



Pressurized Irrigation Water Audit

Prepared for

Lehi City

Prepared by



January 2016

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Purpose of Water Audit

The purpose of the water audit is to provide a better understanding of the water sources for Lehi City’s pressurized irrigation system and determine whether the water sources are providing the volume of wet water in which Lehi City is eligible. The process involved gathering information from each of the water providers including Lehi City, multiple irrigation companies, and water districts. Lehi City has a complicated web of water sources for their pressurized irrigation system. It is beneficial to have multiple sources, but at the same time, it is complicated to determine if the city is receiving its full water allotment. Gary Thomas, Lehi City Pressurized Irrigation Water Manager, and Loren Powell, Lehi City Engineer, were instrumental in providing information.

Benefits of Water Audit

The benefits of this audit include improved knowledge and documentation of the various sources providing water used in the pressurized irrigation system. The audit identifies problems and issues, and provides recommendations. An audit can lead to financial improvement, increased knowledge of the distribution system, more efficient use of existing supplies, improved public relations, reduced legal liability, and reduced disruption to customers.

Lehi City Population

Lehi City has gone through periods of intense growth, with an average growth rate per year of 8.82% since 1990. Being located in the north end of Utah County, many large tech businesses are starting to call Lehi home, which will continue to boost the city’s population. Population estimates provided by Mountainland Association of Governments (AOG) indicate the population will reach 103,610 by the year 2040, see Table 1.

Table 1 – Historical and Projected Population

Year	Population
1990	8,475
1995	14,455
2000	19,028
2007	43,498
2008	46,909
2010	47,415
2012	51,173
2020	62,154
2030	82,589
2040	103,610
2060	120,000

Mountainland AOG – January 2013 Municipal Population Projections

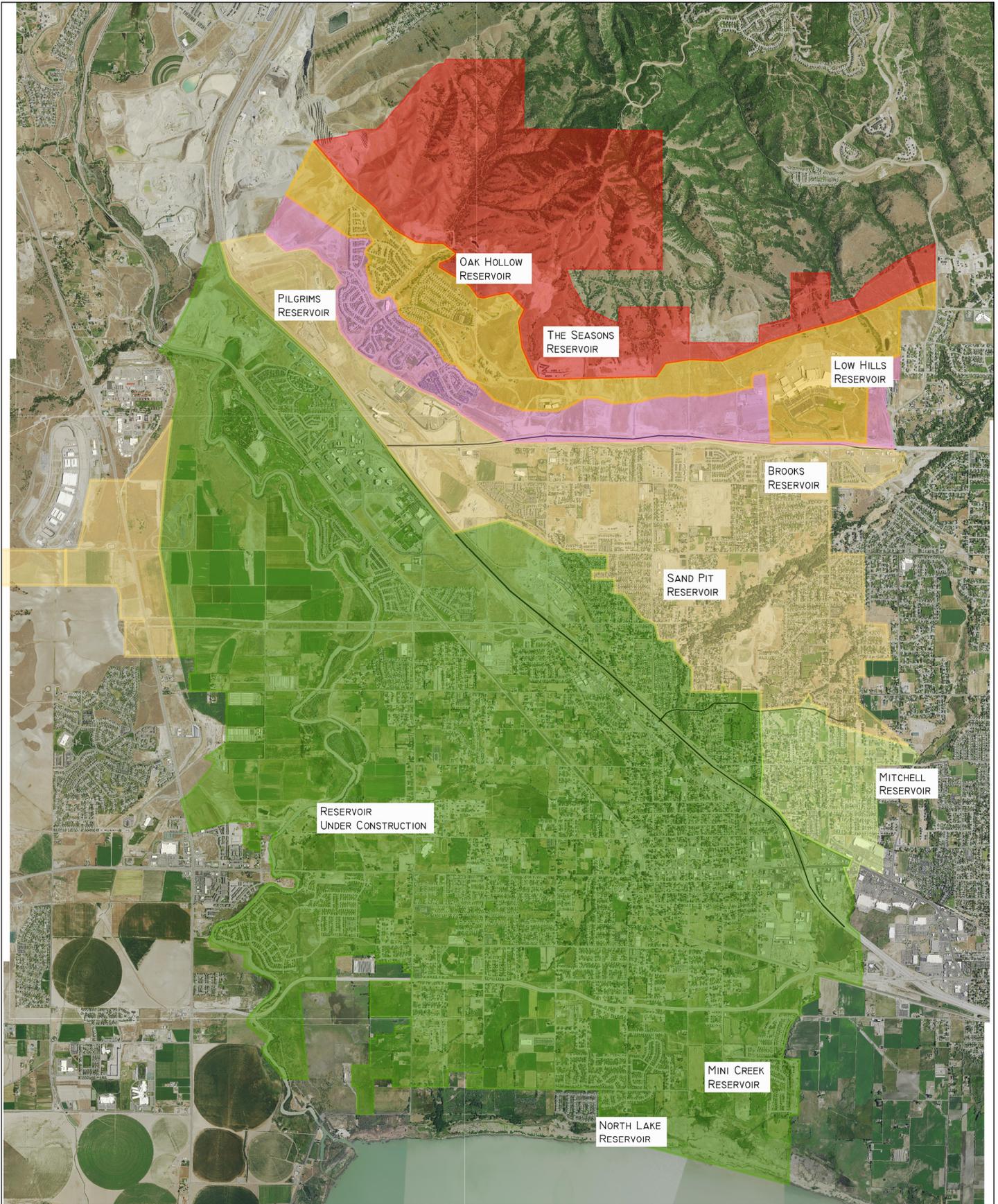
History of Pressurized Irrigation System

Lehi City's pressurized irrigation system, which is connected to the fire protection system, was originally built in the 1990's as a way to alleviate demands on the culinary water system and to use water of lower quality on residents' and businesses lawns and gardens. The system currently operates using five zones. The Lehi City engineers have planned for the proposed buildout of the system including additional pipelines and storage reservoirs to support future growth.

Figure 1 shows the city's five pressure zones along with locations of the pressurized irrigation reservoirs. While water can flow between the five zones, this is not typically how the system is operated. There are 10 reservoirs that are used to store water for regulation into the various zones. The three northmost zones (red, orange, pink) are the smallest zones due to the higher elevation and topography. Due to the varying elevations in this zone, multiple pressure reducing valves (PRV's) are used to keep the pressures within allowable range. They are served by the Oak Hollow Reservoir (10 acre-feet) and The Seasons Reservoir (3.2 acre-feet).

The fourth zone (represented in yellow), is primarily located northeast of the I-15 freeway but will also include a small area south of the National Security Agency Utah Data Center along Redwood Road in the future. The Low Hills Reservoir and Brooks Reservoir have a combined capacity of 32 acre-feet to serve this zone. The Brooks Reservoir primarily is a holding reservoir for pumping water to the Low Hills Reservoir. The light green area is also served by this zone but can also be served by the Mitchell Reservoir (40 acre-feet) for 3 of every 11 days. Outside this period, this area is served by the Low Hills Reservoir.

The fifth zone (dark green) is the largest zone serving Lehi. It has multiple storage reservoirs which serve this zone including the two Sand Pit Reservoirs (62 acre-feet combined), Pilgrims Reservoir (10 acre-feet), Mini Creek Pond (25 acre-feet), and North Lake Reservoir (3 acre-feet). The addition of the 50 acre-foot Sand Pit Reservoir this spring has added flexibility into the system and is reducing shortages in this zone. A new 49 acre-foot reservoir located adjacent to the Jordan River, near Willow Park, is under construction and will be put into use next spring.



