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Long Range Water Plan

May 2013

Prepared for:

The City of Liberty

Prepared by:

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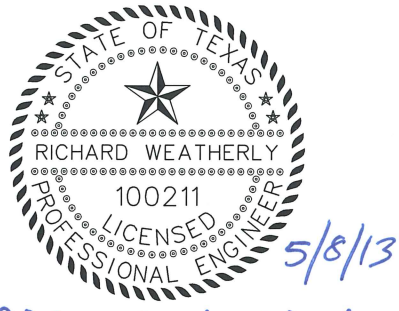
Long Range Water Plan
May 2013



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1.0 INTRODUCTION

The City of Liberty is a community located in southeast Texas, within Liberty County. The City currently provides water service to approximately 8,700 people utilizing groundwater as their sole source of water supply. The population within the service area is projected to grow by almost 50% in the next 20 years. Accommodating this growth in an efficient and cost effective manner, while also focusing on maintaining high quality service to existing customers, is the purpose of this 2013 Long Range Water Plan. This report has been prepared to provide the City of Liberty a planning tool that will serve as a guide for short-term and long-term water supply planning.

1.1 SCOPE OF WORK

Freese and Nichols, Inc. (FNI) was retained in 2012 by the City of Liberty to prepare a Long Range Water Plan. The major elements of the scope of this project included:

- Population & Demand Projections
- Water Supply Assessment
- Wastewater Reuse Feasibiity
- Water Distribution Improvements
- Phased Capital Improvements Plan

The goals of the Long Range Water Plan were to summarize the long term availability of groundwater and surface water supplies, assess the feasibility of implementing a reuse program, evaluate the water distribution system's ability to serve the future water service area and to recommend a phased capital improvement plan (CIP) through the year 2030. The recommended improvements will serve as a basis for the design, construction, and financing of facilities required to meet Liberty's long range water supply needs.

1.2 LIST OF ABBREVIATIONS

Table 1.1 Table of Abbreviations

Abbreviation	Actual
AD	Average Day Demand
ac-ft/yr	Acre-Feet per Year
BOD_5	
CCN	Certificate of Convenience and Necessity
CFU/100 mL	Colony Forming Units per 100 milliliters
CIP	Capital Improvement Program
COH	City of Houston
EST	Elevated Storage Tank
FNI	Freese and Nichols, Inc.
GCD	Groundwater Conservation District
GIS	Geographic Information Systems
gpcd	Gallons per Capita per Day
gpd	Gallons per Day
gpm	Gallons per Minute
GST	Ground Storage Tank
HGAC	Houston-Galveston Area Council
MAG	Modeled Available Groundwater
MD	Maximum Day Demand
MG	Million Gallons
MGD	Million Gallons per Day
mg/l	Milligrams per Liter
NTU	Nephelometric Turbidity Units
PH	Peak Hour Demand
psi	Pounds per Square Inch
TCEQ	Texas Commission on Environmental Quality
TRA	Trinity River Authority
TWDB	Texas Water Development Board
WWTP	Wastewater Treatment Plant

2.0 POPULATION

Population projections are an important element in the analysis of water supply and water distribution systems. Water demands depend on the residential population and commercial development served by the system and determine the sizing and location of system infrastructure. A thorough analysis of historical and projected populations provides the basis for projecting future water demands.

2.1 SERVICE AREA

Figure 2.1 shows the service area evaluated as part of Liberty's Long Range Water Plan. Liberty's city limits encompass approximately 40.66 square miles or 26,024 acres. While the current Liberty CCN (certificate of convenience & necessity) area does not encompass the entire city limits, it is anticipated that the City of Liberty will serve all areas within the current city limits in addition to the current CCN area.

CITY OF LIBERTY CCN

LIBERTY / RAYWOOD WSC DUAL CCN

LIBERTY / AMES MWSC DUAL CCN

RAYWOOD WSC CCN

AMES-MINGLEWOOD WSC CCN

LIBERTY CITY LIMITS

CCN BOUNDARIES

- City of Liberty
- Ames-Minglewood WSC
- Raywood WSC
- Liberty/Ames MWSC Dual CCN
- Liberty/Raywood MWSC Dual CCN

0 2,500 5,000

SCALE IN FEET

FIGURE 2.1
CITY OF LIBERTY
SERVICE AREA

LEGEND

- Roads
- Railroad
- Stream
- Lake
- Liberty City Limit

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2.2 HISTORICAL POPULATION

US Census data for the City of Liberty was used to determine the 2000 and 2010 population. The data indicated an increasing growth rate with an average annual growth of 0.44% from 2000 to 2010. The 2012 population was considered the base year population and was developed using Houston-Galveston Area Council (HGAC) 5-year growth rates. **Table 2.1** presents the historical populations for the City of Liberty.

Table 2.1 Historical Population

Year	Population	Average Annual Growth Rate
2000[(1)]	8,033	-
2010[(1)]	8,397	0.44%
2012	8,704	1.81%
Average		**0.67%**

(1) Official US Census population

2.3 PROJECTED POPULATION

Population growth projections were developed for the City of Liberty and adjacent potential growth areas for years 2010 through 2030. FNI consulted the Texas Water Development Board's Region H Regional Water Plan and the HGAC Regional Growth forecast to project future population.

Region H projections are based on the Texas State Data Center's cohort-component projections for counties, which considers base population as well as birth, death, and migration rates. These county-level projections are then disaggregated to cities, utilities, and water authorities based on a number of factors, including local input. Region H estimates are available on a decadal basis through the year 2060. HGAC's 2040 Regional Growth forecast uses a somewhat different model which considers both biological components (birth, aging, and survival) and social factor event types (domestic migration in and out, foreign in-migration). These factors are applied annually to a base year population, starting with Texas State Data Center estimates and then using prior year results for the following base year population. HGAC projections are available on a 1,000-ft grid. Geographic Information System (GIS) analysis was used to extract annual population projections for grid cells within the City of Liberty city limits and surrounding CCNs.

Projections from the HGAC grid are far higher than those from the Region H plan, even after adjusting results for Census 2010 results. This is likely due to differences in methodology as well as local data availability and resolution. For purposes of this study it is recommended that the more conservative

HGAC data be used due to the more local focus of the HGAC analysis and the possibility for strong growth related to development of the Grand Parkway transportation corridor.

Table 2.2 presents the projected water service area population for each planning period.

Table 2.2 Population Projections

Year	City of Liberty Population	Future Service Area Population	Potential Total Service Area Population	Average Annual Growth Rate
2015	9,165	487	9,652	3.63%
2020	10,007	2,103	12,110	5.09%
2030	10,864	2,408	13,272	0.96%

3.0 WATER DEMANDS

A water utility must be able to supply water at rates that fluctuate over time. Yearly, monthly, daily, and hourly variations in water use occur, with higher use during dry years and in hot months. Flow rates most important to the hydraulic design and operation of a water plant and distribution system are average day (AD), maximum day (MD), and peak hour (PH) demands. Average day use is the total annual water use divided by the number of days in the year. The average day demand rate is used as a basis for estimating maximum day and peak hour demands. Maximum day demand is the maximum quantity of water used on any one day of the year. Water supply facilities are typically designed based on the maximum day demand. Peak hour use is the peak rate at which water is required during any one hour of the year. Since minimum distribution pressures are usually experienced during peak hour, the sizes and locations of distribution facilities are generally determined based on this condition.

3.1 HISTORICAL WATER DEMANDS

Reviewing historical water demands provides insight into selecting design criteria used to project future water demands. Historical monthly water usage records were analyzed from 2007 through 2011. The City provided recent water usage data consisting of monthly production and maximum day consumption. Historical annual average day demand, maximum day to average day peaking factors, and per-capita consumption are summarized in **Table 3.1**.

Table 3.1 Historical Water Usage

Year	Population	Average Day Demand (MGD)	Average Per-capita (gpcd)	Maximum Day Demand (MGD)	MD:AD Peaking Factor
2007	8,330	1.35	162	3.52	2.61
2008	8,345	1.31	156	2.74	2.10
2009	8,379	1.27	151	2.98	2.35
2010	8,397	1.51	180	3.20	2.11
2011	8,455	1.64	194	3.88	2.37
Average		**1.42**	**169**	**3.26**	**2.31**
Maximum		**1.64**	**194**	**3.88**	**2.61**

3.2 PROJECTED WATER DEMANDS

Water demands were projected for 2012, 2015, 2020, and 2030 conditions. The evaluation of historical data provided a basis for determining the design criteria used to project water demands. Average day per capita water usage ranged from a low of 151 gpcd to a high of 194 gpcd during the 2011 drought, with an average of 169 gpcd over the last 5 years. Based on the review of this data and the need to plan for low rainfall (dry) years with minimal water restrictions, FNI recommends using an average day demand of 200 gpcd. In selecting a peaking factor to project maximum day demands, FNI reviewed historical peaking factors and the years in which those peaking factors occurred, as just using the highest values for per-capitas and peaking factors may be over conservative. Historical water usage data indicated the maximum day to average day peaking factor ranged from 2.10 to 2.61 over the last 5 years with an average of 2.31; therefore, a peaking factor of 2.40 was selected for future year demands given the data from the past two years. The Texas Commission on Environmental Quality (TCEQ) recommends that, in the absence of verified historical data, the peak hourly demand be 1.25 times the maximum daily demand (prorated to an hourly rate).

As described in Section 7.2, the City will be creating a new pressure plane. The populations by census block tract were overlaid with future pressure plane boundaries and used to distribute water demands by future pressure plane throughout the City. The projected population and water demands are summarized for each planning period in **Table 3.2**.

