenances	1	LS.	$ 60,000.00	$ 60,000.00
5	Chainlink Fence & Gate	1400	LN.-FT.	$ 20.00	$ 28,000.00
6	14" AWWA C900 PVC SDR 18 Pipe and Fittings	3300	LN.-FT.	$ 28.00	$ 92,400.00
7	14" Gate Valve	4	EACH	$ 4,200.00	$ 16,800.00
8	Import Pipe Bedding	3300	LN.-FT.	$ 2.00	$ 6,600.00
	Well Improvements				
9	Mobilization	1	L.S.	$ 20,000.00	$ 20,000.00
10	12" AWWA C900 PVC SDR 18 Pipe and Fittings (Well Line)	5000	LN.-FT.	$ 24.00	$ 120,000.00
11	12" Gate Valve	4	EACH	$ 2,800.00	$ 11,200.00
12	Aquifer Water Sample	1	Each	$ 2,500.00	$ 2,500.00
13	Test Well 400 feet	1	L.S.	$ 60,000.00	$ 60,000.00
14	Surface Casing 24-inch	100	LnFt	$ 125.00	$ 12,500.00
15	Well Drilling 24-inch	400	LnFt	$ 220.00	$ 88,000.00
16	16" Carbon Steel Well Casing	300	LnFt	$ 100.00	$ 30,000.00
17	16" Stainless Steel Well Screen	100	LnFt	$ 200.00	$ 20,000.00
18	Gravel Packing	30	CuYd	$ 600.00	$ 18,000.00
19	4" Galvanized Steel Refill Pipe	200	LnFt	$ 15.00	$ 3,000.00
20	Grout - Sanitary Seal	1	L.S.	$ 20,000.00	$ 20,000.00
21	Well Development	80	Hour	$ 250.00	$ 20,000.00
22	Furnish and Install Test Pump & Equipment	1	L.S.	$ 20,000.00	$ 20,000.00
23	Step Test Pumping	12	Hour	$ 250.00	$ 3,000.00
24	Constant Rate Test Pumping	24	Hour	$ 250.00	$ 6,000.00
25	Disinfection & Capping	1	L.S.	$ 1,000.00	$ 1,000.00
26	Submersible Well Pump, Pump Control Panel, Pitless Adapter	1	L.S.	$ 60,000.00	$ 60,000.00
27	Furnish and Install SCADA Equipment	1	L.S.	$ 85,000.00	$ 85,000.00
28	Controls and Instrumentation for Well and tank	1	L.S.	$ 15,000.00	$ 15,000.00
29	Well Building	1	L.S.	$ 45,000.00	$ 45,000.00
30	Electrical for Well Building	1	L.S.	$ 50,000.00	$ 50,000.00
31	Back-up Generator	1	L.S.	$ 50,000.00	$ 50,000.00
32	Power to Building	1000	LnFt	$ 25.00	$ 25,000.00
33	Well Building Piping	1	L.S.	$ 20,000.00	$ 20,000.00
34	Chlorination Equipment	1	L.S.	$ 20,000.00	$ 20,000.00
35	Chain Link Fence & Gates	800	LnFt	$ 20.00	$ 16,000.00
	SUBTOTAL Water Improvement Costs:				**$ 2,405,000.00**
	Contingency:				**$ 350,000.00**
	TOTAL Construction Costs:				**$ 2,755,000.00**
	Non-Construction Services				
a.	Administration, Funding services, Preliminary Engineering	1	L.S.	$ 30,000.00	$ 30,000.00
b.	Design Engineering	1	L.S.	$ 190,000.00	$ 190,000.00
c.	Quality Control Inspection	1	Hourly	$ 213,000.00	$ 213,000.00
d.	Survey and Mapping	1	L.S.	$ 20,000.00	$ 20,000.00
e.	Well Siting Study	1	L.S.	$ 10,000.00	$ 10,000.00
f.	Preliminary Evaluation Report (PER) & Well Specification	1	L.S.	$ 10,000.00	$ 10,000.00
g.	Source Protection Plan	1	L.S.	$ 5,000.00	$ 5,000.00
h.	Water Rights Services	1	Hourly	$ 5,000.00	$ 5,000.00
i.	Land Acquisition	1	L.S.	$ 80,000.00	$ 80,000.00
j.	Legal, Fiscal, Interim Financing	1	Est.	$ 162,000.00	$ 162,000.00
k.	Environmental	1	LS.	$ 25,000.00	$ 25,000.00
	TOTAL Non-Construction Services:				**$ 750,000.00**
	TOTAL PROJECT COST:				**$ 3,505,000.00**

NEPHI CITY CULINARY WATER MASTER PLAN - 2011

TABLE 8 - A
OPINION OF PROBABLE COST - PHASE III

	ITEM	QTY.	UNITS	UNIT COST	AMOUNT
	Storage Improvements				
1	Mobilization	1	LS.	$ 30,000.00	$ 30,000.00
2	Tank Site Earthwork, Subgrade, and Foundation	1	LS.	$ 30,000.00	$ 30,000.00
3	Construct New 2,000,000 Gallon Concrete Storage Tank	1	LS.	$ 1,300,000.00	$ 1,300,000.00
4	Tank Piping and Appurtenances	1	LS.	$ 60,000.00	$ 60,000.00
5	Chainlink Fence & Gate	1400	LN.-FT.	$ 20.00	$ 28,000.00
6	14" AWWA C900 PVC SDR 18 Pipe and Fittings	1200	LN.-FT.	$ 28.00	$ 33,600.00
7	14" Gate Valve	4	EACH	$ 4,200.00	$ 16,800.00
8	Import Pipe Bedding	1200	LN.-FT.	$ 2.00	$ 2,400.00
	Airport Improvements				
9	Mobilization	1	L.S.	$ 20,000.00	$ 20,000.00
10	8" AWWA C900 PVC SDR 18 Pipe and Fittings (Well Line)	24000	LN.-FT.	$ 18.00	$ 432,000.00
11	8" Gate Valve	20	EACH	$ 1,300.00	$ 26,000.00
12	Import Pipe Bedding	24000	LN.-FT.	$ 2.00	$ 48,000.00
13	Untreated Base Course	30	TON	$ 16.00	$ 480.00
14	3" Bituminous Surfacing for Street Crossings.	300	SQ.-YD.	$ 18.00	$ 5,400.00
15	Boring and Jacking	400	LN.-FT.	$ 300.00	$ 120,000.00
16	New Fire Hydrant Assembly	28	EACH	$ 3,200.00	$ 89,600.00
17	2" Combination Air Valve Assembly	2	EACH	$ 3,000.00	$ 6,000.00
18	1 PRV Station	1	EACH	$ 20,000.00	$ 20,000.00
				SUBTOTAL Water Improvement Costs:	**$ 2,268,280.00**
				Contingency:	**$ 294,720.00**
				TOTAL Construction Costs:	**$ 2,563,000.00**
	Non-Construction Services				
a.	Administration, Funding Services, Preliminary Engineering	1	L.S.	$ 30,000.00	$ 30,000.00
b.	Design Engineering	1	L.S.	$ 160,000.00	$ 160,000.00
c.	Quality Control Inspection	1	Hourly	$ 178,000.00	$ 178,000.00
d.	Survey and Mapping	1	L.S.	$ 15,000.00	$ 15,000.00
e.	Land Acquisition	1	L.S.	$ 20,000.00	$ 20,000.00
f.	Legal, Fiscal, Interim Financing	1	Est.	$ 134,000.00	$ 134,000.00
g.	Environmental	1	LS.	$ 25,000.00	$ 25,000.00
				TOTAL Non-Construction Services:	**$ 562,000.00**
				TOTAL PROJECT COST:	**$ 3,125,000.00**

NEPHI CITY CULINARY WATER MASTER PLAN - 2011

TABLE 8 - A
OPINION OF PROBABLE COST - PHASE IV

	ITEM	QTY.	UNITS	UNIT COST	AMOUNT
Distribution (Spring Line) Improvement Projects					
1	Mobilization	1	LS.	$ 250,000.00	$ 250,000.00
2	Pre-Construction Video	1	LS.	$ 1,500.00	$ 1,500.00
3	Traffic Control	1	LS.	$ 100,000.00	$ 100,000.00
4	Subsurface Investigation	60	HOUR	$ 200.00	$ 12,000.00
5	Spring Rehabilitation	1	LS.	$ 150,000.00	$ 150,000.00
6	10" AWWA C900 PVC SDR 18 Pipe and Fittings	27000	LN.-FT.	$ 30.00	$ 810,000.00
7	10" Gate Valve	8	EACH	$ 2,000.00	$ 16,000.00
8	Import Pipe Bedding	27000	LN.-FT.	$ 2.00	$ 54,000.00
9	Untreated Base Course	400	TON	$ 16.00	$ 6,400.00
10	3" Bituminous Surfacing for Street Crossings.	6200	SQ.-YD.	$ 18.00	$ 111,600.00
11	Boring and Jacking	200	LN.-FT.	$ 300.00	$ 60,000.00
12	2" Combination Air Valve Assembly	10	EACH	$ 3,000.00	$ 30,000.00
13	Thrust Blocks	10	EACH	$ 3,000.00	$ 30,000.00
				SUBTOTAL	**$ 1,631,500.00**
				Contingency:	**$ 244,500.00**
			TOTAL Construction Costs:		**$ 1,876,000.00**
Non-Construction Services					
a.	Administration, Funding Services, Preliminary Engineering	1	L.S.	$ 30,000.00	$ 30,000.00
b.	Design Engineering	1	L.S.	$ 130,000.00	$ 130,000.00
c.	Quality Control Inspection	1	Hourly	$ 150,000.00	$ 150,000.00
d.	Survey and Mapping	1	L.S.	$ 45,000.00	$ 45,000.00
e.	Land Acquisition	1	L.S.	$ 20,000.00	$ 20,000.00
f.	Legal, Fiscal, Interim Financing	1	Est.	$ 113,000.00	$ 113,000.00
g.	Environmental	1	LS	$ 25,000.00	$ 25,000.00
			TOTAL Non-Construction Services:		**$ 513,000.00**
			TOTAL PROJECT COST:		**$ 2,389,000.00**

TABLE 8 - B
PROPOSED FINANCING PLAN

TOTAL PROJECT COST

Proposed Funding:	**Year Built**	***Rate**	**Term in Yrs.**	**Principal**
Project Name				-
Phase I Distribution	2012	2.5%	20	$4,945,000.00
Phase II Storage/Well	2017	2.5%	20	$4,063,255.63
Phase III Storage	2023	2.5%	20	$4,325,730.85
Phase IV Spring Line	2031	2.5%	20	$4,189,125.96

*This rate is a conservative number typical of Government Funding Rates

TOTAL PHASED PROJECT FUNDING: $ 17,523,112.44

SUM OF PHASED FUNDING PACKAGE

Phase I 2012	**Phase II 2017**	**Phase III 2023**	**Phase IV 2031**
Annual Payment:	**Annual Payment:**	**Annual Payment:**	**Annual Payment:**
$317,208.00	$260,646.00	$277,483.00	$268,720.00

SYSTEM EXPENSES: (FY 2013 When First Loan Payment is Due)

Operation and Maintenance Expenses		
(Projected O&M)	$	563,388.56
Funded Depreciation @ 5% of total of System O&M plus Debt Service		
(Projected FD)		47,604.82
Subtotal O & M and Funded Depreciation 2013:	**$**	**610,993.38**
Subtotal O & M and Funded Depreciation 2018:	**$**	**661,666.70**

EXISTING SYSTEM DEBT SERVICE:

1993	End Year 2013	$	39,779.00

NEW DEBT SERVICE

2012 Phase I + Existing	Payment	$356,987.00
2018 Phase I and II	Payment	$577,854.00
2024 Phase I, II, and III	Payment	$855,337.00
2031 Phase I, II, III, and IV	Payment	$1,124,057.00
New Loan Payment (From Sum of New Funding Package Above)		$317,208.00
New Loan Reserves (Typical Payment/10)		31,720.80
Subtotal 2013 Debt Service:	**$**	**348,928.80**
Subtotal 2018 Debt Service:	**$**	**635,639.40**
GRAND TOTAL (NEW + EXISTING) EXPENSES 2013:	**$**	**959,922.18**
2018	**$**	**1,297,306.10**

PAYMENTS (AVERAGE PER CONNECTION INCLUDING OVERAGES)

Total Number Of ERC's (**2013**)	2940	
Required Average Monthly Culinary Water Bill		**27.21**
Total Number Of ERC's (**2018**)	3402	
Required Average Monthly Culinary Water Bill		**31.78**
Median Adjusted Gross Income (MAGI) 2007 Tax Returns	$	37,914.00
1.75% OF MAGI DIVIDED BY 12 MONTHS	**$**	**55.29**

SECTION 9.0

CONNECTION FEE ANALYSIS

Nephi currently charges a $1,450 connection fee for new 3/4" connections and $1,600 for new 1" connections to its system. According to the Impact Fee Act, connection fees pay for actual costs incurred by the City to connect a water user to the system. Connection fees should not be confused with impact fees. The fee must be reasonable and not in excess of the approximate average cost to complete a connection to the utility. The connection fee pays for all services provided that are directly attributable to the connection to the utility service, including all material, equipment, transportation, labor, and administrative costs. Nephi requires commercial water users to pay for installation of the majority of the equipment necessary for a connection therefore a small connection fee is required.

Connection fees should be charged for all new water connections at the time the building permit is issued. If the connection is to be installed at a vacant lot, the fee should be charged at the time the request for installation is made.

Due to the varying cost of components for different-sized connections, it is recommended that connection fees should be based on the size of the connection. The following tables may be used to evaluate the current connection fee as compared to various-sized connections.

TABLE IX – A	**¾" SERVICE CONNECTION**
Task	**Cost**
Pavement cutting.	$100.00
Furnish and install service saddle, corporation stop, and main line tap.	$150.00
Furnish and install 50 feet of 3/4" PE service lateral tubing @ $4.00 per foot.	$200.00
Repair road surface - furnish and install 1.2 cu yd road base.	$200.00
Repair road surface - furnish and install asphalt tack coat and primer.	$100.00
Repair road surface - furnish and install 0.5 cu-yd hot mix asphalt.	$200.00
Furnish and install meter box with lid.	$320.00
Furnish and install 3/4" meter setter assembly and 3/4" meter.	$240.00
Flush service lateral tubing.	$50.00
As built drawing, office account set-up, paperwork and data entry.	$50.00
CONNECTION FEE TOTAL:	**$1,610.00**

TABLE IX – B	**1" SERVICE CONNECTION**
Task	**Cost**
Pavement cutting.	$100.00
Furnish and install service saddle, corporation stop, and main line tap.	$185.00
Furnish and install 50 feet of 1" PE service lateral tubing @ $5.00 per foot	$250.00
Repair road surface - furnish and install 1.2 cu yd road base	$200.00
Repair road surface - furnish and install asphalt tack coat and primer	$100.00
Repair road surface - furnish and install 0.5 cu yd hot mix asphalt.	$200.00
Furnish and install meter box with lid.	$320.00
Furnish and install 1" meter setter assembly and 1" meter.	$350.00
Flush service lateral tubing.	$50.00
As built drawing, office account set-up, paperwork and data entry.	$50.00
CONNECTION FEE TOTAL:	**$1,805.00**

TABLE IX – C	**1 ½" SERVICE CONNECTION**
Task	**Cost**
Pavement cutting.	$100.00
Furnish and install service saddle, corporation stop, and main line tap.	$220.00
Furnish and install 50 feet of 1 1/2" PE service lateral tubing @ $6.00 per foot	$300.00
Repair road surface - furnish and install 1.2 cu yd road base	$200.00

Repair road surface - furnish and install asphalt tack coat and primer	$100.00
Repair road surface - furnish and install 0.5 cu yd hot mix asphalt.	$200.00
Furnish and install meter box with lid.	$160.00
Furnish and install 1 1/2" meter setter assembly and 1 ½" meter.	$960.00
Flush service lateral tubing.	$50.00
As built drawing, office account set-up, paperwork and data entry.	$50.00
CONNECTION FEE TOTAL:	**$2,340.00**

TABLE IX – D	**2" SERVICE CONNECTION**
Task	**Cost**
Pavement cutting.	$100.00
Furnish and install 2" service saddle, corporation stop, and main line tap.	$280.00
Furnish and install 50 feet of 2" PE service lateral tubing @ $7.50 per foot	$375.00
Repair road surface - furnish and install 1.2 cu yd road base	$200.00
Repair road surface - furnish and install asphalt tack coat and primer	$100.00
Repair road surface - furnish and install 0.5 cu yd hot mix asphalt.	$200.00
Furnish and install meter box with lid.	$230.00
Furnish and install 2" meter setter assembly and 2" meter.	$1,200.00
Flush service lateral tubing.	$50.00
As built drawing, office account set-up, paperwork and data entry.	$50.00
CONNECTION FEE TOTAL:	**$2,785.00**

The costs listed in the tables are based on estimates for labor and equipment and on the assumption that the water main is located in the center of a 99-foot paved road right-of-way. For the average connection, the distance from the water main to the property line would be 49.5 feet. The City supplies all equipment, labor and materials to complete the connection. The tables may be used as a guide for establishing connection fees for ¾-inch, 1-inch, 1 ½-inch, and 2-inch connections. The costs should be appropriately adjusted for wider rights-of-way, unpaved streets, and larger connection sizes.

The costs shown in the tables vary as the cost of labor and materials fluctuates. The Council should evaluate and adjust connection fees to reflect actual costs for each connection size on a regular basis. The Council should set a separate impact fee in accordance with the impact fee act. An impact fee analysis will be completed in the next section. The fees currently charged by the City may need to be adjusted to ensure that they cover all of the inspection and administration costs associated with coordinating the connections.

SECTION 10.0
IMPACT FEE FACILITIES PLAN

10.1 GENERAL

It is recommended that an impact fee be charged for all new connections to the Nephi City culinary water system. This section will analyze the system to determine the maximum impact fee that can be charged based on a reasonable plan. The amount of the impact fee for commercial customers will be based on the projected amount of water (based on ERC's) required for a proposed new commercial connection, but no impact fee will be less than that paid for a standard residential connection. The use of impact fee money will help the City to maintain its high level of service to its water customers by reducing the amount of debt required to finance future impact-fee-eligible construction projects as they become necessary. Money from the impact fees should be used to retire the system debt or to construct system improvements that are required to support growth.

Nephi City currently charges a $1,450 connection fee for new ¾" connections, and a $1,600 connection fee for 1" connections, but an impact fee is not currently charged for new connections. According to the Impact Fee Act, connection fees are charged to pay for actual costs incurred by a City to connect a water user to the system. Connection fees must not be confused with impact fees, which can be used to offset the costs required to construct additional infrastructure needed to support growth on the system. The impact fee could be based on the size of the connection if the City chooses, but this study bases the impact fee on the type of connection.

Impact fee amounts have been analyzed and prepared pursuant to Title 11, Chapter 36a, Impact Fees Act, of the Utah Code Annotated 1953, as enacted by Senate Bill 4 of the 1995 First Special Session, as amended in 2011.

10.2 IMPACT FEE CALCULATION

The goal of this fee is to allow new growth to pay for system improvements that are a direct result of new growth, but not to increase the quality or level of service to the existing users. Recent modifications to the rule have changed the methods for calculating impact fees. Impact fee facility plan requirements should identify demands placed on existing public facilities by new development, and the excess capacity of its existing infrastructure.

10.3 EXISTING SYSTEM ANALYSIS

Nephi City's culinary water system will be evaluated to determine the excess capacity of the existing system, which will determine whether or not improvements within each area are necessary within the planning period. Future growth requirements within each aspect of the water system will be quantified and incorporated into the impact fee analysis.

10.3.1 WATER RIGHT

Water Right, as used in this section, deals with available water rights on file at the State of Utah Division of Water Rights. From the water rights section of this master plan, it was determined that the City was entitled to 17,022 ac-ft per year. At the time of this writing, calculations show that the City requires 3,621 acre feet to supply 2,773 ERC's, with an available surplus of 13,401 acre feet. According to the water right records, there is approximately 8,388 ac-ft. of water available for summer use, which exceeds the need for the 20-year projection of this plan.

Based on this determination a water impact fee regarding future need in water rights is not warranted, and cash-in-lieu is not recommended. No additional fees are recommended to increase the City's water right. It is recommended that the excess rights be protected through lease agreements and/or through a 40 year water rights master plan.

10.3.2 WATER SOURCE

Water Source deals with amount of water that the City has developed and is producing from its wells and springs. As listed in Section 4 of this report, there are currently 4,300 gpm available to the City through its water sources. In this same section it was determined that the total existing required source capacity is 3,940 gpm, and an excess of 360 gpm currently exists.

Therefore the City currently meets the State Requirements for water source capacity, and provides a high level of service to its residents in regards to providing adequate water source. The projected required source capacity for the twenty-year planning period is 7,340 gpm, which leaves the City with a future deficit of 3,040 gpm. In order to meet the future demands, the City needs to increase its water source capacity. It is recommended that the City plan for water source improvements in the second phase of construction. Therefore the portion of the funding required to improve the City's water source beyond its current need will be applied in the impact fee calculation. It is calculated that 100% of the storage improvements in Phase II can be attributed to growth. See calculations in Section 10.4 below.

10.3.3 WATER STORAGE

From Section 5, Storage Capacity Analysis, of this master plan, it was determined that the City requires 3,428,983 gallons of storage to serve the 2,772 ERC's that are currently served by the system. At the time of this writing the City has a deficit of 828,983 gallons of storage capacity. The maximum number of ERC's that can be served by the available 2,600,000 gallons of storage is 2,322. Construction of an additional 2,000,000 gallons of storage is planned for Phase II, which will provide sufficient storage for 4,109 ERC's. To find the impact-fee-eligible portion of the new storage project, the amount of storage capacity currently necessary to bring the level of service to the State minimum standards will be reduced from the total storage costs recommended in this plan. It is calculated that 77% of the storage improvements in Phase II can be attributed to growth. See calculations in Section 10.4 below.

10.3.3 WATER DISTRIBUTION

As a result of the water model performed, as described in Section 6 of this report, a large number of improvements have been recommended for the distribution system. The level of service provided by the City in other areas of the system is higher than that of the distribution system. In order to attain the same level of service in the distribution system, a large number of distribution lines need to be increased in size. On the other hand, future additions to the distribution system would not meet State requirements without these improvements, and the necessary improvements could therefore be justified for future growth in the system. In order to determine the extent of the distribution improvements that could be included in the impact fee calculation, the water model was adjusted to include the least amount of improvements necessary to bring the system up to State pressure and flow requirements. Based on this calculation, approximately 45% of the distribution costs were accounted for in determining the appropriate impact fees.

10.4 IMPACT FEES CALCULATION

The table below shows the summarized system improvements in regards to each phase of construction for the water system. The current-year costs shown in the table below include all construction, engineering, and contingency costs broken out in Table 8-A above.

TABLE 10-A

Culinary Water System Projects				
Project Description	Year	Current Year Cost	Construction Year Cost	Cost During IF Period
Phase I Project (Distribution System)	2012	4,945,000	$ 4,945,000.00	$ 4,945,000.00
Phase II Project (Storage Tank and Well)	2017	3,505,000	$ 4,063,255.63	$ 4,063,255.63
Phase III Project (North Storage Tank and Airport)	2023	3,125,000	$ 4,325,730.85	$ 4,325,730.85
PhaseIV Project (Canyon Spring Lines)	2031	2,389,000	$ 4,189,125.96	$ 4,189,125.96
Total		$ 13,964,000.00	$ 17,523,112.44	$ 17,523,112.44

The City does not currently meet the State minimum requirements for Storage and/or Distribution. The growth projection shows that the current water source available will meet the State minimum requirement in the year 2017, and approximately 2 million gallons of additional storage will be needed after the year 2023. The south storage tank and the well project have been planned for the year 2012. In order to anticipate future costs for the projects, a 3% inflation rate has been incorporated into the future construction costs of each of the projects as shown in the table above.

The next step in the impact fee process includes determining which percent of the costs during the impact fee period are attributed to growth. The table below shows the calculated percentages along with a calculated impact fee for Nephi City. A calculated figure of 77% of the storage projects is attributed to growth by subtracting the amount of storage needed today from the total storage recommended, divided by the total storage recommended. The portion of the needed water source attributed to growth is 100% due to the fact that the City has sufficient water source today but, due to growth, will have a 3,040 gpm deficit in the future. A calculated percentage of 45% of the distribution improvements are attributed to future growth as explained in Section 10.3.3 above.

Phase I Impact Fee Calculation

Distribution Impact Fee Percentage: = 45%

Phase II Impact Fee Calculation

Storage Impact Fee Percentage: $\frac{3{,}658{,}792 \text{ gal} - 828{,}983 \text{ gal}}{3{,}658{,}792 \text{ gal}} = 77\%$

Source Impact Fee Percentage $\frac{3{,}040 \text{ gpm}}{3{,}040 \text{ gpm}} = 100\%$

Phase I Percentage $\frac{77\% + 100\%}{2} =$ **88.5%**

Phase III Impact Fee Calculation

(Airport extension costs not attributed to growth and not included) = 66%

Phase 4 is not included in the impact fee calculation due to the fact that the project is not attributed to growth, but is a result of a need to replace the spring line based on service life. Table 10-B below shows the calculations used to determine applicable impact fee values.

TABLE 10-B

Table 10-B -- Nephi City Culinary Water Impact Fee Cost Per ERC						
Description	**Total Costs for projects in IF Period**	**% Attributable to Growth**	**Costs Attributable to Growth**	**Related ERCs Served**	**Cost per New ERC**	**Percent of Total IF**
Capital Project Fees						
Phase I Project (Distribution System)	$ 4,945,000.00	45%	$ 2,225,250.00	2,303	$ 966.24	17.1%
Phase II Project (Tank and Well)	$ 4,063,255.63	89%	$ 3,616,297.51	1,054	$ 3,431.02	60.9%
Phase III Project (North Storage Tank and Airport	$ 4,325,730.85	66%	$ 2,854,982.36	2,303	$ 1,239.68	22.0%
PhaseIV Project (Canyon Spring Lines)	$ 4,189,125.96	0%	$ -	2,303	$ -	0.0%
			$ 8,696,529.87			
			Total Impact Fee Cost per New ERC:			$ 5,636.94

In addition to Impact fees, the rates in Nephi will also need to be increased to pay for these improvements. In the Proposed Financing Plan in Table 8-B, it is shown that the annual debt service payment for Phases I, II and III will be $855,337. This amount divided by the number of ERCs at the end of the planning period and 12 months per year equates to an average increase of 14.05 per month per ERC as a result of these projects.

$$\frac{\$855,337}{5,075 \text{ ERC} \times 12 \text{ Months}} = \$14.05 \text{ / month / ERC}$$

TABLE 10-C

APPENDIX C					
Calculation of the Number of Years That New Users Will Be Paying User Fees During The Planning Period					
Fiscal Year Ending June	**Planning Period Year**	**Total ERU's at the End of the Year**	**A = ERU Increase**	**B = # of Years Remaining to Pay User Fees During Planning**	**A x B**
2011		2772	2772		
2012	1	2854	82	19	1560
2013	2	2940	85	18	1532
2014	3	3027	87	17	1483
2015	4	3116	89	16	1430
2016	5	3209	93	15	1389
2017	6	3304	95	14	1328
2018	7	3402	98	13	1276
2019	8	3503	102	12	1219
2020	9	3607	104	11	1144
2021	10	3715	108	10	1076
2022	11	3826	111	9	1001
2023	12	3940	114	8	911
2024	13	4061	121	7	845
2025	14	4227	166	6	995
2026	15	4357	131	5	653
2027	16	4492	135	4	539
2028	17	4631	139	3	417
2029	18	4775	143	2	287
2030	19	4923	148	1	148
2031	20	5075	153	0	0
RU Increase **= C**:		2303	Sum of Column A x B = D:		19235
Average Number of Years = D / C:					**8.4**

Table 10-C calculates that the average New User will pay approximately 8.4 years-worth of water fees over the planning period. Therefore the total amount of revenue generated by future water rate fees is calculated as follows:

2303 x $14.05 / Month x 12 months / year x 8.4 years = $3,261,600

Subtracting this amount of revenue from the applicable Costs Attributed to Growth, shown in Table 10-B above, equates to a total applicable cost of:

$8,696,529 - $3,261,600 = $5,434,928

Based on these figures the equation below calculates what the maximum impact fee should be.