DATE: FEBRUARY 2, 2016
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 LAYOUT: Layout1

LEHI CITY
 LEHI CITY WATER AUDIT

FIGURE I
 PRESSURE ZONES

Water Sources and Shares

Lehi City’s pressurized irrigation system is supplied by various water sources including water from city owned wells, Provo River Water Users Association (PRWUA) shares, Central Utah Project (CUP) water, Micron water, Spring Creek, and shares in irrigation companies with water rights in Deer Creek Reservoir, American Fork River, Dry Creek, irrigation company wells, Mitchell Hollow, and Mill Pond. Based on historical use of the city wells, shares owned in irrigation companies, CUP, and Micron water, approximately 17,757 acre-feet¹ should have been available in 2015 assuming a 100% allocation. Each water source will be discussed in detail below.

Lehi City Owned Wells

Lehi City owns the irrigation wells shown in Table 2. They are pumped during the irrigation months to supplement the secondary water supply. The total amount pumped was very consistent between 2012 and 2014. Less water than normal was pumped in 2015 as a result of utilizing the 2,000 acre-feet of rented water from the Central Utah Water Conservancy District (CUWCD). The Pilgrims and Vibbert Wells were put online in 2014; however, the Vibbert Well was not used in 2015 due to needing a new pump.

Table 2 – Lehi City Irrigation Wells and Water Use

Well	Zone	Water Use (acre-feet)			
		2012	2013	2014	2015 (to 10/28/15)
600 East Well	Upper	155	159	155	138
Doc Jones Well	Upper	665	595	472	103
Pilgrims Well	Upper	N/A	N/A	155	268
Vibbert Well	Upper	N/A	N/A	152	0*
300 North Well	Lower	363	363	158	32
Jordan Narrows Well	Lower	331	251	199	271
Mill Well	Lower	425	499	521	81
New Survey Well	Lower	192	113	114	7
Stoker Corner Well	Lower	275	193	102	53
Sunderland Well	Lower	252	162	175	69
Oak Hollow Well	Traverse	933	1,077	1,216	1,172
Total		3,591	3,412	3,419	2,194

*Vibbert Well was out of commission during 2015 for a new pump.

¹ This number includes 3,400 acre-feet from Lehi City wells, 100% allocation of water from shares owned in all the companies/districts from Table 3 except American Fork Irrigation Company. This one was eliminated because the water is not used in Lehi City. The number also includes 1,145 acre-feet of CUP water, 550 acre-feet of Micron water, and 1,040 acre-feet of Mini/Spring Creek/Well water (average over past 4 years).

Shares Owned in Other Companies

Lehi City owns shares in many irrigation companies. These sources are conveyed to Lehi City through a variety of ways as shown in Table 3. Contacts for each of these companies are found in Appendix A. Figure 2 shows the conveyance facilities for these irrigation companies within Lehi.

Table 3 – Water Sources and Shares Owned in 2015

Irrigation Company/Company	Water Conveyance	Shares Owned*	Acre-Feet/Share	Acre-Feet (rounded) at 100% Allocation
Provo Reservoir Canal – Deer Creek	Provo Reservoir Canal	500	1	500
Provo Reservoir Canal – Full Shares	Provo Reservoir Canal	29.5	4	118
Provo Reservoir Canal – Late Shares	Provo Reservoir Canal	154.8	2.6	402
Highland Conservation District	Provo Reservoir Canal	906.99	1	907
Lehi Irrigation Company	Bull River (til July 10) Provo late shares American Fork River (exchanges) irrigation company wells	2,577.45	2.6	6,701
North Bench Irrigation Company	Bull River Ditch	946.62	1.3	1,231
Mitchell Hollow Irrigation Company	Mitchell Hollow Pond	169.29	2.6	440
Lehi Spring Creek Irrigation Company	Mill Pond, Spring Creek	769	1.72	1,323

*Shares owned are based on certificates in the Lehi City safe as of August 20, 2015.

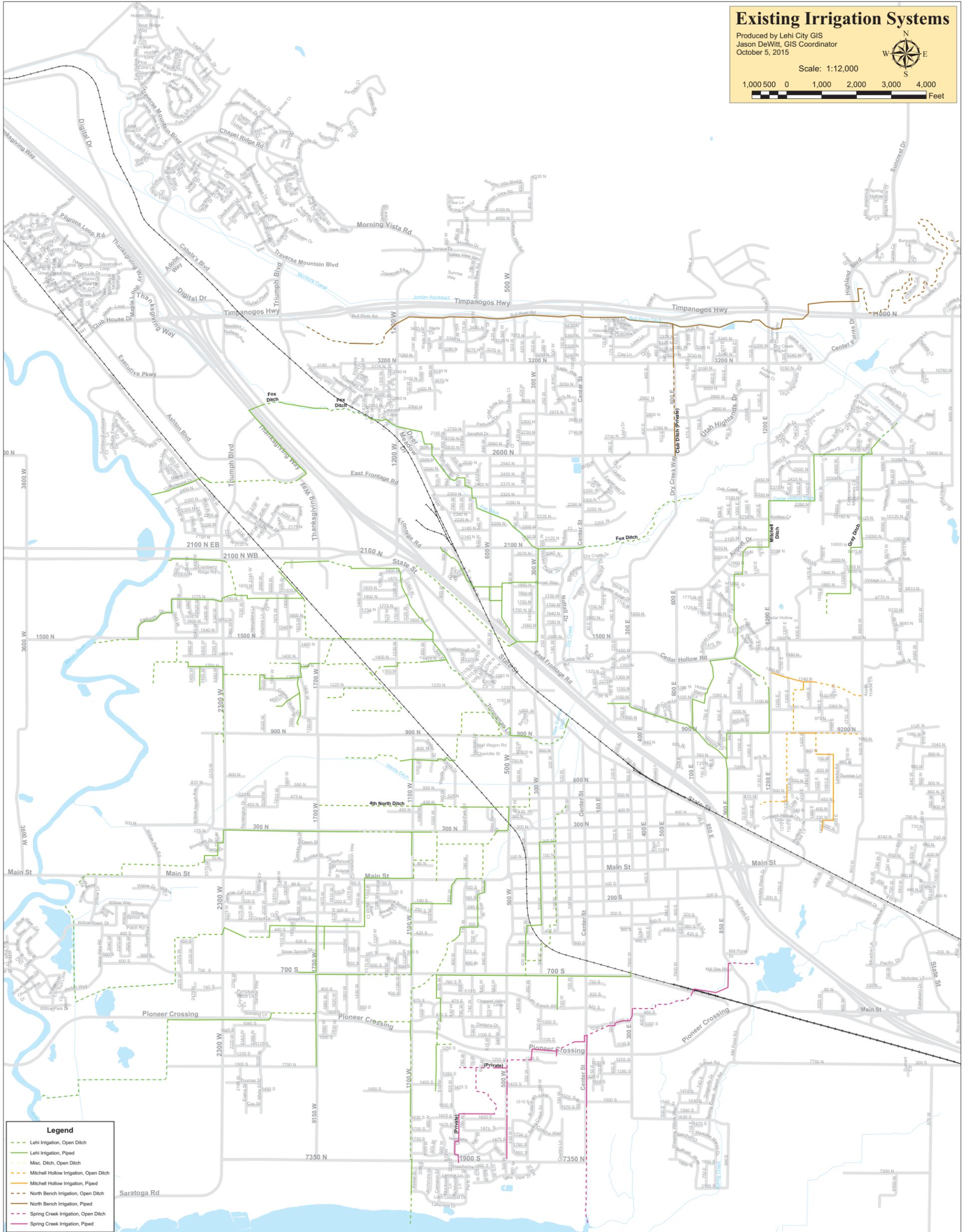
Lehi City also owns shares in five irrigation companies, as shown in Table 4, that cannot be used in the pressurized irrigation system as they do not have conveyances to Lehi City's system. The American Fork Irrigation Company shares are listed here because they are used at the Fox Hollow Golf Course rather than in Lehi's system. Many have also been converted to culinary well sources. Some are being utilized and some are just paper rights at this time and will be used in the future.

