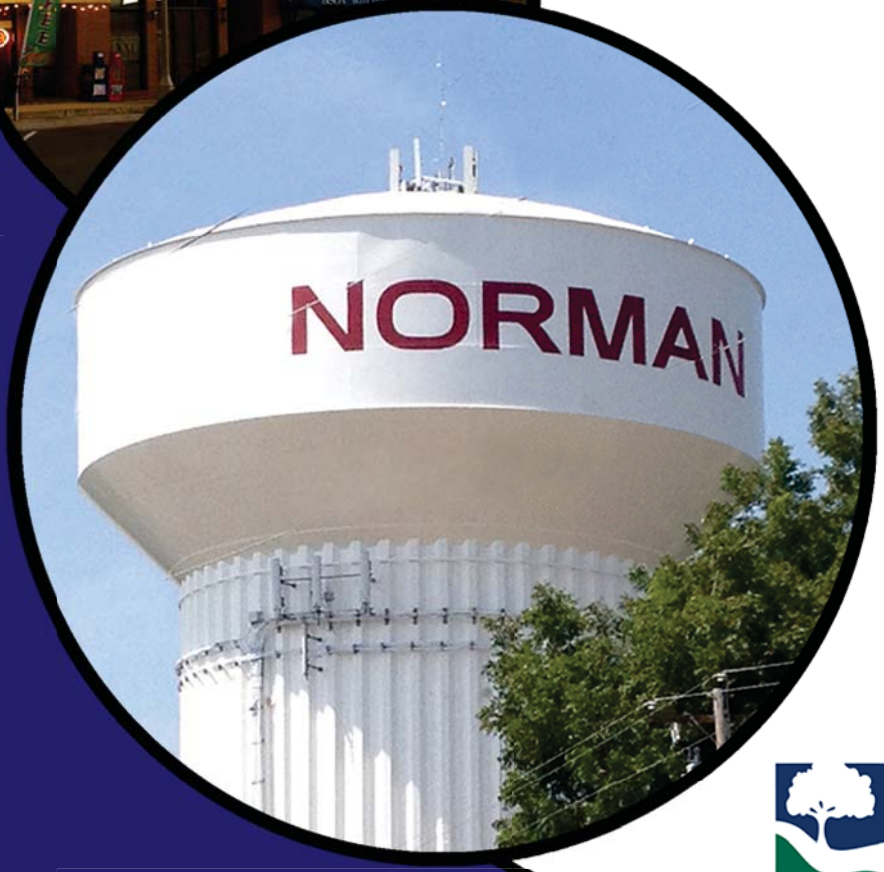
CITY OF NORMAN



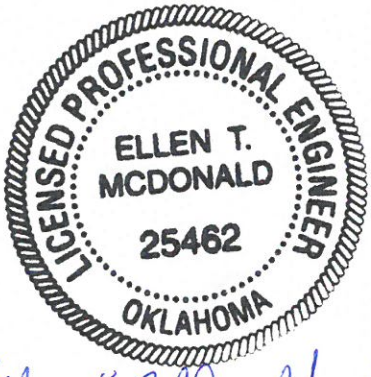
Update Distribution System Modeling

March 2018

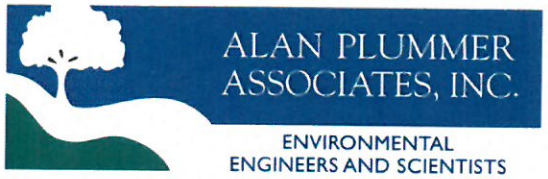
ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

City of Norman, Oklahoma

Update Distribution System Modeling



Ellen T. McDonald 3/23/18



OKPE Certificate of Authorization 1097, Renewal: June 30, 2018

March 2018

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List of Abbreviations

APAI	Alan Plummer Associates, Inc.
AWWA	American Water Works Association
CIP	capital improvement plan
City	City of Norman, Oklahoma
DEQ	Oklahoma Department of Environmental Quality
DIP	ductile iron pipe
EPS	extended period simulation
EST	elevated storage tank
ft	feet
gal/day	gallons per day
gpcd	gallons per capita per day
gpm	gallons per minute
GPSFD	gallons per square foot of building area per day
hp	horsepower
in	inch
LF	linear foot
MFU	multi-family housing unit
MG	million gallons
MGD	million gallons per day
MDS	Main Distribution System
NUA	Norman Utilities Authority
OKC	Oklahoma City
OPCC	opinion of probable construction cost
PS	pump station
psi	pounds per square inch
PZ	Upper Pressure Zone
SA	service area
SCADA	supervisory control and data acquisition
SFU	single-family housing unit
OU	University of Oklahoma
VFD	variable frequency drive
WDM	water distribution model
WTP	water treatment plant

Executive Summary

Norman Utilities Authority (NUA) provides water and sewer service to the City of Norman, located in Cleveland County in central Oklahoma. NUA last updated its water distribution system model and master plan in 2003. NUA contracted with Alan Plummer Associates, Inc. to provide a Water Distribution Model Update.

The water distribution model for NUA was updated by utilizing current system GIS data, operational pumping controls and as-built facility data, and historical daily pumping and monthly billing data. A calibrated hydraulic model was used to aid in the analyses of the existing water system and recommendation of proposed improvements.

After calibrating the existing system, future demands were placed in the model based on growth projections in the 2025 Land Use Plan. The future model also includes 2 MGD of additional groundwater supply from a well expansion project that NUA is currently evaluating. The performance of NUA's distribution system under a future max day scenario was then evaluated using criteria for minimum water pressure, unit headloss through pipelines, and available fire flow from hydrants around the City. A list of Capital Improvement Plan (CIP) projects was developed to address areas of the City that did not achieve the minimum performance criteria.

The future maximum day (max day) demand scenario indicated that water pressure in the eastern region of the distribution system along 24th Ave. SE was below the desired minimum pressure criteria. Additionally, the model predicted that a number of pipelines in the distribution system would experience elevated levels of headloss, requiring a capacity expansion. Finally, a number of fire hydrants were identified that did not meet the minimum desired available fire flow. A list of CIP projects was developed that, when implemented, will achieve the desired performance criteria under the future max day demand scenario. Key projects identified include a new elevated storage tank (EST) for the main distribution system pressure plane (MDS), additional pumping capacity in the MDS pump station, expansion of water mains along Robinson Street and 24th Ave NE, and several pipeline renewal/maintenance projects targeting ductile iron lines that need replacing due to age or material incompatibility with soils.

The CIP project list was separated into six categories depending on the primary driver for the project, although there are multiple drivers for most projects that overlap between several categories. Prioritization of the projects was provided by NUA. CIP projects are displayed on Figure 5-1 (page 41), color coded by category. The CIP project categories included:

- **Future Development**. These projects are located in future development areas and would only be required when growth is experienced in these areas. Consequently, it is assumed that the developer will be responsible for the cost of these projects, not the City.
- **Low Fire Flow**. CIP projects in this category are required to increase available fire flows at hydrants throughout the distribution system.