$5,434,928 / 2,303 ERCs = **$2,359**

Based on this calculation it is recommended that the maximum culinary water system impact fee for one new ERC should be $2,359. The actual amount of the impact fee that will be charged for a new connection must be established by the City. A calculated maximum impact fee provides flexibility for the City in setting the minimum impact fee for new connections. The amount of minimum impact fees set by the City should be reviewed every 3 to 5 years.

10.5 IMPACT FEES AND ERC's

In Section 2 of this master plan it was estimated that one ERC on the Nephi City culinary system represents 12,000 gallons per month. The total impact fee that should be charged to a particular new commercial connection is based upon the number of ERC's represented by that connection.

A single-family residential connection always represents 1 ERC, and no connection, residential or commercial, should pay less than the amount of impact fee charged for a residential connection. However, some commercial connections require much more water. The impact fee for these commercial connections can be determined by either of 2 ways; by a multiplier, which represents the amount of water in ERC's required for the proposed commercial or industrial connection, or by a multiplier based on what water meter size is installed. Both of these options will be reviewed in this analysis; option 1 being a multiplier based on the type of connection, and option 2 being based on the meter size.

10.5.1 OPTION 1

Table 10–D below has been compiled from water usage information contained in the *State of Utah Rules for Public Drinking Water Systems* and from water usage data from other communities in Utah. The multiplier representing the number of ERC's required for typical commercial connections is provided in the table. For example, 8 rooms in a hotel represent 1 ERC. Therefore, for a hotel connection supplying 52 rooms, the multiplier would be 6.5 (52 ÷ 8 = 6.5), because this connection would represent 6.5 ERC's.

Table 10-D does not list all possible types of commercial connections. However, an attempt has been made to list representative types of commercial enterprises with their representative water consumption levels. In the event that a particular type of business is excluded from the table, City staff could require the developer to submit planned water usage and confirm from consulting other systems for water usage information to establish a multiplier based on peak demand for that type of business. Examples of typical impact fee calculations using the multiplier are provided following Table 10-D.

TABLE 10-D
COMMERCIAL CONNECTION IMPACT FEE MULTIPLIER

TYPE OF CONNECTION	IMPACT FEE MULTIPLIER FOR EACH COMMERCIAL CONNECTION
Auto Dealership	1 (per public toilet facility)
Bed and Breakfast	1 (per every 6 rooms)
Boarding House	1 (per every 6 rooms)
Bowling Alley	1 (per every 8 alleys)
Campground	1 (per every 15 hookups)
Car Wash	1 (per stall)
Church	1 (per every 80 members)
Dentist's Office	1 (per every 4 chairs)
Doctor's Office	1 (per every 3 doctors or physicians assistants)
Dry Goods Store	1 (per public toilet facility)
Fast Food Restaurant	1 (per every 6 employees)
Filling Station	1 (per every 2 islands, one island = 2 pumps)
Filling Station/Food Mart	1 (per island one island = 2 pumps)
Golf Course (Not Culinary Irrigation)	1 (per public toilet facility)
Grocery Store	1 (per every 15 employees)
Hair Salon	1 (per every 10 chairs)
Horse Stable	1 (per every 8 Horses)
Hospital	1 (per every 4 beds)
Hotel	1 (per every 8 rooms)
Industrial (with showers)	1 (per every 20 employees)
Industrial (without showers)	1 (per every 40 employees)
Launderette	1 (per every 2 washers)
Mechanic Shop	See Industrial
Motel	1 (per every 8 rooms)
Movie Theater	1 (per every 150 seats)
Nursing Home	1 (per every 4 beds)
Nursery (Privately Irrigated)	See Industrial
Nursery (Culinary Water Irrigated)	1 (per 0.5 acre)
Office Buildings	1 (per every 40 employees)
Restaurants	1 (per every 18 seats)
RV Park	1 (per every 8 Sites)
School (Elementary)	1 (per every 40 students)
School (Middle)	1 (per every 36 students)
School (High School / Community College)	1 (per every 32 students)
Tavern	1 (per every 30 seats)
Veterinary Clinic	1 (per every 3 veterinarians or vet assistants)

Example 1:

A 10-screen movie complex with seating for 100 people per screen wishes to locate in Nephi. Find Movie Theater in the table and note that one impact fee is due per every 150 seats. With 10 screens at 100 seats per screen this theater complex will have 1,000 seats. Dividing the 1,000 seats by 150 seats per standard impact fee yields 6.67 times the standard residential impact fee.

Example 2:

An industrial facility manufacturing billiard balls wishes to locate in Nephi. This facility is planned to operate two shifts and employ 25 people per shift. This work is relatively clean, and no employee showers will be provided. Find Industrial (without showers) in the table and note that one impact fee is due per every 40 employees. Dividing the 50

employees planned for employment at this facility by 40 employees per standard impact fee yields 1.25 times the standard residential impact fee.

Example 3:

An industrial facility manufacturing cardboard boxes wishes to locate in Nephi. This facility is planned to operate two shifts and employ 15 people per shift. This work is relatively clean, and no employee showers will be provided. Find Industrial (without showers) in the table and note that one impact fee is due per every 40 employees. Dividing the 30 employees planned for employment at this facility by the 40 employees per standard impact fee yields 0.75 times the standard residential impact fee. Because this facility is expected to operate below the minimum number of 40 employees, this facility would be charged only the standard residential impact fee for its water connection.

Example 4:

A group of physicians wishes to build clinic in Nephi. There will be 3 fulltime physicians. In addition, there will be 2 physician's assistants to reduce the patient load per physician. This equates to 5 total physicians or physicians assistants. Find Doctors Office in the table and note that one impact fee is due per every 2 doctors or physicians assistants. 5 total physicians or physician's assistants divided by 3 doctors or physicians assistants per standard impact fee yields 1.67 times the standard residential impact fee.

Example 5:

A national hotel chain has decided to build a new 64-room hotel with a 100-seat restaurant included in the building in Nephi. The amount of impact fee that would be charged is the total that would be charged for a separate hotel and restaurant. In this case, find Motel in the table and note that one impact fee is due for every 8 rooms. With 64 rooms, this motel should be charged 8 times the standard residential impact fee. Then find Restaurant in the table and note that one impact fee is due for every 18 seats. Dividing the 100 seats planned for the new restaurant on the property by 18 yields 5.6. This means that the restaurant should be charged 5.6 times the standard residential impact fee. The total impact fee that should be charged for this new commercial customer would be the total of (8 + 5.6) or 13.6 times the standard residential impact fee.

10.5.1 OPTION 2

For this option, ERCs will be calculated based on the water meter size that is installed as required by the building code or as requested by the customer. ERCs will be based on a multiplier calculated by the maximum flow that a given size of meter is rated at as compared to a standard 3/4" by 5/8" meter, per the table below.

TABLE 10-E

Water Meter Size vs # of ERCs		
Meter Size	**AWWA Max Flow (gpm)**	**ERC's**
3/4 x 5/8 inch	20	1
1 inch	50	1
1-1/2 inch	100	2
2 inch	160	3.2
3 inch	300	6
4 inch	500	10
6 inch	1000	20
8 inch	1600	32

For example, if the impact fee for 1 ERC were $100, then the impact fee for a single-family residential connection for which a 1-1/2-inch meter is installed would be $200, where a 1-1/2-inch meter has a max flow of 2 times that of a 1-inch meter. This provides the City with a simple method of calculating the number of ERCs of a given commercial or residential connection. At the request of City officials, an ERC value of 1 was used for both 3/4" and 1" connections. The flow rate for the 1" connection, 50 gpm, was used as the basis for determining the rest of the values in Table 10-E.

10.6 CONCLUSIONS AND RECOMMENDATIONS

A single-family residential connection always represents 1 ERC, and no customer's connection, residential or commercial, should be charged less than the amount of impact fee charged for a single-family residential connection. However, some commercial connections require much more water and therefore represent multiple ERC's. It is recommended that the impact fee charged for new commercial customers be based on Option 2 which is dependent upon the meter size requested or required by the customer. The fee charged should be equal to the amount set for a single-family residential customer times the multiplier determined from Table 10-E for the particular size connection as required. This provides a straight-forward and cost-effective method for the City to determine how much of an impact fee should be charged.

Impact fees are charged in addition and separate from connection fees established in Section 9. Money from the impact fees can be used to retire the system debt service. It can also be used to construct system improvements that are required to support growth.

Based on the information in this impact fee calculation, the calculated maximum culinary water impact fee is $2,359per ERC. Ultimately the City Council must decide whether to set the impact fee at the calculated maximum value or at some lower value. The high calculated maximum fee provides flexibility for the Council in setting the minimum impact fee for new connections.

The impact fee amount should be reviewed periodically to determine if it should be raised or lowered based on system equity. The calculated culinary water impact fee is comparable with other systems. It is recommended that the City begin using this impact fee value. Impact fees should be reviewed every 3 to 5 years.

SECTION 11.0
WATER RATES

11.1 GENERAL

Water rates are a combination of base rates and usage rates. The base rate is charged to all connections in the system whether or not any water is used. Usage rates, on the other hand, are used to pay for water use. Usage rates are normally set to encourage water conservation, and as a rule of thumb cover only variable costs of the system. Table 11A below illustrates the current rate structure implemented for Nephi City.

TABLE 11-A CURRENT WATER RATES

CLASSIFICATION	RATE	Usage
Residential	$7.50	$0.60 per thousand gallons
Commercial	$10.50	$0.60 per thousand gallons
Industrial	$10.50	$0.35 per thousand gallons up to 5 Million, then $0.45 per 1,000 gallons

11.2 WATER RATES

The water rate must pay for both fixed and variable system expenses. Fixed expenses are those that must be paid when the system is installed and ready for customers, but it is supplying no water. With no water supplied by the system, there are no personnel salaries, no new connections, no materials, no maintenance, no supplies, or any other operating expenses. The only expenses in this condition are fixed costs due to the debt service associated with system construction. Variable expenses are those that change with water usage such as administration, professional or technical services, operation and maintenance costs, etc.

11.3 USAGE RATES

Usage rates can be used to encourage conservation. New State program guidelines encourage that usage rates be increased in steps proportional to higher usage to encourage conservation. The cash flow projections show the current usage rate of $0.60 per 1,000 gallons. The actual overage steps should be analyzed and determined once the final project funding is determined.

11.4 PROJECT FUNDING GUIDELINES

In order for a system to qualify for grant funding, the State of Utah Division of Drinking Water requires that the minimum average water bill must be equal to 1.75% of the median adjusted gross income. The debtor entity is also required to maintain the debt service coverage ratio at 1.25. The majority of the funding agencies follow these general guidelines. If Nephi City were to seek funding for the entire $18 million project, the City may still not qualify for a grant. The 2007 MAGI has Nephi City's value at $37,914. In order to qualify for grant under normal guidelines, the average monthly water rate in Nephi City would need to be 1.75% of the monthly MAGI value, or $55.29. With an average residential water bill of $17 per month, it is likely that the resultant $38 increase would not be acceptable to the community. In recent years, some funding agencies have offered grant money for water projects based on health risks to the community. It is possible that a funding agency may offer some grant for a project replacing the cast-iron, lead-jointed pipe in the system, which may be considered a health risk to the community.

11.5 RATES REQUIRED

It will be necessary to raise rates in the system to complete the improvements recommended in this master plan. The increase should be made as soon as this plan is adopted. This will enable the City to begin building the funds necessary to cover the initial project startup costs. The amount of rate increase will depend on the size of the project undertaken in Phase I. The previous sections show a phasing of the projects, which would allow the City to increase its rates at a stepped interval over the next 12 years. The cash flow projection in this study shows a phased project plan over the next 12 years. The base rates used in this projection are the same for all types of connections. The City may determine that the base rate for commercial should differ from that of industrial and/or residential but should recognize this assumption in the spreadsheet. This projection is included in Appendix A. There are two cash flow projections in Appendix A, one that incorporates impact fees into paying down the new debt service and one that does not. The rates discussed below relate to the projection that utilizes the impact fees in paying down the debt service.

Beginning with the fiscal year ending June 2013, the first year the proposed new debt service may be due, the Cash Flow Projection in Appendix A incorporates a base rate of $18.00 with the existing usage rates of $0.60 per 1,000 gallons. Based on current water usage history provided by the City, $18 still does not yield an average bill high enough to qualify for grant funding, but it would meet the debt service required to fund the recommended improvements and operate the system. It also provides enough revenue to support the debt-service coverage and a funded depreciation account based on 5% of the total expenses. Both debt-service coverage and funded depreciation are requirements of funding agencies. Starting in the year 2018, when Phase 2 (Storage and Well Improvements Phase) is incorporated into the budget, the City will need to increase the water rates to approximately $30.00 for a base rate, with the same overage value of $0.60 per 1,000 gallons. If the City continues to grow as projected in the plan, the $30.00 base rate may be enough to cover the final storage tank project planned for 2023. The cash-on-hand item in the cash flow spreadsheet shows the projected savings in the system based on the expenses anticipated. The 1.25% debt-coverage ratio required allows systems to save more than the necessary operating expenses, and when the project is paid for, it is likely that additional funds will be available for future projects. The City will need to reanalyze the growth and connections prior to commencing any of the phases for construction in the future. An increase or decrease in the connections on the system will have a major effect on the base rate required to cover the debt service.

It must be understood that customers will likely respond to this relatively large rate increase by conserving water. The conservation response usually lasts for a relatively short period until customers become accustomed to the higher rates. However, if usage does not return to near normal levels, a second rate increase may be required.

The City may want to consider an automatic annual rate adjustment based on inflation or some other projection. Once established, this will require less of a rate increase in the future.

Surplus earnings from the culinary water system, resulting from the required 1.25% debt service coverage, should be placed in a capital improvements fund. As this fund grows and earns compound interest, the need for loans to complete future system improvement projects will be greatly diminished or eliminated. Expenses, shown on the Cash Flow Projection in Appendix A, incorporate a 3% average annual rate of inflation during the planning period.

It must also be understood that the base rate recommended above is only one means to raise the revenues required to maintain the system and retire the debt service. Another method to raise the revenue would be to increase the overage rate or a combination of increased base rate and increased overage.

11.6 SUMMARY

The current water base rate is $7.50 per month. Improvements are recommended to meet the City's current and projected needs. In order to qualify for low interest loans with grants, the average water bill needs to be 1.75% of the median adjusted gross income in the City. In addition, to ensure that the debt can be paid, funding agencies and institutions typically require that system income be a minimum of 1.25 times that needed to pay for the O&M plus debt service. With these requirements in mind for Phase I, the average water bill must be raised to $24. As shown in the Cash Flow Projection in Appendix A, a base rate of $18.00 per connection and an additional rate of $0.60 per 1,000 gallons will provide the level of income required by funding agencies to proceed with the project. This is only one of many possible funding scenarios for Nephi City. Once the City has determined what the impact fees will be, the rate analysis could then be recalculated to determine the required base rate for water.

The recommended water rates are comparable to rates charged by other communities in Utah. Water rates and fees should be reviewed by the City Council periodically, to ensure that they remain abreast of actual inflation rates and costs.

These rates are also estimated based on Nephi City acquiring a loan for the entire portion of the project. It is recommended that the City apply to a couple of funding agencies in order to explore any grant/loan options that may be available. Although a rate increase is recommended as soon as possible, a rate assessment will need to be re-visited once a funding package is acquired.

SECTION 12.0
SUMMARY AND CONCLUSIONS

12.1 PURPOSE

This Culinary Water Master Plan has been commissioned by Nephi City for the purpose of evaluating culinary water system needs. An analysis of water rates, impact fees, and connection fees has also been completed. The analysis demonstrates that the recommended water rates to be charged monthly to all customers, and the connection fees and impact fees, that could be charged to all future culinary water customers, are fair to both existing and future residents. The water base rate recommended was assigned to all connections including residential, commercial, and industrial. The City may want to adjust this figure and charge a variable base rate depending on the type of connection. For this study, the same base rate will be used for all future connections.

Preparation of this report required an examination of all aspects of the existing culinary water system. Evaluations were made as to the age, condition, and capacity of the system piping, valves, hydrants, tanks, springs, water rights, system pressures, and fire protection. As a result, several recommendations for system improvements have been made and are summarized in Section 8.1 of this report.

12.2 CONNECTION FEES

In accordance with the Impact Fee Act, connection fees must be established as the average actual cost incurred by the City to perform the connection to the culinary water system. Cost estimate tables are provided in the analysis to set the connection fees at $1,500.00 for a 3/4" service, $1,750.00 for a 1" service, $2,250.00 for a 1 1/2" service, and $2,670.00 for a 2" service. The estimates account for all installation costs, including material, equipment, transportation, and labor, required for the City to complete the connection to the utility service. The estimates were based on actual costs of supplies, fuel, labor and equipment for connections to culinary water systems in Utah during the past three years. Actual costs to the City may be slightly higher or lower than these estimates. If the City continues its current method of requiring commercial and industrial users to provide their own connection, the City should determine whether the current fees are sufficient to cover the administration costs associated therein.

12.3 IMPACT FEES

An impact fee, based on the number of ERC's that a new connection represents, should be charged to all new connections. A single-family residential connection, for 3/4-inch or 1-inch, is always 1 ERC. Commercial connection impact fees are determined by multiplying the impact fee for 1 ERC by the multiplier provided in Table 10 – E. Multi-family units may need to be treated differently, where each unit will have a separate meter but will require less water due to very little outdoor irrigation being utilized. It is recommended that multi-family connections be treated like commercial connections. The impact fees charged by a community can be used to pay for debt service on system improvements, or to construct new infrastructure that is needed to support growth.

Impact fees are separate and in addition to connection fees. Based on the impact fee calculation as used in this report, the calculated maximum culinary water impact fee is $2,359 per ERC. The calculated maximum fee provides flexibility for the Council in setting the impact fee for new connections. It is recommended that the Council implement the calculated impact fee of $2,359. This fee remains reasonable, and it is comparable to impact fees charged by communities in this area. Ultimately the City Council must decide whether to set the impact fee at the calculated maximum value or at some lower value.

12.4 WATER RATES

The recommended base rate is $18.00 with additional costs of $0.60 per 1,000 gallons, assuming a minimum growth rate of 1.75%. The City may determine that a lower base rate and a higher overage rate may promote water conservation. The City should discuss this issue prior to setting the water base rate. The Cash Flow Projection in Appendix A shows that these rates will provide the level of revenue required by the funding agencies to proceed with the recommended improvements. Starting in 2017, contingent upon implementation of Phase II, the base rate should be increased to $30.00 per month, with no water provided, and a minimum charge of $0.60 per 1,000 gallons for all water. Given these assumptions, this rate should provide the City with the funds necessary for these project improvements while maintaining a 1.25 debt service coverage ratio.

Based on the 2007 Nephi median adjusted gross income of $37,914 and the State of Utah guidelines, either of these scenarios is reasonable. The rates are comparable to rates charged by other similar communities in Utah.

12.5 CITY COUNCIL REVIEW

The Nephi City Council should periodically (5 years max.) review rates and fees to ensure that they remain reasonable, that they remain abreast of inflation, and that they meet the obligations of the system. Rates and fees should be adjusted if required. If growth patterns, inflation, regulations, etc. surpass those projected by this plan, the culinary water system should be reanalyzed before the end of the planning period, when the total number of ERC's approaches the 20 year projected number of 5,075. Impact fees are reviewed automatically when the culinary water system is reanalyzed.

APPENDIX A

CASH FLOW PROJECTION
APPROVED BUDGET
PROJECT ESTIMATE

CASH FLOW PROJECTION

EXPLANATION AND ASSUMPTIONS

Appendix A is an example of a probable cash flow scenario for Nephi City. In order to develop the spreadsheet a number of assumptions were necessary. The assumptions made were conservative to give Nephi City some room for error. The following is a list of assumptions incorporated into the spreadsheet.

1- The growth rates shown on the spreadsheet are less than those used in the general plan, and in the text of the report. A residential and commercial growth rate of 1.75% was used in the spreadsheet and, in addition, an industrial growth rate of 2% was used. This is conservatively lower than the respective 2.73% and 5% growth rates used in the projects for planning.
2- An annual inflation rate of 3% was assumed over the planning period for O&M expenses.
3- Connection fees are incorporated into the calculation.
4- There are two cash flow scenarios; one with impact fees collected, and one without impact fees. The impact fee spreadsheet assumes that all future connections have an ERC value of 1. This is a conservative assumption, but is logical where it is not known what type of connections the future will bring. If impact fees are not collected, the base rate and/or usage rates will need to be increased.
5- Base rates are shown at the existing rate of $7.50 as established by Nephi City. The City may want to discuss usage rate options and review possible rate options.
6- There are 4 phases to the project, and phase 4 isn't scheduled until 2032. It is recommended that the City review these phases in case the priority of the phases changes with time.
7- Line item 50 shows a Payment Reserve for the loans issued over the planning period. Typically, funding agencies require that a payment reserve be established for one-year's payment. This line item shows the payment reserve being generated over a 10-year period.
8- Item 56 shows the debt-service coverage for the culinary-water funds. This number is calculated by subtracting the Total Operation and Maintenance expenses (line item 44) from the Total Revenue (line item 35), and then dividing that number by the Total Debt Service (line item 51). Typically this figure should be approximately 1.25. With the base rate at $18, the debt service coverage ratio is well over 1.25 for the first 5 years. Once the loan for the second phase of construction is initiated, the base rate will need to increase to approximately $30. Although the ratio is under 1.25 for these next few years, the average over the planning period is approximately 1.25. As the loans for each phase of construction are implemented, the amount of revenue needs to increase, and raising the base rate is a good way to ensure the needed money is available.

APPENDIX A
CASH FLOW PROJECTION
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%				
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00	
3	Annual Commercial Growth Rate	1.75%				
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	2,359.00	

	Fiscal Year Ending June		2011		2012		2013
6	**BASE DATA:**						
7	**Base Residential Rate**	$	7.50	$	18.00	$	18.00
8	Base Amount (gallons)		-		-		-
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000
11	**Base Commercial Rate**	$	10.50	$	18.00	$	18.00
12	Base Amount (gallons)		-		-		-
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000
15	**Base Industrial Rate**	$	10.50	$	18.00	$	18.00
16	Base Amount (gallons)		-		-		-
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000
19	**System Users:**						
20	Residential		1,810		1,842		1,874
21	Commercial Connections In Town Only		178		181		184
22	Industrial		1		1		1
23	Total		1,988		2,023		2,058
24	**New Connections:**						
25	New Residential		32		32		33
26	New Commercial		3		3		4
27	New Industrial		0		0		0
28	**REVENUES:**						
29	Water Sales Residential	$	322,106.40	$	561,859.20	$	571,687.20
30	Water Sales Commercial	$	154,441.80	$	173,448.00	$	176,774.40
31	Water Sales Industrial	$	21,126.00	$	21,216.00	$	21,216.00
32	Water Connection Fees (Connection fees)	$	50,750.00	$	50,750.00	$	53,650.00
33	Impact Fees	$	-	$	82,565.00	$	87,283.00
34	**TOTAL REVENUE:**	**$**	**548,424.20**	**$**	**889,838.20**	**$**	**910,610.60**
35	**EXPENSES:** (Including O&M & Debt Serv.)						
36	Personnel Salaries	$	227,286.00	$	234,104.58	$	241,127.72
37	Benefits	$	96,861.75	$	99,767.60	$	102,760.63
38	Office Supplies and Expenses	$	46,900.00	$	48,307.00	$	49,756.21
39	Sundry Expenses	$	32,000.00	$	32,960.00	$	33,948.80
40	Capital Outlay	$	65,000.00	$	66,950.00	$	68,958.50
41	Administration	$	41,500.00	$	42,745.00	$	44,027.35
42	Services	$	21,500.00	$	22,145.00	$	22,809.35
43	**Sub-Total Operation & Maintenance**	**$**	**531,047.75**	**$**	**546,979.18**	**$**	**563,388.56**
44	P&I Existing Loan	$	39,779.00	$	39,779.00	$	39,779.00
45	P&I Phase I Loan						$317,208.00
46	P&I Phase II Loan						
47	P&I Phase III Loan						
48	P&I Phase IV Loan						
49	Payment Reserve (Annual Pmt./10 For 10 yr.)					$	31,720.80
50	**Total Debt Service**	**$**	**39,779.00**	**$**	**39,779.00**	**$**	**388,707.80**
51	Funded Depreciation	$	28,541.34	$	29,337.91	$	47,604.82
52	**TOTAL EXPENSES:**	**$**	**599,368.09**	**$**	**616,096.09**	**$**	**999,701.18**
53	**Net Revenue less Expense**	$	(50,943.89)	$	273,742.11	$	(89,090.58)
54	**Cash on Hand**	$	(50,943.89)	$	222,798.22	$	133,707.65
55	Debt service coverage		0.44		8.62		0.97
56	Funded Depreciation Account Balance:	$	28,541.34	$	57,879.25	$	105,484.06
57							
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00						

APPENDIX A
CASH FLOW PROJECTION
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%				
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00	
3	Annual Commercial Growth Rate	1.75%				
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	2,359.00	

5	**Fiscal Year Ending June**		**2014**		**2015**		**2016**
6	**BASE DATA:**						
7	**Base Residential Rate**	$	18.00	$	18.00	$	18.00
8	Base Amount (gallons)		-		-		-
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000
11	**Base Commercial Rate**	$	18.00	$	18.00	$	18.00
12	Base Amount (gallons)		-		-		-
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000
15	**Base Industrial Rate**	$	18.00	$	18.00	$	18.00
16	Base Amount (gallons)		-		-		-
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000
19	**System Users:**						
20	Residential		1,907		1,940		1,974
21	Commercial Connections In Town Only		188		191		194
22	Industrial		1		1		1
23	Total		2,095		2,131		2,168
24	**New Connections:**						
25	New Residential		33		34		35
26	New Commercial		3		3		4
27	New Industrial		0		0		0
28	**REVENUES:**						
29	Water Sales Residential	$	581,666.40	$	591,796.80	$	602,229.60
30	Water Sales Commercial	$	180,100.80	$	182,952.00	$	186,278.40
31	Water Sales Industrial	$	21,216.00	$	21,216.00	$	21,216.00
32	Water Connection Fees (Connection fees)	$	52,200.00	$	53,650.00	$	56,550.00
33	Impact Fees	$	84,924.00	$	87,283.00	$	92,001.00
34	**TOTAL REVENUE:**	**$**	**920,107.20**	**$**	**936,897.80**	**$**	**958,275.00**
35	**EXPENSES:** (Including O&M & Debt Serv.)						
36	Personnel Salaries	$	248,361.55	$	255,812.40	$	263,486.77
37	Benefits	$	105,843.45	$	109,018.75	$	112,289.32
38	Office Supplies and Expenses	$	51,248.90	$	52,786.36	$	54,369.95
39	Sundry Expenses	$	34,967.26	$	36,016.28	$	37,096.77
40	Capital Outlay	$	71,027.26	$	73,158.07	$	75,352.81
41	Administration	$	45,348.17	$	46,708.62	$	48,109.87
42	Services	$	23,493.63	$	24,198.44	$	24,924.39
43	**Sub-Total Operation & Maintenance**	**$**	**580,290.21**	**$**	**597,698.92**	**$**	**615,629.89**
44	P&I Existing Loan	$	-	$	-	$	-
45	P&I Phase I Loan		$317,208.00		$317,208.00		$317,208.00
46	P&I Phase II Loan						
47	P&I Phase III Loan						
48	P&I Phase IV Loan						
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$	31,720.80	$	31,720.80	$	31,720.80
50	**Total Debt Service**	**$**	**348,928.80**	**$**	**348,928.80**	**$**	**348,928.80**
51	Funded Depreciation	$	46,460.95	$	47,331.39	$	48,227.93
52	**TOTAL EXPENSES:**	**$**	**929,219.01**	**$**	**946,627.72**	**$**	**964,558.69**
53	**Net Revenue less Expense**	$	(9,111.81)	$	(9,729.92)	$	(6,283.69)
54	**Cash on Hand**	$	124,595.83	$	114,865.91	$	108,582.22
55	Debt service coverage		1.07		1.07		1.08
56	Funded Depreciation Account Balance:	$	151,945.02	$	199,276.40	$	247,504.34
57							
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00						

APPENDIX A
CASH FLOW PROJECTION
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%				
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00	
3	Annual Commercial Growth Rate	1.75%				
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	2,359.00	