Table 3.2 Water Demand Projections

Planning Year	Population	Average Per-capita (gpcd)	Average Day Demand (MGD)	MD:AD Peaking Factor	Maximum Day Demand (MGD)	PH:MD Peaking Factor	Peak Hour Demand (MGD)
2012	8,704	200	1.74	2.4	4.18	1.25	5.22
2015	9,652	200	1.93	2.4	4.63	1.25	5.79
2020	12,110	200	2.42	2.4	5.81	1.25	7.27
2030	13,272	200	2.65	2.4	6.37	1.25	7.96

4.0 DESCRIPTION OF THE EXISTING WATER SYSTEM

The City of Liberty's water distribution system consists of a network of water lines, three elevated storage tanks and two groundwater plants with associated ground storage tanks and pump stations. The distribution system is served by a single pressure plane. The City of Liberty's distribution system consists of 65 miles of water lines. Pipeline diameters range in size from 1.5-inch to 12-inches. **Figure 4.1** shows the existing water distribution system for the City of Liberty.

4.1 GROUNDWATER PLANTS

The City currently has two water plants in service to supply all of the City's water demands. The Monta Water Plant is located in the center of the City of Liberty. The North Water Plant is located in the northeast corner of the City. The Trinity Water Plant, which is currently out of service, is located to the west of the Monta Plant in the center of the City. **Table 4.1** provides a summary of estimated reliable well production capacity from each of the water plants within Liberty's distribution system.

Table 4.1 Existing Water Plants

Facility	Estimated Reliable Well Production Capacity (gpm)
Monta Water Plant	1,250
North Water Plant	1,250
TOTAL PRODUCTION CAPACITY	**2,500**

4.2 STORAGE FACILITIES

The City currently utilizes two ground storage tanks (GSTs) within the distribution system. The first GST is located at and supplied by the Monta Water Plant. The second GST is located at and supplied by the North Water Plant.

Additionally, three elevated storage tanks (ESTs) are located throughout the distribution system. One EST is located at the Monta Water Plant. The Palmer Street EST is located in the southwestern part of the City. The San Jacinto EST is located in the south central part of the City. **Table 4.2** presents a summary of the City's existing ground storage tanks, and **Table 4.3** summarizes the elevated storage facilities.

Table 4.2 Existing Ground Storage Tanks

Tank Name	Capacity (MG)
Monta Water Plant GST	1.00
North Water Plant GST	0.50
Trinity Water Plant GST[(1)]	0.30
TOTAL IN-SERVICE	**1.50**

[(1)] Currently Out of Service

Table 4.3 Existing Elevated Storage Tanks

Tank Name	Capacity (MG)
Monta Water Plant EST	0.200
Palmer Road EST	0.300
San Jacinto EST	0.065
TOTAL IN-SERVICE	**0.565**

FIGURE 4.1

CITY OF LIBERTY

EXISTING WATER SYSTEM

LEGEND

- Existing Elevated Storage Tank
- Existing Ground Storage Tank
- Water Plant
- 6" and Smaller Water Line
- 8" and Larger Water Line
- Road
- Railroad
- Index Contour (25 ft)
- Intermediate Contour (5 ft)
- Stream
- Lake
- Liberty City Limit
- Other City Limit

North Water Plant
Production Capacity: 1,250 gpm
(3) - 1,000 GPM Booster Pumps
0.50 MG Ground Storage Tank

Monta Water Plant
Production Capacity: 1,250 gpm
(3) - 1,000 GPM Booster Pumps
1.0 MG Ground Storage Tank
0.20 MG Elevated Storage Tank

Trinity Water Plant
0.30 MG Ground Storage Tank
(Out of Service)

Palmer Street
0.30 MG Elevated Storage Tank

San Jacinto Street
0.065 MG Elevated Storage Tank

City of Ames Water Plant

City of Liberty

City of Ames

Josie Lake

Twin Lake

Lake Liberty

0 1,200 2,400
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5.0 WATER SUPPLY ASSESSMENT

5.1 GROUNDWATER

Groundwater represents the City of Liberty's sole existing water supply source. Therefore, groundwater availability is critical for the City's long-term water supply planning. The TWDB's estimate of modeled available groundwater (MAG) for Liberty County is 43,033 ac-ft per year through 2040. Almost the entire MAG occurs in the Chicot and Evangeline formations of the Gulf Coast Aquifer, with very little available in the deeper Jasper formation. While groundwater is likely to remain a major component of municipal and industrial water supply in Liberty County, future changes to state policy regarding groundwater or future revisions of the MAG could result in lower estimated available groundwater supply.

Liberty County is located within Groundwater Management Area 14, which includes 21 counties along the Gulf Coast. The county does not currently have a groundwater conservation district (GCD) to administer permitting or apply pumpage limits. Loss of subsurface storage capacity due to subsidence would also reduce availability, although to date subsidence has not posed a substantial threat to the county's groundwater resources.

Table 5.1 reflects a county-wide comparison of water demands to available groundwater. Most of the non-irrigation demand growth in Liberty County is anticipated to be municipal. The MAG is more than sufficient to meet non-irrigation water demands in Liberty County through 2040. Liberty County irrigation demands are primarily served by surface water.

Table 5.1 Liberty County Water Demand vs MAG (acre-ft/year)

Supply / Demand	Balance Component	2020	2030	2040
Liberty County MAG	Gulf Coast Aquifer	43,033	43,033	43,033
Liberty County Non-Irrigation Demands	Non-Irrigation Demands[(1)]	25,974	27,997	30,188
Liberty County Remaining Available Groundwater		**17,059**	**15,036**	**12,845**

[(1)] From 2011 Region H Water Plan

5.2 SURFACE WATER

The evaluation of potential surface water supply for the City of Liberty incorporated several sources of information, including prior Regional Water Plans and discussions with water right holders. Assessments focused on supplies in the lower Trinity River basin below Lake Livingston. Interbasin transfers from adjacent river basins were not considered due to the City of Liberty's close proximity to the Trinity River and the legal and financial challenges associated with moving water across river basins. While there are a number of water rights in the lower basin, the majority are small run-of-river rights with limited yield or reliability. Many of these rights would require permit amendments to allow for municipal use and an additional diversion location.

The most viable surface water option in the lower basin is Lake Livingston, which has a total permitted diversion of 1,3440,000 ac-ft per year held jointly by the Trinity River Authority (TRA) and the City of Houston (COH). The reliability and volume of this water right and the proximity upstream of the City of Liberty offer a number of advantages over other options. The City is located between the Capers Ridge diversion location for the ongoing Luce Bayou project and the existing Coastal Water Authority (CWA) pump station diversion point downstream. While a permit amendment or additional authorization might be required to allow a new diversion point near the City, this would not be expected to be a major obstacle to procuring reservoir supply.

The TRA share of the Lake Livingston permit is 403,200 ac-ft. Examination of the 2011 Region H Water Plan suggests that even with other potential future projects and contract expansions, the remaining volume available to be contracted is likely to be approximately 80,000 ac-ft per year in 2060 and substantially higher for the near-term. Per discussion with TRA, they do have a substantial amount of water available to contract long-term. TRA's current contract rate for the purchase of raw water is $95 per ac-ft, although a rate study is currently in progress and this value may be adjusted when the study becomes available near the end of 2012. If the City of Liberty were interested in moving forward with a contract, TRA could work out a long-term plan for a contract that would increase over time with demands. This would allow the City to purchase water without having to contract a full, long-term amount immediately, thereby avoiding paying for water in excess of demands in the near-term. Prior to commencement of diversions, an agreed-upon volume could be reserved at a cost of 30 percent of the contract rate.

The City of Houston (COH), which holds the remaining 940,800 ac-ft per year of the permitted yield of Lake Livingston, is another option for contracted surface water supply. Per COH, timing of any projects

or contracts is essential to their long-term planning. If the City of Liberty is interested in pursuing a contract with COH, additional coordination with Houston would be necessary.

While it may be possible for the City of Liberty to independently contract with TRA or possibly COH for Lake Livingston supplies, consideration of participation in a regional approach is recommended. A regional approach in the lower Trinity River basin could result in lower overall project costs for participants and may be more feasible from a provider standpoint as well.

5.3 COMPARISON OF OPTIONS

Both groundwater and surface water strategies have merit for meeting future water supply needs for the City of Liberty. Both groundwater and surface water supplies are expected to be adequate to meet the City's demands through 2040.

The groundwater supply is largely buffered against short-term variability, such as drought, that can impact surface water supplies. However, increased water demands during drought conditions could result in accelerated aquifer drawdown and permanent loss of storage capacity through compaction. While surface water is more heavily impacted by drought, storage in Lake Livingston provides far greater reliability than run-of-river water rights. A contracted firm supply would be expected to be available even under drought conditions.

The groundwater plant infrastructure capital cost is estimated to be approximately $2.00 per gallon per day of water supply. This cost estimate is based on developing a new 1,500 gpm groundwater plant. The surface water treatment plant infrastructure capital cost is estimated to be approximately $5.00 per gallon per day of water supply. This cost estimate is based off the costs of other surface water plants in the region but is dependent upon numerous factors including source water quality and the determined treatment process. Further analysis would be required to develop a more precise cost estimate.

The City currently relies on groundwater supply and associated existing infrastructure. While treatment requirements can vary among well sites, groundwater would generally be expected to have simpler and less expensive treatment requirements than surface water. Surface water would require additional and more costly operations and maintenance as well as additional water distribution infrastructure in order to incorporate the surface water supply source into the water distribution system.