- **High Headloss**. Pipelines experiencing a unit headloss approximately equal to or greater than 7 ft/1,000 ft were identified in the model and a CIP project was created to increase the pipeline size to reduce headloss.
- **Maintenance**. CIP projects falling under the category of Maintenance have all been previously identified by NUA as pipelines that will require replacement in the near future due to pipe age or condition. In general, pipelines identified in the Maintenance category are sized appropriately for future flows and do not need to be replaced with larger lines, though there are some exceptions. These pipelines would be replaced to proactively prevent pipe failures in the future.
- **Low Pressure**. NUA desires to deliver a minimum pressure of 40 psi throughout the distribution system. Locations with a minimum pressure of 35 psi or less were addressed by recommending CIP projects to increase the pressure above 40 psi.
- **High Water Age**. This CIP project category includes projects that eliminate dead end water lines or create water loops to improve delivery efficiency and reduce water age.

Opinions of probable construction cost were developed for the water CIP projects. The combined OPCC for all of the recommended projects is approximately $95.5 million. However, it is anticipated that approximately $6.4 million of this total will be funded by developers. Table E-1 summarizes the total OPCC for each category in the CIP list. The complete list of CIP projects is presented in Appendix H.

Table E-1: CIP Project OPCC by Category

Category	OPCC (millions)[A]
Future Development	$6.4
Low Fire Flow	$10.9
High Headloss	$2.8
Maintenance	$66.5
Low Pressure	$4.0
High Water Age	$4.8
Total	**$95.5**
City Responsibility	**$89.1**

A. Costs are presented in 2017 dollars.

1 Introduction

1.1 PURPOSE AND BACKGROUND

Norman Utilities Authority (NUA) provides water and sewer service to the City of Norman (City), located in Cleveland County in central Oklahoma. NUA last updated its water distribution system model and master plan in 2003. NUA contracted with Alan Plummer Associates, Inc. (APAI) to provide a Water Distribution Model (WDM) Update.

A primary objective of the WDM Update is to develop a water distribution system model including all pipes in the system, based on the City's GIS database. The City of Norman has also undergone significant growth since 2003, including improvements and changes to the water distribution system and water supply facilities. The purpose of this evaluation is to provide NUA with an updated water system model and to develop recommendations for system improvements through 2025 based on growth projections from the 2025 Land Use Plan.

1.2 SCOPE OF WORK

The scope of work defines the following major activities for this project.

A. Data collection from NUA and other sources necessary for model building and calibration.
B. Prepare population projections based upon the 2025 Land Use Plan[1] (as amended) and the 2060 Strategic Water Supply Plan[2].
C. Build an "all pipes" water model based on the City's GIS.
D. Calibrate the model using peak flow data, collected by NUA using pressure recording devices as provided by APAI.
E. Conduct a system performance evaluation.
F. Identify system improvements required for the maximum day future model scenario.
G. Recommend and develop a CIP list for the identified improvements.
H. Provide training to NUA's personnel on the hydraulic model.
I. Preparation and presentation of Model Update Report documenting the work conducted and the recommendations made.

[1] Clarion, Norman 2025 Land Use and Transportation Plan, Adoption Draft, October 15, 2004, as amended through date of data collection.
[2] Carollo Engineers in association with Tetratech, 2060 Strategic Water Supply Plan, prepared for Norman Utilities Authority, August 2014.

2 Water System Overview

NUA currently provides water service to the majority of citizens within its incorporated city limits. In conjunction with the 2025 Land Use Plan, NUA has mapped various growth area boundaries to describe level of service and categorize development density in the City (Figure 2-1, page 3). The 2025 Land Use Plan, and this WDM Update, includes potable water service to future developments within the Current Urban[3] and Future Urban[4] service areas. Projected water demands (see Section 3.2) will not include water service to the Suburban Residential[5] or Country Residential[6] areas.

The remainder of this section discusses the existing facilities owned and operated by NUA within the Current Urban service area.

2.1 DISTRIBUTION FACILITIES

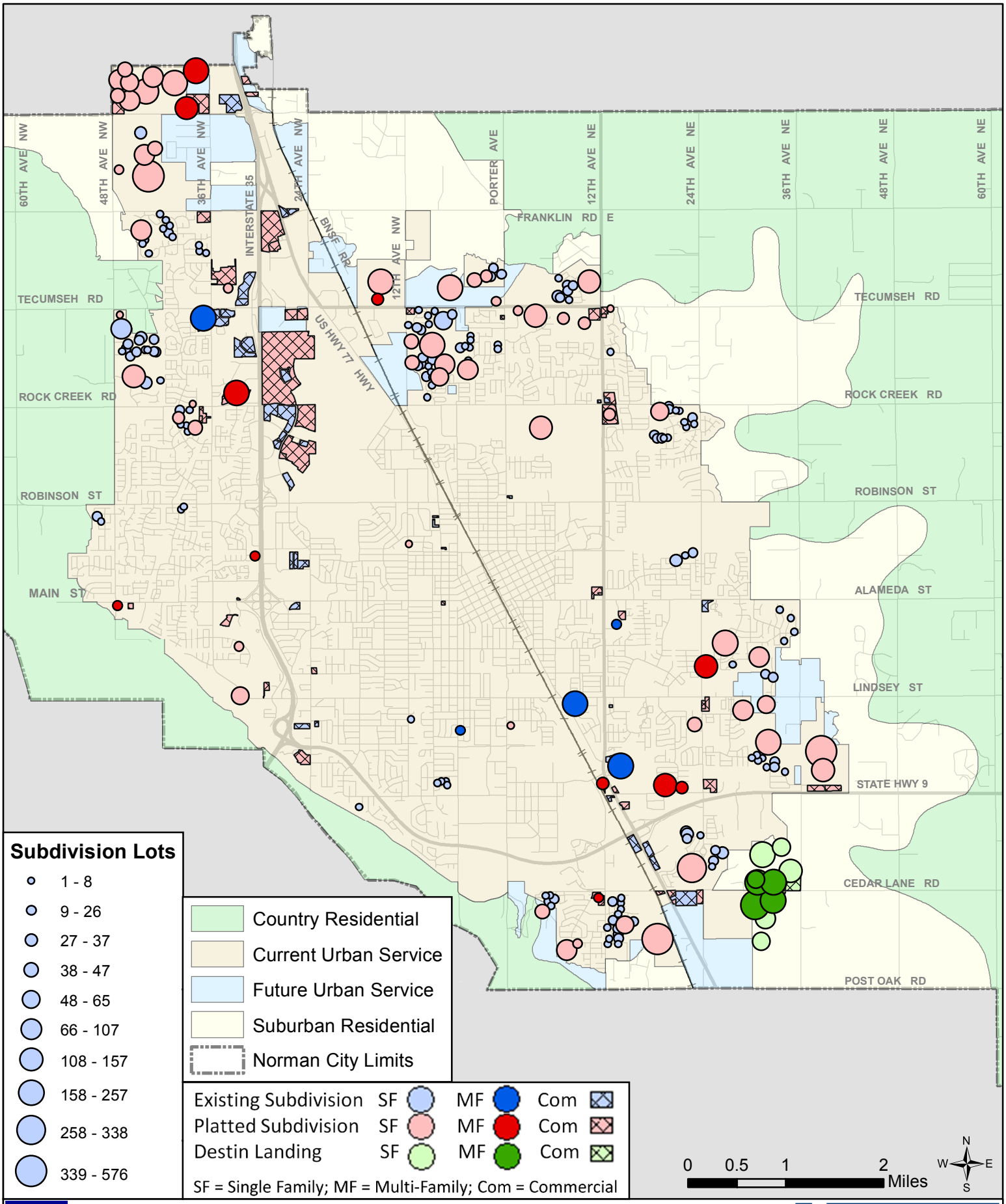
NUA's existing water distribution system is comprised of approximately 597 miles of water mains ranging in size from 1-inch to 36-inches. The system includes two pressure planes, the Main Distribution System (MDS), which serves a majority of the city and the smaller Upper Pressure Zone (PZ) which serves approximately 4.4 square miles of northeastern Norman (See Figure 2-2, page 4). The MDS operates within a normal pressure range of 37 to 113 pounds per square inch (psi). The PZ operates within a normal pressure range of 49 to 108 psi. There are 17 existing isolation valves along the boundary between the two pressure planes. Also shown in Figure 2-2 (page 4) are the water treatment plant, which provides the main source of treated water and pumping capacity for the system; the active water towers which provide storage and pressure in the system; active groundwater wells; and the existing connection to Oklahoma City Water Utility.