5	**Fiscal Year Ending June**		**2017**		**2018**		**2019**
6	**BASE DATA:**						
7	**Base Residential Rate**	$	30.00	$	30.00	$	30.00
8	Base Amount (gallons)		-		-		-
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000
11	**Base Commercial Rate**	$	30.00	$	30.00	$	30.00
12	Base Amount (gallons)		-		-		-
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000
15	**Base Industrial Rate**	$	30.00	$	30.00	$	30.00
16	Base Amount (gallons)		-		-		-
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000
19	**System Users:**						
20	Residential		2,009		2,044		2,079
21	Commercial Connections In Town Only		198		201		205
22	Industrial		1		1		1
23	Total		2,207		2,245		2,284
24	**New Connections:**						
25	New Residential		35		35		37
26	New Commercial		3		4		3
27	New Industrial		0		0		0
28	**REVENUES:**						
29	Water Sales Residential	$	904,629.60	$	920,253.60	$	936,324.00
30	Water Sales Commercial	$	218,332.80	$	222,163.20	$	225,993.60
31	Water Sales Industrial	$	21,360.00	$	21,360.00	$	21,360.00
32	Water Connection Fees (Connection fees)	$	55,100.00	$	56,550.00	$	58,000.00
33	Impact Fees	$	89,642.00	$	92,001.00	$	94,360.00
34	**TOTAL REVENUE:**	**$**	**1,289,064.40**	**$**	**1,312,327.80**	**$**	**1,336,037.60**
35	**EXPENSES:** (Including O&M & Debt Serv.)						
36	Personnel Salaries	$	271,391.37	$	279,533.11	$	287,919.10
37	Benefits	$	115,658.00	$	119,127.73	$	122,701.57
38	Office Supplies and Expenses	$	56,001.05	$	57,681.08	$	59,411.52
39	Sundry Expenses	$	38,209.67	$	39,355.96	$	40,536.64
40	Capital Outlay	$	77,613.40	$	79,941.80	$	82,340.06
41	Administration	$	49,553.17	$	51,039.77	$	52,570.96
42	Services	$	25,672.12	$	26,442.29	$	27,235.56
43	**Sub-Total Operation & Maintenance**	**$**	**634,098.79**	**$**	**653,121.75**	**$**	**672,715.40**
44	P&I Existing Loan	$	-	$	-	$	-
45	P&I Phase I Loan		$317,208.00		$317,208.00		$317,208.00
46	P&I Phase II Loan				$260,646.00		$260,646.00
47	P&I Phase III Loan						
48	P&I Phase IV Loan						
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$	31,720.80	$	57,785.40	$	57,785.40
50	**Total Debt Service**	**$**	**348,928.80**	**$**	**635,639.40**	**$**	**635,639.40**
51	Funded Depreciation	$	49,151.38	$	64,438.06	$	65,417.74
52	**TOTAL EXPENSES:**	**$**	**983,027.59**	**$**	**1,288,761.15**	**$**	**1,308,354.80**
53	**Net Revenue less Expense**	$	306,036.81	$	23,566.65	$	27,682.80
54	**Cash on Hand**	$	414,619.03	$	438,185.69	$	465,868.48
55	Debt service coverage		2.06		1.14		1.15
56	Funded Depreciation Account Balance:	$	296,655.72	$	361,093.77	$	426,511.51
57							
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00						

APPENDIX A
CASH FLOW PROJECTION
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%			
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00
3	Annual Commercial Growth Rate	1.75%			
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	2,359.00

5	**Fiscal Year Ending June**		**2020**		**2021**		**2022**
6	**BASE DATA:**						
7	**Base Residential Rate**	$	30.00	$	30.00	$	30.00
8	Base Amount (gallons)		-		-		-
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000
11	**Base Commercial Rate**	$	30.00	$	30.00	$	30.00
12	Base Amount (gallons)		-		-		-
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000
15	**Base Industrial Rate**	$	30.00	$	30.00	$	30.00
16	Base Amount (gallons)		-		-		-
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000
19	**System Users:**						
20	Residential		2,116		2,153		2,191
21	Commercial Connections In Town Only		208		212		215
22	Industrial		1		1		1
23	Total		2,324		2,365		2,406
24	**New Connections:**						
25	New Residential		37		38		38
26	New Commercial		4		3		4
27	New Industrial		0		0		0
28	**REVENUES:**						
29	Water Sales Residential	$	952,840.80	$	969,580.80	$	986,544.00
30	Water Sales Commercial	$	229,824.00	$	233,654.40	$	237,484.80
31	Water Sales Industrial	$	21,360.00	$	21,360.00	$	21,360.00
32	Water Connection Fees (Connection fees)	$	59,450.00	$	59,450.00	$	60,900.00
33	Impact Fees	$	96,719.00	$	96,719.00	$	99,078.00
34	**TOTAL REVENUE:**	**$**	**1,360,193.80**	**$**	**1,380,764.20**	**$**	**1,405,366.80**
35	**EXPENSES:** (Including O&M & Debt Serv.)						
36	Personnel Salaries	$	296,556.68	$	305,453.38	$	314,616.98
37	Benefits	$	126,382.61	$	130,174.09	$	134,079.32
38	Office Supplies and Expenses	$	61,193.86	$	63,029.68	$	64,920.57
39	Sundry Expenses	$	41,752.74	$	43,005.32	$	44,295.48
40	Capital Outlay	$	84,810.26	$	87,354.56	$	89,975.20
41	Administration	$	54,148.09	$	55,772.53	$	57,445.71
42	Services	$	28,052.62	$	28,894.20	$	29,761.03
43	**Sub-Total Operation & Maintenance**	**$**	**692,896.86**	**$**	**713,683.77**	**$**	**735,094.28**
44	P&I Existing Loan	$	-	$	-	$	-
45	P&I Phase I Loan		$317,208.00		$317,208.00		$317,208.00
46	P&I Phase II Loan		$260,646.00		$260,646.00		$260,646.00
47	P&I Phase III Loan						
48	P&I Phase IV Loan						
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$	57,785.40	$	57,785.40	$	57,785.40
50	**Total Debt Service**	**$**	**635,639.40**	**$**	**635,639.40**	**$**	**635,639.40**
51	Funded Depreciation	$	66,426.81	$	67,466.16	$	68,536.68
52	**TOTAL EXPENSES:**	**$**	**1,328,536.26**	**$**	**1,349,323.17**	**$**	**1,370,733.68**
53	**Net Revenue less Expense**	$	31,657.54	$	31,441.03	$	34,633.12
54	**Cash on Hand**	$	497,526.02	$	528,967.05	$	563,600.17
55	Debt service coverage		1.15		1.15		1.16
56	Funded Depreciation Account Balance:	$	492,938.33	$	560,404.48	$	628,941.17
57							
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00						

APPENDIX A
CASH FLOW PROJECTION
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%			
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00
3	Annual Commercial Growth Rate	1.75%			
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	2,359.00

	Fiscal Year Ending June	2023	2024	2025
6	**BASE DATA:**			
7	**Base Residential Rate**	$ 30.00	$ 40.00	$ 40.00
8	Base Amount (gallons)	-	-	-
9	Overage Rate ($0.60per 1,000 gal.)	$ 0.60	$ 0.60	$ 0.60
10	Ave. Month Water Use / Res. Conn. (Gal.)	12,000	12,000	12,000
11	**Base Commercial Rate**	$ 30.00	$ 40.00	$ 40.00
12	Base Amount (gallons)	-	-	-
13	Overage Rate ($0.60) Per 1000 gal.)	$ 0.60	$ 0.60	$ 0.60
14	Ave. Month Water Use / Com. Conn. (Gal.)	102,000	102,000	102,000
15	**Base Industrial Rate**	$ 30.00	$ 40.00	$ 40.00
16	Base Amount (gallons)	-	-	-
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$ 0.35	$ 0.35	$ 0.35
18	Ave. Month Water Use / Ind. Conn. (Gal.)	5,000,000	5,000,000	5,000,000
19	**System Users:**			
20	Residential	2,229	2,268	2,308
21	Commercial Connections In Town Only	219	223	227
22	Industrial	1	1	1
23	Total	2,448	2,491	2,535
24	**New Connections:**			
25	New Residential	39	40	40
26	New Commercial	4	4	4
27	New Industrial	0	0	0
28	**REVENUES:**			
29	Water Sales Residential	$ 1,003,730.40	$ 1,295,923.20	$ 1,318,579.20
30	Water Sales Commercial	$ 241,862.40	$ 273,240.00	$ 278,097.60
31	Water Sales Industrial	$ 21,360.00	$ 21,480.00	$ 21,480.00
32	Water Connection Fees (Connection fees)	$ 62,350.00	$ 63,800.00	$ 63,800.00
33	Impact Fees	$ 101,437.00	$ 103,796.00	$ 103,796.00
34	**TOTAL REVENUE:**	**$ 1,430,739.80**	**$ 1,758,239.20**	**$ 1,785,752.80**
35	**EXPENSES:** (Including O&M & Debt Serv.)			
36	Personnel Salaries	$ 324,055.49	$ 333,777.15	$ 343,790.47
37	Benefits	$ 138,101.69	$ 142,244.75	$ 146,512.09
38	Office Supplies and Expenses	$ 66,868.19	$ 68,874.23	$ 70,940.46
39	Sundry Expenses	$ 45,624.35	$ 46,993.08	$ 48,402.87
40	Capital Outlay	$ 92,674.46	$ 95,454.69	$ 98,318.33
41	Administration	$ 59,169.08	$ 60,944.15	$ 62,772.47
42	Services	$ 30,653.86	$ 31,573.47	$ 32,520.68
43	**Sub-Total Operation & Maintenance**	**$ 757,147.11**	**$ 779,861.52**	**$ 803,257.37**
44	P&I Existing Loan	$ -	$ -	$ -
45	P&I Phase I Loan	$317,208.00	$317,208.00	$317,208.00
46	P&I Phase II Loan	$260,646.00	$260,646.00	$260,646.00
47	P&I Phase III Loan		$277,483.00	$277,483.00
48	P&I Phase IV Loan			
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$ 26,064.60	$ 53,812.90	$ 53,812.90
50	**Total Debt Service**	**$ 603,918.60**	**$ 909,149.90**	**$ 909,149.90**
51	Funded Depreciation	$ 68,053.29	$ 84,450.57	$ 85,620.36
52	**TOTAL EXPENSES:**	**$ 1,361,065.71**	**$ 1,689,011.42**	**$ 1,712,407.27**
53	**Net Revenue less Expense**	$ 69,674.09	$ 69,227.78	$ 73,345.53
54	**Cash on Hand**	$ 633,274.26	$ 702,502.03	$ 775,847.56
55	Debt service coverage	1.17	1.14	1.15
56	Funded Depreciation Account Balance:	$ 696,994.45	$ 781,445.03	$ 867,065.39
57				
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00			

APPENDIX A
CASH FLOW PROJECTION
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%				
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00	
3	Annual Commercial Growth Rate	1.75%				
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	2,359.00	

	Fiscal Year Ending June		2026		2027		2028
6	**BASE DATA:**						
7	**Base Residential Rate**	$	40.00	$	40.00	$	40.00
8	Base Amount (gallons)		-		-		-
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000
11	**Base Commercial Rate**	$	40.00	$	40.00	$	40.00
12	Base Amount (gallons)		-		-		-
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000
15	**Base Industrial Rate**	$	40.00	$	40.00	$	40.00
16	Base Amount (gallons)		-		-		-
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000
19	**System Users:**						
20	Residential		2,348		2,389		2,431
21	Commercial Connections In Town Only		231		235		239
22	Industrial		1		1		1
23	Total		2,579		2,624		2,670
24	**New Connections:**						
25	New Residential		41		42		42
26	New Commercial		4		4		4
27	New Industrial		0		0		0
28	**REVENUES:**						
29	Water Sales Residential	$	1,341,518.40	$	1,365,024.00	$	1,388,812.80
30	Water Sales Commercial	$	282,955.20	$	287,812.80	$	292,670.40
31	Water Sales Industrial	$	21,480.00	$	21,480.00	$	21,480.00
32	Water Connection Fees (Connection fees)	$	65,250.00	$	66,700.00	$	66,700.00
33	Impact Fees	$	106,155.00	$	108,514.00	$	108,514.00
34	**TOTAL REVENUE:**	**$**	**1,817,358.60**	**$**	**1,849,530.80**	**$**	**1,878,177.20**
35	**EXPENSES:** (Including O&M & Debt Serv.)						
36	Personnel Salaries	$	354,104.18	$	364,727.31	$	375,669.13
37	Benefits	$	150,907.45	$	155,434.67	$	160,097.71
38	Office Supplies and Expenses	$	73,068.67	$	75,260.73	$	77,518.55
39	Sundry Expenses	$	49,854.96	$	51,350.61	$	52,891.12
40	Capital Outlay	$	101,267.88	$	104,305.92	$	107,435.10
41	Administration	$	64,655.65	$	66,595.32	$	68,593.18
42	Services	$	33,496.30	$	34,501.19	$	35,536.22
43	**Sub-Total Operation & Maintenance**	**$**	**827,355.09**	**$**	**852,175.74**	**$**	**877,741.02**
44	P&I Existing Loan	$	-	$	-	$	-
45	P&I Phase I Loan		$317,208.00		$317,208.00		$317,208.00
46	P&I Phase II Loan		$260,646.00		$260,646.00		$260,646.00
47	P&I Phase III Loan		$277,483.00		$277,483.00		$277,483.00
48	P&I Phase IV Loan						
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$	53,812.90	$	53,812.90	$	27,748.30
50	**Total Debt Service**	**$**	**909,149.90**	**$**	**909,149.90**	**$**	**883,085.30**
51	Funded Depreciation	$	86,825.25	$	88,066.28	$	88,041.32
52	**TOTAL EXPENSES:**	**$**	**1,736,504.99**	**$**	**1,761,325.64**	**$**	**1,760,826.32**
53	**Net Revenue less Expense**	$	80,853.61	$	88,205.16	$	117,350.88
54	**Cash on Hand**	$	856,701.17	$	944,906.33	$	1,062,257.21
55	Debt service coverage		1.16		1.17		1.17
56	Funded Depreciation Account Balance:	$	953,890.64	$	1,041,956.92	$	1,129,998.24
57							
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00						

APPENDIX A
CASH FLOW PROJECTION
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%				
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00	
3	Annual Commercial Growth Rate	1.75%				
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	2,359.00	

5	**Fiscal Year Ending June**		**2029**		**2030**		**2031**
6	**BASE DATA:**						
7	**Base Residential Rate**	$	40.00	$	40.00	$	40.00
8	Base Amount (gallons)		-		-		-
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000
11	**Base Commercial Rate**	$	40.00	$	40.00	$	40.00
12	Base Amount (gallons)		-		-		-
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000
15	**Base Industrial Rate**	$	40.00	$	40.00	$	40.00
16	Base Amount (gallons)		-		-		-
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000
19	**System Users:**						
20	Residential		2,473		2,517		2,561
21	Commercial Connections In Town Only		243		247		252
22	Industrial		1		1		1
23	Total		2,716		2,764		2,813
24	**New Connections:**						
25	New Residential		44		44		45
26	New Commercial		4		5		4
27	New Industrial		0		0		1
28	**REVENUES:**						
29	Water Sales Residential	$	1,413,168.00	$	1,438,089.60	$	1,463,294.40
30	Water Sales Commercial	$	297,528.00	$	302,992.80	$	308,457.60
31	Water Sales Industrial	$	21,480.00	$	21,480.00	$	32,220.00
32	Water Connection Fees (Connection fees)	$	69,600.00	$	71,050.00	$	72,500.00
33	Impact Fees	$	113,232.00	$	115,591.00	$	117,950.00
34	**TOTAL REVENUE:**	**$**	**1,915,008.00**	**$**	**1,949,203.40**	**$**	**1,994,422.00**
35	**EXPENSES:** (Including O&M & Debt Serv.)						
36	Personnel Salaries	$	386,939.20	$	398,547.38	$	410,503.80
37	Benefits	$	164,900.65	$	169,847.66	$	174,943.09
38	Office Supplies and Expenses	$	79,844.11	$	82,239.43	$	84,706.62
39	Sundry Expenses	$	54,477.86	$	56,112.19	$	57,795.56
40	Capital Outlay	$	110,658.15	$	113,977.89	$	117,397.23
41	Administration	$	70,650.97	$	72,770.50	$	74,953.62
42	Services	$	36,602.31	$	37,700.38	$	38,831.39
43	**Sub-Total Operation & Maintenance**	**$**	**904,073.25**	**$**	**931,195.44**	**$**	**959,131.31**
44	P&I Existing Loan	$	-	$	-	$	-
45	P&I Phase I Loan		$317,208.00		$317,208.00		$317,208.00
46	P&I Phase II Loan		$260,646.00		$260,646.00		$260,646.00
47	P&I Phase III Loan		$277,483.00		$277,483.00		$277,483.00
48	P&I Phase IV Loan						
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$	27,748.30	$	27,748.30	$	27,748.30
50	**Total Debt Service**	**$**	**883,085.30**	**$**	**883,085.30**	**$**	**883,085.30**
51	Funded Depreciation	$	89,357.93	$	90,714.04	$	92,110.83
52	**TOTAL EXPENSES:**	**$**	**1,787,158.55**	**$**	**1,814,280.74**	**$**	**1,842,216.61**
53	**Net Revenue less Expense**	$	127,849.45	$	134,922.66	$	152,205.39
54	**Cash on Hand**	$	1,190,106.67	$	1,325,029.32	$	1,477,234.71
55	Debt service coverage		1.18		1.19		1.21
56	Funded Depreciation Account Balance:	$	1,219,356.16	$	1,310,070.20	$	1,402,181.03
57							
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00						

APPENDIX A
CASH FLOW PROJECTION
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%				
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00	
3	Annual Commercial Growth Rate	1.75%				
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	2,359.00	

5	**Fiscal Year Ending June**		**2032**		**2033**		**2034**
6	**BASE DATA:**						
7	**Base Residential Rate**	$	48.00	$	48.00	$	48.00
8	Base Amount (gallons)		-		-		-
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000
11	**Base Commercial Rate**	$	48.00	$	48.00	$	48.00
12	Base Amount (gallons)		-		-		-
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000
15	**Base Industrial Rate**	$	48.00	$	48.00	$	48.00
16	Base Amount (gallons)		-		-		-
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000
19	**System Users:**						
20	Residential		2,606		2,651		2,698
21	Commercial Connections In Town Only		256		261		265
22	Industrial		2		2		2
23	Total		2,862		2,912		2,963
24	**New Connections:**						
25	New Residential		45		47		47
26	New Commercial		5		4		5
27	New Industrial		0		0		0
28	**REVENUES:**						
29	Water Sales Residential	$	1,741,118.40	$	1,771,588.80	$	1,787,155.20
30	Water Sales Commercial	$	338,738.40	$	344,635.20	$	350,532.00
31	Water Sales Industrial	$	43,152.00	$	43,152.00	$	43,152.00
32	Water Connection Fees (Connection fees)	$	72,500.00	$	73,950.00	$	75,400.00
33	Impact Fees	$	117,950.00	$	120,309.00	$	122,668.00
34	**TOTAL REVENUE:**	**$**	**2,313,458.80**	**$**	**2,353,635.00**	**$**	**2,378,907.20**
35	**EXPENSES:** (Including O&M & Debt Serv.)						
36	Personnel Salaries	$	422,818.91	$	435,503.48	$	448,568.58
37	Benefits	$	180,191.39	$	185,597.13	$	191,165.04
38	Office Supplies and Expenses	$	87,247.82	$	89,865.25	$	92,561.21
39	Sundry Expenses	$	59,529.43	$	61,315.31	$	63,154.77
40	Capital Outlay	$	120,919.15	$	124,546.72	$	128,283.12
41	Administration	$	77,202.22	$	79,518.29	$	81,903.84
42	Services	$	39,996.33	$	41,196.22	$	42,432.11
43	**Sub-Total Operation & Maintenance**	**$**	**987,905.25**	**$**	**1,017,542.40**	**$**	**1,048,068.68**
44	P&I Existing Loan	$	-	$	-	$	-
45	P&I Phase I Loan		$317,208.00		$317,208.00		
46	P&I Phase II Loan		$260,646.00		$260,646.00		$260,646.00
47	P&I Phase III Loan		$277,483.00		$277,483.00		$277,483.00
48	P&I Phase IV Loan		$268,720.00		$268,720.00		$268,720.00
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$	54,620.30	$	54,620.30	$	26,872.00
50	**Total Debt Service**	**$**	**1,178,677.30**	**$**	**1,178,677.30**	**$**	**833,721.00**
51	Funded Depreciation	$	108,329.13	$	109,810.99	$	94,089.48
52	**TOTAL EXPENSES:**	**$**	**2,166,582.55**	**$**	**2,196,219.70**	**$**	**1,881,789.68**
53	**Net Revenue less Expense**	$	146,876.25	$	157,415.30	$	497,117.52
54	**Cash on Hand**	$	1,624,110.97	$	1,781,526.26	$	2,278,643.79
55	Debt service coverage		1.18		1.19		1.65
56	Funded Depreciation Account Balance:	$	1,510,510.16	$	1,620,321.14	$	1,714,410.63
57							
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00						

APPENDIX A
CASH FLOW PROJECTION (WITHOUT IMPACT FEES)
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%				
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00	
3	Annual Commercial Growth Rate	1.75%				
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	-	

5	**Fiscal Year Ending June**		**2011**		**2012**		**2013**
6	**BASE DATA:**						
7	**Base Residential Rate**	$	7.50	$	21.50	$	21.50
8	Base Amount (gallons)		-		-		-
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000
11	**Base Commercial Rate**	$	10.50	$	21.50	$	21.50
12	Base Amount (gallons)		-		-		-
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000
15	**Base Industrial Rate**	$	10.50	$	21.50	$	21.50
16	Base Amount (gallons)		-		-		-
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000
19	**System Users:**						
20	Residential		1,810		1,842		1,874
21	Commercial Connections In Town Only		178		181		184
22	Industrial		1		1		1
23	Total		1,988		2,023		2,058
24	**New Connections:**						
25	New Residential		32		32		33
26	New Commercial		3		3		4
27	New Industrial		0		0		0
28	**REVENUES:**						
29	Water Sales Residential	$	322,106.40	$	639,895.20	$	651,088.20
30	Water Sales Commercial	$	154,441.80	$	181,113.00	$	184,586.40
31	Water Sales Industrial	$	21,126.00	$	21,258.00	$	21,258.00
32	Water Connection Fees (Connection fees)	$	50,750.00	$	50,750.00	$	53,650.00
33	Impact Fees	$	-	$	-	$	-
34	**TOTAL REVENUE:**	**$**	**548,424.20**	**$**	**893,016.20**	**$**	**910,582.60**
35	**EXPENSES:** (Including O&M & Debt Serv.)						
36	Personnel Salaries	$	227,286.00	$	234,104.58	$	241,127.72
37	Benefits	$	96,861.75	$	99,767.60	$	102,760.63
38	Office Supplies and Expenses	$	46,900.00	$	48,307.00	$	49,756.21
39	Sundry Expenses	$	32,000.00	$	32,960.00	$	33,948.80
40	Capital Outlay	$	65,000.00	$	66,950.00	$	68,958.50
41	Administration	$	41,500.00	$	42,745.00	$	44,027.35
42	Services	$	21,500.00	$	22,145.00	$	22,809.35
43	**Sub-Total Operation & Maintenance**	**$**	**531,047.75**	**$**	**546,979.18**	**$**	**563,388.56**
44	P&I Existing Loan	$	39,779.00	$	39,779.00	$	39,779.00
45	P&I Phase I Loan						$317,208.00
46	P&I Phase II Loan						
47	P&I Phase III Loan						
48	P&I Phase IV Loan						
49	Payment Reserve (Annual Pmt./10 For 10 yr.)					$	31,720.80
50	**Total Debt Service**	**$**	**39,779.00**	**$**	**39,779.00**	**$**	**388,707.80**
51	Funded Depreciation	$	28,541.34	$	29,337.91	$	47,604.82
52	**TOTAL EXPENSES:**	**$**	**599,368.09**	**$**	**616,096.09**	**$**	**999,701.18**
53	**Net Revenue less Expense**	$	(50,943.89)	$	276,920.11	$	(89,118.58)
54	**Cash on Hand**	$	(50,943.89)	$	225,976.22	$	136,857.65
55	Debt service coverage		0.44		8.70		0.97
56	Funded Depreciation Account Balance:	$	28,541.34	$	57,879.25	$	105,484.06
57							
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00						

APPENDIX A
CASH FLOW PROJECTION (WITHOUT IMPACT FEES)
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%				
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00	
3	Annual Commercial Growth Rate	1.75%				
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	-	

5	**Fiscal Year Ending June**		**2014**		**2015**		**2016**	
6	**BASE DATA:**							
7	**Base Residential Rate**	$	21.50	$	21.50	$	21.50	
8	Base Amount (gallons)		-		-		-	
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60	
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000	
11	**Base Commercial Rate**	$	21.50	$	21.50	$	21.50	
12	Base Amount (gallons)		-		-		-	
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60	
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000	
15	**Base Industrial Rate**	$	21.50	$	21.50	$	21.50	
16	Base Amount (gallons)		-		-		-	
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35	
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000	
19	**System Users:**							
20	Residential		1,907		1,940		1,974	
21	Commercial Connections In Town Only		188		191		194	
22	Industrial		1		1		1	
23	Total		2,095		2,131		2,168	
24	**New Connections:**							
25	New Residential		33		34		35	
26	New Commercial		3		3		4	
27	New Industrial		0		0		0	
28	**REVENUES:**							
29	Water Sales Residential	$	662,453.40	$	673,990.80	$	685,872.60	
30	Water Sales Commercial	$	188,059.80	$	191,037.00	$	194,510.40	
31	Water Sales Industrial	$	21,258.00	$	21,258.00	$	21,258.00	
32	Water Connection Fees (Connection fees)	$	52,200.00	$	53,650.00	$	56,550.00	
33	Impact Fees	$	-	$	-	$	-	
34	**TOTAL REVENUE:**	**$**	**923,971.20**	**$**	**939,935.80**	**$**	**958,191.00**	
35	**EXPENSES:** (Including O&M & Debt Serv.)							
36	Personnel Salaries	$	248,361.55	$	255,812.40	$	263,486.77	
37	Benefits	$	105,843.45	$	109,018.75	$	112,289.32	
38	Office Supplies and Expenses	$	51,248.90	$	52,786.36	$	54,369.95	
39	Sundry Expenses	$	34,967.26	$	36,016.28	$	37,096.77	
40	Capital Outlay	$	71,027.26	$	73,158.07	$	75,352.81	
41	Administration	$	45,348.17	$	46,708.62	$	48,109.87	
42	Services	$	23,493.63	$	24,198.44	$	24,924.39	
43	**Sub-Total Operation & Maintenance**	**$**	**580,290.21**	**$**	**597,698.92**	**$**	**615,629.89**	
44	P&I Existing Loan	$	-	$	-	$	-	
45	P&I Phase I Loan		$317,208.00		$317,208.00		$317,208.00	
46	P&I Phase II Loan							
47	P&I Phase III Loan							
48	P&I Phase IV Loan							
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$	31,720.80	$	31,720.80	$	31,720.80	
50	**Total Debt Service**	**$**	**348,928.80**	**$**	**348,928.80**	**$**	**348,928.80**	
51	Funded Depreciation	$	46,460.95	$	47,331.39	$	48,227.93	
52	**TOTAL EXPENSES:**	**$**	**929,219.01**	**$**	**946,627.72**	**$**	**964,558.69**	
53	**Net Revenue less Expense**	$	(5,247.81)	$	(6,691.92)	$	(6,367.69)	
54	**Cash on Hand**	$	131,609.83	$	124,917.91	$	118,550.22	
55	Debt service coverage		1.08		1.08		1.08	
56	Funded Depreciation Account Balance:	$	151,945.02	$	199,276.40	$	247,504.34	
57								
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00							

APPENDIX A
CASH FLOW PROJECTION (WITHOUT IMPACT FEES)
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%				
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00	
3	Annual Commercial Growth Rate	1.75%				
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	-	