Table 4 – Other Irrigation Companies

Company Name	Shares Owned*	Acre-Feet/Share	Acre-Feet
East Jordan Irrigation Company	602.5	4.84	2,916.10
Fort Field Irrigation Company	32.0	7.87	251.84
South Jordan Irrigation Company	171.0	3.84	656.64
Utah & Salt Lake Irrigation Company	218.0	4.59	1,000.62
American Fork Irrigation Company	113.71	2.6	296

*Shares owned are based on certificates in the Lehi City safe as of August 20, 2015.

Figure 2



Provo River Water Users Association

PRWUA operates and maintains the Deer Creek Diversion of the Provo River Project which supplies water for irrigation in several counties, including Utah County. The water is conveyed through the Provo Reservoir Aqueduct, also known as the Provo Reservoir Canal. Lehi City owns shares in the PRWUA and shares in the Highland Conservation District, also for this water supply. PRWUA reports diversions made for Lehi City from these shares. Lehi Irrigation Company also owns shares in PRWUA, of which some water is delivered to Lehi City.

With the exception of 2011, which was an extraordinary water year, the past five years have been dry years with snowpack averaging less than the average depth of 85.5 feet for the basins contributing to PRWUA's project water supply. The PRWUA board uses the local watershed snowpack from snotel sites to determine what each year's allocation will be as a percent of a full allocation. This percentage is readdressed at each board meeting and historically changes as the water year continues. While 2009, 2010, and 2011 were 100% allocations; 2012 was 77%; 2013 was 43.5%; 2014 started at 40%, jumped to 65%, and ended at 82%; and 2015 started at 25%, jumped to 41%, and ended at 61%. It is unknown what the allocation will be in future years, as it is dependent on the snowpack of the prior winter, the timing of the spring runoff, and spring weather conditions. This allocation is representative of what is occurring in surrounding watersheds and is used as a basis for other water sources besides PRWUA water.

This water supply can be held over in Deer Creek Reservoir for one year. Lehi City's water operator, Gary Thomas, will use other water sources prior to requesting water from these shares to sustain as much holdover water for the following year. He works directly with PRWUA in the spring to contract supplies for the current water year. Table 5 shows the water used since 2009. A trend can be seen that when a dry year occurs and the allotment is not at 100%, prior year holdover water has been used by Lehi City.

While water from PRWUA is a reliable water source, each year the amount of water that will be available is unknown until spring when the starting allotment is determined. The allotment may change as the water year progresses due to weather patterns, but it cannot be expected to increase. Since holding water over to the next year is an option, this water source is typically the last one to be used by Lehi City.

Another factor regarding the water supply from PRWUA is the matter of natural flows and extra allotment. Natural flow water is determined daily by the Provo River Commissioner and if available, comes from other rights held by PRWUA. This water has no storage right associated with it. Extra allotment occurs in wet years when Deer Creek Reservoir will fill and water may be available on a daily basis. It does not count against shareholder's Deer Creek storage water. Appendix B has more information on the PRWUA's water entitlement, natural flow, and extra allotment.

Table 5 – Water Delivered from Shares in PRWUA (in acre-feet)

Year	Total Use	Allocated	Allocation Used	Extra Allotment Used	Available Holdover	Used Holdover	Holdover to Next Year
Provo Reservoir Water Users Company – Lehi City's Full and Late Shares							
2011	203	248	186	17	72	0	62
2012	141	182	79	0	62	62	103
2013	139	109	36	0	103	103	73
2014	(42)	175	(115)	0	73	73	290
Provo Reservoir Water Users Company – Lehi City's Deer Creek Shares							
2011	377	500	354	23	9	0	146
2012	527	385	381	0	146	146	4
2013	336	218	165	0	171	171	53
2014	315	410	262	0	53	53	148
Highland Conservation District – Lehi City							
2011	663	793	539	124	408	0	254
2012	866	613	612	0	254	254	1
2013	306	346	305	0	1	1	41
2014	557	653	516	0	41	41	137

Numbers are from PRWUA annual reports. The 2015 annual report is not yet available.

Highland Conservation District

Lehi City currently owns 906.99 shares in the Highland Conservation District (HCD) as noted in their certificates. However, the HCD list shows Lehi City as owning 833.4 A&B Shares and 4.0 D Shares and leasing 22.4 A&B Shares for a total of 855.8 A&B Shares and 4.0 D Shares. It is unknown why these numbers do not match. There is a total of 5,010 acre-feet allocated to the HCD. The A&B Shares are equal to 1.0 acre-feet and the D Shares are equal to 0.9 acre-feet. Assuming HCD is only delivering the water they show records of Lehi City owning, the city should receive 859.8 acre-feet during a full water supply year at 100% allocation. In dry water years, the allocation is reduced due to less water being available. This water is supplied from Deer Creek Reservoir through the Provo Reservoir Canal.

Lehi Irrigation Company

Water received from the Lehi Irrigation Company (LIC) is complicated as there are multiple water sources including Dry Creek, American Fork River (exchanges with Highland City), irrigation company wells, and PRWUA shares of Deer Creek water. These sources reach Lehi City via the Bull River Ditch (diverted from Dry Creek), exchanges with the HCD initiated by Highland City, irrigation company wells pumped into Lehi's pressurized irrigation system, and deliveries from LIC's shares in the Provo Reservoir Canal. Water from the American Fork River is not currently delivered to the Lehi City pressurized irrigation system.

As of August 20, 2015, Lehi City owned 2,577.45 shares in LIC. The amount of shares typically increase each year as developers purchase shares to dedicate to the city in exchange for water supplied to a new development. Each share entitles the shareholder to 2.6 acre-feet of water during a full water supply year. During a wet water year at 100% allocation, this amounts to 6,701 acre-feet of water for Lehi City. However, in dry water years, the allocation is reduced due to less water being available.

The company looks at all water sources and determines how best to supply the water to its users based on location. This is done early and mid-season as water supplies change during the year. LIC takes into account 15-20% losses from Dry Creek and American Fork River due to seepage and evaporation. The various sources of LIC water are discussed below.

Dry Creek (Bull River Ditch)

LIC was the first appropriator of water from Dry Creek with Alpine City and the North Bench Irrigation Company (NBIC) also having an interest in the creek. Dry Creek flows are directed by The Smith Decree, dated July 14, 1890, and the H. W. Smith Decree, dated July 14, 1893. Details of these can be found in Appendix C.

Typically there are reasonable flows in Dry Creek until early to mid-June, depending on the year. The NBIC operates the diversion dam located in Alpine. The gate is set to divert up to 30 cfs into the Bull River Ditch for diversion to the LIC and NBIC. No historical diversion records have been kept on this water source, so it is difficult to estimate the actual diversion amounts from Dry Creek. The Analysis section of the Water Audit discusses the method used to estimate the amount of water in Dry Creek belonging to LIC and NBIC.

The decrees state that LIC receive the following percentages of flow in Dry Creek:

- April 1 to July 1 – eleven twenty-sixths (42%).
- July 1 to July 10 – six and five-tenths twenty-sixths (25%).
- After July 10, LIC receives nothing from Dry Creek.

The decrees state that NBIC receives:

- April 1 to July 10 – two-thirteenths (15%).
- After July 10 to September 30, it receives nothing.
- October to March – one-fourth (25%).

American Fork River

LIC's diversions from the American Fork River date back to the late 1800's. A splitting structure located at the mouth of American Fork Canyon, diverts river water into three canals for LIC, American Fork City, and Pleasant Grove City. Ernie John, contracted by the three entities, has been the watermaster for about a year. The splitting structure is operated based on 100+ year old documents and agreements. Figure 3 shows the distribution of water based on the Booth (1903) and McCarty Decrees (1901). The splitting structure gate is operated based on this distribution with gate levels shown in Figure 4. While data has been collected for the past 12 months, the current watermaster does not have any historical data. It has been noted that the water levels are

about 10 cfs greater than the USGS gaging station 10164500, American Fork AB Upper Powerplant Nr American Fork due to inflow from perennial springs below the gaging station.