[3] Current Urban Service Area = The City provides or plans to provide potable water in this area. This area is also sewered by gravity flow, sewerable by gravity flow, served by existing lift stations, or designed to be served by existing lift stations.

[4] Future Urban Service Area = area outside existing water and/or sanitary sewer service areas. The City provides or plans to provide potable water in this area.

[5] Suburban Residential Area = area suitable for development from an environmental standpoint but not planned for sanitary sewer service. In general, potable water in this area will come from private wells.

[6] Country Residential Area = area predominantly located over the Garber-Wellington Aquifer primary recharge area and/or within the flood plains of the Little River and South Canadian River. In general, potable water in this area will come from private wells.



NORMAN UTILITIES AUTHORITY
Water Distribution Model Update

FIGURE 2-1: Designated Growth and Service Areas

ALAN PLUMMER ASSOCIATES, INC.
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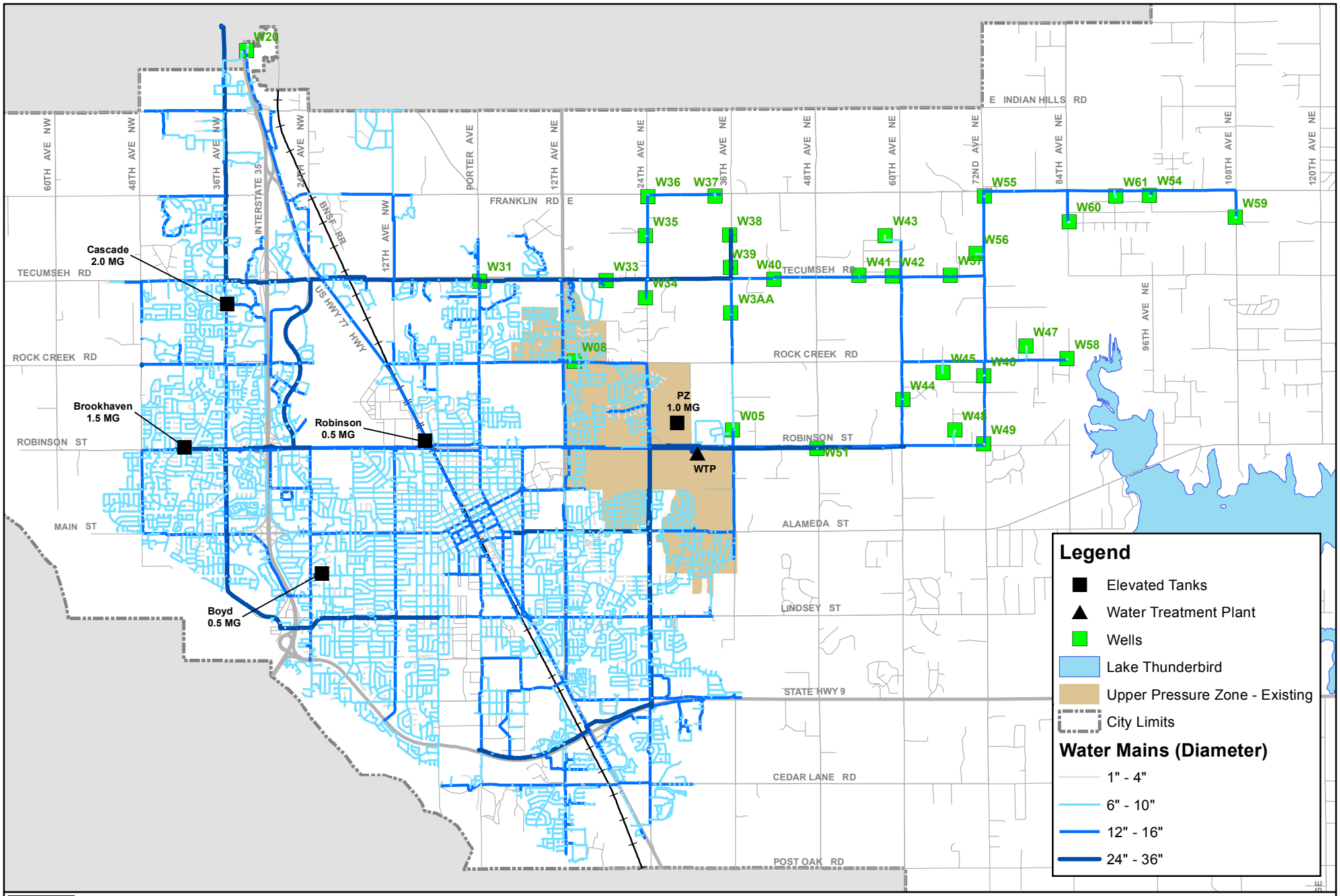
414 NW 4th Street, Suite 150
Oklahoma City, OK 73102



NORMAN UTILITIES AUTHORITY
Water Distribution Model Update

FIGURE 2-2: NUA Existing System Map

0 0.5 1 2 Miles

N W E S

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414 NW 4th Street, Suite 150
Oklahoma City, OK 73102

2.1.1 Pumping Capacity

There are two pump stations both located on the water treatment plant (WTP) property that distribute treated surface water to the distribution system. The larger MDS Pump Station (MDS PS) serves the Main Distribution System pressure plane and the PZ Pump Station (PZ PS) serves the Upper Pressure Zone. APAI provided pump testing services at the end of July and early August 2016 to define the current *in situ* pump curves to reflect accurate pumping conditions in the model. The pump testing protocol is provided in Appendix A and results of the testing are presented in Appendix B. The design flow and head of each pump are summarized in Table 2-1.