The comparison of groundwater and surface water supply alternatives is shown in **Table 5.2**. Due to the groundwater supply abundant availability and lower capital and O&M costs, **FNI recommends groundwater for supplying the City's water demands through 2040.**

Table 5.2 Comparison of Groundwater & Surface Water Supply Alternatives

Supply Alternative	Availability through 2040	Reliability Concerns	Contract	Water Plant Infrastructure Capital Cost	O & M Considerations
Surface Water	Yes	Drought	Contract with TRA or City of Houston	≈ $5.00/gpd	O&M Intensive
Groundwater	Yes	Aquifer Drawdown	No Change	≈ $2.00/gpd	City already has associated groundwater infrastructure

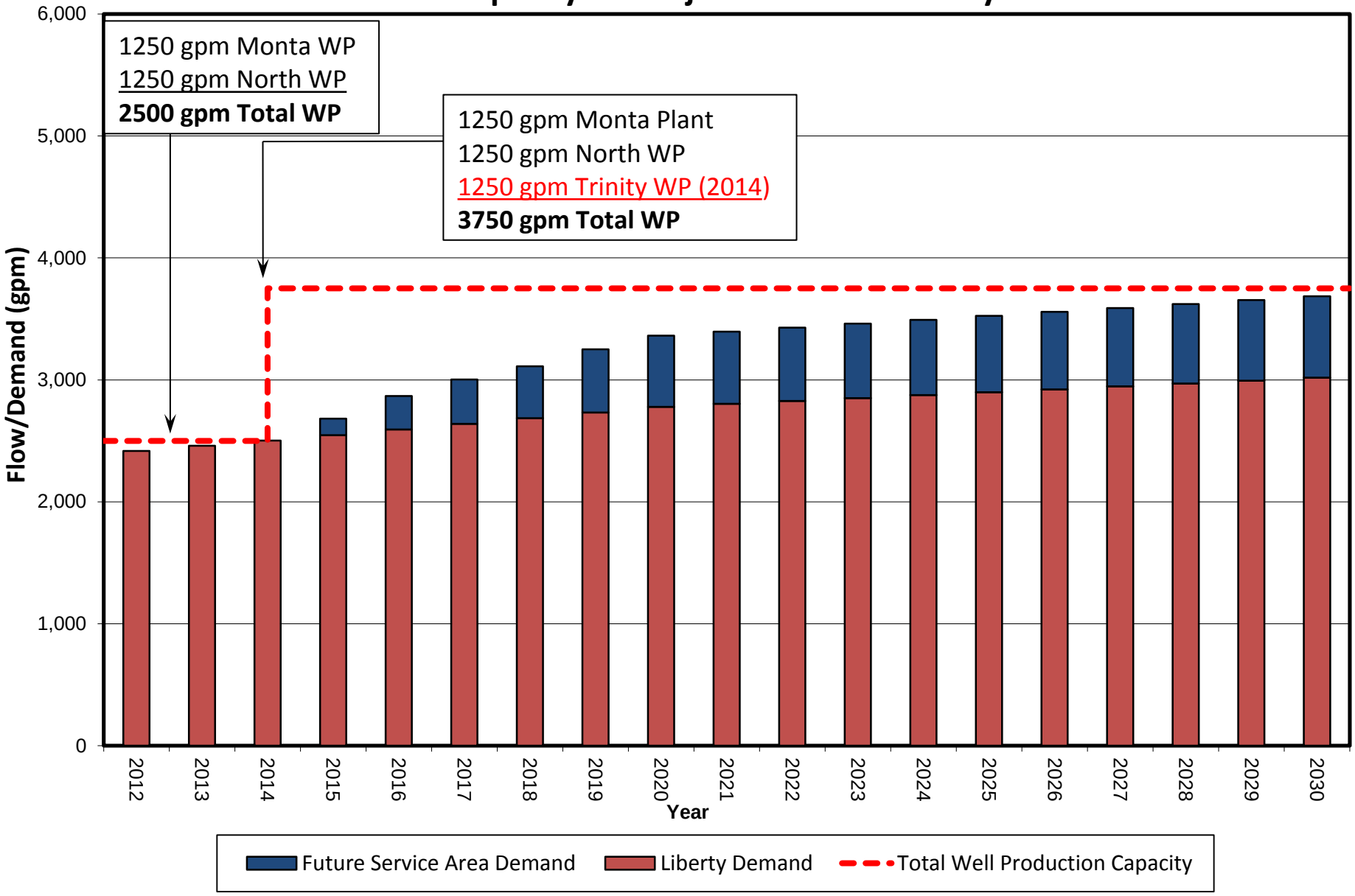
6.0 WATER DISTRIBUTION SYSTEM EVALUATION

Hydraulic analyses were conducted to evaluate the City of Liberty's water distribution system's ability to serve the future water service area and identify system deficiencies and areas needing improvement. Parameters used in developing the capital improvements plan included increasing system reliability, simplifying system operations and maintaining required system pressures.

6.1 INCREASE WATER SYSTEM RELIABILITY

Securing future water supply is essential to support continued growth within the City. The water supply capacity must be sufficient to replenish the water consumed daily within the service area. The maximum day demand is expected to grow from 3.48 MGD (2,400 gpm) to 5.31 MGD (3,700 gpm) by the year 2030. As seen in **Figure 6.1**, the projected demands exceed the existing water supply of 2,500 gpm by 2014. In addition, the City does not currently have a back-up firm supply in case one of the existing groundwater plants has to be taken out of service. Therefore, it is recommended that a new water well be drilled at the existing Trinity Water Plant site to add an additional 1,250 gpm of water supply and increase system reliability. Planning for an additional water supply will be needed in the later portion of the planning period.

Figure 6.1
City of Liberty
Well Production Capacity vs. Projected Maximum Day Water Demands



6.2 CREATION OF UPPER PRESSURE PLANE

Hydraulic analyses were conducted to evaluate the City of Liberty's water distribution system's ability to serve the future water service area. The City currently has one pressure plane with an overflow elevation of 170 feet, which sets the hydraulic gradient. A review of existing static pressures throughout the system revealed that it was difficult for the existing system to provide the TCEQ minimum required pressure of 35 psi to customers at ground elevations greater than 50 ft.

Figure 6.2 shows the ground elevations of the existing water distribution system for the City of Liberty. The figure shows that the existing water system is adequate to serve existing customers but as the City expands to the east, the existing pressure plane will not be able to efficiently supply and support this growth. Therefore, it is recommended that a new Upper Pressure Plane be created to ensure the TCEQ minimum required residual pressure of 35 psi is maintained at all times.

To create the new Upper Pressure Plane with an overflow elevation of 220 feet, the following improvements would be required:

- New Upper Pressure Plane 0.25 MG Elevated Storage Tank
    - Provide adequate elevated storage capacity and fire protection to Upper Pressure Plane
- 12" Water Line Extension to serve Upper Pressure Plane
    - Transmission line to serve Upper Pressure Plane customers and the new elevated storage tank
- Expansion of the North Water Plant
    - The North Water Plant will serve the Upper Pressure Plane
    - The Trinity and Monta Water Plants will serve the Lower Pressure Plane
    - Pressure Reducing Valves to isolate pressure planes and provide emergency connection from the Upper to Lower Pressure Plane
- 12" Water Transmission Loop for Upper Pressure Plane
    - Transmission line along eastern edge of Upper Pressure Plane to provide service and system reliability in Upper Pressure Plane

FIGURE 6.2

CITY OF LIBERTY

GROUND ELEVATION MAP

LEGEND

- Existing Elevated Storage Tank
- Existing Ground Storage Tank
- Water Plant (WTP)
- Wastewater Treatment Plant (WWTP)
- 6" and Smaller Water Line
- 8" and Larger Water Line
- Road
- Railroad
- Index Contour (25 ft)
- Intermediate Contour (5 ft)
- Stream
- Lake
- Liberty City Limit
- Other City Limit

ELEVATION

- Over 50'
- 30' - 50'
- 20' - 30'
- Under 20'

North Water Plant
Production Capacity: 1,250 gpm
0.50 MG Ground Storage Tank

Monta Water Plant
Production Capacity: 1,250 gpm
(3) - 1,000 GPM Booster Pumps
1.0 MG Ground Storage Tank
0.20 MG Elevated Storage Tank

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0.30 MG Elevated Storage Tank

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City of Liberty
Wastewater Treatment Plant

City of Ames
Water Plant

Josie Lake
Trinity River
Big Region
Twin Lake
Lake Liberty
City of Liberty
City of Ames

0 1,200 2,400
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7.0 WASTEWATER REUSE FEASIBILITY

7.1 SUMMARY OF TEXAS REUSE WATER REGULATIONS

In the state of Texas, the TCEQ regulates the use of reclaimed (reuse) water for nonpotable uses only after the notification by a water producer of the intent to provide reuse water for specified purposes. Regulations are found in Title 30, Chapter 210 of the Texas Administrative Code (30 TAC 210), which defines two types of reuse water based on its level of contact with the public.

Quality requirements are based on the intended use and the potential for human contact with the water. For those uses in which there is a high potential for public contact (e.g. parks or school ground irrigation), Type I requirements apply. Reuse uses for which there is controlled access to the usage site are classified as Type II. More specific uses and the requisite water quality parameters are defined below.

Type I Potential Uses

- Irrigation of residential lawns, public parks, golf courses and athletic fields
- Fire protection
- Irrigation of food crops and pastures for milking animals
- Maintenance of natural water bodies where recreational activities are anticipated
- Toilet or urinal flush water

Type II Potential Uses

- Irrigation of sod farms, silviculture, limited access and ROWs
- Irrigation of animal feed crops and food crops without contact with edible part or with pasteurization
- Maintenance of impoundments or water bodies where direct human contact is unlikely
- Soil compaction or dust control
- Irrigation or other nonpotable uses at a WWTP
- Cooling tower make-up water

Table 7.1 provides the specific treated water quality requirements for Type I and Type II reuse applications.

Table 7.1 Water Quality Parameters for Different Water Reuse Applications

Water Quality Parameter		Type I	Type II
Water Quality Standards (30 Day Average)	BOD_5	5 mg/L	20 mg/L
	[or]$CBOD_5$	5 mg/L	15 mg/L
	Turbidity	3 NTU	-
	Fecal Coliform (avg)	<20 CFU/100 mL	<200 CFU/100 mL
	Fecal Coliform (single grab)	<75 CFU/100 mL	<800 CFU/100 mL
Sampling Analysis/Frequency		Twice/week	Once/week

7.2 POTENTIAL RECYCLED WATER CUSTOMERS & DEMANDS

Potential reuse water customers and demands were evaluated by identifying current large volume potable water customers that may have potential for a portion of their water needs to be supplied with reuse water. Monthly water use data for the top 20 water users was obtained for the one-year period from June 2011 to June 2012.