5	**Fiscal Year Ending June**		**2017**		**2018**		**2019**
6	**BASE DATA:**						
7	**Base Residential Rate**	$	34.00	$	34.00	$	34.00
8	Base Amount (gallons)		-		-		-
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000
11	**Base Commercial Rate**	$	34.00	$	34.00	$	34.00
12	Base Amount (gallons)		-		-		-
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000
15	**Base Industrial Rate**	$	34.00	$	34.00	$	34.00
16	Base Amount (gallons)		-		-		-
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000
19	**System Users:**						
20	Residential		2,009		2,044		2,079
21	Commercial Connections In Town Only		198		201		205
22	Industrial		1		1		1
23	Total		2,207		2,245		2,284
24	**New Connections:**						
25	New Residential		35		35		37
26	New Commercial		3		4		3
27	New Industrial		0		0		0
28	**REVENUES:**						
29	Water Sales Residential	$	1,001,901.60	$	1,019,205.60	$	1,037,004.00
30	Water Sales Commercial	$	227,908.80	$	231,907.20	$	235,905.60
31	Water Sales Industrial	$	21,408.00	$	21,408.00	$	21,408.00
32	Water Connection Fees (Connection fees)	$	55,100.00	$	56,550.00	$	58,000.00
33	Impact Fees	$	-	$	-	$	-
34	**TOTAL REVENUE:**	**$**	**1,306,318.40**	**$**	**1,329,070.80**	**$**	**1,352,317.60**
35	**EXPENSES:** (Including O&M & Debt Serv.)						
36	Personnel Salaries	$	271,391.37	$	279,533.11	$	287,919.10
37	Benefits	$	115,658.00	$	119,127.73	$	122,701.57
38	Office Supplies and Expenses	$	56,001.05	$	57,681.08	$	59,411.52
39	Sundry Expenses	$	38,209.67	$	39,355.96	$	40,536.64
40	Capital Outlay	$	77,613.40	$	79,941.80	$	82,340.06
41	Administration	$	49,553.17	$	51,039.77	$	52,570.96
42	Services	$	25,672.12	$	26,442.29	$	27,235.56
43	**Sub-Total Operation & Maintenance**	**$**	**634,098.79**	**$**	**653,121.75**	**$**	**672,715.40**
44	P&I Existing Loan	$	-	$	-	$	-
45	P&I Phase I Loan		$317,208.00		$317,208.00		$317,208.00
46	P&I Phase II Loan				$260,646.00		$260,646.00
47	P&I Phase III Loan						
48	P&I Phase IV Loan						
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$	31,720.80	$	57,785.40	$	57,785.40
50	**Total Debt Service**	**$**	**348,928.80**	**$**	**635,639.40**	**$**	**635,639.40**
51	Funded Depreciation	$	49,151.38	$	64,438.06	$	65,417.74
52	**TOTAL EXPENSES:**	**$**	**983,027.59**	**$**	**1,288,761.15**	**$**	**1,308,354.80**
53	**Net Revenue less Expense**	$	323,290.81	$	40,309.65	$	43,962.80
54	**Cash on Hand**	$	441,841.03	$	482,150.69	$	526,113.48
55	Debt service coverage		2.12		1.17		1.18
56	Funded Depreciation Account Balance:	$	296,655.72	$	361,093.77	$	426,511.51
57							
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00						

APPENDIX A
CASH FLOW PROJECTION (WITHOUT IMPACT FEES)
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%				
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00	
3	Annual Commercial Growth Rate	1.75%				
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	-	

5	**Fiscal Year Ending June**		**2020**		**2021**		**2022**
6	**BASE DATA:**						
7	**Base Residential Rate**	$	34.00	$	34.00	$	34.00
8	Base Amount (gallons)		-		-		-
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000
11	**Base Commercial Rate**	$	34.00	$	34.00	$	34.00
12	Base Amount (gallons)		-		-		-
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000
15	**Base Industrial Rate**	$	34.00	$	34.00	$	34.00
16	Base Amount (gallons)		-		-		-
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000
19	**System Users:**						
20	Residential		2,116		2,153		2,191
21	Commercial Connections In Town Only		208		212		215
22	Industrial		1		1		1
23	Total		2,324		2,365		2,406
24	**New Connections:**						
25	New Residential		37		38		38
26	New Commercial		4		3		4
27	New Industrial		0		0		0
28	**REVENUES:**						
29	Water Sales Residential	$	1,055,296.80	$	1,073,836.80	$	1,092,624.00
30	Water Sales Commercial	$	239,904.00	$	243,902.40	$	247,900.80
31	Water Sales Industrial	$	21,408.00	$	21,408.00	$	21,408.00
32	Water Connection Fees (Connection fees)	$	59,450.00	$	59,450.00	$	60,900.00
33	Impact Fees	$	-	$	-	$	-
34	**TOTAL REVENUE:**	**$**	**1,376,058.80**	**$**	**1,398,597.20**	**$**	**1,422,832.80**
35	**EXPENSES:** (Including O&M & Debt Serv.)						
36	Personnel Salaries	$	296,556.68	$	305,453.38	$	314,616.98
37	Benefits	$	126,382.61	$	130,174.09	$	134,079.32
38	Office Supplies and Expenses	$	61,193.86	$	63,029.68	$	64,920.57
39	Sundry Expenses	$	41,752.74	$	43,005.32	$	44,295.48
40	Capital Outlay	$	84,810.26	$	87,354.56	$	89,975.20
41	Administration	$	54,148.09	$	55,772.53	$	57,445.71
42	Services	$	28,052.62	$	28,894.20	$	29,761.03
43	**Sub-Total Operation & Maintenance**	**$**	**692,896.86**	**$**	**713,683.77**	**$**	**735,094.28**
44	P&I Existing Loan	$	-	$	-	$	-
45	P&I Phase I Loan		$317,208.00		$317,208.00		$317,208.00
46	P&I Phase II Loan		$260,646.00		$260,646.00		$260,646.00
47	P&I Phase III Loan						
48	P&I Phase IV Loan						
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$	57,785.40	$	57,785.40	$	57,785.40
50	**Total Debt Service**	**$**	**635,639.40**	**$**	**635,639.40**	**$**	**635,639.40**
51	Funded Depreciation	$	66,426.81	$	67,466.16	$	68,536.68
52	**TOTAL EXPENSES:**	**$**	**1,328,536.26**	**$**	**1,349,323.17**	**$**	**1,370,733.68**
53	**Net Revenue less Expense**	$	47,522.54	$	49,274.03	$	52,099.12
54	**Cash on Hand**	$	573,636.02	$	622,910.05	$	675,009.17
55	Debt service coverage		1.18		1.19		1.19
56	Funded Depreciation Account Balance:	$	492,938.33	$	560,404.48	$	628,941.17
57							
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00						

APPENDIX A
CASH FLOW PROJECTION (WITHOUT IMPACT FEES)
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%				
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00	
3	Annual Commercial Growth Rate	1.75%				
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	-	

5	**Fiscal Year Ending June**		**2023**		**2024**		**2025**	
6	**BASE DATA:**							
7	**Base Residential Rate**	$	34.00	$	44.00	$	44.00	
8	Base Amount (gallons)		-		-		-	
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60	
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000	
11	**Base Commercial Rate**	$	34.00	$	44.00	$	44.00	
12	Base Amount (gallons)		-		-		-	
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60	
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000	
15	**Base Industrial Rate**	$	34.00	$	44.00	$	44.00	
16	Base Amount (gallons)		-		-		-	
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35	
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000	
19	**System Users:**							
20	Residential		2,229		2,268		2,308	
21	Commercial Connections In Town Only		219		223		227	
22	Industrial		1		1		1	
23	Total		2,448		2,491		2,535	
24	**New Connections:**							
25	New Residential		39		40		40	
26	New Commercial		4		4		4	
27	New Industrial		0		0		0	
28	**REVENUES:**							
29	Water Sales Residential	$	1,111,658.40	$	1,405,747.20	$	1,430,323.20	
30	Water Sales Commercial	$	252,470.40	$	284,040.00	$	289,089.60	
31	Water Sales Industrial	$	21,408.00	$	21,528.00	$	21,528.00	
32	Water Connection Fees (Connection fees)	$	62,350.00	$	63,800.00	$	63,800.00	
33	Impact Fees	$	-	$	-	$	-	
34	**TOTAL REVENUE:**	**$**	**1,447,886.80**	**$**	**1,775,115.20**	**$**	**1,804,740.80**	
35	**EXPENSES:** (Including O&M & Debt Serv.)							
36	Personnel Salaries	$	324,055.49	$	333,777.15	$	343,790.47	
37	Benefits	$	138,101.69	$	142,244.75	$	146,512.09	
38	Office Supplies and Expenses	$	66,868.19	$	68,874.23	$	70,940.46	
39	Sundry Expenses	$	45,624.35	$	46,993.08	$	48,402.87	
40	Capital Outlay	$	92,674.46	$	95,454.69	$	98,318.33	
41	Administration	$	59,169.08	$	60,944.15	$	62,772.47	
42	Services	$	30,653.86	$	31,573.47	$	32,520.68	
43	**Sub-Total Operation & Maintenance**	**$**	**757,147.11**	**$**	**779,861.52**	**$**	**803,257.37**	
44	P&I Existing Loan	$	-	$	-	$	-	
45	P&I Phase I Loan		$317,208.00		$317,208.00		$317,208.00	
46	P&I Phase II Loan		$260,646.00		$260,646.00		$260,646.00	
47	P&I Phase III Loan				$277,483.00		$277,483.00	
48	P&I Phase IV Loan							
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$	26,064.60	$	53,812.90	$	53,812.90	
50	**Total Debt Service**	**$**	**603,918.60**	**$**	**909,149.90**	**$**	**909,149.90**	
51	Funded Depreciation	$	68,053.29	$	84,450.57	$	85,620.36	
52	**TOTAL EXPENSES:**	**$**	**1,361,065.71**	**$**	**1,689,011.42**	**$**	**1,712,407.27**	
53	**Net Revenue less Expense**	$	86,821.09	$	86,103.78	$	92,333.53	
54	**Cash on Hand**	$	761,830.26	$	847,934.03	$	940,267.56	
55	Debt service coverage		1.20		1.16		1.17	
56	Funded Depreciation Account Balance:	$	696,994.45	$	781,445.03	$	867,065.39	
57								
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00							

APPENDIX A
CASH FLOW PROJECTION (WITHOUT IMPACT FEES)
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%				
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00	
3	Annual Commercial Growth Rate	1.75%				
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	-	

5	**Fiscal Year Ending June**		**2026**		**2027**		**2028**	
6	**BASE DATA:**							
7	**Base Residential Rate**	$	44.00	$	44.00	$	44.00	
8	Base Amount (gallons)		-		-		-	
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60	
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000	
11	**Base Commercial Rate**	$	44.00	$	44.00	$	44.00	
12	Base Amount (gallons)		-		-		-	
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60	
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000	
15	**Base Industrial Rate**	$	44.00	$	44.00	$	44.00	
16	Base Amount (gallons)		-		-		-	
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35	
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000	
19	**System Users:**							
20	Residential		2,348		2,389		2,431	
21	Commercial Connections In Town Only		231		235		239	
22	Industrial		1		1		1	
23	Total		2,579		2,624		2,670	
24	**New Connections:**							
25	New Residential		41		42		42	
26	New Commercial		4		4		4	
27	New Industrial		0		0		0	
28	**REVENUES:**							
29	Water Sales Residential	$	1,455,206.40	$	1,480,704.00	$	1,506,508.80	
30	Water Sales Commercial	$	294,139.20	$	299,188.80	$	304,238.40	
31	Water Sales Industrial	$	21,528.00	$	21,528.00	$	21,528.00	
32	Water Connection Fees (Connection fees)	$	65,250.00	$	66,700.00	$	66,700.00	
33	Impact Fees	$	-	$	-	$	-	
34	**TOTAL REVENUE:**	**$**	**1,836,123.60**	**$**	**1,868,120.80**	**$**	**1,898,975.20**	
35	**EXPENSES:** (Including O&M & Debt Serv.)							
36	Personnel Salaries	$	354,104.18	$	364,727.31	$	375,669.13	
37	Benefits	$	150,907.45	$	155,434.67	$	160,097.71	
38	Office Supplies and Expenses	$	73,068.67	$	75,260.73	$	77,518.55	
39	Sundry Expenses	$	49,854.96	$	51,350.61	$	52,891.12	
40	Capital Outlay	$	101,267.88	$	104,305.92	$	107,435.10	
41	Administration	$	64,655.65	$	66,595.32	$	68,593.18	
42	Services	$	33,496.30	$	34,501.19	$	35,536.22	
43	**Sub-Total Operation & Maintenance**	**$**	**827,355.09**	**$**	**852,175.74**	**$**	**877,741.02**	
44	P&I Existing Loan	$	-	$	-	$	-	
45	P&I Phase I Loan		$317,208.00		$317,208.00		$317,208.00	
46	P&I Phase II Loan		$260,646.00		$260,646.00		$260,646.00	
47	P&I Phase III Loan		$277,483.00		$277,483.00		$277,483.00	
48	P&I Phase IV Loan							
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$	53,812.90	$	53,812.90	$	27,748.30	
50	**Total Debt Service**	**$**	**909,149.90**	**$**	**909,149.90**	**$**	**883,085.30**	
51	Funded Depreciation	$	86,825.25	$	88,066.28	$	88,041.32	
52	**TOTAL EXPENSES:**	**$**	**1,736,504.99**	**$**	**1,761,325.64**	**$**	**1,760,826.32**	
53	**Net Revenue less Expense**	$	99,618.61	$	106,795.16	$	138,148.88	
54	**Cash on Hand**	$	1,039,886.17	$	1,146,681.33	$	1,284,830.21	
55	Debt service coverage		1.18		1.19		1.19	
56	Funded Depreciation Account Balance:	$	953,890.64	$	1,041,956.92	$	1,129,998.24	
57								
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00							

APPENDIX A
CASH FLOW PROJECTION (WITHOUT IMPACT FEES)
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%				
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00	
3	Annual Commercial Growth Rate	1.75%				
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	-	

5	**Fiscal Year Ending June**		**2029**		**2030**		**2031**
6	**BASE DATA:**						
7	**Base Residential Rate**	$	44.00	$	44.00	$	44.00
8	Base Amount (gallons)		-		-		-
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000
11	**Base Commercial Rate**	$	44.00	$	44.00	$	44.00
12	Base Amount (gallons)		-		-		-
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000
15	**Base Industrial Rate**	$	44.00	$	44.00	$	44.00
16	Base Amount (gallons)		-		-		-
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000
19	**System Users:**						
20	Residential		2,473		2,517		2,561
21	Commercial Connections In Town Only		243		247		252
22	Industrial		1		1		1
23	Total		2,716		2,764		2,813
24	**New Connections:**						
25	New Residential		44		44		45
26	New Commercial		4		5		4
27	New Industrial		0		0		1
28	**REVENUES:**						
29	Water Sales Residential	$	1,532,928.00	$	1,559,961.60	$	1,587,302.40
30	Water Sales Commercial	$	309,288.00	$	314,968.80	$	320,649.60
31	Water Sales Industrial	$	21,528.00	$	21,528.00	$	32,292.00
32	Water Connection Fees (Connection fees)	$	69,600.00	$	71,050.00	$	72,500.00
33	Impact Fees	$	-	$	-	$	-
34	**TOTAL REVENUE:**	**$**	**1,933,344.00**	**$**	**1,967,508.40**	**$**	**2,012,744.00**
35	**EXPENSES:** (Including O&M & Debt Serv.)						
36	Personnel Salaries	$	386,939.20	$	398,547.38	$	410,503.80
37	Benefits	$	164,900.65	$	169,847.66	$	174,943.09
38	Office Supplies and Expenses	$	79,844.11	$	82,239.43	$	84,706.62
39	Sundry Expenses	$	54,477.86	$	56,112.19	$	57,795.56
40	Capital Outlay	$	110,658.15	$	113,977.89	$	117,397.23
41	Administration	$	70,650.97	$	72,770.50	$	74,953.62
42	Services	$	36,602.31	$	37,700.38	$	38,831.39
43	**Sub-Total Operation & Maintenance**	**$**	**904,073.25**	**$**	**931,195.44**	**$**	**959,131.31**
44	P&I Existing Loan	$	-	$	-	$	-
45	P&I Phase I Loan		$317,208.00		$317,208.00		$317,208.00
46	P&I Phase II Loan		$260,646.00		$260,646.00		$260,646.00
47	P&I Phase III Loan		$277,483.00		$277,483.00		$277,483.00
48	P&I Phase IV Loan						
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$	27,748.30	$	27,748.30	$	27,748.30
50	**Total Debt Service**	**$**	**883,085.30**	**$**	**883,085.30**	**$**	**883,085.30**
51	Funded Depreciation	$	89,357.93	$	90,714.04	$	92,110.83
52	**TOTAL EXPENSES:**	**$**	**1,787,158.55**	**$**	**1,814,280.74**	**$**	**1,842,216.61**
53	**Net Revenue less Expense**	$	146,185.45	$	153,227.66	$	170,527.39
54	**Cash on Hand**	$	1,431,015.67	$	1,584,243.32	$	1,754,770.71
55	Debt service coverage		1.20		1.21		1.23
56	Funded Depreciation Account Balance:	$	1,219,356.16	$	1,310,070.20	$	1,402,181.03
57							
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00						

APPENDIX A
CASH FLOW PROJECTION (WITHOUT IMPACT FEES)
NEPHI CITY CULINARY WATER SYSTEM

1	Annual Industrial Growth Rate	2.00%			
2	Annual Residential Growth Rate	1.75%	Connection fee	$	1,450.00
3	Annual Commercial Growth Rate	1.75%			
4	Annual Inflation Rate	3.0%	Impact fee per ERC	$	-

5	**Fiscal Year Ending June**		**2032**		**2033**		**2034**
6	**BASE DATA:**						
7	**Base Residential Rate**	$	52.00	$	52.00	$	52.00
8	Base Amount (gallons)		-		-		-
9	Overage Rate ($0.60per 1,000 gal.)	$	0.60	$	0.60	$	0.60
10	Ave. Month Water Use / Res. Conn. (Gal.)		12,000		12,000		12,000
11	**Base Commercial Rate**	$	52.00	$	52.00	$	52.00
12	Base Amount (gallons)		-		-		-
13	Overage Rate ($0.60) Per 1000 gal.)	$	0.60	$	0.60	$	0.60
14	Ave. Month Water Use / Com. Conn. (Gal.)		102,000		102,000		102,000
15	**Base Industrial Rate**	$	52.00	$	52.00	$	52.00
16	Base Amount (gallons)		-		-		-
17	Overage Rate ($0.35) Per 1000 gal. to 5 million gal.)	$	0.35	$	0.35	$	0.35
18	Ave. Month Water Use / Ind. Conn. (Gal.)		5,000,000		5,000,000		5,000,000
19	**System Users:**						
20	Residential		2,606		2,651		2,698
21	Commercial Connections In Town Only		256		261		265
22	Industrial		2		2		2
23	Total		2,862		2,912		2,963
24	**New Connections:**						
25	New Residential		45		47		47
26	New Commercial		5		4		5
27	New Industrial		0		0		0
28	**REVENUES:**						
29	Water Sales Residential	$	1,867,286.40	$	1,899,964.80	$	1,916,659.20
30	Water Sales Commercial	$	351,146.40	$	357,259.20	$	363,372.00
31	Water Sales Industrial	$	43,248.00	$	43,248.00	$	43,248.00
32	Water Connection Fees (Connection fees)	$	72,500.00	$	73,950.00	$	75,400.00
33	Impact Fees	$	-	$	-	$	-
34	**TOTAL REVENUE:**	**$**	**2,334,180.80**	**$**	**2,374,422.00**	**$**	**2,398,679.20**
35	**EXPENSES:** (Including O&M & Debt Serv.)						
36	Personnel Salaries	$	422,818.91	$	435,503.48	$	448,568.58
37	Benefits	$	180,191.39	$	185,597.13	$	191,165.04
38	Office Supplies and Expenses	$	87,247.82	$	89,865.25	$	92,561.21
39	Sundry Expenses	$	59,529.43	$	61,315.31	$	63,154.77
40	Capital Outlay	$	120,919.15	$	124,546.72	$	128,283.12
41	Administration	$	77,202.22	$	79,518.29	$	81,903.84
42	Services	$	39,996.33	$	41,196.22	$	42,432.11
43	**Sub-Total Operation & Maintenance**	**$**	**987,905.25**	**$**	**1,017,542.40**	**$**	**1,048,068.68**
44	P&I Existing Loan	$	-	$	-	$	-
45	P&I Phase I Loan		$317,208.00		$317,208.00		
46	P&I Phase II Loan		$260,646.00		$260,646.00		$260,646.00
47	P&I Phase III Loan		$277,483.00		$277,483.00		$277,483.00
48	P&I Phase IV Loan		$268,720.00		$268,720.00		$268,720.00
49	Payment Reserve (Annual Pmt./10 For 10 yr.)	$	54,620.30	$	54,620.30	$	26,872.00
50	**Total Debt Service**	**$**	**1,178,677.30**	**$**	**1,178,677.30**	**$**	**833,721.00**
51	Funded Depreciation	$	108,329.13	$	109,810.99	$	94,089.48
52	**TOTAL EXPENSES:**	**$**	**2,166,582.55**	**$**	**2,196,219.70**	**$**	**1,881,789.68**
53	**Net Revenue less Expense**	$	167,598.25	$	178,202.30	$	516,889.52
54	**Cash on Hand**	$	1,922,368.97	$	2,100,571.26	$	2,617,460.79
55	Debt service coverage		1.20		1.21		1.67
56	Funded Depreciation Account Balance:	$	1,510,510.16	$	1,620,321.14	$	1,714,410.63
57							
58	Median Adjusted Gross Income 2007 Tax Returns = $37,914.00						

					603,114
51-5100	WATER DEPARTMENT				
100	1. Salaries			227,286	
	Superintendent	4567*12	54,804		
	Utility operator Ld	3563*12	42,756		
	Utility workers	3225*12*2	77,400		
51-5300	Pool manager	705*12	8,460		
100	Pool instructors	8.8*60*10+(	14,772		
	Pool lifeguards	8.55*160*13	17,784		
	Pool counter help	7.25*60*13*	11,310		
51-5100	2. Benefits			129,149	
130	Superintendent	54804*0.6	32,882		
	Utility operator	42756*0.7	29,929		
	Utility workers	77400*0.73	56,502		
51-5300	Pool manager	8460*0.67	5,668		
130	Pool hourly	43866*0.095	4,167		
51-5100	3. Materials and Supplies			46,900	
201	Postage, misc.		7,500		
202	Fuel, repair parts, repairs		10,000		
203	Chlorine, freight		5,000		
204	Waterline repair materials		3,000		
205	Meter repair materials		2,000		
51-5300	Pool				
302	Pool restroom supplies, repair		400		
303	Pool paint, parts, etc.		3,000		
304	Pool chlorine		6,000		
609	Pool equipment		500		
650	Pool telephone		500		
660	Pool gas, boiler service		8,000		
742	Pool capital		1,000		
	4. Sundry Expenses			32,000	
601	Tires and tire repairs		1,000		
602	Subscriptions		100		
603	Notices, publishing costs		500		
604	Easements, mapping, etc.		750		
605	Water sample testing		2,000		
606	Tools and shop expenses		2,750		
610	Contract services, envtl., safety		17,500		
650	Telephone expenses		1,200		
660	Natural gas		2,200		
680	Training and travel		4,000		
	5. Capital Outlay			65,000	
741	Capital materials		30,000		
742	Vehicle relacement		0		
743	Equipment purchases		10,000		
744	Water resource development		25,000		
810	6. Loan Repayment			39,779	
540	7. Charges For Administration			41,500	
541	8. Charges For Services			21,500	

TABLE 8 - A
OPINION OF PROBABLE COST - PHASE I

	ITEM	QTY.	UNITS	UNIT COST	AMOUNT
Distribution Improvement Projects					
1	Mobilization	1	LS.	$ 250,000.00	$ 250,000.00
2	Pre-Construction Video	1	LS.	$ 1,500.00	$ 1,500.00
3	Traffic Control	1	LS.	$ 30,000.00	$ 30,000.00
4	Subsurface Investigation	60	HOUR	$ 200.00	$ 12,000.00
5	14" AWWA C900 PVC SDR 18 Pipe and Fittings	6000	LN.-FT.	$ 28.00	$ 168,000.00
6	14" Gate Valve	4	EACH	$ 4,200.00	$ 16,800.00
7	12" AWWA C900 PVC SDR 18 Pipe and Fittings	6800	LN.-FT.	$ 24.00	$ 163,200.00
8	12" Gate Valve	20	EACH	$ 2,800.00	$ 56,000.00
9	10" AWWA C900 PVC SDR 18 Pipe and Fittings	3200	LN.-FT.	$ 22.00	$ 70,400.00
10	10" Gate Valve	14	EACH	$ 2,000.00	$ 28,000.00
11	8" AWWA C900 PVC SDR 18 Pipe and Fittings	57000	LN.-FT.	$ 18.00	$ 1,026,000.00
12	8" Gate Valve	120	EACH	$ 1,300.00	$ 156,000.00
13	Import Pipe Bedding	73000	LN.-FT.	$ 2.00	$ 146,000.00
14	Untreated Base Course	5,420	TON	$ 16.00	$ 86,720.00
15	3" Bituminous Surfacing for Street Crossings.	32120	SQ.-YD.	$ 18.00	$ 578,160.00
16	Boring and Jacking	400	LN.-FT.	$ 300.00	$ 120,000.00
17	New Fire Hydrant Assembly	75	EACH	$ 3,200.00	$ 240,000.00
18	Reconnect Existing Fire Hydrant	40	EACH	$ 2,500.00	$ 100,000.00
19	Replace Existing Fire Hydrants	20	EACH	$ 3,200.00	$ 64,000.00
20	3" Combination Air Valve Assembly	4	EACH	$ 3,500.00	$ 14,000.00
21	2" Combination Air Valve Assembly	4	EACH	$ 3,000.00	$ 12,000.00
22	Replace Existing Chlorination System	1	L.S.	$ 60,000.00	$ 60,000.00
23	New Flow Meters for Well and Springs	3	EACH	$ 7,500.00	$ 22,500.00
24	SCADA RTU Tanks/Chlorinator Bldg	3	EACH	$ 12,000.00	$ 36,000.00
25	SCADA RTU Well	2	EACH	$ 12,000.00	$ 24,000.00
26	SCADA HMI Town Office	1	EACH	$ 18,000.00	$ 18,000.00
				SUBTOTAL	**$ 3,499,280.00**
				Contingency:	**$ 525,720.00**
				TOTAL Construction Costs:	**$ 4,025,000.00**
Non-Construction Services					
a.	Administration, Funding Services, Preliminary Engineering	1	L.S.	$ 30,000.00	$ 30,000.00
b.	Design Engineering	1	L.S.	$ 280,000.00	$ 280,000.00
c.	Quality Control Inspection	1	Hourly	$ 323,000.00	$ 323,000.00
d.	Survey and Mapping	1	L.S.	$ 20,000.00	$ 20,000.00
e.	Legal, Fiscal, Interim Finaning	1	Est.	$ 242,000.00	$ 242,000.00
f.	Environmental	1	LS.	$ 25,000.00	$ 25,000.00
				TOTAL Non-Construction Services:	**$ 920,000.00**
				TOTAL PROJECT COST:	**$ 4,945,000.00**