The MDS pump station includes four 250 horse power (hp) vertical turbine pumps, installed in 1982. Pumps 1 and 3 have variable frequency drives (VFDs). The PZ PS includes two 200 hp and two 125 hp vertical turbine pumps, installed in 1963 and 1993, respectively. All four PZ pumps are slated to be replaced within the next few years. The specifications of the selected future PZ PS pumps are described in Section 5.2.1.

Table 2-1: Pumping Facility Summary (Existing)

Pressure Plane	Pump Number	Design Flow (gpm)	Design Head (ft)	Horsepower (hp)
MDS	1	3,600	231	250
	2	3,500	231	250
	3	3,500	231	250
	4	3,500	231	250
PZ	1	2,083	288	200
	2	2,083	288	200
	3	1,388	288	125
	4	1,388	288	125

2.1.2 Elevated Storage

NUA's distribution system includes five elevated storage tanks in the MDS (Lindsey Tower has been decommissioned and is no longer operating) and one in the PZ. The locations of the active tanks are shown in Figure 2-2 (page 4) and a summary of storage facility characteristics is provided in Table 2-2 (page 6). Additional information related to the elevated storage tanks is presented in Appendix C.

Table 2-2: Storage Facility Summary

Pressure Plane	Tower Name	Year Built	Storage Volume (MG)	Ground Surface Elevation (ft)	Bottom of Bowl (ft)	Overflow Elevation (ft)	Notes
MDS	Cascade	1999	2.0	1,189.50	1,265.00	1,315.00	Altitude valve.
	Brookhaven	1975	1.5	1,191.00	1,272.60	1,315.10	MDS PS controls off this tower.
	Boyd	1965	0.5	1,160.20	1,280.00	1,320.00	Altitude valve.
	Robinson	1954	0.5	1,190.20	1,275.34	1,315.00	Has mixing system installed in tank and altitude valve.
	Lindsey	1950's	0.5	1,153.20	1,263.81	1,312.01	Currently decommissioned due to location and changes in distribution system operations.
Upper PZ	High Pressure Plane (HPP)	2016	1.0	1,185.50	1,341.00	1,381.00	

2.2 WATER SUPPLIES

NUA's main water source is surface water from Lake Thunderbird, which is pumped to the WTP via an existing 8 mile raw water pipeline comprised of 33-inch and 30-inch diameter segments. In 2014 NUA constructed a 48-inch pipeline parallel to the 30-inch segment to increase raw water conveyance capacity. NUA also has 30 to 36 active groundwater wells, the majority of which are located in the northeastern side of the City. In recent past years, NUA has decommissioned several of the wells due to water quality concerns. Those wells were located mostly in the central city area. Newer wells are located to the northeast of the City, which will also likely be the location of the well field expansion currently being evaluated in a separate study. For the purpose of this project, NUA provided APAI with the intersection of Tecumseh Rd. and 36th Ave. NE as a representative location for the future well field point of entry in the distribution system model. It was assumed that an annual average supply of 2 million gallons per day (MGD) and maximum daily supply of 3 MGD would be available from the future well field. Additionally, NUA has an emergency connection to the Oklahoma City (OKC) distribution system that became operational in September 2000. NUA can control the amount of water received from OKC and prefers to limit usage to an average daily use of 1 MGD or less. During the week of calibration in August 2016, instantaneous flow from OKC varied between 0.52 and 1.12 MGD.

3 Water Demands

Historical water usage trends were estimated from daily pumping data and monthly billing data provided by NUA. Daily pumping data provides a historical record of the volume of water obtained from surface water (Lake Thunderbird to the WTP), groundwater wells, and the connection with OKC. A comparison of billed and pumped volumes also provides an estimate of non-revenue water used within the City.

Future water demands were projected based on historical water usage and projected land use trends.

3.1 HISTORICAL WATER DEMANDS

A six year period of production data (January 2010 through September 2016) was reviewed and normalized based on available demographic data and is summarized in Table 3-1. The ratio of maximum day demands to average day demands (max day factor) has historically ranged from 1.53 to 1.88. The 2060 Strategic Water Supply Plan (Strategic Plan)[7] used a max day factor of 1.9 for planning purposes. Based on the historical data, this same max day factor of 1.9 was used in this study. The annualized average percent non-revenue water (which includes real[8] and apparent[9] losses) is approximately 12.5%.

Table 3-1: Historical Production Data

Year	Service Population	Total Production (1,000 gal/day)			Max Day Factor	Max Day Date	Average gpcd
		Minimum	Average	Maximum			
2010	98,075	6,792	12,225	22,242	1.82	8/9/2010	124.7
2011	99,429	7,355	13,514	23,935	1.77	8/5/2011	135.9
2012	100,782	7,315	13,231	24,822	1.88	7/23/2012	131.3
2013	102,136	6,954	11,195	20,605	1.84	7/11/2013	109.6
2014	103,489	7,014	13,113	20,692	1.58	7/8/2014	126.7
2015	104,843	7,385	12,378	19,873	1.61	9/7/2015	118.1
2016	106,197	7,523	11,931	18,254	1.53	8/15/2016	112.3

[7] Carollo Engineers in association with Tetratech, 2060 Strategic Water Supply Plan, prepared for Norman Utilities Authority, August 2014.
[8] A real loss is water lost physically from the distribution system, like through pipe leaks or storage tank overflows. This water's financial loss is calculated using the production cost of water.
[9] An apparent loss is water not paid for because it is "lost" due to metering inaccuracies, unauthorized consumption or water theft, or billing data errors. This water's financial loss is calculated using the retail cost of water.

Table 3-2: Top 10 Maximum Historical Production Days

Rank	Year	Service Population	Total Production (1,000 gal/day)				Max Day Factor	Max Day Date
			WTP	Wells	OKC	Total		
1	2012	100,782	13,327	8,251	3,244	24,822	1.88	7/23/2012
2	2012	100,782	13,809	6,583	4,281	24,673	1.86	8/4/2012
3	2012	100,782	14,741	8,281	1,541	24,563	1.86	7/22/2012
4	2012	100,782	12,457	7,573	4,499	24,529	1.85	7/30/2012
5	2012	100,782	13,463	6,598	4,417	24,478	1.85	8/3/2012
6	2013	102,136	12,964	7,641	-	20,605	1.84	7/11/2013
7	2012	100,782	14,069	8,084	1,973	24,126	1.82	7/27/2012
8	2012	100,782	13,593	7,037	3,465	24,095	1.82	8/1/2012
9	2012	100,782	13,237	8,385	2,458	24,080	1.82	7/20/2012
10	2010	98,075	12,435	6,991	2,816	22,242	1.82	8/9/2010

3.2 PROJECTED WATER DEMANDS

The following sections describe projection of annual water system demands and allocation of these demands to locations in the water system.