Figure 7.1 identifies the location of the six businesses chosen as potential reuse water customers. **Table 7.2** summarizes the estimated average and maximum water demands for the six potential reuse water customers. The customers are grouped as Southwest customers and Northeast customers based on their location within the City. Due to the longer distance from the City's WWTP and the relatively lower demand, it is recommended that the City focus their initial reuse program on serving the Southwest customers. The potential southwest reuse demands used for this reuse feasibility study are 0.288 MGD (200 gpm).

Table 7.2 Summary of Potential Reuse Water Demands

	Customer	Projected Maximum Day Demand (MGD)
Southwest	Boomerang Tube, LLC	0.265
	Liberty Forge	0.012
	Baze Chemical	0.011
Total Southwest Customer Reuse Demand		***0.288***
Northeast	R. Griswold Properties	0.034
	Keeton Services	0.023
	Ward McCarty, Inc.	0.016
Total Northeast Customer Reuse Demand		***0.073***

FIGURE 7.1

CITY OF LIBERTY

POTENTIAL REUSE CUSTOMERS

LEGEND

- Potential Southwest Reuse Customer
- Potential Northeast Reuse Customer
- Existing Elevated Storage Tank
- Existing Ground Storage Tank
- Water Plant
- Wastewater Treatment Plant
- Road
- Railroad
- Index Contour (25 ft)
- Intermediate Contour (5 ft)
- Stream
- Lake
- Liberty City Limit
- Other City Limit

FREESE AND NICHOLS

Ward McCarty, Inc.

Keaton Services

R. Griswold Properties, LLC

City of Liberty

City of Liberty Wastewater Treatment Plant

Baze Chemical and Liberty Forge

Boomerang Tube, LLC

City of Ames

Josie Lake

Twin Lake

Lake Liberty

Trinity River

0 1,200 2,400

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Job No.: LBT12289
Location: H:\R_WR_PLANNING\DELIVERABLES\06_Final_Report\Figure-7.1\Potential_Reuse_Customers.mxd
Updated: Friday, April 05, 2013 8:31:20 AM

7.3 REUSE WATER QUALITY & AVAILABILITY

The City of Liberty currently reports to the TCEQ the total suspended solids (TSS), BOD5, Fecal Coliform count and flow from their wastewater treatment plant (WWTP) each month. **Figure 7.2** illustrates the monthly average effluent water quality BOD5 from March 2007 to May 2012. As seen on **Figure 7.2**, during the past five years, BOD5 effluent water quality has consistently met the required Type II standard. However, during March 2007 and April 2011, the average effluent water quality did not meet Type I requirements for BOD5. The City of Liberty has had zero fecal coliform counts during the past five years. During the months where Type I water quality requirements are not met, the City would be restricted to supplying reuse water to only Type II customers.

FNI analyzed monthly flow data provided by the City from March 2007 through May 2012 to determine the historical trends in system-wide average daily flow. The historical wastewater flow is illustrated on **Figure 7.3.**

Figure 7.2
City of Liberty
Wastewater Treatment Plant Effluent BOD_5
March 2007 - May 2012

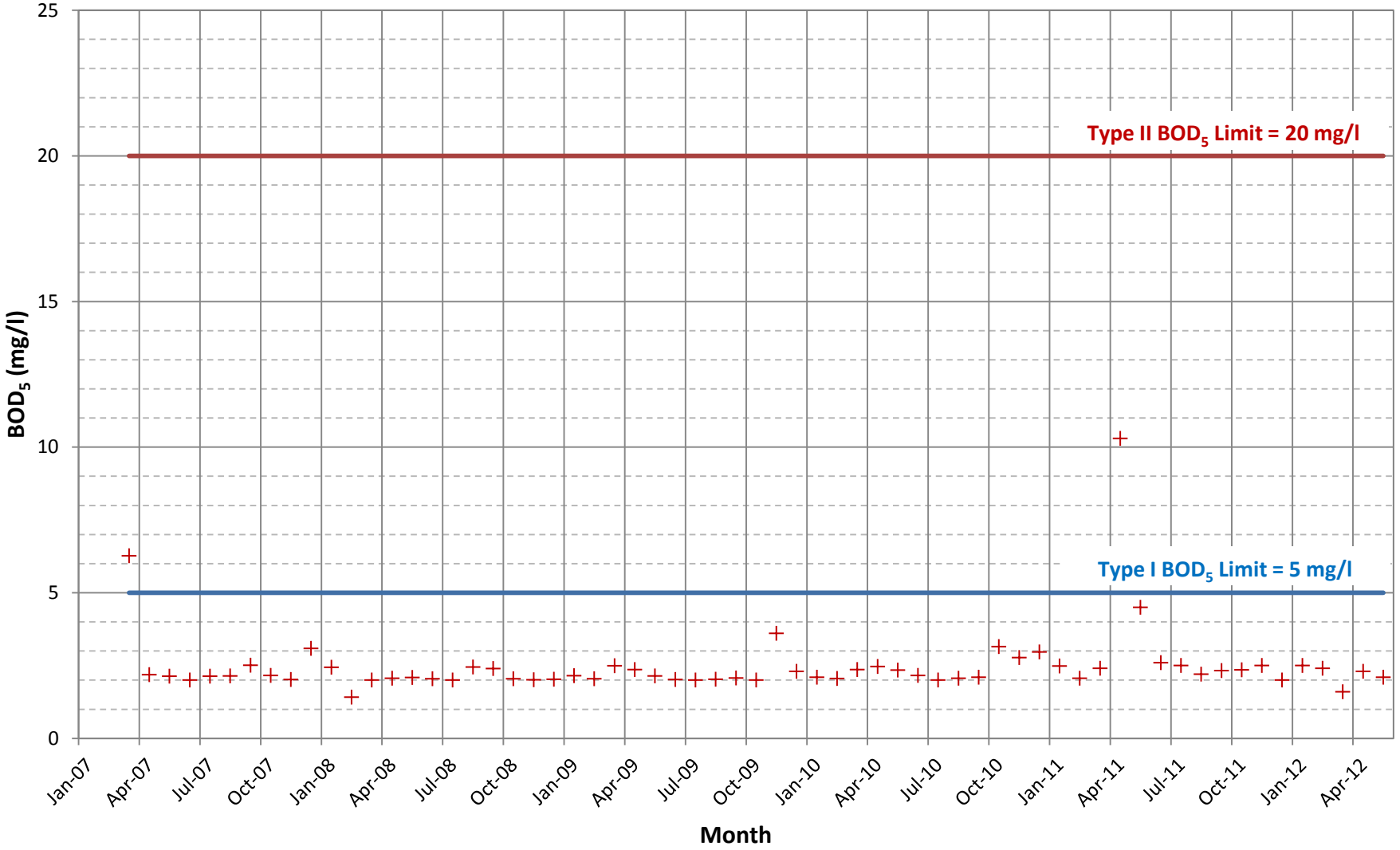
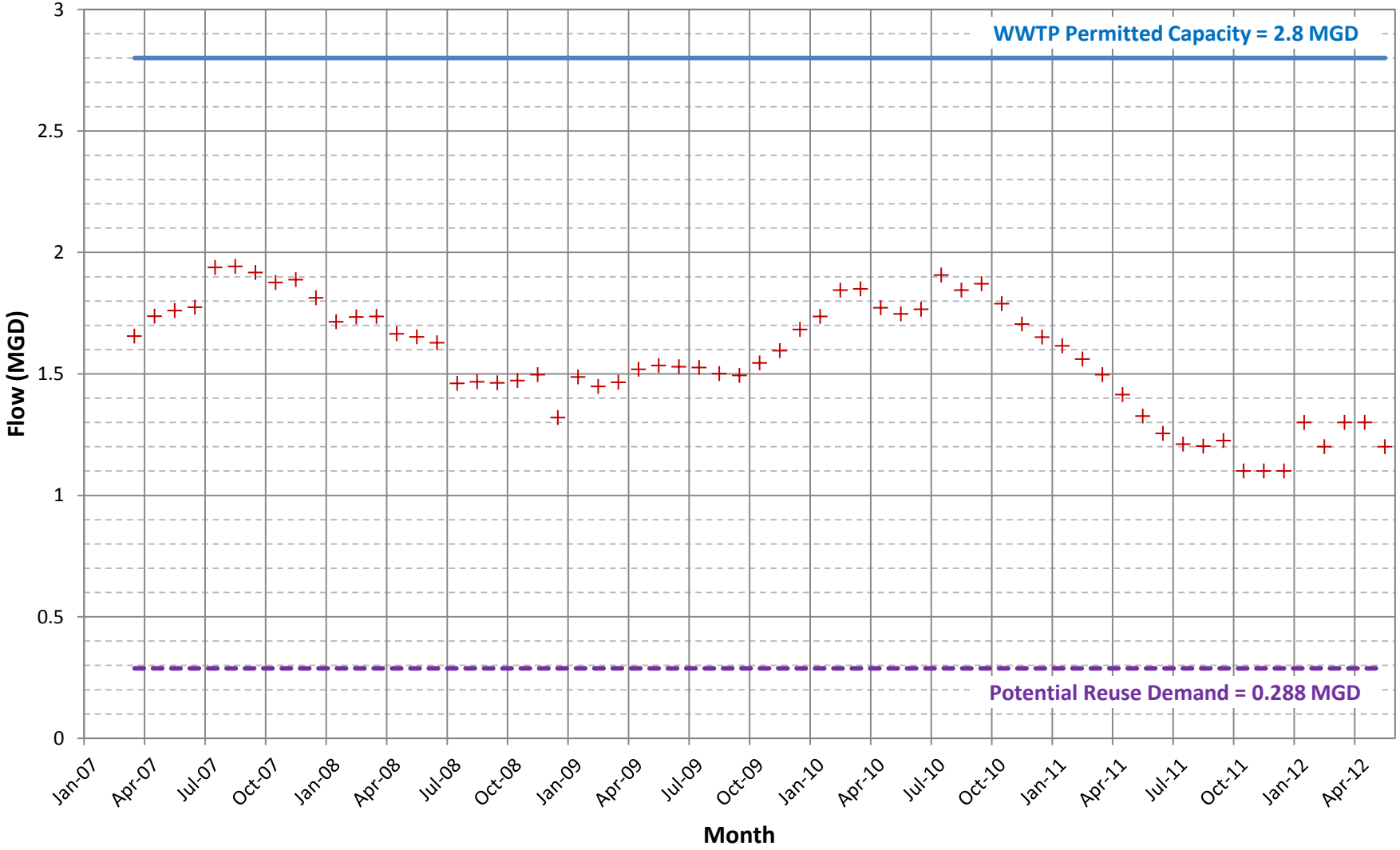