Figure 3 – Water Distribution of American Fork River

	Lehi	American Fork	Pleasant Grove
April 15 - July 1	calculated percentage = 16.7%	"twenty-five forty-seconds" = 25/42 calculated percentage = 59.5%	" ten forty-seconds" = 10/42 calculated percentage = 23.8%
July 1 - Sept. 20	calculated percentage = 33.3%	"twenty forty-seconds" = 20/42 calculated percentage = 47.6%	"eight forty-seconds" = 8/42 calculated percentage = 19.0%
Sept. 20 - April 1	calculated percentage = 16.7%	"twenty-five thirty-thirds" = 25/33 calculated percentage = 75.8%	" two and one-half thirty-thirds" =2.5/33 calculated percentage = 7.6%
April 1 - April 15	calculated percentage = 16.7%	"twenty-one and one half thirty-thirds" = 21.5/33 calculated percentage = 65.2%	"six thirty-thirds" = 6/33 calculated percentage = 18.2%

Figure 4 – Gate Levels for the Distribution of Water Flows from American Fork Canyon

	Lehi	American Fork	Pleasant Grove	Total			
Weir measurement, feet/inches	5'	5'	12' 6"	1' 6"	3' 6"	2'	
Weir measurement, feet, decimal	5	5	12.5	1.5	3.5	2	29.50
April 15 - July 1							
Weir division, feet/inches	5'	5'	12' 6"	1' 6"	3' 6"	2'	
Weir division, feet, decimal	5	17.5	7.0				29.50
Percentage of weir	16.9%	59.3%	23.7%				100.0%
July 1 - Sept. 20							
Weir division, feet/inches	5'	5'	12' 6"	1' 6"	3' 6"	2'	
Weir division, feet, decimal	10	14	5.5				29.50
Percentage of weir	33.9%	47.5%	18.6%				100.0%
Sept. 20 - April 1							
Weir division, feet/inches	5'	5'	12' 6"	1' 6"	3' 6"	2'	
Weir division, feet, decimal	5	22.5	2				29.50
Percentage of weir	16.9%	76.3%	6.8%				100.0%
April 1 - April 15							
Weir division, feet/inches	5'	5'	12' 6"	1' 6"	3' 6"	2'	
Weir division, feet, decimal	5	19	5.5				29.50
Percentage of weir	16.9%	64.4%	18.6%				100.0%

The Lehi Main Ditch is used to convey flows from American Fork River directly to the Dry Creek Debris Basin on Dry Creek, which is controlled by the North Utah County Water Conservancy District. In high water years, flows can reach Utah Lake due to not enough storage capacity within the user's systems. Currently, flows from American Fork River are not able to be used in Lehi's pressurized irrigation system due to the lack of conveyance facilities between LIC facilities and Lehi City's pressurized irrigation ponds. When flows are high enough, an exchange may be made

between the HCD, Highland City, and/or the LIC. Highland City will take LIC's water from American Fork River and replace the water with its water from the Provo Reservoir Canal. When flows are low (below 3-6 cfs), LIC will not make exchanges.

1952 Trade Agreement with Highland Conservation District

Historically, LIC had traded water with HCD, which is separate from the shares Lehi City owns in the HCD. This agreement dates back to March 1952 and was instigated by the HCD water users in Highland City to use American Fork River water on its lands above the canal. In exchange, an equal quantity of water would be supplied to LIC from the Provo Reservoir Canal (previously called the Murdock Canal) to be used on lands below the canal. The agreement calls for measurement by a designated official. The amount of traded water would be deducted from the Highland City HCD's water allotment.

Highland City currently manages the HCD's trade water and requests the trade with Gary Thomas of Lehi City to facilitate it. The parties are trading based on discussions that occur each year resulting in an annual verbal agreement rather than a written agreement. According to Gary Thomas and Justin Purdue, Highland City, there is no formal documentation of the amount of water historically traded. However, Justin Purdue reported that exchanges were made in 2013, 2014, and 2015 in the amounts of 67.4 acre-feet, 240.4 acre-feet, and 176.0 acre-feet, respectively. Exchanges were not made in recent prior years to 2013 likely as a result of development that has occurred between American Fork Canyon and Lehi City. If trades are not made between the parties, LIC can not supply American Fork River water to Lehi City.

Lehi Irrigation Company's Distribution System

LIC utilizes seven ditches to convey water to its users in Highland City and Lehi City, which include:

- Two upper ditches, south ditch with three users, and north ditch supplying Alpine users. Located near the West Rock plant at the mouth of American Fork Canyon, the same weir is used to measure and direct the flows.
- Two lower ditches, located near the Wendy's restaurant in Highland. The same weir is used to measure and direct the flows and can be used concurrently.
- Harmon Ditch is located near 6400 West. It can receive water from either American Fork River or from the Provo Reservoir Canal.
- Two west ditches, located near 6400 West and 10200 North, can receive water from either American Fork River or from the Provo Reservoir Canal.

Table 6 shows the target numbers for Highland and Lehi users that the LIC's board recently set to provide a consistent target from year to year. Mark Thompson, a LIC board member, provided these numbers with the explanation that these may fluctuate annually based on users leasing to another user. The annual leases are done by non-binding agreements between the individual parties.

Table 6 – Percentage of Lehi Irrigation Company Shares Based on User

Water User Group	Percentage	Total Percentage
Bench Shares		
• Highland Ditches – Private users	12%	30%
• Highland City	18%	
Field Shares		
• Lehi Ditches – Private users	30%	70%
• Lehi City	40%	

Target percentages defined by the LIC Board may not represent the actual number of shares owned.

North Bench Irrigation Company

As of August 20, 2015, Lehi City owned 946.62 shares in the NBIC, which is 94.8% of the company’s total shares. An additional 2% is leased by Lehi City from other shareholders. The amount of shares owned by Lehi City typically increases each year as shareholders sell to developers. Each share provides 1.3 acre-feet of water. During a wet water year at 100% allocation, this amounts to 1,230 acre-feet of water for Lehi City. However, in dry water years, less water supplies are available and the allocation is reduced.

NBIC was incorporated in 1878 as the North Bench Canal Company and has been operated by Kenny Carter for over 40 years. Water from Dry Creek can be diverted by the irrigation company from April 1 to July 10. If water is available during this period, NBIC will divert it over the diversion dam into the Bull River Ditch. The diversion structure is set to 30 cubic feet per second (cfs), which diverts water for NBIC and LIC per the decrees as described above. After July 10, Alpine City has the right to take all the water throughout the end of September. NBIC can take 100% of the water from October to March. The system has losses from seepage and evaporation. When the flow in Bull River Ditch is 25 cfs, about 3 cfs is lost. When the flow is 12 cfs, about 2 cfs is lost.

NBIC’s water serves shareholders on the northern bench in Lehi and into Lehi City’s pressurized irrigation system. NBIC has about eight other users besides Lehi City, which sometimes choose not to use their water. The NBIC system is about six miles long with a portion that was piped in 2007-08. There are three clubs of water. Shareholders receive water every 11 days. The first club’s water is directed into the Brooks Reservoir located just west of 1200 East and the Timpanogos Highway. It is metered and has a continuous diversion rate of 2 cfs to Lehi’s pressurized irrigation system. The second club’s water is also used by Lehi City and is diverted at Center Street into the Sand Pit Reservoir. The third club’s water is used by the new Mountain Point Medical Center. When users do not divert their water, it is given to Lehi City.

Mitchell Hollow Irrigation Company

As of August 20, 2015, Lehi City owned 169.29 shares out of about 240 shares in the Mitchell Hollow Irrigation Company. Each share provides 2.6 acre-feet when the water supply is at 100%. At 100% allocation, this equates to 440 acre-feet per year. There is a well and spring that supply water to Mitchell Hollow Reservoir. Lehi City receives water from the Mitchell Hollow Reservoir for 3 of every 11 days during the irrigation season.