3.2.1 Projection of Annual Water System Demands

Land use projections in the Norman 2025 Land Use and Transportation Plan (Land Use Plan)[10] begin in 2004. Between 2004 and 2025, the Land Use Plan projected an additional 10,032 single-family housing units (SFUs) and 3,034 multi-family housing units (MFUs) (Table 3-3, page 8).

Table 3-3: Projected Single-Family and Multi-Family Units

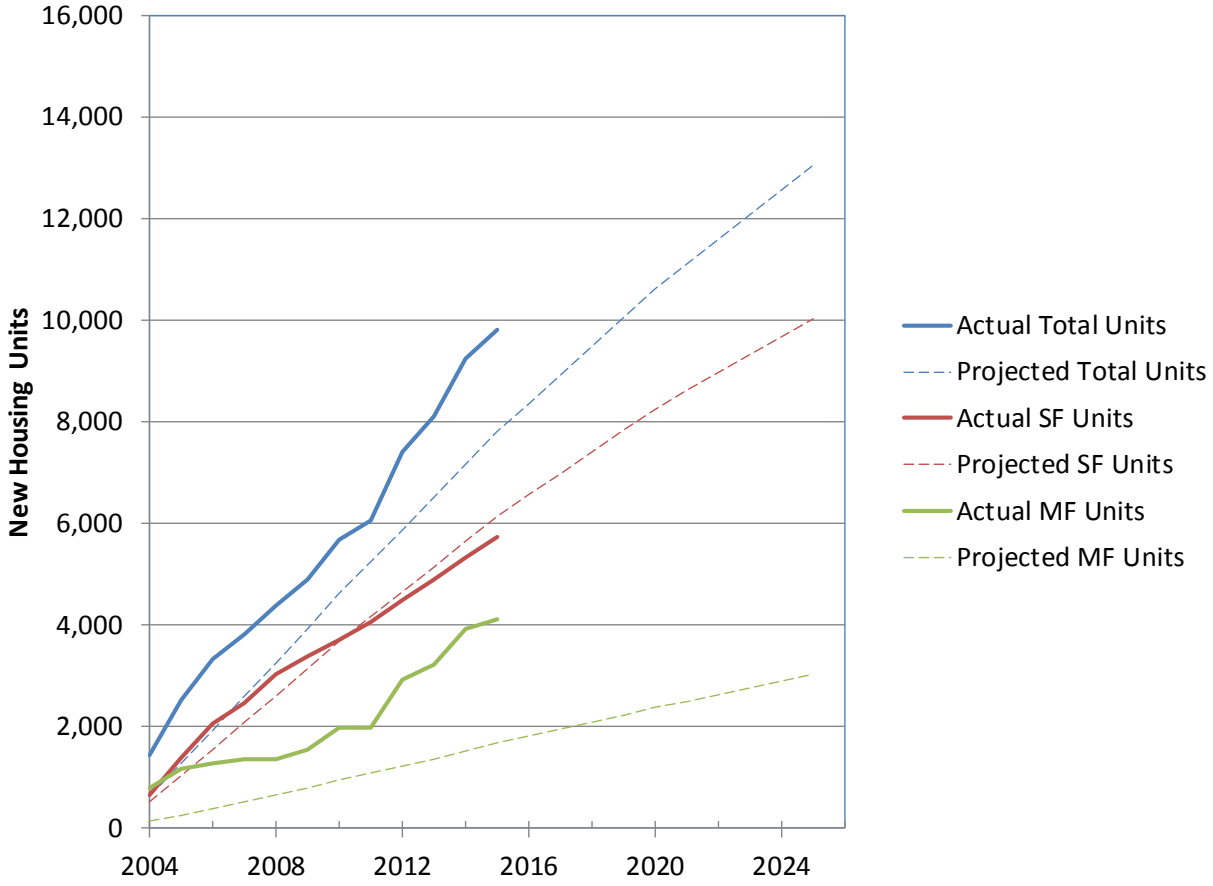
Year	Single-Family Units	Multi-Family Units
2004	29,241	15,283
Projected Increase	10,032	3,034
2025	39,273	18,317

From the 2025 Land Use and Transportation Plan

[10] Clarion, Norman 2025 Land Use and Transportation Plan, Adoption Draft, October 15, 2004, as amended through date of data collection.

In addition, NUA provided APAI with actual residential development data through 2015. An analysis of these data showed that recent growth has been different than projected in the Land Use Plan (Figure 3-1, page 9). Single-family development has occurred slightly more slowly than projected, and multi-family development has occurred more quickly than projected. The rapid multi-family development rate in recent years has resulted in overall more total housing units than predicted by the Land Use Plan.