Figure 7.3
City of Liberty
Wastewater Treatment Plant Monthly Flow
March 2007 - May 2012



7.4 WATER REUSE SYSTEM

In order to deliver reuse water from the WWTP to the potential reuse customers, the following infrastructure is recommended:

- Reuse Pump Station with 200 gpm firm pumping capacity
- 75,000 gallon Ground Storage Tank
- 8,000 ft of 6” reuse transmission line

A map of the improvements is shown on **Figure 7.4**. A conceptual layout of the proposed improvements at the WWTP is shown on **Figure 7.5**. The detailed cost estimates are included in **Appendix A**.

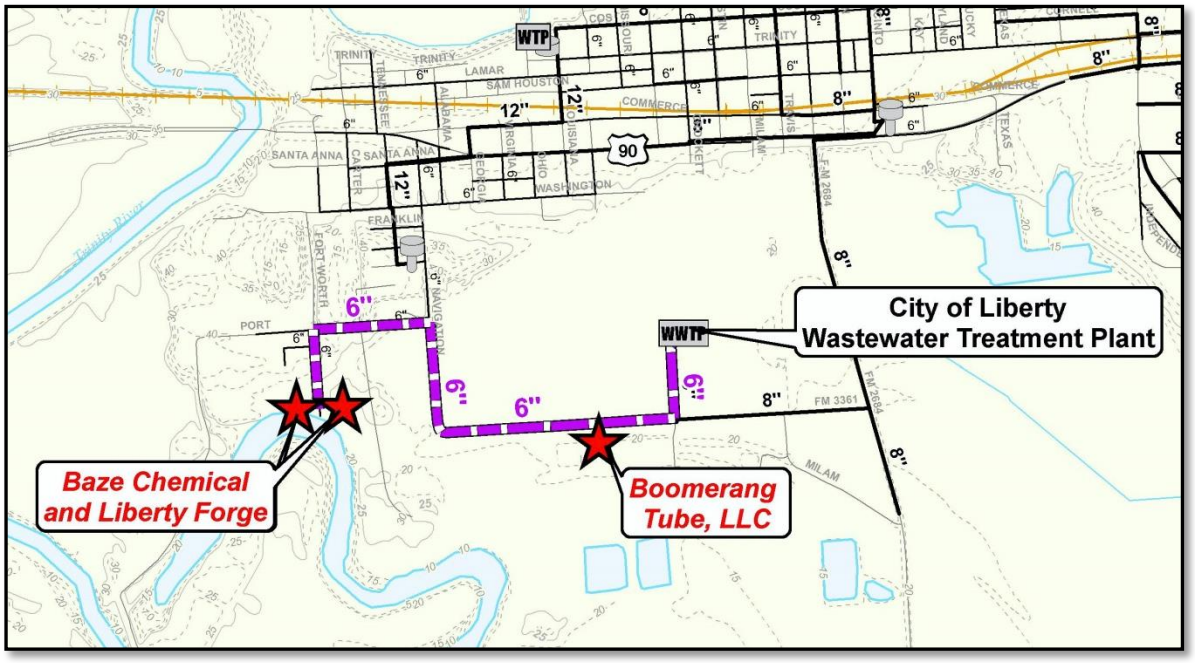


Figure 7.4 Reuse Water Transmission Line

Created By Freese and Nichols, Inc.
Job No.: LBT12269
Location: H:\W_WW_PLANNING\DELIVERABLES\06_Final_Report\(Figure-7.5)-Conceptual_Layout_of_Proposed_Reuse_System_at_Liberty_WWTP.mxd
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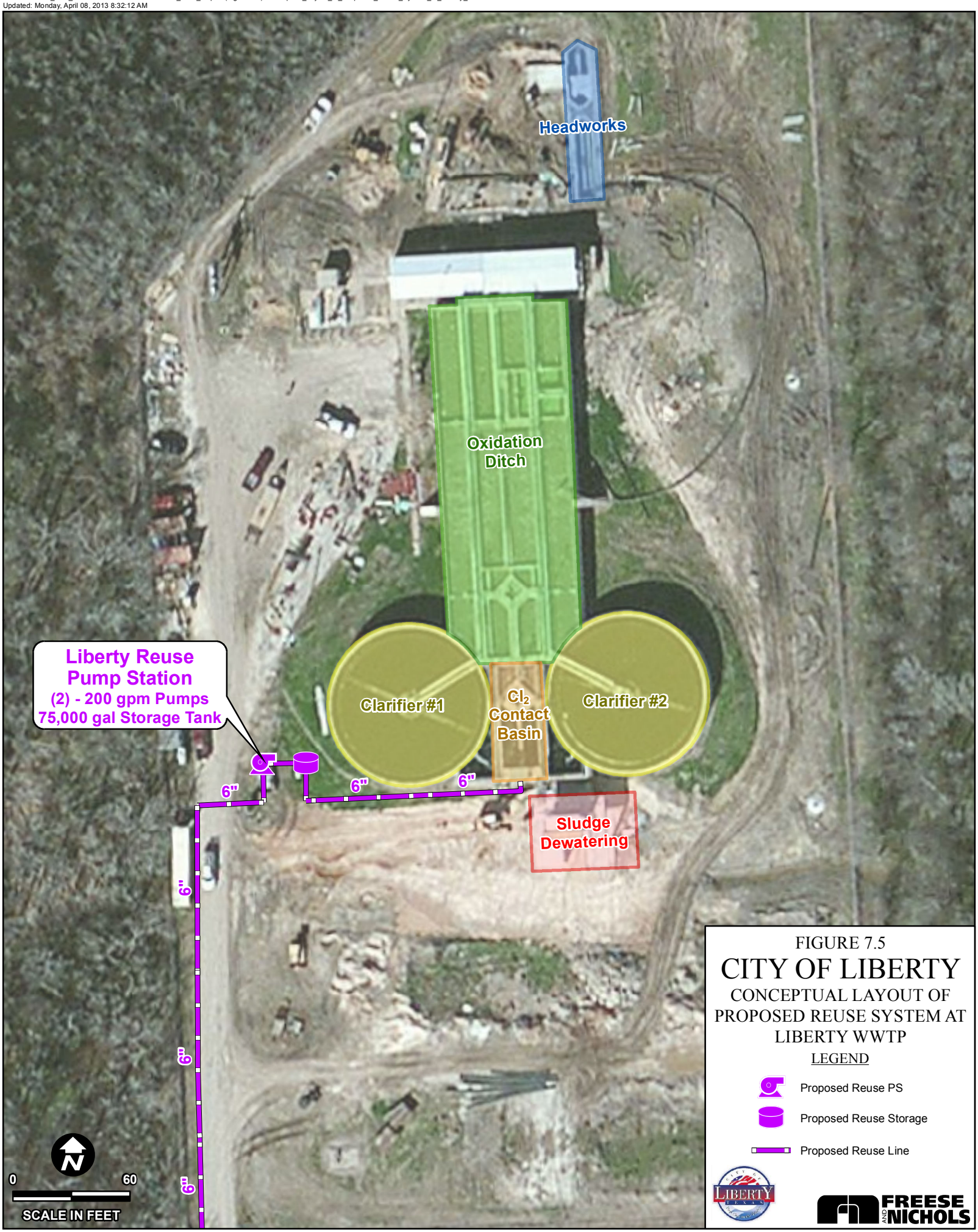

FIGURE 7.5

CITY OF LIBERTY

CONCEPTUAL LAYOUT OF PROPOSED REUSE SYSTEM AT LIBERTY WWTP

LEGEND

- Proposed Reuse PS
- Proposed Reuse Storage
- Proposed Reuse Line

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7.5 IMPLEMENTATION ISSUES

Reliability & Backup Supply

Since the Southwest potential reuse customers will use the supply for industrial processes, reliability and backup is critical. It is important that there be a back-up water supply in the event that the wastewater treatment plant does not meet Type II quality standards or in the event of a power failure. As the Southwest potential reuse customers are currently served by the City's treated water distribution system, the City could use the treated water supply as a backup. However, extreme care would need to be taken in this situation as it greatly increases the potential for contamination in the potable water system.

Water Quality

The City is not required to provide a minimum chlorine residual in the reuse system as is required in a potable water systems; however, it may be necessary at times to add chlorine to the reuse water to avoid odor issues. Additionally, it may be necessary to include some flushing or line disinfection in the annual maintenance of the reuse system prior to the hot summer months.

7.6 REUSE PROGRAM ADMINISTRATION PLAN

The regulations for a reuse water system are primarily governed by Chapter 210 of Title 30 of the Texas Administrative Code, "Use of Reclaimed Water".