NEPHI CITY CULINARY WATER MASTER PLAN - 2011

TABLE 8 - A
OPINION OF PROBABLE COST - PHASE II

	ITEM	QTY.	UNITS	UNIT COST	AMOUNT
	Storage Improvements				
1	Mobilization	1	LS.	$ 30,000.00	$ 30,000.00
2	Tank Site Earthwork, Subgrade, and Foundation	1	LS.	$ 30,000.00	$ 30,000.00
3	Construct New 2,000,000 Gallon Concrete Storage Tank	1	LS.	$ 1,300,000.00	$ 1,300,000.00
4	Tank Piping and Appurtenances	1	LS.	$ 60,000.00	$ 60,000.00
5	Chainlink Fence & Gate	1400	LN.-FT.	$ 20.00	$ 28,000.00
6	14" AWWA C900 PVC SDR 18 Pipe and Fittings	3300	LN.-FT.	$ 28.00	$ 92,400.00
7	14" Gate Valve	4	EACH	$ 4,200.00	$ 16,800.00
8	Import Pipe Bedding	3300	LN.-FT.	$ 2.00	$ 6,600.00
	Well Improvements				
9	Mobilization	1	L.S.	$ 20,000.00	$ 20,000.00
10	12" AWWA C900 PVC SDR 18 Pipe and Fittings (Well Line)	5000	LN.-FT.	$ 24.00	$ 120,000.00
11	12" Gate Valve	4	EACH	$ 2,800.00	$ 11,200.00
12	Aquifer Water Sample	1	Each	$ 2,500.00	$ 2,500.00
13	Test Well 400 feet	1	L.S.	$ 60,000.00	$ 60,000.00
14	Surface Casing 24-inch	100	LnFt	$ 125.00	$ 12,500.00
15	Well Drilling 24-inch	400	LnFt	$ 220.00	$ 88,000.00
16	16" Carbon Steel Well Casing	300	LnFt	$ 100.00	$ 30,000.00
17	16" Stainless Steel Well Screen	100	LnFt	$ 200.00	$ 20,000.00
18	Gravel Packing	30	CuYd	$ 600.00	$ 18,000.00
19	4" Galvanized Steel Refill Pipe	200	LnFt	$ 15.00	$ 3,000.00
20	Grout - Sanitary Seal	1	L.S.	$ 20,000.00	$ 20,000.00
21	Well Development	80	Hour	$ 250.00	$ 20,000.00
22	Furnish and Install Test Pump & Equipment	1	L.S.	$ 20,000.00	$ 20,000.00
23	Step Test Pumping	12	Hour	$ 250.00	$ 3,000.00
24	Constant Rate Test Pumping	24	Hour	$ 250.00	$ 6,000.00
25	Disinfection & Capping	1	L.S.	$ 1,000.00	$ 1,000.00
26	Submersible Well Pump, Pump Control Panel, Pitless Adapter	1	L.S.	$ 60,000.00	$ 60,000.00
27	Furnish and Install SCADA Equipment	1	L.S.	$ 85,000.00	$ 85,000.00
28	Controls and Instrumentation for Well and tank	1	L.S.	$ 15,000.00	$ 15,000.00
29	Well Building	1	L.S.	$ 45,000.00	$ 45,000.00
30	Electrical for Well Building	1	L.S.	$ 50,000.00	$ 50,000.00
31	Back-up Generator	1	L.S.	$ 50,000.00	$ 50,000.00
32	Power to Building	1000	LnFt	$ 25.00	$ 25,000.00
33	Well Building Piping	1	L.S.	$ 20,000.00	$ 20,000.00
34	Chlorination Equipment	1	L.S.	$ 20,000.00	$ 20,000.00
35	Chain Link Fence & Gates	800	LnFt	$ 20.00	$ 16,000.00
	SUBTOTAL Water Improvement Costs:				**$ 2,405,000.00**
	Contingency:				**$ 350,000.00**
	TOTAL Construction Costs:				**$ 2,755,000.00**
	Non-Construction Services				
a.	Administration, Funding services, Preliminary Engineering	1	L.S.	$ 30,000.00	$ 30,000.00
b.	Design Engineering	1	L.S.	$ 190,000.00	$ 190,000.00
c.	Quality Control Inspection	1	Hourly	$ 213,000.00	$ 213,000.00
d.	Survey and Mapping	1	L.S.	$ 20,000.00	$ 20,000.00
e.	Well Siting Study	1	L.S.	$ 10,000.00	$ 10,000.00
f.	Preliminary Evaluation Report (PER) & Well Specification	1	L.S.	$ 10,000.00	$ 10,000.00
g.	Source Protection Plan	1	L.S.	$ 5,000.00	$ 5,000.00
h.	Water Rights Services	1	Hourly	$ 5,000.00	$ 5,000.00
i.	Land Acquisition	1	L.S.	$ 80,000.00	$ 80,000.00
j.	Legal, Fiscal, Interim Financing	1	Est.	$ 162,000.00	$ 162,000.00
k.	Environmental	1	LS.	$ 25,000.00	$ 25,000.00
	TOTAL Non-Construction Services:				**$ 750,000.00**
	TOTAL PROJECT COST:				**$ 3,505,000.00**

TABLE 8 - A
OPINION OF PROBABLE COST - PHASE III

	ITEM	QTY.	UNITS	UNIT COST	AMOUNT
	Storage Improvements				
1	Mobilization	1	LS.	$ 30,000.00	$ 30,000.00
2	Tank Site Earthwork, Subgrade, and Foundation	1	LS.	$ 30,000.00	$ 30,000.00
3	Construct New 2,000,000 Gallon Concrete Storage Tank	1	LS.	$ 1,300,000.00	$ 1,300,000.00
4	Tank Piping and Appurtenances	1	LS.	$ 60,000.00	$ 60,000.00
5	Chainlink Fence & Gate	1400	LN.-FT.	$ 20.00	$ 28,000.00
6	14" AWWA C900 PVC SDR 18 Pipe and Fittings	1200	LN.-FT.	$ 28.00	$ 33,600.00
7	14" Gate Valve	4	EACH	$ 4,200.00	$ 16,800.00
8	Import Pipe Bedding	1200	LN.-FT.	$ 2.00	$ 2,400.00
	Airport Improvements				
9	Mobilization	1	L.S.	$ 20,000.00	$ 20,000.00
10	8" AWWA C900 PVC SDR 18 Pipe and Fittings (Well Line)	24000	LN.-FT.	$ 18.00	$ 432,000.00
11	8" Gate Valve	20	EACH	$ 1,300.00	$ 26,000.00
12	Import Pipe Bedding	24000	LN.-FT.	$ 2.00	$ 48,000.00
13	Untreated Base Course	30	TON	$ 16.00	$ 480.00
14	3" Bituminous Surfacing for Street Crossings.	300	SQ.-YD.	$ 18.00	$ 5,400.00
15	Boring and Jacking	400	LN.-FT.	$ 300.00	$ 120,000.00
16	New Fire Hydrant Assembly	28	EACH	$ 3,200.00	$ 89,600.00
17	2" Combination Air Valve Assembly	2	EACH	$ 3,000.00	$ 6,000.00
18	1 PRV Station	1	EACH	$ 20,000.00	$ 20,000.00
	SUBTOTAL Water Improvement Costs:				**$ 2,268,280.00**
	Contingency:				**$ 294,720.00**
	TOTAL Construction Costs:				**$ 2,563,000.00**
	Non-Construction Services				
a.	Administration, Funding Services, Preliminary Engineering	1	L.S.	$ 30,000.00	$ 30,000.00
b.	Design Engineering	1	L.S.	$ 160,000.00	$ 160,000.00
c.	Quality Control Inspection	1	Hourly	$ 178,000.00	$ 178,000.00
d.	Survey and Mapping	1	L.S.	$ 15,000.00	$ 15,000.00
e.	Land Acquisition	1	L.S.	$ 20,000.00	$ 20,000.00
f.	Legal, Fiscal, Interim Financing	1	Est.	$ 134,000.00	$ 134,000.00
g.	Environmental	1	LS.	$ 25,000.00	$ 25,000.00
	TOTAL Non-Construction Services:				**$ 562,000.00**
	TOTAL PROJECT COST:				**$ 3,125,000.00**

TABLE 8 - A
OPINION OF PROBABLE COST - PHASE IV

	ITEM	QTY.	UNITS	UNIT COST	AMOUNT
Distribution (Spring Line) Improvement Projects					
1	Mobilization	1	LS.	$ 250,000.00	$ 250,000.00
2	Pre-Construction Video	1	LS.	$ 1,500.00	$ 1,500.00
3	Traffic Control	1	LS.	$ 100,000.00	$ 100,000.00
4	Subsurface Investigation	60	HOUR	$ 200.00	$ 12,000.00
5	Spring Rehabilitation	1	LS.	$ 150,000.00	$ 150,000.00
6	10" AWWA C900 PVC SDR 18 Pipe and Fittings	27000	LN.-FT.	$ 30.00	$ 810,000.00
7	10" Gate Valve	8	EACH	$ 2,000.00	$ 16,000.00
8	Import Pipe Bedding	27000	LN.-FT.	$ 2.00	$ 54,000.00
9	Untreated Base Course	400	TON	$ 16.00	$ 6,400.00
10	3" Bituminous Surfacing for Street Crossings.	6200	SQ.-YD.	$ 18.00	$ 111,600.00
11	Boring and Jacking	200	LN.-FT.	$ 300.00	$ 60,000.00
12	2" Combination Air Valve Assembly	10	EACH	$ 3,000.00	$ 30,000.00
13	Thrust Blocks	10	EACH	$ 3,000.00	$ 30,000.00
				SUBTOTAL	**$ 1,631,500.00**
				Contingency:	**$ 244,500.00**
				TOTAL Construction Costs:	**$ 1,876,000.00**
Non-Construction Services					
a.	Administration, Funding Services, Preliminary Engineering	1	L.S.	$ 30,000.00	$ 30,000.00
b.	Design Engineering	1	L.S.	$ 130,000.00	$ 130,000.00
c.	Quality Control Inspection	1	Hourly	$ 150,000.00	$ 150,000.00
d.	Survey and Mapping	1	L.S.	$ 45,000.00	$ 45,000.00
e.	Land Acquisition	1	L.S.	$ 20,000.00	$ 20,000.00
f.	Legal, Fiscal, Interim Financing	1	Est.	$ 113,000.00	$ 113,000.00
g.	Environmental	1	LS	$ 25,000.00	$ 25,000.00
				TOTAL Non-Construction Services:	**$ 513,000.00**
				TOTAL PROJECT COST:	**$ 2,389,000.00**

APPENDIX B

FIVE POINT ANALYSIS

FIVE POINT ANALYSIS

1 POPULATION DATA:

1970 Census Data	2,699
1980 Census Data	3,285
1990 Census Data	3,515
2000 Census Data	4,733
2010 Census Data	5,389

Growth rate from 1970 to 1980	1.98%
Growth rate from 1980 to 1990	0.68%
Growth rate from 1990 to 2000	3.02%
Growth rate from 2000 to 2010	1.31%
Growth rate from 1970 to 2010	1.74%
Growth rate from 1990 to 2010	2.16%

Population growth rate used for planning	
Residential	2.73%
Commercial	2.00%
2010 Census Population	5,389
2030 Projected Population	9,226
2010 Connections	1,989
2030 Projected Connections	3,368

		Connection Projections				ERC Projections			
Year	*Population	*Est. Res. Conn.	*Est. Com. Conn.	*Est. Ind. Conn.	*Est. Total Conn.	*Est. Res. ERC's	*Est. Com. ERC's (1)	*Est. Ind. ERC's (3)	*Est. Total ERC's
2011	5,389	1,810	178	1	1,989	1,810	546	417	2,772
2012	5,536	1,859	182	1	2,042	1,859	558	438	2,854
2013	5,687	1,910	186	1	2,097	1,910	570	459	2,940
2014	5,842	1,962	190	1	2,153	1,962	582	482	3,027
2015	6,001	2,015	194	1	2,210	2,015	595	506	3,116
2016	6,164	2,070	198	1	2,269	2,070	607	532	3,209
2017	6,332	2,126	202	1	2,329	2,126	619	558	3,304
2018	6,505	2,184	206	1	2,391	2,184	632	586	3,402
2019	6,682	2,244	210	1	2,455	2,244	644	616	3,503
2020	6,864	2,305	214	2	2,521	2,305	656	646	3,607
2021	7,051	2,368	218	2	2,588	2,368	668	679	3,715
2022	7,243	2,433	222	2	2,657	2,433	681	713	3,826
2023	7,441	2,499	226	2	2,727	2,499	693	748	3,940
2024	7,644	2,567	231	2	2,800	2,567	708	786	4,061
2025	7,852	2,637	236	2	2,875	2,637	724	866	4,227
2026	8,066	2,709	241	2	2,952	2,709	739	910	4,357
2027	8,286	2,783	246	2	3,031	2,783	754	955	4,492
2028	8,511	2,859	251	2	3,112	2,859	770	1,003	4,631
2029	8,743	2,937	256	3	3,196	2,937	785	1,053	4,775
2030	8,982	3,017	261	3	3,281	3,017	800	1,106	4,923
2031	9,226	3,099	266	3	3,368	3,099	815	1,161	5,075

* Figures are rounded to the nearest whole number at projected annual rate of growth except for the first row in 2011. The initial year's numbers are whole numbers from which the rest of the figures are calculated.

ERC Calculations

(1) 1 Residential Connection =	400 Gallons/Day	=	12,000 Gal/Month	=	1 ERC
(2) 1 Commercial Connection - Winter/base use =			36,789 Gal/Month	=	3.1 ERC
(3) 1 Commercial Connection - Additional Summer Use =			46,200 Gal/Month	=	3.9 ERC
(4) 1 Industrial Connection - Year Round =			5,000,000 Gal/Month	=	417 ERC

FIVE POINT ANALYSIS

2. Water Rights

A. Existing Water Right

W.R. #	Source		Amount of Right ac-ft	cfs	gpm
53	Marsh Spring	=	562.42	0.78	348.68
53-2	Rowley's Spring	=	83.00	0.11	51.46
53-35	Monument Springs 1,2,3	=	488.68	0.68	302.97
53-53	Underground, Airport well	=	57.92	0.08	35.91
53-63	Underground	=	2628.04	3.63	1629.28
53-64	Industrial Waste	=	200.00	0.28	123.99
53-65	Underground & Bradley Spring	=	4343.87	6.00	2693.02
53-80	Bradley Spring Winter	=	1092.48	1.51	677.29
53-87	Underground	=	3062.42	4.23	1898.58
53-88	Underground	=	3663.33	5.06	2271.12
53-1516	Underground	=	839.82	1.16	520.65
		Total =	17,021.97	23.51	10,552.94
		Water Right Available	**17,021.97**	**23.51**	**10,552.94**

B. Existing Required Water Right:

Residential Use:

Indoor

1,810 ERC's x (400 gal / ERC day) x (365 day / 1 year) x (1 ac-ft / 325,851 gal) = 811 ac-ft

Outdoor

1,110 ERC's x (1 ir. acre / 5 ERC's) x (1.87 ac-ft/yr / ir.-acre/yr) x (1 / 0.7 eff) = 593 ac-ft

Commercial Use:

546 ERC's x (400 gal / ERC day) x (365 day / 1 year) x (1 ac-ft / 325,851 gal) = 245 ac-ft

Commercial Additional Summer Use:

546 ERC's x (46,200 gal / ERC Month) x (6 Mo / 1 year) x (1 ac-ft / 325,851 gal) = 464 ac-ft

Industrial Use:

417 ERC's x (400 gal / ERC day) x (365 day / 1 year) x (1 ac-ft / 325,851 gal) = 187 ac-ft

Parks & Cemetery

(40 ir. acre / ir.-acre/yr) x (2.47 ac-ft/yr / 0.7 eff) = 141 ac-ft

Golf Course

(35 ir. acre / ir.-acre/yr) x (2.47 ac-ft/yr / 0.7 eff) = 124 ac-ft

Leased to Irrigation Company (Flow Data Supplied by City) 1,057.0 ac-ft

Total Existing Required Water Right 3,621 ac-ft

Estimated Existing Water Right Surplus 13,401 ac-ft

C. Projected Required Water Right: (20 year growth)

Residential Use:

Indoor

3,099 ERC's x (400 gal / ERC day) x (365 day / 1 year) x (1 ac-ft / 325,851 gal) = 1,389 ac-ft

Outdoor

2,399 ERC's x (1 ir. acre / 5 ERC's) x (1.87 ac-ft/yr / ir.-acre/yr) x (1 / 0.7 eff) = 1,282 ac-ft

Commercial Use:

815 ERC's x (400 gal / ERC day) x (365 day / 1 year) x (1 ac-ft / 325,851 gal) = 365 ac-ft

Commercial Additional Summer Use:

815 ERC's x (46,200 gal / ERC Month) x (6 Mo / 1 year) x (1 ac-ft / 325,851 gal) = 694 ac-ft

Industrial Use:

1,161 ERC's x (400 gal / ERC day) x (365 day / 1 year) x (1 ac-ft / 325,851 gal) = 520 ac-ft

Parks & Cemetery

(65 ir. acre / ir.-acre/yr) x (2.47 ac-ft/yr / 0.7 eff) = 229 ac-ft

Golf Course

(60 ir. acre / ir.-acre/yr) x (2.47 ac-ft/yr / 0.7 eff) = 212 ac-ft

Leased to Irrigation Company (Flow Data Supplied by City) 1,057.0 ac-ft

Total Projected Required Water Right 5,748 ac-ft

Estimated Projected Water Right Surplus 11,274 ac-ft

Note: 1/5Acre = Assumed average irrigated acre per lot with a 70% sprinkler efficiency.

Note: The number of existing outdoor ERCs is indoor ERCs minus 700 irrigation customers

FIVE POINT ANALYSIS

3. Water Source Capacity:

Source		
Upper & Lower Marsh Springs	=	600 gpm
Upper & Lower Bradley Springs	=	1300 gpm
Equipment Shed Well	=	2400 gpm
**Jones Well	=	1100 gpm
Total	=	5400 gpm

A. Existing Required Source Capacity:

Residential Use:

Indoor

1,810 ERC's x (800 gpd / ERC) x (1 day / 24 hr) x (1 hr / 60 min.) = 1,006 gpm

Outdoor

1,110 ERC's x (1 acre / 5 ERC's) x (3.96 gpm / irr. acre) x (1 / 0.7 eff) = 1,256 gpm

Commercial Use:

546 ERC's x (800 gpd / ERC) x (1 day / 24 hr) x (1 hr / 60 min.) = 303 gpm

Comunercial Additional Summer Use:

546 ERC's x (1540 gpd / ERC) x (1 day / 24 hr) x (1 hr / 60 min.) = 584 gpm

Industrial Use:

417 ERC's x (800 gpd / ERC) x (1 day / 24 hr) x (1 hr / 60 min.) = 231 gpm

Parks & Cemetery

40 acre x (5.23 gpm / irr. acre) x (1 / 0.7 eff) = 299 gpm

Golf Course

35 acre x (5.23 gpm / irr. acre) x (1 / 0.7 eff) = 262 gpm

Total Existing Required Source Capacity	**3,940 gpm**
Estimated Existing Source Capacity Surplus	**1,460 gpm**

B. Projected Required Source Capacity:

Residential Use:

Indoor

3,099 ERC's x (800 gpd / ERC) x (1 day / 24 hr) x (1 hr / 60 min.) = 1,722 gpm

Outdoor

2,399 ERC's x (1 acre / 5 ERC's) x (3.96 gpm / irr. acre) x (1 / 0.7 eff) = 2,714 gpm

Commercial Use:

815 ERC's x (800 gpd / ERC) x (1 day / 24 hr) x (1 hr / 60 min.) = 453 gpm

Commercial Additional Summer Use:

815 ERC's x (1540 gpd / ERC) x (1 day / 24 hr) x (1 hr / 60 min.) = 872 gpm

Industrial Use:

1,161 ERC's x (800 gpd / ERC) x (1 day / 24 hr) x (1 hr / 60 min.) = 645 gpm

Parks and Golf Course Use:

Parks & Cemetery

65 acre x (5.23 gpm / irr. acre) x (1 / 0.7 eff) = 486 gpm

Golf Course

60 acre x (5.23 gpm / irr. acre) x (1 / 0.7 eff) = 448 gpm

Total Projected Required Source Capacity	**7,340 gpm**
Estimated Projected Source Capacity Deficit	**(1,940) gpm**

Note: 1/5Acre = Assumed average irrigated acre per lot with a 70% sprinkler efficiency.

Note: The number of existing outdoor ERCs is indoor ERCs minus 700 irrigation customers

** Jones Well is listed as zero because it is being diverted for irrigation use

FIVE POINT ANALYSIS

4. Water Storage Capacity:

Existing Storage Capacity:	Tank #1 (Blue Tank)	2,000,000 gal.
	Tank #2 (Silver Tank)	600,000 gal.
Total Existing Storage Capacity		2,600,000 gal.

A. Existing Required Storage Capacity:

Residential Use:

Indoor

1,810 ERC's x (400 gal. / ERC) = 724,000 gal.

Outdoor

1,110 ERC's x (1 acre / 5 ERC's) x (2848 gal / irr. acre) x (1 eff / 0.7) = 903,223 gal.

Commercial Use:

546 ERC's x (400 gal. / ERC) = 218,281 gal.

Commercial Additional Summer Use:

546 ERC's x (1540 gal. / ERC) = 840,383 gal.

Industrial Use:

417 Conn x (400 gal. / ERC) = 166,667 gal.

Parks & Cemetery

40 acre x (3700 gal / irr. acre) x (1 eff / 0.7) = 211,429 gal.

Golf Course

35 acre x (3700 gal / irr. acre) x (1 eff / 0.7) = 185,000 gal.

Fire Protection:

1500 gal./min x 2 hr. x (60 min. / hr) = 180,000 gal.

Total Existing Required Storage Capacity	3,428,983 gal.
Estimated Existing Storage Capacity Deficit	(828,983) gal.

B. Projected Required Storage Capacity:

Residential Use:

Indoor

3,099 ERC's x (400 gal. / ERC) = 1,239,600 gal.

Outdoor

2,399 ERC's x (1 acre / 5 ERC's) x (2848 gal / irr. acre) x (1 eff / 0.7) = 1,952,101 gal.

Commercial Use:

815 ERC's x (400 gal. / ERC) = 326,196 gal.

Commercial Additional Summer Use:

815 ERC's x (1540 gal. / ERC) = 1,255,854 gal.

Industrial Use:

1,161 Conn x (400 gal. / ERC) = 464,327 gal.

Parks & Cemetery

65 acre x (3700 gal / irr. acre) x (1 eff / 0.7) = 343,571 gal.

Golf Course

60 acre x (3700 gal / irr. acre) x (1 eff / 0.7) = 317,143 gal.

Fire Protection:

3000 gal./min x 2 hr. x (60 min. / hr) = 360,000 gal.

Total Projected Required Storage Capacity	6,258,792 gal.
Estimated Projected Storage Capacity Deficit	(3,658,792) gal.

Note: 1/5Acre = Assumed average irrigated acre per lot with a 70% sprinkler efficiency.

Note: The number of existing outdoor ERCs is indoor ERCs minus 700 irrigation customers

APPENDIX C

EXISTING & PROPOSED SYSTEM DEBT

TABLE 8 - B
PROPOSED FINANCING PLAN

TOTAL PROJECT COST

Proposed Funding: Project Name	**Year Built**	***Rate**	**Term in Yrs.**	**Principal**
				-
Phase I Distribution	2012	2.5%	20	$4,945,000.00
Phase II Storage/Well	2017	2.5%	20	$4,063,255.63
Phase III Storage	2023	2.5%	20	$4,325,730.85
Phase IV Spring Line	2031	2.5%	20	$4,189,125.96

*This rate is a conservative number typical of Government Funding Rates

TOTAL PHASED PROJECT FUNDING: $ 17,523,112.44

SUM OF PHASED FUNDING PACKAGE

Phase I 2012 Annual Payment:	**Phase II 2017 Annual Payment:**	**Phase III 2023 Annual Payment:**	**Phase IV 2031 Annual Payment:**
$317,208.00	$260,646.00	$277,483.00	$268,720.00

SYSTEM EXPENSES: (FY 2013 When First Loan Payment is Due)

Operation and Maintenance Expenses			
	(Projected O&M)	$	563,388.56
Funded Depreciation @ 5% of total of System O&M plus Debt Service			
	(Projected FD)		47,604.82
Subtotal O & M and Funded Depreciation 2013:		**$**	**610,993.38**
Subtotal O & M and Funded Depreciation 2018:		**$**	**661,666.70**

EXISTING SYSTEM DEBT SERVICE:

1993	End Year 2013	$	39,779.00

NEW DEBT SERVICE

2012 Phase I + Existing	Payment	$356,987.00
2018 Phase I and II	Payment	$577,854.00
2024 Phase I, II, and III	Payment	$855,337.00
2031 Phase I, II, III, and IV	Payment	$1,124,057.00

New Loan Payment (From Sum of New Funding Package Above)		$317,208.00
New Loan Reserves (Typical Payment/10)		31,720.80
Subtotal 2013 Debt Service:		**$348,928.80**
Subtotal 2018 Debt Service:	**$**	**635,639.40**

GRAND TOTAL (NEW + EXISTING) EXPENSES 2013:	**$**	**959,922.18**
2018	**$**	**1,297,306.10**

PAYMENTS (AVERAGE PER CONNECTION INCLUDING OVERAGES)

Total Number Of ERC's (**2013**)	2940	
Required Average Monthly Culinary Water Bill		**27.21**
Total Number Of ERC's (**2018**)	3402	
Required Average Monthly Culinary Water Bill		**31.78**
Median Adjusted Gross Income (MAGI) 2007 Tax Returns	$	37,914.00
1.75% OF MAGI DIVIDED BY 12 MONTHS	**$**	**55.29**

APPENDIX D

OPINION OF PROBABLE COST FOR WELL REPLACEMENT OPTIONS

APPENDIX D-1
Construction Cost Estimates for Source Options

	ITEM	QTY.	UNITS	UNIT COST	AMOUNT
New Well Improvements					
1	Mobilization	1	L.S.	$ 20,000.00	$ 20,000.00
2	12" AWWA C900 PVC SDR 18 Pipe and Fittings (Well Line)	5000	LN.-FT.	$ 24.00	$ 120,000.00
3	12" Gate Valve	4	EACH	$ 2,800.00	$ 11,200.00
4	Aquifer Water Sample	1	Each	$ 2,500.00	$ 2,500.00
5	Test Well 400 feet	1	L.S.	$ 60,000.00	$ 60,000.00
6	Surface Casing 24-inch	100	LnFt	$ 125.00	$ 12,500.00
7	Well Drilling 24-inch	400	LnFt	$ 220.00	$ 88,000.00
8	16" Carbon Steel Well Casing	300	LnFt	$ 100.00	$ 30,000.00
9	16" Stainless Steel Well Screen	100	LnFt	$ 200.00	$ 20,000.00
10	Gravel Packing	30	CuYd	$ 600.00	$ 18,000.00
11	4" Galvanized Steel Refill Pipe	200	LnFt	$ 15.00	$ 3,000.00
12	Grout - Sanitary Seal	1	L.S.	$ 20,000.00	$ 20,000.00
13	Well Development	80	Hour	$ 250.00	$ 20,000.00
14	Furnish and Install Test Pump & Equipment	1	L.S.	$ 20,000.00	$ 20,000.00
15	Step Test Pumping	12	Hour	$ 250.00	$ 3,000.00
16	Constant Rate Test Pumping	24	Hour	$ 250.00	$ 6,000.00
17	Disinfection & Capping	1	L.S.	$ 1,000.00	$ 1,000.00
18	Submersible Well Pump, Pump Control Panel, Pitless Adapter	1	L.S.	$ 60,000.00	$ 60,000.00
19	Furnish and Install SCADA Equipment	1	L.S.	$ 30,000.00	$ 30,000.00
20	Controls and Instrumentation for Well and tank	1	L.S.	$ 15,000.00	$ 15,000.00
21	Well Building	1	L.S.	$ 45,000.00	$ 45,000.00
22	Electrical for Well Building	1	L.S.	$ 50,000.00	$ 50,000.00
23	Back-up Generator	1	L.S.	$ 50,000.00	$ 50,000.00
24	Power to Building	1000	LnFt	$ 25.00	$ 25,000.00
25	Well Building Piping	1	L.S.	$ 20,000.00	$ 20,000.00
26	Chlorination Equipment	1	L.S.	$ 20,000.00	$ 20,000.00
27	Chain Link Fence & Gates	800	LnFt	$ 20.00	$ 16,000.00
			SUBTOTAL Source Improvement Costs:		**$ 786,200.00**

APPENDIX D-2
Construction Cost Estimates for Source Options

	ITEM	QTY.	UNITS	UNIT COST	AMOUNT
	Irrigation Well Improvements				
1	Mobilization	1	L.S.	$ 20,000.00	$ 20,000.00
2	12" AWWA C900 PVC SDR 18 Pipe and Fittings (Well Line)	12500	LN.-FT.	$ 24.00	$ 300,000.00
3	12" Gate Valve	6	EACH	$ 2,800.00	$ 16,800.00
4	Test Well 400 feet	1	L.S.	$ 60,000.00	$ 60,000.00
5	Well Drilling 20-inch	400	LnFt	$ 180.00	$ 72,000.00
6	16" Carbon Steel Well Casing	400	LnFt	$ 100.00	$ 40,000.00
7	Well Development	80	Hour	$ 250.00	$ 20,000.00
8	Furnish and Install Test Pump & Equipment	1	L.S.	$ 20,000.00	$ 20,000.00
9	Step Test Pumping	12	Hour	$ 250.00	$ 3,000.00
10	Constant Rate Test Pumping	24	Hour	$ 250.00	$ 6,000.00
11	Submersible Well Pump, Pump Control Panel, Pitless Adapter	1	L.S.	$ 60,000.00	$ 60,000.00
12	Controls and Instrumentation for Well and tank	1	L.S.	$ 15,000.00	$ 15,000.00
13	Electrical	1	L.S.	$ 50,000.00	$ 50,000.00
14	Power to Site	1000	LnFt	$ 12.00	$ 12,000.00
15	Site Piping	1	L.S.	$ 20,000.00	$ 20,000.00
16	Chain Link Fence & Gates	800	LnFt	$ 20.00	$ 16,000.00
17	Booster Pump Station	1	LS	$ 50,000.00	$ 50,000.00
	SUBTOTAL Source Improvement Costs:				**$ 780,800.00**