Figure 3-1: Actual and Projected New Housing Units

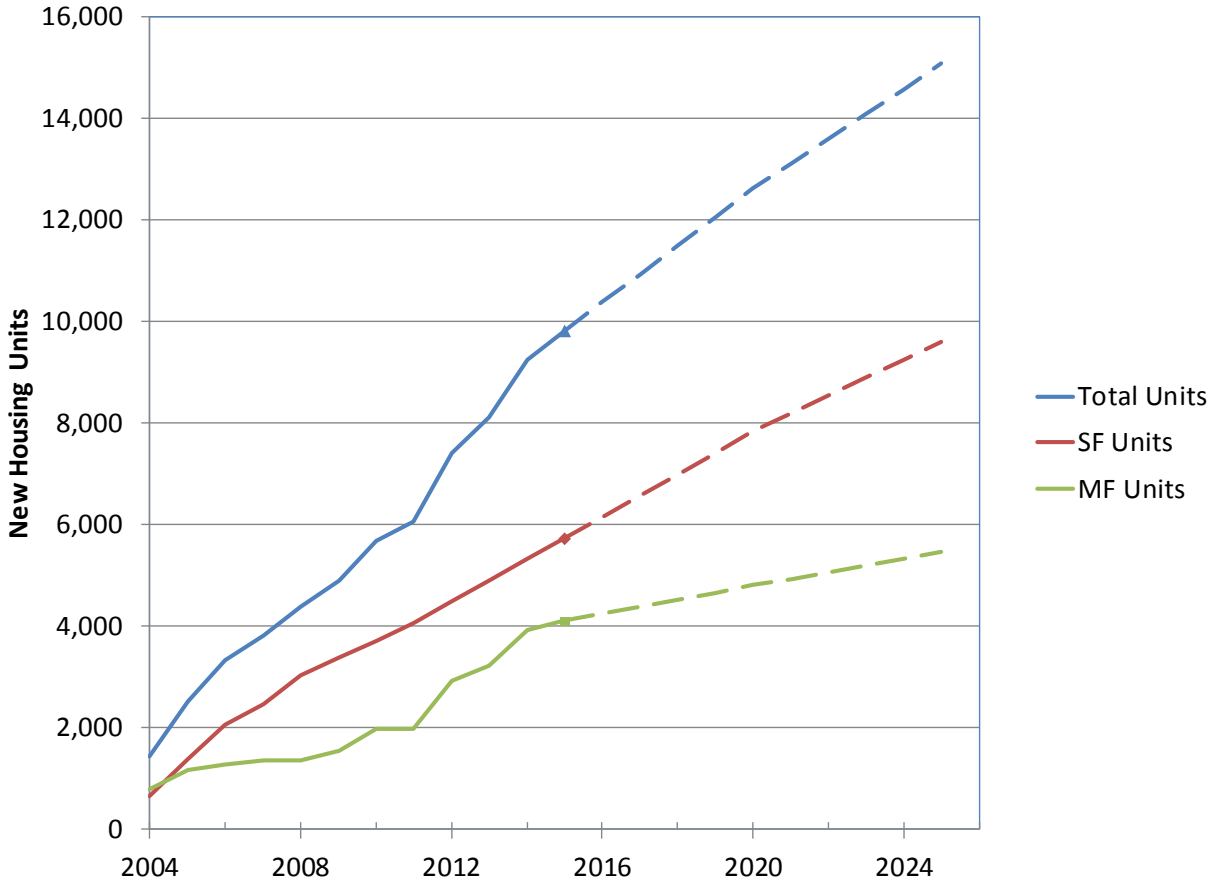


In consultation with City staff, the following decisions were reached with respect to the population and water demand projections:

- Projected new housing units should be revised to account for actual development from 2004 through 2015. Revised projections for new housing units were developed by adding the projected new housing units for 2016 through 2025 to the actual 2015 new housing unit totals (Figure 3-2).
- Population densities should be based on those used in a previous wastewater modeling project performed by another consultant. The population densities for use in this study are 2.55 people per SFU and 1.91 people per MFU.

- The “High Service Area” (or “High SA”) scenario from the Strategic Plan should be used for water system modeling and development of the CIP.[11]
- Water demand projections should be based on 145 gallons per capita per day (gpcd). This projection omits the 15 gpcd reserve supply and the passive water conservation savings discussed in the Strategic Plan.

Figure 3-2: Revised Projections of New Housing Units



Based on the projected number of new housing units, population projections are presented in Table 3-4 (page 11) and Figure 3-3 (page 11) and associated water demand projections are presented in Figure 3-4 (page 12). The decrease in the projected 2020 water demand from the 2060 Strategic Plan is caused by including passive water conservation savings in the projections (Figure 3-4, page 12). As described above, passive water conservation savings are not considered in the water demand projections for this study.

The projected 2025 water demand is 20,111 acre-feet per year (ac-ft/yr), for an average day water demand of 17.95 MGD.

[11] The “High SA” scenario is described in the notes for Figure 3-3 (page 18).

Table 3-4: Revised Projections of New Housing Units and Population

Year	Single-Family Units	Multi-Family Units	City Population	High Service Area Percentage	High Service Area Population
2004	29,241	15,283	103,101	85%	90,305
Projected Increase	9,609	5,465	34,938	4.7%	33,516
2025	38,850	20,748	138,039	89.7%	123,821

Figure 3-3: Comparison of Population Projections to 2060 Strategic Water Supply Plan

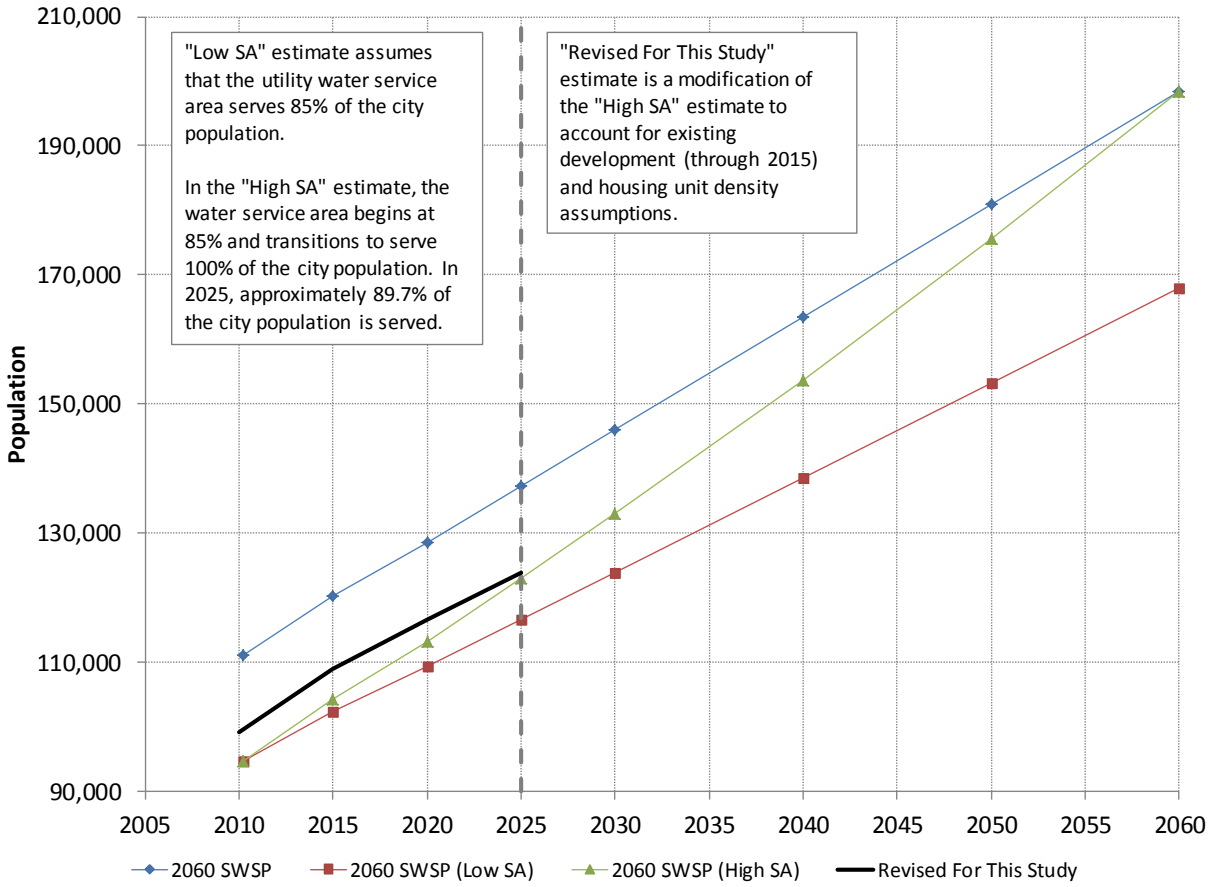
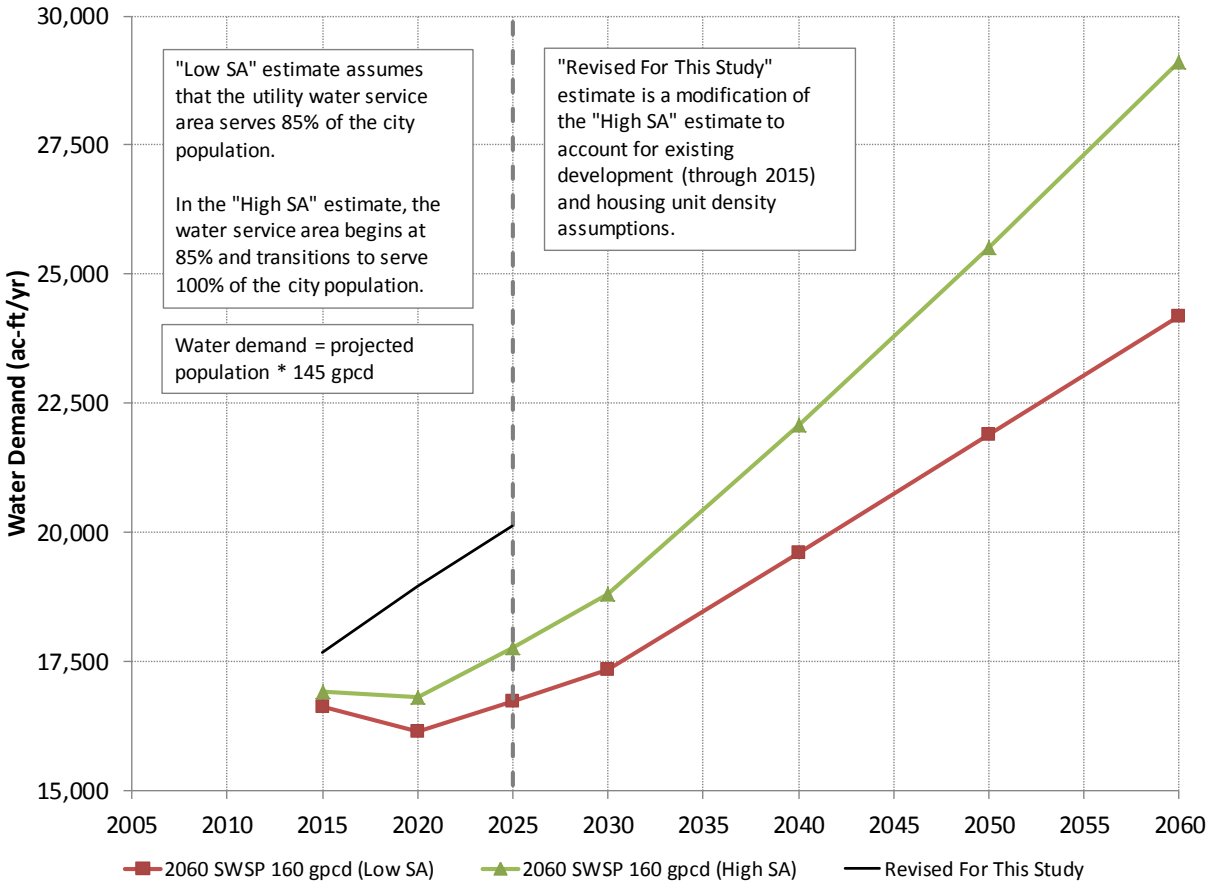