System Monitoring & Sampling Needs

Under the TCEQ requirements, the participants of a reuse system are defined as Produced, Provider and User. The Producer (City of Liberty) is a person or entity that produces reuse water by treating domestic wastewater or municipal wastewater, in accordance with a permit of other authorization of the Agency, to meet the quality criteria established in [30 TAC section 210]. The Provider (City of Liberty) is a person or entity that distributes reuse water to a user(s) of reuse water. For purposes of this chapter [30 TAC section 210], the reuse water provider may also be a reuse water producer. The User (Reuse system customers) is a person or entity utilizing reuse water for beneficial use, in accordance with the requirement of this chapter [30 TAC section 210]. A reuse water user may also be a producer or a provider. Where the City plans to use reuse water for street median irrigation, the City will be the user.

Producer

It will be the City of Liberty's responsibility to transfer reuse water of at least the minimum quality required by [30 TAC section 210] at the point of delivery to the user for the specified use. The water quality requirements are summarized in **Table 7.1**. It will also be the City of Liberty's responsibility to sample and analyze the reuse water and report such analyses in accordance with Section 210.34 and 210.36 (b) of this title [30 TAC section 210], relating to Sampling and Analysis and Record Keeping and Reporting, respectively. The minimum sampling frequency for Type I reuse water is twice per week and Type II reuse water is once per week. It will be the City of Liberty's responsibility to notify the executive director of TCEQ within five days of obtaining knowledge of reuse water use not authorized by the executive director's reuse water use approval.

The City of Liberty will be required to submit monthly reports on volume and water quality of reuse water to TCEQ. TCEQ will provide the forms for these reports. The City of Liberty will need to maintain records of these reports for five years at the WWTP site. The City of Liberty and the users should maintain on the sites a current operation and maintenance plan. The operation and maintenance plan should contain the following information:

- A labeling and separation plan for reuse water facilities
- Plans to prevent unauthorized access to reuse water facilities (e.g. secured valves)
- Procedures for monitoring reuse water
- A plan for how reuse water uses will be scheduled to minimize inadvertent human exposure
- Schedules for routine maintenance
- A plan for worker safety and training
- Contingency plan for system failure or upsets

Provider

It will be the City of Liberty's responsibility to ensure that construction of the reuse water distribution lines or systems is in accordance with section 210.25. Another responsibility of the City is to confirm the reuse water at the delivery point to the user meets TCEQ reuse water quality requirements. The City should notify the executive director of TCEQ within five days of obtaining knowledge of reuse water use not authorized by the executive director's reuse water use approval. The City will not be found in violation of Chapter 210 for the misuse of the reuse water by the user if transfer of such water is shut off promptly upon knowledge of misuse regardless of contract provisions.

The City should have an operation and maintenance plan under ordinance or as part of the water supply contract or other binding agreement with the user. The operation and maintenance plan should include the following:

- Conduct periodic audits of appropriate controls implemented by reuse water users
- A labeling and separation plan for reuse water facilities
- Plans to prevent unauthorized access to reuse water facilities (e.g. secured valves)
- Procedures for monitoring reuse water
- A plan for how reuse water uses will be scheduled to minimize inadvertent human exposure
- Schedules for routine maintenance
- A plan for worker safety and training
- Contingency plan for system failure or upsets

The City is required to keep records of the following for a period of five years at the WWTP:

- Notifications to TCEQ concerning reuse water projects
- Copies of contracts with each user (this requirement does not include users at residences that have separate distribution lines for potable water)
- Records of volume of water delivered to each user (this requirement does not include users at residences that have separate distribution lines for potable water)
- Reuse water quality analyses

User

It will be the user's responsibility that reuse water is used in accordance with TCEQ requirements. The user should prevent discharge of reuse water into waters of the state, except for discharges directly resulting from rainfall events. The user is required to report unauthorized overflow of a holding pond to TCEQ within five working days. Reuse water holding ponds should not be located within a floodway. Holding ponds should be lined with compacted material having permeability less than or equal to 1x10-4 cm/sec, at least 24 inches thick, compacted in lifts no greater than 6 inches each; or, with a 40 mil synthetic liner. The liner should be certified by a Texas Registered Professional Engineer. The use of reuse water should be at irrigation rates that will avoid surface runoff or excessive percolation below the root zone. The user should determine and document typical irrigation demands based on type of vegetation and land area to be irrigated. The user is required to provide warning signage at all reuse water storage areas, hose bibs and faucets; or secure these areas to prevent unauthorized access.

Infrastructure Requirements

All pipes and fittings for a reuse water system are required to have a minimum working pressure of 150 psi. Minimum test pressure should be 1.5 times the maximum design pressure. Allowable leakage rates should be determined as described in [30 TAC section 317.2(d)(4)]. All exposed reuse piping, as well as reuse piping within a building, should be either purple pipe or painted purple. All buried piping installed after the effective date of the TCEQ rules should be one of the following: manufactured in purple, painted purple, taped with purple metallic tape or bagged in purple.

Reuse water lines should be separated from the potable water piping by a horizontal distance of at least nine feet. Where the nine foot separation distance cannot be achieved, the reuse water piping must meet the line separation requirements of [30 TAC section 290].

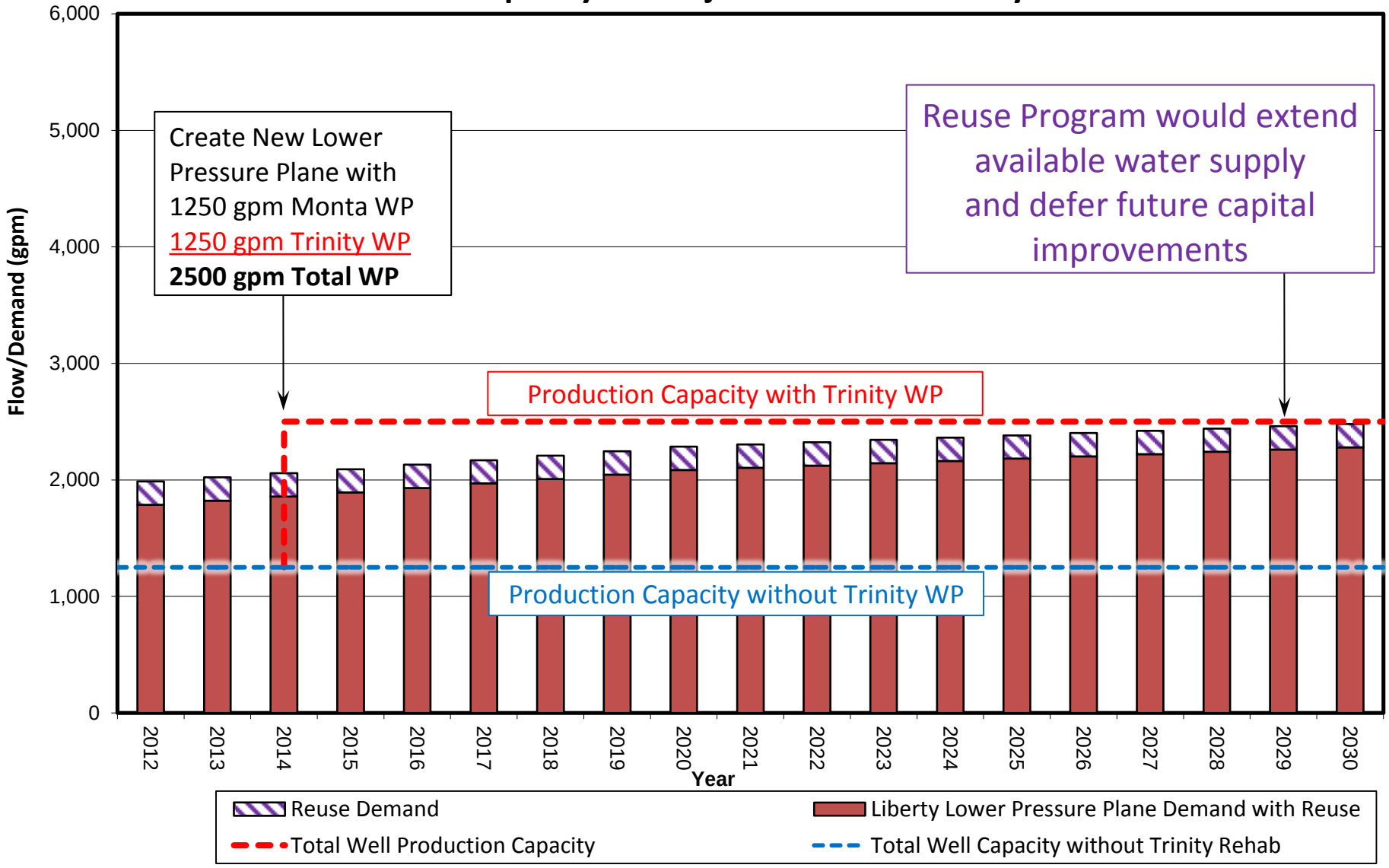
Where reuse water line parallels a sanitary sewer line, the horizontal separation distance should be three feet with the reuse water line at the level of or above the sewer line. Where a reuse water line crosses a sanitary sewer line, the requirement of [30 TAC section 290.44 (e)(5)(B)] should be followed with "reclaimed water line" substituted in [30 TAC section 290.44 (e)] for "water line".

All ground level and elevated storage tanks should be designed, installed and constructed in accordance with current AWWA standards with reference to materials to be used and construction practices to be followed, except for health-based standards strictly related to potable water storage and contract practices, where appropriately less restrictive standards may be applied.