APPENDIX D-3
Construction Cost Estimates for Source Options

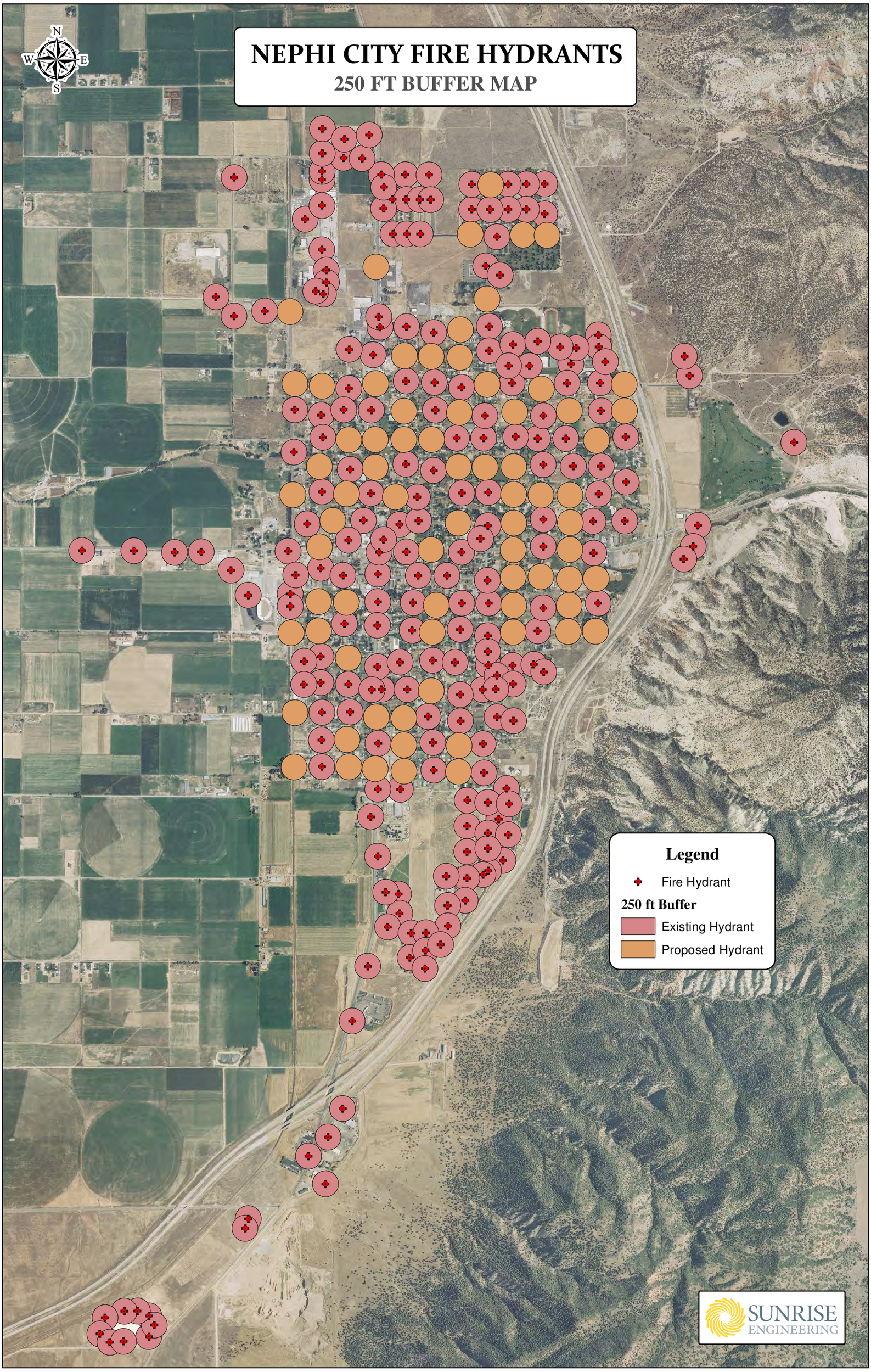
	ITEM	QTY.	UNITS	UNIT COST	AMOUNT
Fire Station Well Rehabilitation					
1	Pump Testing (Sand Concentration vs. Flow Rate)	24	HR	$ 200.00	$ 4,800.00
2	Water Sampling	1	LS	$ 10,000.00	$ 10,000.00
3	New Pumping Equipment	1	LS	$ 20,000.00	$ 20,000.00
4	Well House	1	LS	$ 45,000.00	$ 45,000.00
5	12" AWWA C900 PVC SDR 18 Pipe and Fittings (Well Line)	14000	LN.-FT.	$ 25.00	$ 350,000.00
6	12" Gate Valve	6	EACH	$ 2,800.00	$ 16,800.00
7	Motor Actuated Valve Control Valve	2	EACH	$ 15,000.00	$ 30,000.00
8	Electrical Upgrades	1	LS	$ 20,000.00	$ 20,000.00
9	Import Pipe Bedding	14000	LN.-FT.	$ 2.00	$ 28,000.00
10	Untreated Base Course	945	TON	$ 16.00	$ 15,120.00
11	3" Bituminous Surfacing for Street Crossings.	5300	SQ.-YD.	$ 18.00	$ 95,400.00
12	Boring and Jacking	400	LN.-FT.	$ 300.00	$ 120,000.00
				SUBTOTAL Source Improvement Costs:	**$ 755,120.00**

APPENDIX D-4
Construction Cost Estimates for Source Options

	ITEM	QTY.	UNITS	UNIT COST	AMOUNT
East Supply Line					
1	Pressure Sustaining Valve Station (head sufficient to fill S tank)	1	LS	$ 45,000.00	$ 45,000.00
2	14" AWWA C900 PVC SDR 18 Pipe and Fittings (Well Line)	21000	LN.-FT.	$ 28.00	$ 588,000.00
3	14" Gate Valve	4	EACH	$ 4,000.00	$ 16,000.00
4	Control Valves	1	EACH	$ 15,000.00	$ 15,000.00
5	Electrical Upgrades	1	LS	$ 5,000.00	$ 5,000.00
6	Import Pipe Bedding	21000	LN.-FT.	$ 2.00	$ 42,000.00
7	Untreated Base Course (Replace County Road)	6,000	TON	$ 16.00	$ 96,000.00
8	Boring and Jacking	150	LN.-FT.	$ 300.00	$ 45,000.00
				SUBTOTAL Source Improvement Costs:	**$ 852,000.00**

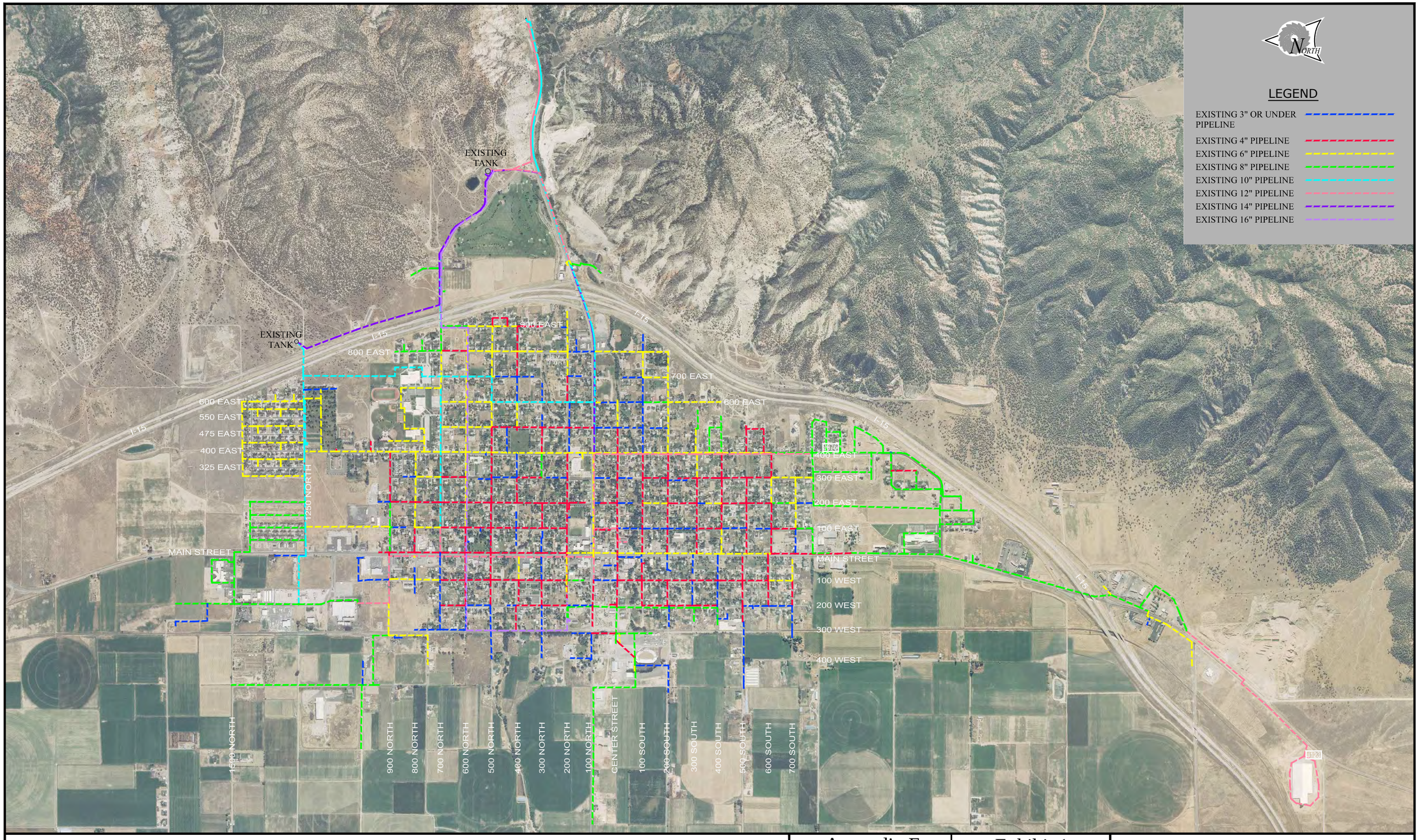
APPENDIX E

FIRE HYDRANT
COVERAGE MAPS


N
W
E
S
NEPHI CITY FIRE HYDRANTS
250 FT BUFFER MAP
Legend
Fire Hydrant
250 ft Buffer
Existing Hydrant
Proposed Hydrant
SUNRISE
ENGINEERING

APPENDIX F

EXISTING SYSTEM MAPS



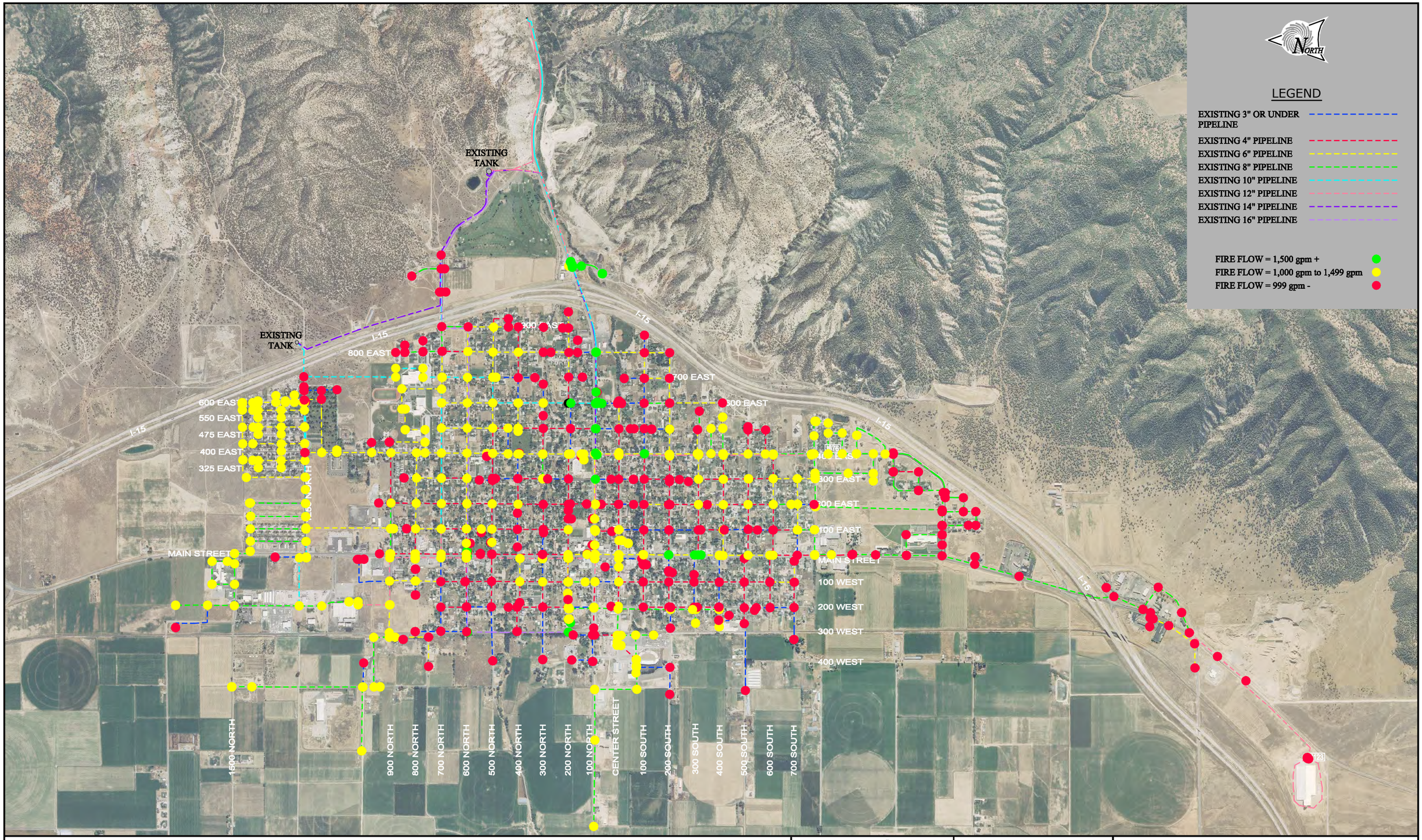
NEPHI CITY

H20Net Model

Appendix F | Exhibit 1

Existing Water System

SUNRISE ENGINEERING
25 EAST 500 NORTH
FILLMORE, UTAH 84631
TEL 435.743.6151 • FAX 435.743.7900
www.sunrise-eng.com



NEPHI CITY

H20Net Model

Appendix F | Exhibit 2

Existing Water System

SUNRISE ENGINEERING
25 EAST 500 NORTH
FILLMORE, UTAH 84631
TEL 435.743.6151 • FAX 435.743.7900
www.sunrise-eng.com

H2ONET EXISTING SYSTEM

ANALYSIS RESULTS

Appendix F1 is a map of the existing Nephi City culinary water system, Appendix F2 is a map showing flow conditions for the water system, and the spreadsheet in Appendix F gives the pressure and flow conditions particular to each junction node analyzed in the system.

The flow analysis for the Nephi City culinary water system was conducted using H2O Net modeling software. In order to calibrate the model, 5 particular junctions, chosen at strategic locations encompassing the system, were measured in the field for flow and pressures at the particular locations. The flows measured in the field were entered into the model, and the pressure calculated in the model was compared with the pressures measured in the field. Minor adjustments to the coefficients of friction and verification of pipe sizes were made until the field conditions matched the model conditions.

Each of the junction nodes is identified on the following spreadsheet under the ID column, and the subsequent flow and pressure data for each node are displayed in the other columns. The total flow under the peak-day demand column equals the existing peak-day demand calculated in the report of 3,940 gpm.

Prior to conducting the fire flow analysis, the peak-day demand was placed upon the system. The fire flow is then calculated at each location along with the peak-day demand spread throughout the system. The map in Appendix F2 shows the available fire flow conditions of the existing system where the nodes are color-coordinated to signify these conditions. The nodes color-coded red have less than 1,000 gpm available fire flow, and the nodes color-coded yellow have between 1,000 and 1,500 gpm available fire flow. Those color-coded green have over 1,500 gpm available fire flow. The flows represent the maximum amount of flow achievable at each particular node, without lowering the pressure below 20 psi at any point in the distribution system.

The H2ONet Analysis Results spreadsheet in Appendix F shows what the minimum and maximum pressures are throughout the existing system. The minimum pressure column represents what the dynamic pressures are under the peak instantaneous demand during peak-day conditions. The pressures under the minimum column should not be less than 30 psi according to the State Drinking Water Regulations. The maximum pressures represent a static level when no demands are placed on the system. According to State regulations, the static pressure, represented by the maximum pressure column in this appendix, should not be under 40 psi. As can be seen on the spreadsheet, there are a number of nodes that are under the minimum pressure (30 psi) standard set by the State, and a few of the nodes that are below the Static pressure minimum of 40 psi, shown in the maximum pressure column.

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
3	1	34	47	1742
5	1	43	49	2006
7	1	25	28	
10	0	32	34	
11	1	83	96	1161
12	3	83	96	1168
13	3	84	102	98
15	3	95	108	1170
16	1	100	113	70
17	1	73	91	1396
18	1	71	89	130
19	1	70	88	1350
20	4	70	88	1353
21	1	73	91	1396
22	1	73	91	1396
28	0	66	66	1794
29	0	67	67	1900
30	0	79	80	1650
31	11	72	72	2034
32	0	86	87	1782
33	14	81	82	2290
34	0	94	95	1890
35	14	89	90	2496
36	6	68	76	1104
37	13	65	73	1111
38	6	69	76	1210
39	8	64	71	1212
40	3	76	77	1574
41	7	72	74	2025
42	0	68	69	1429
43	10	62	63	1725
44	4	56	57	1396
45	0	57	58	1486
46	1	54	56	1627
47	0	54	56	1597
48	0	58	59	1558
49	1	60	61	1730

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
50	4	58	60	1933
51	0	70	72	2052
52	3	67	69	2514
53	6	76	78	2222
54	6	73	76	1988
55	1	66	73	1236
56	6	69	76	1302
57	1	27	33	905
58	1	42	49	48
59	1	31	37	921
60	1	40	47	956
61	1	62	72	1085
62	4	64	73	1088
63	1	58	74	1323
64	1	59	75	1320
65	1	59	75	1317
66	1	56	72	1313
67	1	53	69	1282
68	1	59	77	817
69	6	58	77	556
70	1	54	73	259
71	1	54	73	1457
72	1	53	72	1459
73	1	54	73	1425
77	1	20	22	
81	0	32	34	
87	3	39	54	283
88	7	38	53	327
89	6	45	60	769
90	10	42	57	1123
91	8	44	60	397
92	4	41	57	85
96	0	26	29	
98	7	64	81	1470
99	7	64	82	1470
100	1	62	84	42
101	4	62	83	1491

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
102	11	54	77	829
103	7	55	78	858
104	1	62	83	1085
105	1	59	79	1114
106	1	21	42	975
107	1	21	42	197
108	1	74	92	1417
109	1	72	90	1417
110	3	76	94	1418
111	1	73	92	1417
112	1	76	94	1417
113	1	77	96	1350
114	1	75	95	75
115	3	78	98	57
116	1	76	95	1417
117	1	72	91	1421
118	1	71	91	19
119	7	51	72	1478
120	10	40	62	572
121	1	74	95	883
122	3	67	89	885
123	1	54	75	720
124	1	54	76	720
125	1	54	76	720
127	1	9	11	
130	3	63	80	1464
131	1	5	7	
141	0	21	24	
142	0	21	24	
144	0	20	23	
145	0	31	33	
147	6	64	81	579
148	1	34	47	1701
149	3	43	49	1304
150	1	43	49	2681
151	1	46	52	1864
152	1	42	48	2681

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
153	6	54	74	1224
154	1	54	75	1222
155	1	54	74	1252
156	6	49	71	1253
157	3	49	71	1382
158	8	51	72	1329
160	10	52	72	1391
162	1	70	88	1411
163	1	72	90	560
164	6	57	75	835
165	3	60	77	109
166	1	31	38	924
167	1	31	38	926
169	1	25	31	897
170	1	100	100	14302
171	0	100	100	21245
172	1	55	63	
173	1	55	63	
174	0	55	63	
175	0	55	63	
176	1	55	70	1002
177	6	54	70	1415
178	6	46	67	1153
179	1	44	65	1149
181	4	56	72	1556
182	1	56	72	1553
183	1	51	66	1562
184	1	51	66	1562
185	1	91	104	1159
186	1	93	105	1159
187	1	93	106	1160
188	1	94	106	1160
189	0	74	75	3843
190	8	64	91	343
191	4	64	92	291
192	6	70	89	1428
193	1	70	89	816

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
194	4	61	84	102
195	1	61	84	33
196	3	63	83	113
197	6	64	84	1087
198	6	64	83	1408
199	4	63	83	86
200	3	59	77	583
201	7	60	77	1489
202	13	59	77	865
203	8	56	79	931
204	15	56	78	1022
205	8	59	81	1325
206	10	61	83	1322
207	1	65	83	1440
208	1	66	84	1400
209	4	50	66	1565
210	1	52	67	1562
211	1	80	98	1135
212	1	80	98	25
213	3	72	91	56
214	1	70	91	15
215	1	71	90	54
216	3	75	93	1339
217	10	69	87	1400
218	1	68	86	1392
219	10	67	85	1402
220	1	67	85	1394
221	1	69	87	1392
222	4	39	55	367
223	3	39	55	118
224	7	47	62	1353
225	6	49	64	1351
226	6	53	68	1115
227	6	57	74	1411
228	1	58	75	1387
229	1	58	75	235
231	6	62	80	1468

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
244	0	30	33	
245	1	25	29	
247	1	25	28	
252	1	27	31	
256	3	4	7	
263	1	5	8	
264	1	5	7	
265	1	2	5	
267	1	77	84	1229
268	4	68	77	1042
269	8	62	70	1013
270	3	99	99	12612
271	3	71	90	1422
272	1	71	90	1421
273	1	61	74	655
275	1	61	80	524
276	4	60	78	829
277	1	55	73	432
278	4	56	73	1418
279	1	53	66	396
280	3	52	65	1737
281	1	67	84	637
282	3	67	85	1431
283	1	65	83	275
284	3	64	82	1448
285	3	61	79	283
286	3	61	79	1455
287	1	67	84	229
288	3	67	84	1133
289	1	69	87	899
290	1	70	87	899
291	1	66	84	424
292	3	67	85	1007
293	1	65	83	227
294	4	65	82	1102
295	1	71	92	831
296	1	77	98	163

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
298	1	52	74	966
299	3	64	65	1626
300	4	60	61	1282
301	3	69	70	2308
302	4	66	67	1612
303	0	74	75	4621
304	6	78	79	4876
305	6	89	89	6157
306	10	67	85	1428
307	8	79	97	840
308	4	82	100	724
309	1	82	99	1229
310	1	80	98	1322
311	1	86	104	1128
312	1	85	103	1128
313	1	86	104	1108
314	3	92	110	1069
315	3	96	113	1029
316	1	96	113	1006
317	1	86	104	1108
318	1	81	99	1210
319	1	77	94	1330
320	1	81	98	1321
321	1	77	94	1330
322	1	81	98	1315
323	1	80	97	1297
324	230	88	104	1476
325	1	98	111	1169
326	7	88	102	1199
328	1	93	105	1162
330	7	93	106	1174
331	1	92	105	1155
332	1	88	101	1148
333	10	87	100	1151
334	10	81	93	1154
335	24	83	95	1158
336	8	78	89	1141

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
337	24	82	93	1151
338	15	75	87	1136
339	1	78	90	1124
340	11	73	84	1111
341	13	78	90	1135
342	1	83	96	1161
343	13	82	100	86
344	1	70	80	1069
345	1	84	103	1321
346	4	92	111	1185
347	1	79	98	1417
348	1	80	98	1417
349	1	76	95	1417
350	1	73	92	1417
351	1	72	91	482
352	3	73	92	99
353	1	72	91	1417
354	1	74	93	1417
355	1	74	92	1417
356	14	70	88	873
357	7	-271	71	866
358	7	69	87	1042
359	7	70	88	526
360	7	71	90	419
361	1	73	92	25
362	6	74	92	323
363	1	73	91	1396
364	4	70	88	1419
365	4	73	91	1399
366	1	69	87	567
367	3	69	87	1396
368	1	69	87	1395
369	1	67	85	1394
370	7	60	92	37
371	4	61	94	32
372	4	72	91	465
373	4	70	89	1420

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
374	11	66	86	1302
375	1	42	63	1065
376	11	31	52	1051
377	1	53	74	967
378	1	61	82	970
379	1	46	67	964
380	1	33	54	957
381	8	30	51	960
382	1	34	55	957
383	4	30	51	958
384	6	37	58	961
385	8	39	60	964
386	3	42	63	961
387	1	51	72	965
388	1	55	76	966
389	3	42	63	961
390	1	21	42	944
391	6	23	44	955
392	7	25	46	954
393	1	22	43	947
394	4	73	94	834
395	1	62	83	795
396	3	63	84	754
397	1	60	81	730
398	1	56	78	725
399	1	50	71	720
400	1	63	84	620
401	1	69	90	589
402	1	70	92	749
403	1	69	90	831
404	1	67	88	831
405	1	63	84	966
406	3	56	77	967
407	1	65	87	979
408	1	68	89	998
409	1	68	89	985
410	3	67	89	1266

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
411	3	67	89	1266
412	4	63	85	1257
414	6	67	89	1269
415	7	66	88	954
416	11	62	85	749
417	17	61	85	697
418	7	64	88	745
419	10	65	88	615
420	8	61	86	581
421	15	61	87	595
422	1	65	89	466
423	8	65	89	452
424	1	70	89	1421
425	3	71	90	1422
426	4	65	88	742
427	4	71	90	103
428	1	60	83	431
429	4	60	83	412
430	6	63	83	1476
431	11	68	85	1457
432	1	70	88	1395
433	11	67	85	1199
434	10	65	83	1395
435	17	70	88	449
436	6	68	86	1384
437	7	75	96	101
438	6	74	95	120
439	1	75	96	37
440	10	74	92	546
441	11	73	91	604
442	15	71	89	964
443	1	69	91	9
444	10	73	91	1102
445	3	71	89	1345
446	1	71	89	1258
447	3	69	87	1359
448	6	69	87	1368

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
449	3	67	85	1396
450	6	67	83	771
451	1	68	84	123
452	1	55	70	1329
453	1	59	75	901
454	6	60	76	1318
455	1	51	66	1331
456	7	50	64	1311
457	1	54	67	1264
458	7	52	68	1339
459	13	51	66	1355
460	15	70	88	615
461	1	70	87	1042
462	20	72	91	209
463	4	-62	86	5
464	10	67	85	838
465	7	73	89	1262
466	6	75	89	1101
467	6	71	87	1341
468	1	62	80	1451
469	3	65	83	1450
470	1	76	90	638
471	8	65	83	469
472	13	61	83	1509
473	1	62	84	95
474	8	63	85	1511
475	4	63	86	95
476	18	61	88	527
477	6	72	90	1425
478	1	73	92	1421
479	7	67	91	378
480	1	66	91	56
481	4	63	85	1474
482	1	64	92	112
483	11	63	90	437
484	3	65	92	112
485	15	63	89	590

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
486	7	66	97	51
487	6	58	85	337
488	4	64	87	1296
489	8	63	90	538
490	10	65	92	412
491	7	50	93	23
492	6	61	88	497
493	3	72	86	1086
494	7	77	89	1139
495	6	73	87	1089
496	3	72	86	57
497	8	66	82	1328
498	8	62	78	1327
499	4	64	80	118
500	4	69	83	1036
501	13	67	83	1348
502	6	69	85	1329
503	10	64	80	1345
504	13	62	78	1347
505	11	66	82	1372
506	18	62	79	1380
507	8	60	76	1368
508	8	59	74	1343
509	8	63	81	1250
510	13	61	79	1351
511	11	63	81	673
512	7	37	82	16
513	3	41	78	8
514	7	62	80	917
515	1	57	75	842
516	10	57	73	1401
517	7	58	76	306
518	11	56	74	1442
520	17	57	75	880
521	3	56	73	1416
522	6	58	76	1436
523	10	61	79	952