Figure 3-4: Comparison of Annual Water Service Area Demand Projections to 2060 Strategic Water Supply Plan



3.2.2 Allocation of Projected Demands to Land Use Categories

Projected 2025 annual water demand in the water service area can be divided between existing water use and future development water use (Table 3-5, page 13). To assist in the allocation, City staff provided existing water use data for October 2015 through September 2016, including customer meter data, estimates of other uses, and estimated water loss. “Other uses” may include water used for fire-fighting, street cleaning, water main and sewer flushing, fire flow tests, and other unmetered uses. From October 2015 through September 2016, the City estimated the volume of other uses and water loss to be about 2.0 percent and 12.5 percent of total water use, respectively.

Table 3-5: Allocation of Projected Water Demands

<table>
<tr><td rowspan="11">2025 Water Use (17.95)</td><td rowspan="3">Existing System Use (16.06)</td><td colspan="2">Metered Customer Use (13.73)</td></tr>
<tr><td colspan="2">Other Uses (0.32)</td></tr>
<tr><td colspan="2">Water Loss (2.01)</td></tr>
<tr><td rowspan="8">Future Development Use (1.89)</td><td rowspan="7">Metered Flow for New Accounts (1.62)</td><td>Single-Family (0.76)</td></tr>
<tr><td>Multi-Family (0.15)</td></tr>
<tr><td>Office/Retail (0.25)</td></tr>
<tr><td>Industrial/Warehouse (0.38)</td></tr>
<tr><td>Parks (0.01)</td></tr>
<tr><td>Schools (0.001)</td></tr>
<tr><td>Other (0.07)</td></tr>
<tr><td colspan="2">Other Uses (0.04)</td></tr>
<tr><td colspan="2">Water Loss (0.24)</td></tr>
</table>

Numbers represent approximate average day water demand in MGD.

The allocation of projected water demand among the different existing and future uses is described in detail in Appendix D. The primary assumptions in the allocation process are:

- Projections based on numbers of connections:
    - 17.25 multi-family units per multi-family water connection. This was estimated from the average day water use for a multi-family connection (1,859 gallons per day) and the average day water use for an independently metered apartment (102 gallons per day), with adjustments for differences in irrigation between these types of connections.
    - For each residential category, the unit water use was estimated to be the average of the 2015-16 average day water uses for all existing meters.
    - Based on these procedures and the estimated population densities, these assumptions result in projected single-family water use of 77 gpcd and projected multi-family water use of 56 gpcd. Based on literature values and experience with other utilities, these are reasonable estimates.
- Projections based on information provided by the City
    - The City provided information on parks and schools that are expected to be developed before 2025. For each new park and school, the City also identified an existing park or school with expected similar water use. Metered data from these comparable properties were used to estimate future water use at the new parks and schools.
    - A 20-acre future OU development with 1,200-bed student housing and an office building was also identified by the City. Unit water use of 56 gallons per bed per day was assumed for student housing (same value as multi-family per capita water use). Projected water use for the office building is described in the next bulleted items.

- Projections based on land use acreage:
    - For each category (office/retail and industrial/warehouse), the number of connections per acre was projected by identifying the existing total acreage of this land use and existing total number of meters for developed parcels with similar land use.
    - Water use in the office/retail and industrial/warehouse land use categories is highly variable, depending on the property, with the average water use skewed by a few large water users (For each category, the average of the average day water use for all meters is about the 83rd percentile value). In addition, there are only 19 existing connections in the industrial/warehouse category that had metered 2015-16 water use. For these reasons, smaller percentile values were used that would also make the total allocated metered water use equal the amount projected based on the 2060 Strategic Water Supply Plan (Tables 2 and 3):
        - 69th percentile average day water use for existing meters for the projections without water conservation and
        - 63rd percentile average day water use for existing meters for the projections with water conservation.