Lehi Spring Creek Irrigation Company and Mill Pond

As on August 20, 2015, Lehi City owned 769 shares in the Lehi Spring Creek Irrigation Company (LSCIC). Each share provides 1.72 acre-feet. This water source comes from the Mill Pond, formerly known as Mulliner's Pond. It receives its water from several sources including two main tributaries, Varney Slough and Curry Slough, which are natural sloughs; Cedar Hollow flows; water rights owned by Lehi City known as the Prestwich and Guyman rights; and natural springs from surface runoff and underground seepage and drainage.

The water supply from the Cedar Hollow area has dwindled over time and flows at about ¼ cfs. Lehi City owns 1 acre of land at approximately 1500 North and 1200 East for a future pond site which could capture this water source. Two pipes enter Mill Pond conveying the Prestwich and Guyman rights without any flow measurement. These waters are commingled with other water in Mill Pond and any right for Lehi City to use this water is lost. Lehi City is currently preparing a change application on these rights which will quantify the water.

There are three outlet ditches from Mill Pond including Spring Creek Ditch, Spring Creek South Ditch, and Green Ditch. LSCIC diverts water into the Spring Creek Ditch on the westerly side of Mill Pond. There is a device on Spring Creek Ditch to measure water being diverted. Lehi City's portion of the water is conveyed to North Lake Reservoir. Green Ditch located on the southerly side of Mill Pond has other water users besides LSCIC and Lehi City.

There is a decree, Civil No. 24,698, dating to March 4, 1963 that provides for the operation of Mill Pond. There are the following three rights, but LSCIC only receives water on the first right, which has the highest priority date of 1857. Water can be diverted for irrigation purposes from March 15 to November 15.

- 1st right: 5.25 cfs (of 8.06 cfs), priority date of 1857
- 2nd right: 0.00 cfs (of 7.19 cfs), priority date of 1860
- 3rd right: 0.00 cfs (of 2.18 cfs), priority date of 1865

If the combined flow of Spring Creek is less than 8.06 cfs, then it is prorated on the basis of 525/806 to LSCIC, and 281/806 to other users, either in continuous streams or on turns as agreed upon. If the combined flow of Spring Creek is greater than 8.06 cfs, then LSCIC can divert a continuous stream of 5.25 cfs.

Others may divert 2.81 cfs plus any and all additional waters either by continuous flow or intermittently diverting a larger stream when available. Of these other users, Lehi City now owns a portion of this water, which is diverted and measured as it enters the Spring Creek South Ditch. Lehi City and Jay and Mindy Sager are the only users of this water source, which has been operated

on a verbal agreement for many years. Lehi City’s water is conveyed to Mini Creek Reservoir. Natural springs and mined groundwater also provide water to Spring Creek South Ditch and Mini Creek Reservoir. The Mini Creek Spring flows have decreased over time from 1-2 cfs to about 20 gpm.

American Fork Irrigation Company

Lehi City owns 113.71 shares in the American Fork Irrigation Company. Each share is equal to 2.6 acre-feet. These shares are used by American Fork City to water Fox Hollow Golf Course as part of the tri-cities agreement between Lehi, American Fork, and Pleasant Grove Cities. This water is not available to Lehi City’s pressurized irrigation system.

Water from CUWCD

Lehi City receives water through the CUWCD’s Alpine 3/Olmstead Aqueduct (A3) from several water sources, including water petitioned from the CUP, water portion from IM Flash Technologies (aka Micron), and on certain years when purchased - rented water from CUWCD.

The petitioned CUP water is available to Lehi City for decades to come. The CUP water allocation is 1,145 acre-feet annually with a 100% allocation. Contrary to other water sources, this water source amount can go up 110-120% in a dry year and down when it is a wet year, as long as the long-term average remains at the petitioned amount of 1,145 acre-feet. Water storage is available in Jordanelle Reservoir, so this water is typically the last to be used by Lehi City. Micron receives 550 acre-feet of CUWCD water annually, but cannot use this water source in the company’s processes. Therefore, Lehi City uses Micron’s 550 acre-feet annually in exchange for well water in the same amount. Any rented water is contracted annually by Lehi City with CUWCD, and is purchased at \$150 per acre-foot. The contracted amount cannot be changed mid-season. Table 7 shows the water received from CUWCD since 2012.

Table 7 – Water from CUWCD (in acre-feet)

Water Source	2012	2013	2014	2015
Lehi City – CUP Project	1,435	1,195	853	1,822
Lehi City – Non-project Water Temporary	0	1,000	1,250	2,000
Micron (IM Flash Technologies)	550	550	550	550
Total	1,985	2,745	2,653	4,372

Numbers are from Lehi City Annual Reports.

Analysis

Lehi City has enough irrigation water to meet current needs with the shares owned in various irrigation companies and its other sources if it receives the water it is entitled to. The amount of water received is dependent on what type of water year it is and the amount of water available from mother nature and the allocation that is determined to be available.

Historically, Lehi City has not received its portion of water from LIC and in some years NBIC, which will be discussed in this section. As a result, Lehi City has been obligated to purchase additional water to ensure adequate supplies were available in 2013, 2014, and 2015. Water rental is available from CUWCD at a purchase price of \$150 per acre-foot. With this, a purchaser must estimate and obligate to rent a set amount, which cannot be changed mid-season. Lehi City spent \$150,000 in 2013 for 1,000 acre-feet, \$187,500 in 2014 for 1,250 acre-feet, and \$300,000 in 2015 for 2,000 acre-feet to ensure adequate water was available to its residents.

Water Allocated to Lehi City

The amount of water that should have been provided to Lehi City in 2012 through 2015 from their shares owned in irrigation companies was determined based on the number of shares Lehi City owned during each of these years and the acre-foot/share allocation for each company. Based on a 100% water allocation, Lehi City should have received 16,322 acre-feet, 16,690 acre-feet, 17,289 acre-feet, and 17,757 acre-feet in 2012, 2013, 2014, and 2015, respectively, based on the shares owned and historical use as shown in Table 8. However, it is not typical for 100% water allocation as it is based on mother nature. The past 4 years' water allocations were 77%, 43.5%, 65%, and 41%, respectively, according to PRWUA. Although 2014 and 2015 ended at 82% and 61% respectively, the summer allocations of 65% and 41% were used because this was the allocation for the majority of the delivery season. PRWUA continually determines the allocation that is available based on available supplies. While the PRWUA allotment is determined for the Deer Creek watershed, it is representative of the surrounding watersheds and has been used in this analysis.

Measurements are not made by Ernie Johns, American Fork River Watermaster, at the splitting structure at the mouth of American Fork Canyon, so an alternate method must be used to estimate the annual water deliveries which are reduced due to drought. The PRWUA allocations are used as a guide to determine the actual water available for delivery in drought years. Applying the PRWUA allocation to the irrigation company shares owned, Lehi City should have received 13,979 acre-feet in 2012, 10,726 acre-feet in 2013, 13,385 acre-feet in 2014, and 10,900 acre-feet in 2015, also shown in Table 8. These yearly totals make the assumption that the approximately 3,400 acre-feet that were pumped from the Lehi City wells in 2012, 2013, and 2014, will remain fairly constant. The pumped amount in 2015 was less due to utilizing the CUP rented water. The CUP water supply average remains at approximately 1,145 acre-feet, although there can be fluctuations based on dry and wet years. The CUP water is connected to Jordanelle Reservoir, which allows extra water to be stored in wet years and released in dry years. The Micron amount does not fluctuate. An average amount of 1,040 acre-feet for the past four years was used for Mini/Spring Creek/Well.