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
524	13	59	78	1012
525	10	-8	75	14
526	10	61	80	1010
527	8	58	77	891
528	7	54	73	1455
529	11	57	75	739
530	6	58	78	86
531	3	59	78	389
532	6	50	65	1454
533	15	49	64	1425
534	7	52	71	1165
536	1	42	48	2681
537	1	25	29	
538	1	51	61	1896
539	3	45	60	1603
541	1	62	70	1036
542	1	33	40	855
543	11	62	76	1229
544	11	63	76	1177
545	10	60	76	1306
546	1	59	67	997
547	4	51	66	878
548	3	49	63	876
549	6	47	62	879
550	6	47	62	879
551	7	44	59	880
552	10	45	60	883
553	1	34	49	758
554	1	35	50	758
555	1	35	49	758
556	6	28	43	724
557	1	28	43	720
558	7	27	42	726
559	1	20	35	701
560	14	55	70	1348
561	3	43	58	829
562	10	56	73	1371

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
563	8	53	68	1360
565	1	56	67	1157
566	1	18	24	877
567	1	56	67	1181
568	1	52	65	1244
569	6	48	62	1334
570	4	43	58	1048
571	4	41	56	882
572	13	53	68	1386
573	11	53	68	1385
574	8	47	62	567
575	1	48	63	82
576	10	43	58	1104
577	10	41	56	1010
578	6	40	55	965
579	8	41	56	323
580	3	43	59	409
581	4	43	59	410
582	6	50	66	1499
583	1	40	61	6
584	13	52	69	987
585	4	49	66	98
586	1	53	71	1451
587	13	52	68	856
588	6	51	66	1504
589	3	52	71	1468
590	10	58	74	1521
591	6	59	76	100
593	1	52	71	1465
594	1	52	72	1485
595	10	45	61	437
596	8	46	63	90
597	6	37	53	347
598	7	54	69	1564
599	6	56	71	1563
600	4	50	65	89
601	1	64	81	1464

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
602	4	62	80	1467
603	17	59	80	889
604	1	63	80	1463
605	3	60	79	103
606	8	55	75	727
607	4	56	75	100
608	8	51	72	1509
609	10	38	68	37
610	1	38	68	27
611	13	49	69	432
612	1	51	70	106
613	7	54	69	1627
614	1	45	65	384
615	4	42	60	937
616	1	40	58	73
617	3	33	52	801
618	11	45	64	844
619	7	45	64	938
620	6	45	64	74
621	6	40	59	925
622	8	46	66	843
623	3	47	67	72
624	8	51	72	1452
625	11	53	74	964
626	10	53	74	670
627	7	55	77	919
628	18	58	80	761
629	6	62	83	1493
630	8	48	68	1026
631	3	49	70	84
632	6	31	51	460
633	8	49	71	1351
634	6	53	74	607
635	4	5	72	7
636	20	52	75	1351
637	6	53	75	457
638	1	55	77	647

APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
639	6	59	81	785
640	8	56	79	1094
641	6	59	82	1158
642	10	58	81	437
643	7	61	84	1511
644	7	61	84	1465
645	1	62	84	1505
646	4	50	71	1371
647	14	54	76	1239
648	13	45	67	782
649	10	38	60	748
650	6	49	71	1219
651	11	45	66	1184
652	10	49	71	1223
653	4	40	62	1160
654	1	40	62	1156
655	1	35	56	1095
656	3	49	71	1211
657	14	49	70	1100
658	4	58	78	1119
659	7	54	75	1185
660	10	39	59	1073
661	1	23	43	853
662	3	28	49	266
663	3	29	49	982
664	1	21	42	975
665	8	28	49	966
666	1	22	43	947
667	15	36	57	1058
668	8	44	64	1064
669	6	25	46	1014
671	10	43	64	1130
672	8	49	69	1139
673	11	50	71	1113
675	4	43	63	1143
676	13	53	73	1141
677	6	45	65	1153

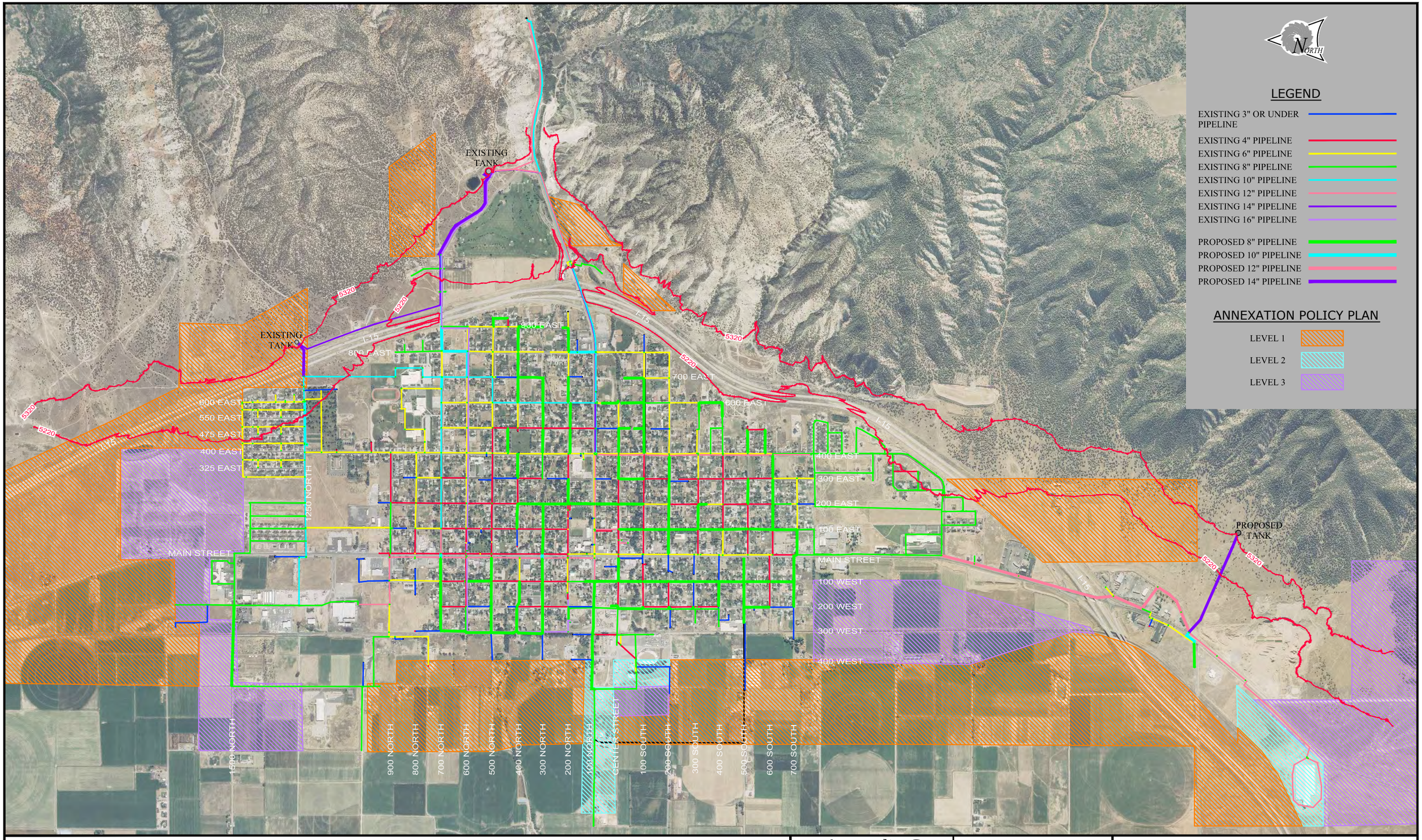
APPENDIX F

Nephi City H2O NET Analysis Results

Existing System				
ID	**Peak Day Demand (gpm)**	**Min. Pressure (psi)**	**Max Pressure (psi)**	**Design Flow (gpm)**
678	13	51	72	1170
679	6	50	71	1344
680	14	54	77	1026
681	8	56	78	1230
682	3	40	61	540
683	1	38	59	468
684	7	53	74	1256
685	13	59	81	1337
686	14	61	84	739
687	6	50	81	24
688	6	63	86	1428
689	11	57	80	1205
690	4	64	87	1274
691	3	62	84	724
692	6	-6	80	8
693	8	58	80	1199
694	6	59	80	1134
695	1	60	83	101
696	10	63	85	1255

APPENDIX G

PROPOSED SYSTEM MAPS



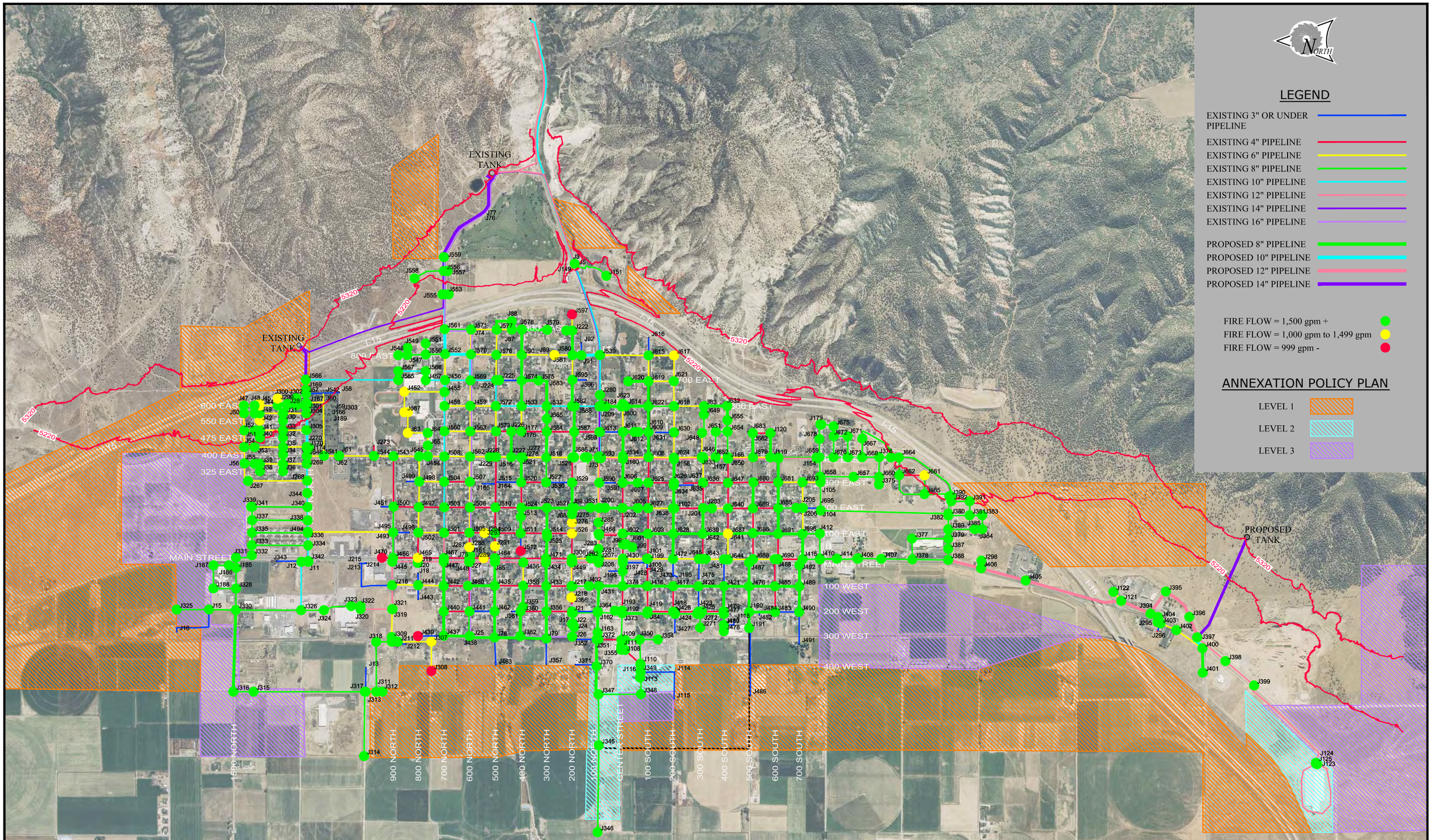
NEPHI CITY

H20Net Model

Appendix G | Exhibit 1

Existing Water System w/ Proposed Improvements

SUNRISE ENGINEERING
25 EAST 500 NORTH
FILLMORE, UTAH 84631
TEL 435.743.6151 · FAX 435.743.7900
www.sunrise-eng.com



NEPHI CITY

H20Net Model

Appendix G | Exhibit 2

Existing Water System w/ Proposed Improvements

SUNRISE ENGINEERING
25 EAST 500 NORTH
FILLMORE, UTAH 84631
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www.sunrise-eng.com

H2ONET PROPOSED SYSTEM

ANALYSIS RESULTS

Appendix G1 is a map of the proposed Nephi City culinary water system, Appendix G2 is a map showing flow conditions for the water system, and the spreadsheet in Appendix G gives the pressure and flow conditions particular to each junction node analyzed in the system.

The flow analysis for the Nephi City culinary water system was conducted using H2O Net modeling software. In order to calibrate the model, 5 particular junctions, chosen at strategic locations encompassing the system were measured in the field for flow and pressures at the particular locations. The flows measured in the field were entered into the model, and the pressure calculated in the model was compared with the pressures measured in the field. Minor adjustments to the coefficients of friction and verifications of pipe sizes were made until the field conditions matched the model conditions. These same conditions were used to build the proposed model.

Each of the junction nodes is identified on the following spreadsheet under the ID column, and the subsequent flow and pressure data for each node are displayed in the other columns. The total flow for all of the nodes under the peak day demand column equals the proposed peak-day demand calculated in the report of 7,340 gpm.

Prior to conducting the fire flow analysis, the peak-day demand was placed upon the system. The fire flow was then calculated at each location along with the peak-day demand spread throughout the system. The map in Appendix G2 shows the available fire flow conditions of the proposed system where the nodes are color-coded to signify these conditions. The nodes color-coded red have less than 1,000 gpm available fire flow, and the nodes color-coded yellow have between 1,000 and 1,500 gpm available fire flow. Those color-coded green have over 1,500 gpm available fire flow. The flows represent the maximum amount of fire flow achievable at each particular node under peak-day-demand conditions, without lowering the pressure below 20 psi at any point in the distribution system.

The H2ONet Analysis Results spreadsheet in Appendix G shows what the minimum and maximum pressures are throughout the proposed system. The minimum-pressure column represents what the dynamic pressures are under the peak instantaneous demand during peak-day conditions. The pressures under the minimum column should not be less than 30 psi according to the State Drinking Water Regulations. The maximum pressures represent a static level when no demands are placed on the system. According to State regulations the static pressure, represented by the maximum-pressure column in this appendix, should not be under 40 psi. As can be seen on the spreadsheet, with the proposed improvements, the majority of the nodes are over the minimum pressure (30 psi) standard set by the State, in addition to being over the 40 psi minimum value under the maximum-pressure column.

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
3	2	41	50	4507
5	2	47	52	2189
7	2	28	30	
10	0	34	36	
11	2	88	98	5603
12	4	88	98	5631
13	4	92	104	
15	4	99	110	3212
16	2	104	115	
17	2	82	94	4930
18	2	79	92	
19	2	78	90	
20	6	78	90	6500
21	2	82	94	4856
22	2	82	94	5605
23	0	108	110	4904
24	0	109	111	6898
25	0	110	112	
26	0	110	112	6898
27	0	100	102	6963
28	0	65	66	7753
29	0	67	67	1788
30	0	79	80	1893
31	15	71	73	1646
32	0	86	88	2031
33	19	81	82	1780
34	0	94	95	2293
35	19	89	91	1895
36	8	71	78	2520
37	17	68	74	1630
38	8	72	78	2120
39	11	67	73	1583
40	4	76	77	2044
41	10	72	74	1576
42	0	68	69	2033
43	13	62	63	1425

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
44	6	56	57	1724
45	0	57	58	1392
46	2	54	56	1480
47	0	54	56	1626
48	0	58	59	1594
49	2	60	61	1553
50	6	58	60	1727
51	0	70	72	1935
52	4	67	69	2063
53	8	76	79	2581
54	8	74	77	2358
55	2	69	75	2934
56	8	72	77	2183
57	2	32	36	2711
58	2	47	51	
59	2	36	40	3808
60	2	45	50	
61	2	68	75	
62	6	69	76	3996
63	2	66	76	2032
64	2	67	77	1557
65	2	67	78	1786
66	2	64	74	2162
67	2	62	72	1474
68	2	68	80	1435
69	8	68	80	2046
70	2	65	76	
71	2	65	76	4678
72	2	64	75	2783
73	2	65	76	2688
74	4	65	67	
75	0	98	100	1912
76	0	25	27	
77	2	22	25	
78	1	83	96	7753
79	1	70	82	5211

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
81	0	34	36	
83	1	51	63	3957
84	7	78	91	2848
85	13	76	88	3750
87	4	48	57	6080
88	9	47	56	2298
89	8	53	63	1869
90	13	50	60	1042
91	11	52	62	3154
92	6	49	60	
96	0	29	31	
98	9	72	84	3936
99	9	72	84	5372
100	2	74	86	
101	6	74	86	5372
102	15	67	79	2756
103	9	68	80	4539
104	2	75	86	4593
105	2	70	82	3126
108	2	83	95	3188
109	2	80	93	2776
110	4	84	97	3673
111	2	82	95	3299
112	2	84	97	3506
113	2	86	98	3291
114	2	84	97	
115	4	86	100	
116	2	85	97	1798
117	2	81	94	3236
118	2	79	94	
119	9	63	75	2122
120	13	53	64	3639
121	2	93	97	2427
122	4	87	91	5172
123	2	76	79	2185
124	2	76	79	3572

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
125	2	76	79	3582
127	2	11	14	
128	0	11	13	
130	4	71	83	3589
131	2	7	10	
133	0	9	11	
134	0	9	11	
141	0	24	26	
142	0	24	26	
144	0	23	25	
145	0	33	35	
147	8	72	84	
148	2	41	50	5404
149	4	47	52	
150	2	47	52	4633
151	2	50	55	3045
152	2	46	51	2014
153	8	65	77	4327
154	2	66	77	3393
155	2	65	77	3392
156	8	62	74	3583
157	4	62	74	3968
158	11	63	74	4163
160	13	63	74	4453
161	0	99	101	
162	2	78	90	4945
163	2	80	93	5495
164	8	66	77	3791
165	4	68	80	
166	2	37	41	914
167	2	36	41	4026
169	2	30	34	4044
170	2	99	100	3721
171	0	100	100	14388
172	2	60	65	
173	2	60	66	

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
174	0	60	65	
175	0	60	66	
176	2	62	73	
177	8	62	73	21346
178	8	58	69	2196
179	2	56	67	3177
181	6	63	74	2033
182	2	64	75	5272
183	2	58	69	5296
184	2	58	69	1802
185	2	96	106	4453
186	2	97	108	4474
187	2	98	108	4206
188	2	98	109	3963
189	0	74	75	3982
190	11	82	94	3835
191	6	82	95	2532
192	8	79	92	2113
193	2	79	91	4331
194	6	73	87	
195	2	73	87	
196	4	73	86	
197	8	74	86	3443
198	8	73	85	3660
199	6	73	86	
200	4	68	80	3343
201	9	68	79	5324
202	17	68	80	5379
203	11	69	81	4541
204	21	69	81	2990
205	11	72	84	3219
206	13	73	85	3766
207	2	73	85	3584
208	2	74	86	5491
209	6	58	68	5607
210	2	59	70	5580

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
211	2	89	101	3016
212	2	88	101	
213	4	78	93	
214	2	76	94	
215	2	78	93	
216	4	84	96	1891
217	13	77	89	6772
218	2	77	89	2351
219	13	75	87	1580
220	2	75	87	5666
221	2	77	89	5654
222	6	47	58	2270
223	4	48	58	1759
224	9	55	64	1689
225	8	57	67	6175
226	8	60	71	3216
227	8	66	77	2660
228	2	67	77	3313
229	2	67	78	
231	8	70	82	2748
243	0	9	11	
244	0	33	35	
245	2	28	32	
247	2	28	32	
252	2	31	34	
256	4	7	9	
263	2	8	10	
264	2	7	10	
265	2	5	7	
267	2	80	85	5370
268	6	72	79	2120
269	11	67	73	5092
270	4	99	99	4879
271	4	80	93	12695
272	2	80	92	2433
273	2	67	76	

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
275	2	71	83	
276	6	69	81	2740
277	2	65	76	
278	6	65	76	1277
279	2	59	69	
280	4	58	68	3013
281	2	75	87	
282	4	75	87	4937
283	2	73	85	
284	4	72	84	3496
285	4	70	82	
286	4	70	82	2785
287	2	75	87	
288	4	75	87	1836
289	2	78	90	
290	2	78	90	1257
291	2	75	87	
292	4	75	87	1305
293	2	73	85	
294	6	73	85	1283
295	2	91	95	1235
296	2	97	101	3407
298	2	69	76	179
299	4	64	65	3778
300	6	60	61	1621
301	4	69	70	1278
302	6	66	67	2302
303	0	74	75	1609
304	8	78	79	4615
305	8	89	89	4877
306	13	75	87	6178
307	11	87	99	3292
308	6	91	103	1081
309	2	90	102	869
310	2	89	101	2348
311	2	95	107	2424

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
312	2	94	106	2450
313	2	95	106	2356
314	4	101	112	2468
315	4	105	116	1888
316	2	105	116	2995
317	2	95	107	3155
318	2	90	101	2471
319	2	85	97	2373
320	2	89	101	6671
321	2	85	97	6550
322	2	89	101	6674
323	2	88	100	5920
324	311	95	107	5338
325	2	102	113	5466
326	9	94	104	2539
328	2	97	108	5792
330	9	98	109	4487
331	2	97	107	4664
332	2	93	103	4616
333	13	92	102	4929
334	13	85	95	5559
335	32	88	98	5565
336	11	82	92	5532
337	32	86	96	5519
338	21	80	89	5494
339	2	83	92	5465
340	15	78	86	4506
341	17	83	92	5380
342	2	88	98	4624
343	17	83	102	
344	2	75	82	5601
345	2	93	106	5224
346	6	101	113	2214
347	2	88	101	1666
348	2	88	101	3157
349	2	85	97	3193

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
350	2	82	94	3247
351	2	82	94	3419
352	4	82	95	
353	2	81	93	2167
354	2	83	95	3780
355	2	82	95	2791
356	19	78	91	3347
357	9	-207	78	
358	9	77	89	4455
359	9	79	91	3839
360	9	80	92	3966
361	2	82	95	
362	8	83	95	4077
363	2	81	93	4873
364	6	78	90	5618
365	6	81	93	5498
366	2	78	90	5621
367	4	77	89	5630
368	2	77	89	5629
369	2	75	87	5653
370	9	84	96	3191
371	6	84	97	
372	6	81	93	3697
373	6	79	91	4718
374	15	76	88	4937
375	2	54	65	2807
376	15	43	54	2680
377	2	68	77	3445
378	2	76	84	3575
379	2	61	69	3149
380	2	47	57	2697
381	11	44	54	2581
382	2	47	57	2711
383	6	43	53	2668
384	8	50	60	2741
385	11	52	62	2778

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
386	4	56	66	2870
387	2	66	74	3354
388	2	71	79	3586
389	4	56	65	2867
390	2	34	45	2472
391	8	36	46	2326
392	9	38	48	2551
393	2	35	45	2502
394	6	93	97	5786
395	2	83	86	6342
396	4	84	88	7464
397	2	82	85	9526
398	2	78	81	6333
399	2	72	75	5018
400	2	84	87	7583
401	2	90	94	3103
402	2	91	95	2794
403	2	89	93	3751
404	2	87	91	5962
405	2	80	86	4093
406	4	72	79	3780
407	2	79	89	3751
408	2	82	92	3864
409	2	82	92	3855
410	4	80	91	4079
411	4	80	91	4079
412	6	76	87	4036
414	8	80	91	3255
415	9	79	91	4151
416	15	76	88	3836
417	23	75	88	3428
418	9	78	91	3152
419	7	78	91	3667
420	11	76	89	3193
421	21	78	90	3297
422	2	79	92	2784

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
423	11	79	92	1738
424	2	79	91	3199
425	4	80	92	2819
426	6	79	91	
427	6	80	93	
428	2	74	86	
429	6	73	85	
430	8	73	85	3612
431	15	75	88	5492
432	2	78	91	5523
433	15	76	88	4830
434	13	74	86	5811
435	23	79	91	5366
436	8	77	89	5931
437	9	87	99	3979
438	8	85	97	4524
439	2	86	99	44
440	13	83	95	4141
441	15	82	94	3175
442	21	80	92	5082
443	2	74	93	2713
444	13	82	94	6648
445	4	80	91	6349
447	4	77	89	6196
448	8	77	89	
449	4	75	88	5654
451	2	75	87	
452	2	63	73	1557
454	8	68	79	3313
455	2	59	69	6571
456	9	59	67	7195
457	2	61	70	6316
458	9	61	70	6475
459	17	59	69	3923
460	21	79	91	2963
461	2	78	90	1749

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
462	26	81	94	4618
463	6	-39	89	
464	13	76	88	2475
465	9	79	91	1483
466	8	80	91	2962
467	8	78	89	6388
468	2	71	83	2021
469	4	73	85	5457
470	2	80	92	777
471	11	74	86	5801
472	17	74	86	3811
473	2	73	87	
474	11	76	88	2464
475	6	76	88	
476	25	78	91	3169
477	8	80	93	2270
478	2	82	94	2060
479	9	81	93	2597
480	2	81	93	
481	6	76	88	2353
482	2	82	95	
483	15	81	93	2320
484	4	82	95	
485	21	80	92	3385
486	9	81	99	
487	8	76	88	2167
488	6	77	89	2295
489	11	81	93	3567
490	13	83	95	2464
491	9	54	95	
492	8	79	91	4137
493	4	77	88	2846
494	9	82	92	5514
495	8	78	89	
496	4	76	88	
497	11	73	85	2945

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
498	11	70	81	3219
499	6	72	83	
500	6	74	85	2530
501	17	74	86	6449
502	8	76	87	2786
503	13	71	83	6524
504	17	69	80	6595
505	15	73	85	2325
506	25	70	82	2616
507	11	68	79	2520
508	11	66	77	6676
509	11	71	84	1739
510	17	69	81	1618
511	15	72	84	2297
512	9	24	83	17
513	4	70	82	2693
514	9	71	83	4644
515	2	66	78	921
516	13	65	76	2956
517	9	67	79	
518	15	66	76	3959
520	23	67	78	2677
521	4	65	76	3116
522	8	68	78	2893
523	13	70	82	4109
524	17	68	80	2920
525	13	71	83	4667
526	13	70	82	1422
527	11	68	80	4638
528	9	65	76	3746
529	15	66	78	2654
530	8	67	80	
531	4	69	81	5469
532	8	58	68	6229
533	21	57	67	6377
534	9	63	74	2590

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
536	2	46	51	4386
537	2	28	32	
538	2	56	64	4470
539	4	52	63	5618
541	2	67	73	2754
542	2	38	43	
543	15	69	79	2149
544	15	70	79	1861
545	13	68	79	3201
546	2	64	70	4752
547	6	62	70	2313
548	4	59	67	2145
549	8	57	65	2143
550	8	58	66	2937
551	9	55	63	2456
552	13	56	64	5723
553	2	49	54	5391
554	2	49	54	4081
555	2	49	54	4907
556	8	44	48	5375
557	2	44	48	4193
558	9	43	47	1912
559	2	37	40	5424
560	19	63	73	6411
561	4	54	62	5938
562	13	65	75	3776
563	11	61	71	3816
565	2	63	70	5212
566	2	23	26	3454
567	2	63	70	5381
568	2	60	68	6029
569	8	56	65	7008
570	6	53	62	5752
571	6	51	59	3767
572	17	61	71	6682
573	15	61	71	2949

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
574	11	55	65	4465
575	2	55	66	3893
576	13	52	61	3297
577	13	49	59	2522
578	8	48	58	2434
579	11	50	59	1619
580	4	52	62	3530
581	6	51	62	1215
582	8	58	68	5892
583	2	54	64	
584	17	61	71	4354
585	6	58	69	4827
586	2	63	74	3982
587	17	60	71	4275
588	8	58	69	5861
589	4	63	74	2703
590	13	65	77	5315
591	8	66	78	
593	2	63	74	2767
594	2	64	75	4360
595	13	54	64	2967
596	11	53	66	
597	8	45	56	999
598	9	61	72	5469
599	8	63	74	5342
600	6	57	68	2573
601	2	72	84	5364
602	6	70	82	5368
603	23	71	83	4880
604	2	71	83	5398
605	4	70	81	4036
606	11	66	77	3797
607	6	67	78	3313
608	11	63	75	4658
609	13	60	72	3643
610	2	61	72	2753

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
611	17	61	72	2337
612	2	62	73	2032
613	9	61	72	5823
614	2	57	68	2545
615	6	51	63	2009
616	2	49	60	
617	4	43	54	1375
618	15	56	67	2978
619	9	55	66	2514
620	8	55	66	1902
621	8	50	62	2027
622	11	57	69	2951
623	4	58	69	2103
624	11	63	75	4044
625	15	66	77	3161
626	13	65	77	4338
627	9	68	80	3908
628	25	71	83	4959
629	8	73	86	2773
630	11	59	71	2094
631	4	60	72	
632	8	42	53	2465
633	11	62	74	4229
634	8	65	77	4258
635	6	-19	72	
636	26	65	77	2054
637	8	66	78	
638	2	68	80	4613
639	8	72	84	3672
640	11	69	81	2410
641	8	72	84	1524
642	13	72	84	
643	9	75	87	2398
644	9	75	87	2357
645	2	75	87	2467
646	6	63	74	4306

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
647	19	67	78	1690
648	17	58	69	2740
649	13	51	63	2730
650	8	62	74	3540
651	15	58	69	3185
652	13	62	74	3441
653	6	53	64	3034
654	2	53	64	3020
655	2	48	59	2717
656	4	62	74	3465
657	19	61	72	2982
658	6	69	81	3182
659	9	66	77	3259
660	13	51	62	2828
661	2	35	46	1673
662	8	40	51	2427
664	4	34	45	2359
665	11	41	51	2109
666	2	35	45	2499
667	21	48	59	2684
668	11	56	67	2750
669	8	37	49	2523
671	13	55	66	3067
672	11	60	72	3103
673	15	62	73	2979
675	6	54	65	3137
676	17	64	75	3102
677	8	56	67	3176
678	17	63	74	3220
679	8	62	73	3759
680	19	67	79	1927
681	11	68	80	3751
682	4	52	64	2421
683	2	50	61	
684	9	65	76	3576
685	17	72	84	3909

APPENDIX G

Nephi City H2O NET Analysis Results

Existing System w/ Proposed Improvements

ID	Peak Day Demand (gpm)	Min. Pressure (psi)	Max Pressure (psi)	Design Flow (gpm)
686	19	75	86	3001
687	8	72	84	
688	8	76	88	2337
689	15	71	83	2077
690	6	78	89	2241
691	4	75	87	4009
693	11	71	82	3384
694	8	71	82	3202
695	2	73	85	
696	13	76	88	4077

APPENDIX H

IRRIGATION COMPANY AGREEMENT

Udell R. Jensen
Attorney at Law
125 North Main Street
Nephi, Utah 84648
Telephone: 623-1141

IN THE DISTRICT COURT OF UTAH, IN AND FOR JUAB COUNTY

- - - - - - - - - - - - -

NEPHI CITY, A Municipal Corporation of the State of Utah,

Plaintiff,

vs.