7.7 BENEFITS OF REUSE PROGRAM TO CITY'S LONG TERM WATER NEEDS

The potential reuse customers identified in Section 6.2, are Lower Pressure Plane customers and therefore their potential conversion to reuse would reduce the water demands in the Lower Pressure Plane. **Figure 7.6** shows the maximum day water demands with reuse versus the well production capacity of the Lower Pressure Plane water plants (Monta and Trinity). This figure shows that it will be necessary to construct the Trinity water plant (before the Upper Pressure Plane is created) in order to serve the demands of the Lower Pressure Plane. The reuse program alone would not reduce the Lower Pressure Plane demands enough to eliminate the need for the Trinity Water Plant. The figure also shows that the reuse program would extend the available water supply (Monta and Trinity) and defer future water plant expansions. **FNI recommends that the reuse water program be implemented between 2021 and 2025.**

Figure 7.6
City of Liberty
Lower Pressure Plane
Well Production Capacity vs. Projected Maximum Day Water Demands



8.0 WATER SYSTEM CAPITAL IMPROVEMENTS PLAN

A phased capital improvements plan (CIP) was developed for the City of Liberty that integrates water supply, wastewater reuse and water distribution system recommendations. The recommended improvements will provide the required capacity and reliability to meet projected water demands through year 2030. The recommended projects for the water system are presented on **Figure 8.1**. Locations shown for new transmission lines and other recommended improvements were generalized for hydraulic analyses. Specific alignments and sites will be determined as part of the design process.

Capital costs were calculated for the major water facilities and do not include individual service connections or subdivision lines. The costs are in 2012 dollars and include an allowance for engineering, surveying, and contingencies. This number can be compared to a future cost index to scale the cost estimates up or down based on the current prices for construction and materials. **Table 8.1** provides the unit costs used to develop the cost estimates for each project. **Table 8.2** summarizes the costs of the water system capital improvements plan for the City of Liberty. Detailed descriptions of the projects and associated costs are included in **Appendix A**.

The water system improvements were phased into the planning period in which they become necessary. It is recommended that these projects be constructed generally in the order listed; however, future conditions may make it necessary to construct some projects sooner or later than anticipated. The following sections list the projects by phase and provide a description and purpose.

Table 8.1 Water Projects Unit Costs

Item	Unit Cost
Water Line	$6/diameter-inch/linear foot
Reuse Water Line	$6.25/diameter-inch/linear foot
Boring & Casing	$25/diameter-inch/linear foot
Fire Hydrant	$2,500

Table 8.2 Long Range Water Plan Proposed Phased Improvements

Project #	Description	Total Project Cost
Develop new water supply with Trinity Water Plant (2014)		
1	Trinity Water Plant Development	$4,247,900
Create new Upper Pressure Plane (UPP) to serve projected growth areas (2015 – 2020)		
2	New Upper Pressure Plane 0.25 MG Elevated Storage Tank	$1,437,500
3	12" Water Line Extension to serve UPP	$1,960,600
4	North Water Plant Pump Expansion	$2,156,300
5	12" Water Transmission Loop for UPP	$3,170,800
	Distribution System Subtotal	***$8,725,200***
Implement reuse program to extend existing water supplies (2021-2030)		
6a	Reuse Pump Station & GST	$378,200
6b	6" Reuse Transmission Line for Southwest Reuse Customers	$560,700
	Reuse Subtotal	***$938,900***
	Total	***$13,912,000***

8.1 PHASE 1: DEVELOP NEW WATER SUPPLY (2014)

Project 1: Trinity Water Plant Development

In order to meet future water demands and provide a firm water supply for their existing customers, it is recommended that a new water well be drilled at the existing Trinity Water Plant site to add an additional 1,250 gpm of water supply and increase system reliability. The existing Trinity water plant should be decommissioned. It is recommended that a new well be drilled and new pump station and chemical feed buildings be constructed at the new Trinity Well site. The existing 0.30 MG ground storage tank should be evaluated to see if it can be brought back into service. If the existing GST has reached the end of its useful life, a new 0.50 MG ground storage tank is also recommended at this site.

8.2 PHASE 2: CREATE UPPER PRESSURE PLANE (2015 – 2020)

In order to serve future growth areas in the eastern Liberty service area, it is recommended that a new Upper Pressure Plane be created. This section describes all of the necessary projects needed to create the new Upper Pressure Plane.

Project 2: New Upper Pressure Plane 0.25 MG Elevated Storage Tank

In order to provide adequate elevated storage capacity and fire protection to the Upper Pressure Plane, elevated storage is needed in the Upper Pressure Plane. A new 0.25 MG elevated storage tank is recommended to be constructed with an overflow elevation of 225 feet.

Project 3: 12" Water Line Extension to serve Upper Pressure Plane

This project consists of a 12-inch water line along Mizzell Rd and Minglewood Rd in the new Upper Pressure Plane. It will provide transmission capacity to serve Upper Pressure Plane customers and the new elevated storage tank.

Project 4: North Water Plant Pump Station Expansion

It is recommended that the booster pump station and chemical feed building at the North Water Plant be replaced with new pumps capable of operating at a higher head. A new 0.5 MG ground storage tank and a temporary hydropneumatic tank are also recommended at this site. This project will provide pumping and ground storage capacity to the Upper Pressure Plane to meet future demands.

Project 5: 12" Water Transmission Loop to serve Upper Pressure Plane

This project consists of a 12-inch water line along the eastern edge of the new Upper Pressure Plane. It will provide transmission capacity and system reliability in the Upper Pressure Plane.

8.3 PHASE 3: IMPLEMENT REUSE PROGRAM (2021 – 2030)

Project 6a: Reuse Pump Station

It is recommended that yard piping be laid from the chlorine contact basin to a 75,000 gallon reuse ground storage tank. From the ground storage tank, a 200 gpm reuse pump station will provide a continuous reuse water supply to the potential customers.

Project 6b: 6" Reuse Transmission Line for Southwest Reuse Customers

This project consists of a 6-inch reuse transmission line to deliver reuse water from the reuse pump station to the potential customers: Boomerang, Liberty Forge & Baze Chemical.

FIGURE 8.1

CITY OF LIBERTY

LONG RANGE WATER PLAN
PROPOSED IMPROVEMENTS

LEGEND

- 2014 Well Improvement
- 2015 - 2020 Valve Improvement
- 2015 - 2020 Pump Station Improvement
- 2015 - 2020 Elevated Storage Tank Improvement
- Existing Elevated Storage Tank
- Existing Ground Storage Tank
- Water Plant
- Wastewater Treatment Plant
- Potential Phase 1 Reuse Customer
- 2015 - 2020 Water Line Improvement
- 2021 - 2030 Reuse Line Improvement
- 6" and Smaller Water Line
- 8" and Larger Water Line
- Road
- Railroad
- Index Contour (25 ft)
- Intermediate Contour (5 ft)
- Stream
- Lake
- City Limit
- Other City Limit

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PROPOSED PRESSURE PLANES

- Lower Pressure Plane
- Upper Pressure Plane

North Water Plant
Production Capacity: 1,250 GPM
0.50 MG Ground Storage Tank
Proposed Pumps for Upper Pressure Plane
(3) - 1,000 GPM Booster Pumps

Monta Water Plant
Production Capacity: 1,250 GPM
(3) - 1,000 GPM Booster Pumps
1.0 MG Ground Storage Tank
0.20 MG Elevated Storage Tank

Trinity Water Plant
0.30 MG Ground Storage Tank
Proposed 1,500 GPM Well
(3) - 1,000 GPM Booster Pumps

San Jacinto Street
0.065 MG Elevated Storage Tank

Palmer Street
0.30 MG Elevated Storage Tank

Wastewater Treatment Plant
Proposed Reuse Pump Station
(2) - 200 GPM Pumps
75,000 GAL Storage Tank

Baze Chemical and Liberty Forge

Boomerang Tube, LLC

Proposed Upper Pressure Plane
0.25 MG Elevated Storage Tank

City of Ames Water Plant

City of Raywood Water Plant

Raywood WSC

City of Ames

Lake Liberty

Twin Bak

1 2 3 4 5 6a 6b

0 1,300 2,600
SCALE IN FEET

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9.0 FUNDING

Funding for improvements to the Liberty water system may be available from several potential funding options. Private financing is one option that can be pursued. While private financing typically entails higher financing costs, obtaining private financing on the open market can be completed on a shorter time line and with fewer application requirements. Several State sponsored programs also exist, and a summary of the programs for which Liberty could potentially qualify for are shown below.

9.1 TEXAS WATER DEVELOPMENT BOARD (TWDB)

Drinking Water State Revolving Fund (DWSRF)

The Texas Water Development Board manages the Drinking Water State Revolving Fund (DWSRF). The DWSRF provides loans at below market interest rates for planning, designing, and constructing public drinking water systems. This loan can be used towards projects similar to the recommended water lines, groundwater wells, water treatment plant improvements, and reuse facilities. The maximum repayment period is 20 years. Liberty is eligible to apply for this loan program. (As of April 19, the open market rate is 2.33 percent for AA-rated loan and 3.48 percent for non-rated loan. The corresponding TWDB rates are 1.08 percent and 2.23 percent, respectively.)

The DWSRF program includes funding provided by the Federal government. The fund requires that the project include the following elements: NEPA review, Davis-Bacon Act wage rates, water conservation and drought contingency plan, and TWDB disadvantaged business requirements.

In order for a project to be eligible for DWSRF funding, the project must be included in the TWDB's Intended Use Plan (IUP). The applicant must submit a Project Information Form (PIF) summarizing the project to the TWDB by March 1. The PIF includes a cost estimate that must be sealed by a registered professional engineer. The TWDB reviews the applications and prioritizes them. Those with the highest priority are included in the IUP and are invited to submit formal DWSRF loan applications in late summer/early fall. The TWDB works its way down the prioritization list until all available funding has been used.

Texas Water Development Fund (DFund)

The Texas Water Development Fund provides low interest loans to plan, design, and construct water and wastewater treatment facilities. The length of the loans can be as much as 30 years. Eligible applicants include political subdivisions of the State. Liberty meets this qualification. The City could consider this loan for any of the recommended strategies included in this report.