Table 8 – Water Allotted to Lehi City based on Shares Owned and Historical Use

Irrigation Company/Company	2012			2013			2014			2015		
	Shares Owned*	Acre-Feet (rounded) at 100% Allocation*	Acre-Feet at 77% Allocation	Shares Owned	Acre-Feet (rounded) at 100% Allocation*	Acre-Feet at 43.5% Allocation	Shares Owned	Acre-Feet (rounded) at 100% Allocation*	Acre-Feet at 65% Allocation	Shares Owned*	Acre-Feet (rounded) at 100% Allocation*	Acre-Feet at 41% Allocation
Provo Reservoir Canal – Deer Creek (1 acre-foot/share)	500	500	385	500	500	218	500	500	325	500	500	205
PRC – Full Shares (4 acre-feet/share)	21	84	65	21	84	37	29.5	118	77	29.5	118	48
PRC – Late Shares (2.6 acre-feet/share)	151.8	395	304	151.8	395	172	154.8	402	262	154.8	402	165
PRC – Highland Conservation District (1 acre-foot/share)	842	842	648	842.49	842	366	906.99	907	590	906.99	907	372
Lehi Irrigation Company (2.6 acre-feet/share)	2,204	5,730	4,412	2,329.45	6,057	2,634	2,461.45	6,400	4,160	2,577.45	6,701	2,748
North Bench Irrigation Company (1.3 acre-feet/share)	850	1,105	851	882.12	1,147	499	925.97	1,204	782	946.62	1,231	505
Mitchell Hollow Irrigation Company (2.6 acre-feet/share)	145.76	379	292	145.76	379	165	145.76	379	246	169.29	440	180
Lehi Spring Creek Irrigation Company (1.72 acre-feet/share)	669.5	1,152	887	669.5	1,152	501	723.5	1,244	809	769	1,323	542
Subtotal		10,187	7,844		10,555	4,591		11,154	7,250		11,622	4,765
Lehi City wells	N/A	3,400	3,400	N/A	3,400	3,400	N/A	3,400	3,400	N/A	3,400	3,400
CUP	N/A	1,145	1,145	N/A	1,145	1,145	N/A	1,145	1,145	N/A	1,145	1,145
Micron	N/A	550	550	N/A	550	550	N/A	550	550	N/A	550	550
Mini/Spring Creek/Well	N/A	1,040	1,040	N/A	1,040	1,040	N/A	1,040	1,040	N/A	1,040	1,040
Total		16,322	13,979		16,690	10,726		17,289	13,385		17,757	10,900

*Shares owned in 2012 were estimated based on past years. Either the same amount was assumed, or a ratio of increase based on past years. 2015 shares are from August 20, 2015.

Water Received by Lehi City

Monthly irrigation water use numbers were supplied by Gary Thomas for 2012 through 2015. Actual delivery amounts are available for all the water sources listed in Table 8 other than water received from LIC and NBIC. PRWUA tracks water delivered from the various water shares conveyed in the Provo Reservoir Canal; including Deer Creek shares, full shares, late shares, and HCD shares. It also tracks water supplied by LIC, but does not track if it was used by LIC or Lehi City in the event of an exchange. As previously mentioned, an exchange may be made between HCD/Highland City and the LIC when flows are high enough in the American Fork River. HCD/Highland City will take LIC's water from American Fork River and replace the water with its water from the Provo Reservoir Canal. This water use is tracked by PRWUA as being used by Highland City. Justin Purdue at Highland City keeps an internal record if any amount is exchanged with Lehi City. Lehi City tracks water received from the Mitchell Hollow and Lehi Spring Creek Irrigation Companies and the Mini/Spring Creek/Well water source. Water received from the CUWCD, including CUP and Micron water, is tracked by Lehi City and CUWCD.

NBIC delivers water to Lehi City through the Bull River Ditch. This ditch also conveys some of the LIC water to Lehi City, which makes it difficult to determine how much water is being supplied by each company. LIC also provides water to Lehi City thru irrigation wells, exchanges as described previously, and PRWUA late shares. The discussion below explains how the water delivered to Lehi City was estimated.

Table 9 compares the actual water received by Lehi City and the calculated amount from Table 8 of what deliveries should have been received based on shares owned as of August 20, 2015 and PRWUA's allocations. CUWCD rental water was removed from the comparison because this is purchased water to make up additional supplies. Water received from the Provo Reservoir Canal was adjusted to remove LIC water, so that it would not be double counted. The total water received from LIC was calculated based on estimated deliveries from the Provo Reservoir Canal, actual amounts pumped from LIC wells, exchanges with HCD/Highland City, and a calculated estimate of LIC water received from the Bull River Ditch.

From the comparison, it is seen that overall Lehi City is receiving less water than it is entitled to. The purchased rental water is not included.

- In 2012, 13,236 acre-feet was received where 13,979 acre-feet was the estimated allocation.
- In 2013, 10,290 acre-feet was received where 10,726 acre-feet was the estimated allocation.
- In 2014, 10,101 acre-feet was received where 13,385 acre-feet was the estimated allocation.
- And, in 2015, 8,749 acre-feet was received where 13,902 acre-feet was the estimated allocation.

Taking a look at the individual sources, Lehi City received less water than it should from LIC in all four years. The LIC only delivered 52%, 71%, 40%, and 49% of the estimated allocation for 2012, 2013, 2014, and 2015, respectively. Lehi City has received its full allotment or close to it in

Table 9 – Actual Water Received Compared to Yearly Allocation (in acre-feet)

Irrigation Company/Company	2012		2013		2014		2015	
	Actual	77% Allocation	Actual	43.5% Allocation	Actual	65% Allocation	Actual	41% Allocation
Provo Reservoir Canal*	1,702	1,402	617	792	889	1,253	949	790
Lehi Irrigation Company**	2,295	4,412	1,876	2,634	1,656	4,160	1,348	2,748
North Bench Irrigation Company	492	851	456	499	405	782	643	505
Mitchell Hollow Irrigation Company	439	292	290	165	407	246	387	180
Lehi Spring Creek Irrigation Company	1,160	887	982	501	843	809	262	542
Lehi City Wells	3,591	3,400	3,411	3,400	3,419	3,400	2,194	3,400
CUP	1,435	1,145	1,195	1,145	853	1,145	1,822	1,145
Micron CUWCD Water	550	550	550	550	550	550	550	550
Mini/Spring Creek	1,572	1,040	913	1,040	1,079	1,040	594	1,040
Subtotal	13,236	13,979	10,290	10,726	10,101	13,385	8,749	10,900
CUWCD Rental	0		1,000		1,250		2,000	
Total	13,236	13,979	11,290	10,726	11,351	13,385	10,749	10,900

*Includes any water from the Provo Reservoir Canal including Deer Creek water shares, full shares and late shares, and HCD. Excludes LIC water including any exchanges it had with HCD/Highland City.

**LIC total deliveries include Bull River Ditch, LIC wells, canal water, and exchanges with HCD/Highland City, and calculated values of Bull River Ditch based on The Smith Decree (1890) and H.W. Smith Decree (1893).

two of the past four years from NBIC. In 2012, 2013, and 2014, Lehi City received 84%, 91%, and 52% of the total water it should have from NBIC. In 2015, Lehi City received 127% of the total water it should have from NBIC. It received 48% of what it should have in 2015 from LSCIC, with the other three years receiving more than its allotment. This shows that Lehi City is not receiving their water allotment from the LIC and from NBIC in three out of the last four years.

Water received from Mitchell Hollow and from Lehi Spring Creek Irrigation Companies in three of four years exceeds the estimated allocation. Artesian wells and springs attribute to this extra amount of water. The water received from the Provo Reservoir Canal and CUP is based on the city's water needs and how much they are receiving from its other sources. The city controls what it requests and operates the system such that these sources are the last to be used to utilize the opportunity to hold over water to the next year. The amounts requested will vary due to the hold over capability in both systems. Lehi City receives the water requested from these sources.