NEPHI IRRIGATION CO., a Corporation, UNITED STATES GYPSUM CO., A Corporation; J. E. WORTHINGTON, REX H. CARTER, EARL JARRETT, DEVON WINN, and ROSS PARK,

Defendants.

STIPULATION OF SETTLEMENT AND FOR DECREE

No. 3152

- - - - - - - - - - - - -

Comes now Nephi City, A Municipal Corporation, plaintiff, hereinafter called the "City"; Nephi Irrigation Company, a Mutual Irrigation Corporation, defendant, hereinafter called the "Company; and J. E. Worthington, Rex H. Carter, Earl Jarrett, Devon Winn, and Ross Park, as officers, and directors of said Company, and for said Company, and for themselves, and also for all the other stockholders of said Company hereinafter called the "Irrigators"; and hereby stipulate as follows, to-wit:

1. That the above entitled action was begun by the City on or about the 31st day of July, 1946; that it was brought for the purpose of condeming the right of the defendants to the use of 2.5 c.f.s. of water from Bradley Canyon Springs in Salt Creek Canyon, Juab County, Utah, for municipal, domestic, commercial, manufacturing, and stock watering purposes for itself, its inhabitants and patrons; or to effect and exchange of the City's water rights for a like amount of the Company's

and Irrigator's water rights, to determine the value thereof, the amount of water saved by piping and also the amount of water returned to defendants; and the net damages to defendants, if any. An amended and supplemental complaint was filed in July, 1949, principally asking to effect an exchange of water and to condemn said water rights and determine damages, if an exchange could not be effected. A second supplemental complaint was filed herein in October, 1952, seeking to recover money for failure of the Company to pay as had been agreed.

That on or about the 16th day of July, 1949, the Company filed its affirmative defense and counterclaim asking for recovery by it of the value of the water taken by the City ; and damages in diminution of the value of land to the Irrigators land; and has been pending since said date.

2. That at all times herein mentioned, up to on or about the 13th day of July, 1949, the Company was entitled to the use of all the water from said Bradley Springs for the irrigation season of April 1, through October 31, of each and every year; and that on or about the 13th day of July, 1949, the above entitled court in the above entitled cause made and entered its Order in part as follows, to-wit:

1. That the plaintiff be granted the right to take immediate possession of not to exceed two and one-half cubic feet per second of the waters of said Bradley's Spring and to divert the same into the municipal waterworks system of said plaintiff for the purpose of supplying the inhabitants of said Nephi City with water for culinary, domestic, stockwatering, industrial and manufacturing purposes.

2. That said plaintiff shall, prior to the diversion of waters of said Bradley's Spring into its waterworks system, install a proper ,measuring device or devices and shall keep an accurate record of the amount of water diverted from said spring, and shall allow the defendants and their duly authorized agents to inspect such measuring device or devices at all times, and shall furnish to the defendants full information as to the amount of water diverted from said spring.

3. That if the plaintiff returns water into the ditches, canals or diversion works of the defendants for use by the defendants, and for which returned water the plaintiff may hereafter claim credit, the said plaintiff shall install proper and sufficient measuring devices and keep proper and sufficient records of such return flow and shall supply the defendants with full information regarding such return flow of water and shall permit the defendants and their duly authorized agents to inspect such measuring devices at all reasonable times.

4. The court reserves the right to modify or supplement this order upon good cause shown upon application of any party to this proceedings.

Done this 13th day of July, 1949.

/s/ Will L. Hoyt
Judge

3. That on or about the 15th day of November, 1949, the above entitled court in the above entitled cause made and entered its order modifying said Decree which modification is as follows, to-wit:

1. That the order heretofore made and entered herein under date of 13 July, 1949, be continued in effect until the further order of the court.

2. That paragraph 3 on page 3 of said order be clarified to show that it was the intention of the court that the plaintiff should install proper and sufficient measuring devices and keep proper and sufficient records of any waters returned or delivered by the plaintiff into the canals or channels carrying waters belonging to or used by the defendants or by the stockholders of the defendant irrigation company for which waters the plaintiff may hereafter claim credit in these proceedings and shall supply the defendants with full information regarding such return flow or delivery of waters from any source and shall permit the defendants and their duly authorized agents to inspect such measuring devices at all reasonable times.

3. The court makes no adjudication at this time as to plaintiff's right to credit waters returned or delivered by it into the canals or channels carrying water used or belonging to the defendants.

Done this 15th day of November, 1949.

/s/ Will L. Hoyt
Judge

4. That pursuant to said order, and subsequently in keeping with the agreements of the parties hereinafter set out, the City did, on or about the 20th day of October, 1949, first take possession of approximately 2-1/2 c.f.s. of the waters of said Bradley's Spring and turned the same into its municipal pipeline.

5. That the City and the defendant, United States Gypsum Company, a Corporation, hereinafter called the "Gypsum", in 1952 agreed that Gypsum would sell, transfer and convey to the City all its rights to the use of waters of Salt Creek, Juab County, Utah and its land in said canyon; that it did so; and on or about the 8th day of June, 1953, the City and, Gypsum, stipulated that Gypsum had no claim or right to any damages or compensation from the City; and that the above case as to said defendant might be dismissed in bar, each party to bear its own costs. Said stipulation was on or about June 8, 1953, approved by the Company and the Irrigators by their then attorney, P. N. Anderson. Upon said stipulation on or about the 12th day of June, 1953, the above entitled court made and entered its order of dismissal as to Gypsum without prejudice to the right of the City to maintain said action against the other defendants named therein and their successors in office.

6. The present officers and directors of the said Company are: J. E. Worthington, Rex H. Carter, Earl Jarrett, Devon Winn, and Ross Park; that they are by order of the above entitled court, substituted as parties-defendant for the former officers and directors of said irrigation company, Albert E. Sells, Reeve Richardson, Clyde Shaw, Burnell H. Lunt, Robert P. Garrett, and George T. Ostler, who are no longer officers or directors of said Company. Said personal substituted defendants are also defendants for and on behalf of each and all of the other stockholders of said Company, the Irrigators, who are too

numerous to name. That said defendants are all the owners and all the claimants whose rights to the use of waters from said Salt Creek, might have been interferred with by the City's taking and acquiring the right to the use of 2-1/2 c.f.s., and using said amount of water from said Bradley's Springs; and also form the exchanges herein sought to be made. They are all the persons whose rights might now be interferred with.

7. That at all times herein mentioned the Company was, and now is, a mutual irrigation company; that it owns in trust for its stockholders and regulates, distributes, and controls for irrigation purposes for its stockholders all of the waters of what is commonly called "Salt Creek", which flows from Salt Creek Canyon, located in the mountains East of Nephi, Juab County, Utah, and which reaches the point designated as follows, to-wit:

> North 87° 25' East 9,546 feet from Northeast corner of the Northwest quarter of the Southeast quarter of Section 5, Township 13 South, Range One (1) East, Salt Lake Base and Meridian.

8. That the City constructed in 1949 and in 1967 large water tanks now of an approximate total capacity of 1,960,000 gallons; that the one tank is located in the mouth of Salt Creek Canyon and the 1967 tank is located approximately one mile Northeast of the City.

9. That at all times herein mentioned the City was, and now is, the owner of the water rights designated and described in that certain "1969 Water Exchange and Lease Agreement of Nephi City, a Municipal Corporation and Nephi Irrigation Company, a Mutual Irrigation Company, a copy of which is marked Exhibit "A" hereto attached and made a part hereof by reference.

10. That the City and the Company on or about the 8th day of July, 1950, agreed to make certain measurements, to pump and exchange water from wells of the City for the water taken from Bradley Springs by the City; that on or about the 9th day of

May, 1951, and on or about the 31st day of October, 1952, said agreement was extended and modified by an agreement of the City and Company.

11. That on or about the 31st of October, 1952, the City and the Company agreed as follows:

1. That the parties hereto will exchange to use of the waters from Marsh and Reese Springs for the same quantity of water from Bradleys Spring, and will exchange the use of the waters from the wells on a basis of 75% of the waters pumped being rated for exchange of waters from Bradleys Spring and 25% for consideration of exchange and return for disputed water.

2. That the City's exchange Application No. 74 filed with the State Engineer be made a part hereof by reference, and this agreement shall be made a part of said exchange application.

3. The City agrees to pay the costs of said application and proof therefor, to obtain and install totalizing meters to meter all the waters covered by the exchange, and the parties agree that the readings thereof shall be the means of computing the exchange.

4. The water from Marsh and Reese Spring will be comingled with the waters of Salt Creek at the place designated in said change Application No. 74.

5. From the period of April 1 to November 1 of each year when the amount of water taken from Bradleys Spring for City use exceed the amounts of water exchanged therefor by the City from Marsh and Reese Spring, the pumps shall be operated to provide amount of water for exchange as herein provided or at the options of the Company as described in paragraphs 6 and 7 of this agreement.

6. That it shall be optional with the Company to have the pumps operated at full rated capacity rather than idled to the amount required for the equal exchange, and when operated at the full rated capacity the Company agrees to pay for the same on the busis of 70¢ per hour pumping costs on well No. 2, in direct proportion of the excess amount of water pumped over the agreed return to the total amount of water pumped, such as if the use by the City from Bradleys Spring exceeded the return from Marsh and Reese Spring by one second foot the City would have to pump one and one-third second feet to make the exchange, now, say that at this particular time the total pumped was two and one-third second feet which would leave one second foot excess water pumped, then take 1/2.33 times 70¢ which would be 30¢ per hour costs to the Company.

7. That it shall be optional with the Company to build up a reserve in the early part of the irrigation season and have it delivered back during the latter part of the irrigation season from the wells.

8. The City reserves the right at the end of any five year period of this agreement to raise or lower the charge for pumping excess water for the Company to conform to its cost of operation upon the same basis as the charge herein was established.

9. That the basis of exchange in this agreement shall be used in computing pumping costs to the Company from the City for the years of exchange of 1950 and 1951; and that on said basis the Company agrees to pay the City the sum of $528.00 for the year 1950 and the sum of $388.00 for the year 1951.

10. The parties hereto shall before extending water investigations at or above the mouth of Salt Creek Canyon advise the other party of its intentions for possible joint operations.

11. It is agreed that the City has from November 1, 1949 to April 1, 1950 inclusive, from November 1, 1949 to April 1, 1951 inclusive, and from November 1, 1951 to April 1, 1952 inclusive, to obtain its waters from Bradleys Spring during said times; that during said periods of time the waters from Marsh and Reese Spring have flowed into the water supply of the Company; and that there is no charge by either party hereto against the other for said uses of water. That the City is contemplating filing an Application to appropriate the waters of Bradleys Spring each year hereafter from November 1, to the following April, 1; that in the years passed the Company has asserted a right to the use of said waters, or part thereof during said period, or some of said period; and that the question of protest to said application and of the respective rights of the parties to said waters from Bradleys Spring during said non-irrigation season is hereby reserved for further consideration of the parties hereto and the State Engineer.

12. That the excess, or surplus, waters flowing from Marsh and Reese Springs during the high-water season of April, May, and June of each year are waters for which no credit has been asked by the City, and it is not contemplated during said periods when there is said excess flow from said Springs to make any charge against the company to claim any build-up credit for the City; and it is not contemplating that the Company will make any charge against the City to claim any build up credit for the Company for the use of the waters from Bradleys Spring during the non-irrigation season of November 1, to the following April 1, of each and every year hereafter. It is claimed by the City that all of the waters flowing from the Marsh and Reese Springs are the waters of the City and that said excess or surplus waters may be diverted to the use of the City at any time it may

so choose, to which claim the parties reserve the matter for further consideration without prejudice to either party hereto.

13. That the term of this agreement shall be from its date to November 1, 1962; that upon expiration of such term or any renewal term hereof, this agreement shall be considered automatically renewed for another ten year period unless a notice in writing to the contrary is given by either party hereto to the other not more than 9 months nor less than 6 months prior to its expiration, or any renewal term hereof.

14. That this agreement shall be binding upon the parties as far as the boards of the two corporations can do so, and subject to the approval of the State Engineer; and it is further subject to the approval of the stockholders of the Company at its annual meeting December 1, 1952.

12. That on or about the 5th day of November, 1952, pursuant to said last designated agreement of the City and Company, the City filed with the office of the State Engineer of Utah an application No. 74 to exchange the waters of Monument Springs (Reese Springs), and the water of Marsh Canyon, plus its waters it obtained from pumping of the wells Nos. 1 and 2 designated in paragraph 6 aforesaid for the waters the City took or received of the defendants from Bradleys Springs aforesaid; that the same was duly published; that no protests were made thereto. That completion of said exchange by the parties may now go forward as per said application and Exhibit "A" hereto attached and made a part hereof by reference. That said Exhibit "A" modifies and replaces all prior agreements of exchange and pumping of wells for irrigation; and it may be used in connection with application No. 74 to carry out the exchange thereunder. That it appears reasonable and fair and may be confirmed by the court.

13. That the City is the owner of the right to use 18 c.f.s. of water from Salt Creek, including the waters flowing from Bradleys Springs for power purposes. That it is also the

owner of 12 c.f.s. of waters of Salt Creek, including the waters flowing from Bradleys Canyon for power purposes, respectively as represented by Certificates of appropriation issued by the Utah State Engineer, respectively No. 1861 and No. 2746; plus the power right acquired from United States Gypsum Co., not herein enumerate, represented by a certificate of appropriation issued by the State Engineer of Utah on or about the 7th day of December, 1907,.certificate No. 70-B.

14. That the agreements of the parties herein before set out have been performed and merged into the agreement of the parties hereto in Exhibit "A" hereto attached; and also are merged into the agreement of exchange of water under application No. 74 of the City now pending before the State Engineer.

15. That no damages have been suffered by the defendants or each or any of them, for the taking of water by the City from Bradley's Spring up to and including 1969.

16. That the City has no claim against the defendants or any of them, for their use of the water of the City returned to the City by Thermoid Company into a lateral of the Company. The credit, if any, to which the City will be entitled is reserved for further attention. Said water remains subject to the use and control of the City. The rights of the City to the use of Rowleys Spring, or Red Canyon Spring, represented by certificate of approximately No. 84-D of the office of the State Engineer are not effected hereby.

17. The issue of condemnation and the value of the 2-1/2 c.f.s. of water from Bradley Springs has not been determined. It is reserved herein for such consideration as the parties may give it within _____ years. If not by then resolved, the parties agree that at the expiration of said time the City will

and the Irrigators dismiss this action and the Company at said time will dismiss its affirmative defense and counterclaim.

18. Let a decree be entered accordingly.

DATED this _____ day of December, 1969.

NEPHI CITY, A Municipal Corporation

Attest:

BY _____
Mayor

_____
Nephi City Recorder

NEPHI IRRIGATION CO.

BY _____
President

BY _____
Secretary

_____

_____

_____

_____

_____
Directors and Officers of Nephi Irrigation Company for selves and all other stockholders of said company.

12-31-69

EXHIBIT A

1969 WATER EXCHANGE & LEASE AGREEMENT
OF NEPHI CITY, A MUNICIPAL CORPORATION AND NEPHI IRRIGATION COMPANY, A MUTUAL IRRIGATION CORPORATION

WHEREAS, Nephi City, a Municipal Corporation of Juab County, State of Utah, hereinafter called the "City"; and the Nephi Irrigation Company, a Mutual Irrigation Corporation, of Nephi, Juab County, Utah, hereinafter called the "Company", have, ever since 1952, exchanged the use of certain of their water rights and waters; and desire to continue to make said exchanges; and

WHEREAS, there is a need for the health and welfare of the inhabitants of the City and its users of municipal water; and it is for the best interests of the Company and its stockholders to make an exchange of waters by the parties; and the parties desire to supplement and replace agreements between the City and the Company made during and between 1954 and 1968, if any, by a new agreement covering the exchange of use of certain of their waters and of the stipulation and decree in Civil case No. 3152 in the District Court of Juab County, Utah, entitled "Nephi City, a Muoicipal Corporation, vs. Nephi Irrigation Company, et al, defendant"; and in accordance with the Exchange Application No 74 pending in the State Engineer's Office of the State of Utah;

NOW THEREFORE, IT IS HEREBY AGREED by and between the City and the Company as follows, to-wit:

1. That the City is the owner of the following municipal water rights, or the rights to the use of water, for municipal purposes, identified or represented as follows, to-wit:

A. MONUMENT SPRINGS (or REES SPRINGS) all of the

waters thereof represented by Application No. 12507, Certificate No. 2754 of the State Engineer's Office of the State of Utah, dated 1-3-45 for 0.675 c.f.s.

B. MARSH CANYON SPRINGS and SEEPS, represented by purchase and court decree in Civil case No. 1602 entitled Nephi Irrigation Co., plaintiff vs. Nephi City, defendant, in the District Court of Utah in and for Juab County, dated 1-15-24 for 1.325 c.f.s.

(Said waters are to be exchanged and delivered to the Company at a point which is S. 1378 ft. and E. 1454 ft., from NW corner of Sec. 1, T. 11 S., R 1 E. SLBM, where it was formerly delivered into the waters of Salt Creek in a hydro-electric power canal of the City)

Total c.f.s. brought forward 2.000 c.f.s.

C. PUMP WELLS Nos. 1 and 2 in Salt Creek Canyon, under Application No. 20865 and Certificate No. 4638, dated 10-7-52 for 3.63 c.f.s.

(This water is to be received in an open earth channel from Well No. 2 at the discharge point of said Well No. 2, and carried in a southerly direction approximately 151 ft. and discharged into the waters of Salt Creek in its original channel at a point S. 3074 ft. and W. 3626 ft. from NE. corner of Sec. 1, T. 11 S., R. 1 E. SLM.)

Total 5.63 c.f.s.

2. That the water rights represented by each and all of the above designated in Exchange Application No. 74 before the State Engineer's office of the State of Utah to exchange the same for 5.63 c.f.s. of water from Bradley Springs for the period of April 1st to November 1st; that the same are to be exchanged as is set out in said Exchange Application No: 74, or amendments thereto; and also as are affected by or covered by a Stipulation for Settlement and Decree in Civil Case No. 3152 in the District Court of Utah, in and for Juab County, entitled Nephi City, a Municipal Corporation of the State of Utah,

plaintiff, vs. Nephi Irrigation Company, a Corporation, et al.

3. That also the City is the owner of the following water rights, or the right to the use of the following designated waters for municipal purposes, identified or represented as follows, to-wit:

(a) BRADLEY SPRINGS, November 1st of one year to April 1st of the following year, Application No. 24275, Certificate No. 5192, dated 1-28-58 of the State Engineer's office of the State of Utah, for 3.63 c.f.s.

(This water is diverted where it emits from the ledge at or near a point which is North 26° 40' E. 1619 ft. from SW. corner of Sec. 5, T. 13 S., R. 2 E. SLBM.)

(b) PUMP WELL No. 3, covered by Application No. 25628 and Certificate No. 7589 of the State Engineer's Office of the State of Utah, dated 10-25-66 for 4.23 c.f.s.

(Said well is located N. 1232.94 ft. and E. 615.58 ft. from SW. corner of Sec. 4, T. 13 S., R. 1 E. SLBM.; and is in Block 29, Plat "A", Nephi Townsite Survey; and when not diverted into the Municipal water system, it is discharged into the natural channel of Salt Creek in said block.)

(c) PUMP WELL No. 4, represented by Application No. 25629 and Certificate No. 6533 of the State Engineers' Office of the State of Utah, dated 5-3-63 for 6.22 c.f.s.

(Said well is located in Lot 3, Block 45 Plat "A" Nephi Townsite Survey, near 3rd West and 2nd North in Nephi, Utah).

THE CITY AGREES:-

A. If any deficiency should occur in the waters received by the Company from the City through its Rees Springs, Marsh Springs and Seeps, and Well No. 2 above designated, by the Company under the Exchange Application No. 74, the City agrees to return the water sufficient to cover said deficiency. It will so do, first,

from the operation of the above designated Well No. 3; and next, if for any reason water may not, or can not be returned from Pump Well Nos. 3, to return the excess from Well No. 4 above designated.

B. It will, at its expense, maintain proper measuring devices for computing records of said exchange; that the readings thereof shall be the means of computing the exchange; and that it will at least twice a month during the period of April 1 through October 31, of each year of exchange, at its expense measure the waters received from the Company and also delivered to the Company, and furnish the Company during November of each year a record of said measurements and exchange.

C. At the request of the Company, and at the Company's expense, the City will operate its Wells Nos. 3 and 4, or either of them, during the irrigation season. Said expenses shall be the annual depreciation charged upon Well No. 3 of 5% per annum on an investment of $8,256.00, for the pump, motor, column, shaft, switch panels and transformers. Said charge begins in 1969 and is to continue each year through 1988. The said yearly amount to be paid on said well is $412.80. Said expenses on Well No. 4 of 5% per annum depreciation shall be computed on the cost of the pump, motor, column, shaft, switch panel, and transformers, at an agreed figure of $10,521.00. The yearly amount to be paid on said well is $526.05; and on both makes a total of $938.85 per year.

D. The depreciation on said Well No. 4 has been paid for the years 1960, 1961, 1962, 1963, 1964, and 1968. The Company may receive a credit against said 5%, which may be pro-rated for the time the City operates said wells, or either of them on exchange; and the time said wells, or either of

them, are then operated for and at the request of the Company. Said credit, if any, will be computed separately on each of said wells Nos. 3 and 4.

D-1. The City will allow the Company said credit of 5% as follows:

Determine the number of days pumped for said exchange purpose, if any, the number of days pumped at the request of the Company, add them together; and then divide that sum into the above figure, or figures of depreciation, and multiply that figure by the number of days pumped for the City to furnish exchange water, if any. It will then credit the product of those two upon the amount of depreciation as above stated.

E. That the city does hereby lease to the Company for the period of November 1 of 1969 through March 31 of 1970, and thereafter for the period of November 1 of one year, to March 31, of the following year, all the City's water of Bradleys Springs, Rees (Monument) Springs, and from Marsh Canyon Springs and Seeps which the City does not use, and also any surplus waters of the City which finds their way into the distribution system of the Company, for the sum of One Dollar ($1.00) per year, the receipt of the first $1.00 is hereby acknowledged.

THE COMPANY HEREBY AGREES:-

(a) That it will, at least two days in advance, notify the City when it wishes to have Wells Nos. 3 and 4, or either of them, operated at its expense; and that it will at least two days in advance of the shut-off date, notify the City when the shut-off dates are desired. The City agrees to cooperate with the Irrigation Company so that the operation period may be a twelve day, eight-hour operation to correspond with the period covered by the water tickets of the Company to its stockholders on its field ditches.

(b) It will, within twelve days after the City billing the Company, pay the City for the pumping of said wells Nos. 3 and 4, when not pumping exchange waters. It will also pay the City said depreciation charges less proper credit givewas above specified in paragraph "D" and "D-1" above, on or before December 1, 1969, and on or before the same date of each year thereafter when Irrigation Company pumps said wells for their benefit, during the term hereof; and any extension thereof. If extended and depreciationis paid each year, the last payment on Well No. 3 will be in 1988; and on Well No. 4, will be in 1983. If no depreciation is paid to the City said wells or either of them, in any year, the term and payment of the depreciation will thereby be extended another year in lieu of payment of any particular year when pumping is not done.

(c) It will pay One Dollar ($1.00) annually on or before the 31st day of October of each year during the life of this contract, for the lease of the above water.

(d) The leasing of said water is subject to the right of the City to take any and all of the waters it hereby leases to the Company, if necessary, to furnish the same for supplying the inhabitants, or users, of Nephi City with culinary, domestic, stock-watering waters, and also its patrons with the same for industrial and manufacturing purposes; and may so do without liability to the Company.

IT IS HEREBY FURTHER MUTUALLY AGREED:-

4. That the City has pumped in advance the amount of exchange waters to the extent of 149.79 acre feet; and that that figure may apply against the waters received from the Company during the year 1969. Further it is agreed that the City may accumulate a credit for excess or surplus waters

exchanged under Application No. 74; and also for pumping of Wells Nos. 3 and 4, if such should occur while the City pumps on its exchange waters. Said exchange credit shall be limited to the number of acre feet pumped the immediate preceeding year; and the credit from one year may be carried forward to another to that extent.

5. The term "excess or surplus waters" flowing from Marsh Springs and Rees Springs, as used in Exchange Application No. 74, and as herein used, is intended to cover all waters which are not carried through the collection system of the City; and over or through the measuring devices of the City.

6. The power rate to be charged by the City, the basis of the charge; and the time and manner of payment therefor are covered by a separate agreement between the parties.

7. That the period of this agreement shall begin on or about the 1st day of June, 1969; and end on or about the 1st day of June, 1974. It shallautomatically be renewed for a period of ten years thereafter, unless either party notifies the other party that it will be terminated; and so does within the 1st nine months of the last year of this contract, or any ten-year extension thereof.

8. That the parties hereto shall, before extending water investigations at or above the mouth of Salt Creek Canyon, advise the other party of its intentions to so do, for possible joint operations.

WITNESS the execution hereof this 6th day of October, 1969.

NEPHI CITY, A Municipal Corporation

By _____
Mayor Pro Tempore

Attest:

_____
City Recorder

NEPHI IRRIGATION CO., a Corporation

By _____

_____

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