The Texas Water Development Board oversees the DFund. The City will be required to submit a copy of their water conservation and drought contingency plan to the TWDB if it pursues this loan. An environmental assessment will also be required. The TWDB accepts applications the first day of each month. The City can apply for this loan program at any time.

9.2 TEXAS DEPARTMENT OF AGRICULTURE

Community Development Block Grant (CDBG)

The Texas Department of Agriculture manages the Community Development Block Grant (CDBG). CDBG can be used to design or construct basic public facilities, including water facilities. Eligible applicants include cities with populations less than 50,000 and counties with populations less than 200,000. According to the U.S. Census, the population of Liberty is less than 50,000. In addition, Liberty County is considered to be a non-entitlement county based on its population being less than 200,000. Being a non-entitlement community simply means that a city or county applies to the TDA. Otherwise, the entity must apply directly to HUD. Projects benefitting low to moderate income areas receive higher scores than others. The program accepts applications every other year. This fund should be available again in Fall 2014.

9.3 ECONOMIC DEVELOPMENT ADMINISTRATION (EDA)

Public Works and Economic Adjustment Assistance Programs

The Economic Development Administration manages federal funding through its Public Works Program. (The notice of funding availability labeled the program as FY 2013 Economic Development Assistance Programs for this fiscal year.) The EDA provides financial support needed in economically distressed areas to provide necessary infrastructure that will result in permanent job creation. Funding assistance is provided in the form of grants and loans. For the past several years, applications have been accepted on a quarterly basis. The remaining deadlines for the current program are June 13 and September 13, 2013.

Liberty meets the EDA definition of economically disadvantaged based on its per capita income. If any of the recommended strategies can be tied to the creation of new, permanent jobs, then the EDA's Public Works Program may be an option for the City to consider further. Letters of interest or support from a company looking to establish itself or to relocate to the area will be needed to prove the potential job creation.

9.4 BUREAU OF RECLAMATION

WaterSMART Water and Energy Efficient Grant

The Bureau of Reclamation has the WaterSMART Water and Energy Efficient Grant that might be a potential funding opportunity related to the City's growing reuse program. The grant provides up to 50 percent of the costs associated with projects that conserve or use water in a more efficient manner. Developing and expanding reuse programs are strong candidates for this grant program. In addition, the proposed project needs to include alternative energy in order to score well enough to be competitive. FNI recommends several reuse improvements in this report. Packaging the improvements into a single package might prove to be a competitive project. The program typically publishes its request for applications in the September-October timeframe with an application deadline in December.

9.5 SUMMARY OF POTENTIAL OPPORTUNITIES

Table 9.1 summarizes the potential funding opportunities and schedules to implement the recommended strategies in this water plan.

Table 9.1 Funding Opportunities and Schedule

Fund	Type of Fund	Potential Schedule	Notes
Drinking Water State Revolving Fund (DWSRF)	Annual loan program	March 1, 2014 – Submit application to fund design of pipeline and pump station for inclusion in the IUP. August 2014 – TWDB announces projects included in the IUP and invites high ranking projects to apply. September / October 2014 – Submit formal application, if invited by TWDB. December 2014 – TWDB announces recipients and work begins shortly thereafter.	Federal requirements must be met. Application process takes about a year to complete. Can submit request for construction funding after design has begun.
Texas Water Development Fund (DFund)	Monthly loan program	First day of Any Month – Submit application. End of Month or Following Month – TWDB Board announces decision.	Water conservation and drought contingency plan Environmental assessment
Community Development Block Grant	Grant available every other year	Next application cycle is Fall 2014, which may be later than when City wants to begin.	Liberty might consider pursuing fund for construction.
Public Works and Economic Development Assistance Programs	Quarterly grant and loan program	June 13, 2013 and September 13, 2013 – deadlines for application consideration	Economically distressed area Project must support creation of new, permanent jobs Federal requirements must be met
WaterSMART Water and Energy Efficiency Grant	Annual grant program	September/October – Bureau publishes request for applications December – applications due	Federal requirements must be met

APPENDIX A
Detailed Cost Estimates

City of Liberty

Liberty Long Range Water Plan

FREESE AND NICHOLS

OPINION OF PROBABLE COST — **May 2013**

Construction Project Number 1

Project Description

Trinty Water Plant Rehab

Detailed Description

Demolish existing pump station and chemical feed building. Cap existing well. New 1,500 gpm well, pump station and chemical feed building at the current Trinity Well site.

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Decommission Well	1	LS	$30,000	30,000
2	Demolition	1	LS	$25,000	25,000
3	Water Well	1	LS	$1,500,000	1,500,000
4	Booster Pump Station & Chemical Feed Building	1	LS	$800,000	800,000
5	Site Work & Yard Piping	1	LS	$200,000	200,000
6	0.5 MG Ground Tank	1	LS	$400,000	400,000

SUBTOTAL:		$2,955,000
CONTINGENCY	25%	$738,800
SUBTOTAL:		$3,693,800
ENG/SURVEY	15%	$554,100
SUBTOTAL:		$4,247,900

PROJECT TOTAL **$4,247,900**

City of Liberty

Liberty Long Range Water Plan

FREESE AND NICHOLS

OPINION OF PROBABLE COST — **May 2013**

Construction Project Number 2

Project Description

New Upper Pressure Plane 0.25 MG Elevated Storage Tank

Detailed Description

A 250,000 gallon composite elevated storage tank at the top of the hill on Hwy 90 to serve the new Upper Pressure Plane

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	250,000 Gallon Elevated Storage Tank	1	LS	$1,000,000	1,000,000

SUBTOTAL:		$1,000,000
CONTINGENCY	25%	$250,000
SUBTOTAL:		$1,250,000
ENG/SURVEY	15%	$187,500
SUBTOTAL:		$1,437,500

PROJECT TOTAL **$1,437,500**

City of Liberty

Liberty Long Range Water Plan

FREESE AND NICHOLS

OPINION OF PROBABLE COST — **May 2013**

Construction Project Number 3

Project Description

12” Water Line Extension to serve Upper Pressure Plane

Detailed Description

Extend 12" Water Line to serve the Upper Pressure Plane

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" WL & Appurtenances	12,900	LF	$72	928,800
2	Fire Hydrant on Dist. Line	14	EA	$2,500	35,000
3	20" Boring and Casing	1,000	LF	$400	400,000

SUBTOTAL:		$1,363,800
CONTINGENCY	25%	$341,000
SUBTOTAL:		$1,704,800
ENG/SURVEY	15%	$255,800
SUBTOTAL:		$1,960,600

PROJECT TOTAL **$1,960,600**

City of Liberty

Liberty Long Range Water Plan

FREESE AND NICHOLS

OPINION OF PROBABLE COST — **May 2013**

Construction Project Number 4

Project Description

North Water Plant Pump Expansion

Detailed Description

Demolition and replacement of existing Booster Pump Station and Chemical Feed Building at the North Water Plant. Construction of a new 0.50 MG Ground Storage Tank and a temporary Hydropneumatic Tank

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Demolition	1	LS	$25,000	25,000
2	Booster Pump Station & Chemical Feed Building	1	LS	$800,000	800,000
3	Site Work & Yard Piping	1	LS	$200,000	200,000
4	Hydropneumatic Tank	1	LS	$75,000	75,000
5	0.5 MG Ground Tank	1	LS	$400,000	400,000

SUBTOTAL:		$1,500,000
CONTINGENCY	25%	$375,000
SUBTOTAL:		$1,875,000
ENG/SURVEY	15%	$281,300
SUBTOTAL:		$2,156,300

PROJECT TOTAL **$2,156,300**

City of Liberty

Liberty Long Range Water Plan

FREESE AND NICHOLS

OPINION OF PROBABLE COST — **May 2013**

Construction Project Number 5

Project Description

12" Water Transmission Loop for UPP

Detailed Description

Construct 12" Water Line loop to serve growth from the Upper Pressure Plane

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	12" WL & Appurtenances	23,100	LF	$72	1,663,200
2	Fire Hydrant on Dist. Line	25	EA	$2,500	62,500
3	20" Boring and Casing	1,200	LF	$400	480,000

SUBTOTAL:		$2,205,700
CONTINGENCY	25%	$551,500
SUBTOTAL:		$2,757,200
ENG/SURVEY	15%	$413,600
SUBTOTAL:		$3,170,800

PROJECT TOTAL **$3,170,800**

City of Liberty

Liberty Long Range Water Plan

FREESE AND NICHOLS

OPINION OF PROBABLE COST — **May 2013**

Construction Project Number 6a

Project Description

Reuse Pump Station

Detailed Description

Reuse Pump Station with (2) - 200 gpm Booster Pumps, 75,000 gallon Reuse GST, Yard Piping from Chlorine Contant Basin to Reuse GST

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	Reuse Pump Station with (2) - 200 gpm , submersible pumps	1	LS	$116,000	116,000
2	75,000 gallon, glass-lined bolted steel ground storage tank	1	LS	$147,000	147,000

SUBTOTAL:		$263,000
CONTINGENCY	25%	$65,800
SUBTOTAL:		$328,800
ENG/SURVEY	15%	$49,400
SUBTOTAL:		$378,200

PROJECT TOTAL **$378,200**

City of Liberty

Liberty Long Range Water Plan

FREESE AND NICHOLS

OPINION OF PROBABLE COST — **May 2013**

Construction Project Number 6b

Project Description

6" Reuse Line for Southwest Reuse Customers

Detailed Description

6" Reuse Line to Boomerang, Liberty Forge & Baze Chemical

ITEM	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL
1	6" Reuse WL & Appurtenances	8,000	LF	$38	300,000
2	12" Boring and Casing	300	LF	$300	90,000

SUBTOTAL:		$390,000
CONTINGENCY	25%	$97,500
SUBTOTAL:		$487,500
ENG/SURVEY	15%	$73,200
SUBTOTAL:		$560,700

PROJECT TOTAL **$560,700**