Lehi Irrigation Company and North Bench Irrigation Company

The following provides an explanation of how the deliveries by LIC and NBIC shown in Table 9 were estimated. LIC provides water to Lehi City throughout various sources as described, including Bull River Ditch, American Fork River (exchanges), irrigation company wells, and Provo Reservoir Canal Company shares of Deer Creek water. While the exchanges are recorded by Highland City and the wells are recorded, there are no records of the Bull River Ditch diversions or how much water is received from the Provo Reservoir Canal from LIC.

Water Diverted from Dry Creek into the Bull River Ditch

Bull River Ditch conveys LIC and NBIC water, so this combined water is calculated to determine how much water is delivered to Lehi City by each irrigation company. Based on shares owned in the LIC and NBIC, Lehi City is entitled to 40% of the LIC water and 96.8% (2% is leased) of the NBIC water diverted from Dry Creek into Bull River Ditch. LIC's percentage is based on the target percentage provided by LIC as shown in Table 6. NBIC's percentage is based on the amount of shares Lehi City owns in the company. However, since LIC typically does not provide American Fork River water to Lehi City, it is assumed that 100% of its Dry Creek water is delivered to Lehi City. This is done in good faith to supply the city with some water and is a conservative assumption. There is not enough water available in Dry Creek for LIC to provide Lehi City with the approximately 40% of LIC's total water supply that Lehi City is entitled to. Table 10 calculates the estimated amount that NBIC and LIC divert on behalf of Lehi City based on the amount recorded by Lehi City and 12% losses. Only months where diversions were made are shown. These amounts were used in the analysis above and shown in Table 9.

Table 10 – Water Received from Dry Creek to Bull River Ditch (in acre-feet)

		Feb	Mar	Apr	May	Jun	Jul	Totals
2012	Total Received by Lehi City	-	40	432	906	381	-	1,759
	NBIC*	-	40	114	238	100	-	492
	LIC**	-	-	318	668	281	-	1,267
2013	Total Received by Lehi City	-	-	144	947	641	-	1,733
	NBIC*	-	-	38	249	169	-	456
	LIC**	-	-	106	698	473	-	1,277
2014	Total Received by Lehi City	-	-	259	439	812	27	1,538
	NBIC*	-	-	68	116	214	7	405
	LIC**	-	-	191	324	598	20	1,133
2015	Total Received by Lehi City	42	239	347	330	686	13	1,656
	NBIC*	42	239	91	87	180	3	643
	LIC**	-	-	256	243	505	9	1,014

*Calculated values based on The Smith Decree (1890) and H.W. Smith Decree (1893).

**Calculated values based on The Smith Decree (1890), H.W. Smith Decree (1893), and assuming 100% of LIC diversions go to Lehi City. The 100% is based on a conversation with Mark Thompson, LIC Watermaster.

Water Received from the Provo Reservoir Canal

To determine the total water deliveries from LIC, calculations were made to determine how much water is being carried in the Provo Reservoir Canal for LIC that is being delivered to Lehi City. There is no formal accounting system in place to track this water delivery. Based on the total amount delivered in the Provo Reservoir Canal to Lehi City, and taking out the water amounts from the other water sources as accounted for by Stan Roberts, Provo River Water Commissioner, the following estimates were calculated for deliveries from LIC: 2012 = 739 acre-feet, 2013 = 297 acre-feet, 2014 = 164 acre-feet, and 2015 = 159 acre-feet. Table 11 shows the calculated total water deliveries from LIC to Lehi City for the past four years.

Table 11 – Water Received from LIC to Lehi City from All Sources

Year	Water Source	Total Water (AF)
2012	Dry Creek (Bull River Ditch)	1,267
	Wells	289
	Provo Reservoir Canal	739
	Exchanges with Highland City (American Fork River water)	-
	Total Calculated Amount of Water Received by Lehi City	2,295
	Total amount Lehi City should receive = Estimated 2,204 shares @ 2.6 AF/share @ 77% allocation	4,412
	Difference	2,117
2013	Dry Creek (Bull River Ditch)	1,277
	Wells	235
	Provo Reservoir Canal	297
	Exchanges with Highland City (American Fork River water)	67
	Total Calculated Amount of Water Received by Lehi City	1,876
	Total amount Lehi City should receive = 2,329 shares @ 2.6 AF/share @ 43.5% allocation	2,634
	Difference	758
2014	Dry Creek (Bull River Ditch)	1,133
	Wells	119
	Provo Reservoir Canal	164
	Exchanges with Highland City (American Fork River water)	240
	Total Calculated Amount of Water Received by Lehi City	1,656
	Total amount Lehi City should receive = 2,461 shares @ 2.6 AF/share @ 65% allocation	4,160
	Difference	2,504
2015	Dry Creek (Bull River Ditch)	1,014
	Wells	0
	Provo Reservoir Canal	159
	Exchanges with Highland City (American Fork River water)	176
	Total Calculated Amount of Water Received by Lehi City	1,348
	Total amount Lehi City should receive = 2,577 shares @ 2.6 AF/share @ 41% allocation	2,748
	Difference	1,400

Summary

In summary, Lehi City can count on a reliable supply of water from CUWCD, Micron water, PRWUA, and Mini/Spring Creek/Well water. The Lehi City wells have also been a dependable source of water. Lehi City has also been receiving more than its estimated water allotment from the Mitchell Hollow, Lehi Spring Creek, and North Bench Irrigation Companies in most years. Lehi City does not receive its full water allocation from the LIC, even accounting for reduced water deliveries due to drought. It is known by Lehi City and LIC that LIC does not have the infrastructure to deliver water to Lehi City’s pressurized irrigation system.

Based on the analysis above and tabulated in Table 9, Lehi City should have received an additional 743 acre-feet in 2012, 436 acre-feet in 2013, 3,284 acre-feet in 2014, and 2,151 acre-feet in 2015 from combined sources. Receiving this water would have eliminated the need to rent any water from CUWCD in 2014 and 2015, and reduced the amount of water rented in 2013. At \$150 per acre-foot, this would be a savings of \$187,500 in 2014 and \$300,000 in 2015.

Recommendations

Conducting this water audit provides the information needed to show that adequate water is apportioned to Lehi City. Money that has been spent on renting water from CUWCD can be used on other resources in the future if solutions are found. The following are recommendations to assist Lehi City in better management of its pressurized irrigation system water.

- Do not accept new shares from the following irrigation companies for pressurized irrigation use: East Jordan Irrigation Company, Fort Field Irrigation Company, South Jordan Irrigation Company, and Utah & Salt Lake Irrigation Company. There are no current conveyance facilities that can convey water from these sources into the Lehi City pressurized irrigation system.
- Do not accept new shares in the American Fork Irrigation Company. The total shares owned in this company are currently adequate to provide Lehi City's share of water needed for the Fox Hollow Golf Course. No additional shares are needed.
- Measure the actual diversions from the American Fork River and Dry Creek, so the actual amount of water Lehi City is entitled to from LIC and NBIC can be determined.
- Work with Lehi Irrigation Company to:
 - Communicate that insufficient water has been delivered based on shares owned by Lehi City.
 - Brainstorm opportunities to deliver Lehi City its water allotment. Irrigation companies are responsible for conveying water to its shareholders. New conveyance facilities are needed in order for Lehi City to receive its water. As a 40% shareholder, the city is entitled to facilities to receive its water. Other Lehi users account for an additional 30% of the shareholders.
 - Encourage delivery of water from American Fork River to Lehi City. Diversions are not currently being made because LIC says the water will not reach Lehi City. However, someone else is receiving and using this water Lehi City is paying for.
 - Provide more exchanges from American Fork River water between the city and HCD operated by Highland City.

- A potential to convey water from American Fork River to Lehi City would be to use any available capacity in Highland City's system. An agreement would be needed between Lehi and Highland City to facilitate this opportunity.
- Work with North Bench Irrigation Company to:
 - Ensure water allotment is delivered based on shares owned by Lehi City.
 - Reallocate water deliveries based on the company's classes.
- Request an analysis of the Lehi City wells pumping status. These pumps were installed 20+ years ago and are likely not operating at peak efficiency. The well drawdown and aquifer levels have changed.
- Install flow meters on the three surface water inflows to Mill Pond. Capture the Prestwich and Guyman flows prior to entering Mill Pond for use in Lehi's system.
- Sign an agreement with the HCD that represents how actual exchanges are taking place, or make sure the current agreement is being followed. Create a method to document exchanges.
- Create a written agreement with Mini Creek water users, Jay and Mindy Sager.
- Rather than spend money on rented water from CUWCD, develop water projects to get water from American Fork River to Lehi City's pressurized irrigation system. The amount paid for rented water could easily pay for a loan on any projects.
- Conduct a feasibility study to research the viable options and cost estimates associated with these recommendations.

Appendices

Appendix A

Contact Information for Shares Owned In Companies

Irrigation Company/Company	Contact	
Lehi Irrigation Company	Lee Barnes, President John Bushman	801-372-0173 801-368-6370
Mitchell Hollow Irrigation Company	Jeff Mitchell, President Randy Bleazard – WM	801-367-9026 801-369-1236
North Bench Irrigation Company	Kenny Carter – WM Renita Revel, Secretary	801-427-0070 801-318-6841
Lehi Spring Creek Irrigation Company	Stan Lewis, President John Bushman, Secretary	801-368-6741 801-368-6370
American Fork Irrigation Company	Ernie John, President	801-471-6576
Provo River Water Users Association	Stan Roberts, Provo River Commissioner Dave Faux, PRWUA	801-224-1797 801-796-8770
East Jordan Irrigation Company	Bill Marcovecchio	801-255-3111
Fort Field Irrigation Company	John Hinckley, President Gene Lamb, Secretary	801-375-9323 801-373-7349
South Jordan Irrigation Company	Ralph Mackay	801-968-0695
Utah & Salt Lake Irrigation Company	Nelson Peterson, President Carolyn McCauley, Secretary	801-969-5419 801-967-3965
Highland City Highland Conservation District	Justin Purdone, Water Operator	801-420-0547

Appendix B

PRWUA Water Entitlement

PRWUA shareholders are entitled to both Deer Creek storage water and to ‘Natural Flow’ water.

Deer Creek Storage

PRWUA owns 16,000 shares of PRWUA stock. This entitles them to a total of 16% (up to a maximum of 16,000 acre-feet) of the PRWUA water stored and available in Deer Creek Reservoir during a water year. In a 100% allotment year, that will be the maximum of 16,000 acre-feet. In a 50% allotment year, that will be only 8,000 acre-feet. The PRWUA Board of Directors will determine each year what percentage allotment will be applied to deliveries for that year. They will apportion out every drop of water available to deliver to Association shareholders based on the number of shares owned. Therefore, PRWUA shareholders will receive every drop of storage water available to be delivered to them as per their shares of Association stock.

Natural Flow (Only pertains to PRWUA)

PRWUA has various other water rights that bring them “natural flow” water during the water season. These rights include “Echo Storage”, “9580 water”, “Shingle Creek water”, “Wright Estate” water, and “Upper Lakes Storage” water.

Natural flow water availability is determined each day by Stan Roberts, the Provo River Commissioner. He then notifies PRWUA of the amount of natural flow water available each day, and that amount is divided – proportional to number of shares owned – between all PRWUA shareholders who took water delivery on that particular day. The reason it has to be done on a daily basis is because there is no storage right associated with these natural flow rights.

For example: On a particular day, only four PRWUA shareholders are taking water delivery. One shareholder owns 100 shares of PRWUA, another shareholder owns 50 shares of PRWUA, a third owns 35 shares of PRWUA, and the fourth owns 15 shares of PRWUA. On that day the river commissioner tells us that 100 acre-feet were available for natural flow delivery. The first shareholder (the one who owns 100 shares of stock) would be entitled to 50% of the natural flow water available on that day, because he owns 50% of the shares (a total of 200) that actively took delivery of PRWUA water on that day. The second shareholder (the one who owns 50 shares of stock) would be entitled to 25% of the natural flow water available on that day, because he owns 25% of the shares that actively took delivery of PRWUA water on that day. The third shareholder would be entitled to 17.5% of natural flow water on that day, and the fourth shareholder would be entitled to 7.5% of natural flow water on that day. If, on any given day, a particular shareholder’s entitlement to natural flow water is in excess of the amount of water delivered, the excess is then accredited proportionally to the other shareholders who took delivery of PRWUA water.

Extra Allotment

In wet years, when Deer Creek Reservoir will fill, the Provo River Commissioner has the right and ability to declare “extra allotment” water. This water is surplus to the filling of Deer Creek Reservoir, and is available on a daily basis to be used by Association shareholders. Mr. Roberts determines the length of days of the extra allotment period. During extra allotment, all water delivered to Association shareholders (including PRWUA) is considered extra allotment water, and is not charged against their Deer Creek storage water. Please note that extra allotment water typically arrives concurrently with natural flow water, and the natural flow water (because it does not have a storage right in Deer Creek Reservoir) is lost.

Appendix C

Water Decrees for Dry Creek

Water Right 55-7549: The Smith Decree, dated July 14, 1890

Restrictions that pertain to Dry Creek and its tributaries, except Grove Spring Stream. The Smith Decree also pertains to the North Bench Irrigation Company (NBIC).

1. April 1 to June 30, North Bench can appropriate and use $\frac{2}{13}$ of $\frac{1}{2}$ of the waters of Alpine Irrigation Company (AIC) and $\frac{2}{13}$ of $\frac{1}{2}$ of the waters of the Lehi Irrigation Company (LIC), making an appropriation of $\frac{2}{13}$ of the whole stream of Dry Creek at the Lehi-Alpine Diversion Dam. (locate on map S1809 Feet and W 1293 feet from the NE corner of Section 18, T4S, R2E, SLBM)

Fork Canyon Creek at the Fork Canyon Diversion Dam – North Bench can appropriate and use $\frac{2}{13}$ of $\frac{1}{2}$ of the waters of AIC and $\frac{2}{13}$ of $\frac{1}{2}$ of the waters of the LIC, making an appropriation of $\frac{2}{13}$ of the whole stream.

2. Written contract between NBIC and LIC dated March 12, 1892 states North Bench receives $\frac{1}{2}$ of LIC's $\frac{1}{2}$ interest in flow of Dry Creek from July 1 to July 10.
3. From October 1 to March 31, NBIC receives $\frac{1}{4}$ interest in flow of Dry Creek and its tributaries, except Grove Spring Stream, from AIC, above the North Bench-Lehi Irrigation Company's Diversion Dam.

Operation of the North Bench-Lehi Irrigation Company's Diversion Dam: when the total flow of Dry Creek and its tributaries, except Grove Spring Stream, above the head gate is less than or equal to 30 cfs, by mutual agreement the water can be placed in the Bull River Ditch and LIC receives $\frac{1}{2}$ of flow and NBIC receives $\frac{1}{2}$ of flow.

When Dry Creek and its tributaries, except Grove Spring Stream, above the Lehi-North Bench Irrigation Company's head gate has a flow greater than 30 cfs, NBIC receives $\frac{4}{15}$ of flow, LIC receives $\frac{11}{15}$ of flow.

This method of dividing water exists as long as water flows down the natural channel of Dry Creek and its tributaries, except Gove Spring Stream, above the Lehi-North Bench Irrigation Company's head gate.

Water Right 55-6925: The H.W. Smith Decree dated July 14, 1893

Water Right 55-6925 has a priority date of 6/15/1877 for 30 cfs or 4812.76 acre-feet. The H.W. Smith Decree dated July 14, 1893, directs the flow in Dry Creek (Bull River Ditch).