3.2.3 Allocation of Projected Demands to Locations in the Water Service Area

Projected 2025 water demands were allocated in the model using a GIS shapefile showing areas of future development including active platted and preliminary platted areas as of 2016. The total future demand due to new metered accounts (1.62 MGD) plus future leakage & water loss (0.28 MGD) was spread equally over approximately 440 nodes in areas of development in the water model.

Figure 3-5 (page 15) displays the areas of future development in the City where future demand was included in the water model. These areas are projected to develop by 2025.

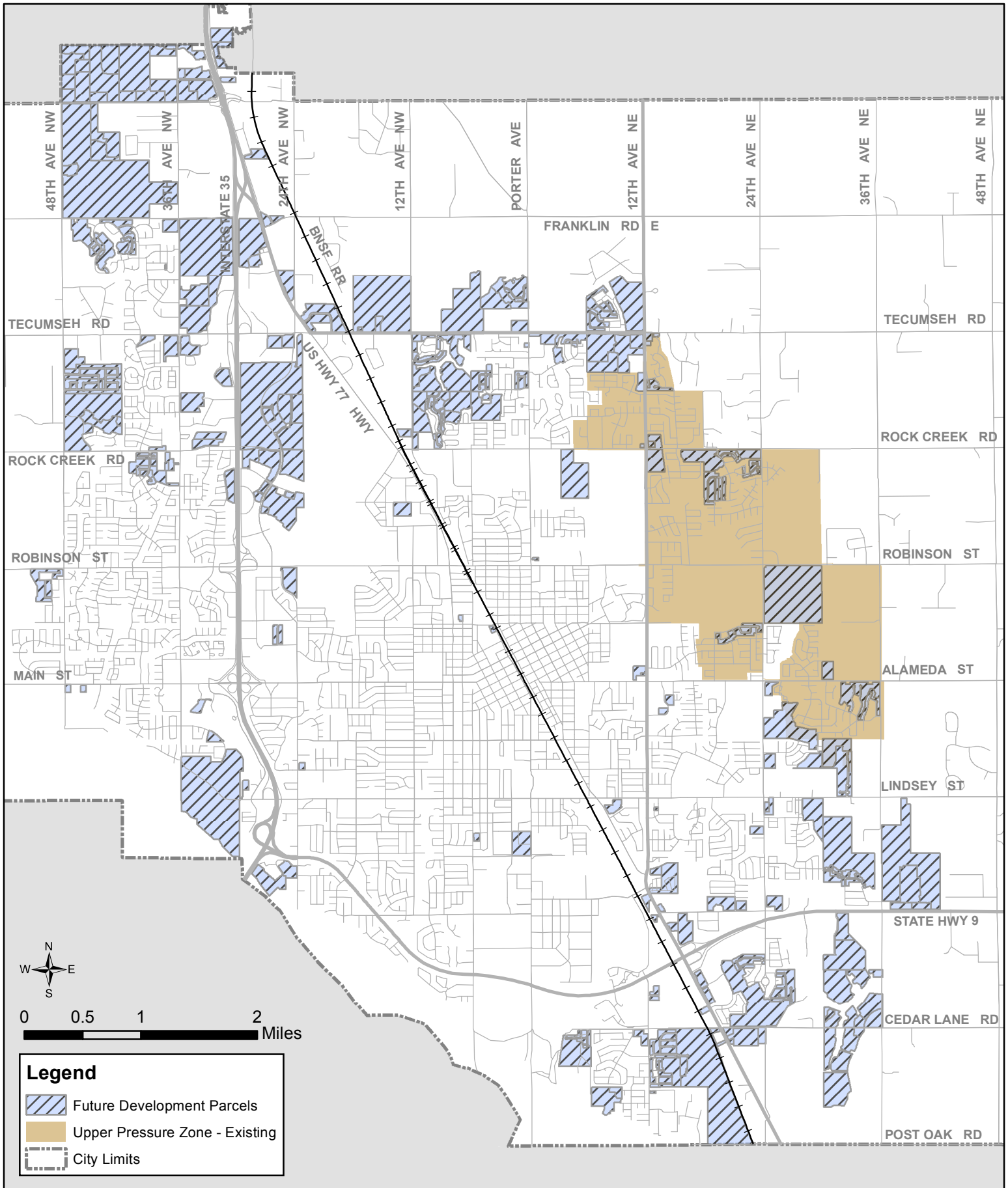


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FIGURE 3-5: Future Developments

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4 Model Development and Evaluation

A new water distribution system model was produced for this project, using the most current data available from NUA. The model was created from a GIS database provided by NUA and included all pipes in the system. All water mains were imported from GIS into the model, and the model auto-generated both junction and end nodes based simply on pipe spatial connectivity. The network-building feature of the Infoworks WS software was a useful, efficient method to quickly generate a base model network from existing GIS data. Digital elevation surfaces were built in the ArcGIS terrain format from 1-foot contours (covers majority of MDS and PZ system) and 2-foot contours (covers majority of well-field area) received from NUA. These terrain surfaces were used to assign the initial node elevations in the model, where each node was assigned the best available terrain surface ground elevation, minus 3.5 feet, to represent the node elevation below ground. In addition, some global model adjustments were required to build the functional model network: 1) the majority of pipes with length < 1 foot were lengthened to 1 foot, 2) the pipes with diameter > length were extended so that length = diameter, and 3) additional junction nodes were inserted where needed to establish full connectivity of the water main network.

Storage and pumping facility data were obtained from as-built plans, NUA's SCADA system and staff knowledge and incorporated into the existing system model. Additionally, operational controls for pumps, wells, and valves were input to the model based on spreadsheet data and discussions with NUA staff. Existing demands were calculated and allocated using historical monthly City billing account information tied directly to billing addresses. Leakage demands representing the 12.5 percent of overall system water loss were then distributed uniformly across the system nodes to increase the total existing demand to production quantity.

This chapter discusses the following topics: Model Calibration, Extended Period Simulations, Performance Criteria, Model Analysis, and Water Quality.

4.1 CALIBRATION

Static and extended period simulation calibration runs were conducted on the newly constructed model for a week and a half from August 23, 2016 through September 2, 2016. Pressure and flow data were collected at 17 hydrant sites throughout Norman during this time period. Four hydrants, two recording pressure and two recording flow, were utilized at each site. Additionally, NUA SCADA data including flow and pressure from the MDS PS and PZ PS and elevated storage tank levels were also collected during the same period.

Figure 4-1 (page 17) displays the locations of the hydrants for each testing site. Appendix E contains detailed instructions that NUA followed for completing the flow tests as well as key maps for each specific site. In cases where pressure dropped significantly and approached a minimum pressure of 20 psi, NUA Staff flowed only one hydrant instead of two hydrants. (It was recommended that the system not be stressed below 20 psi.)

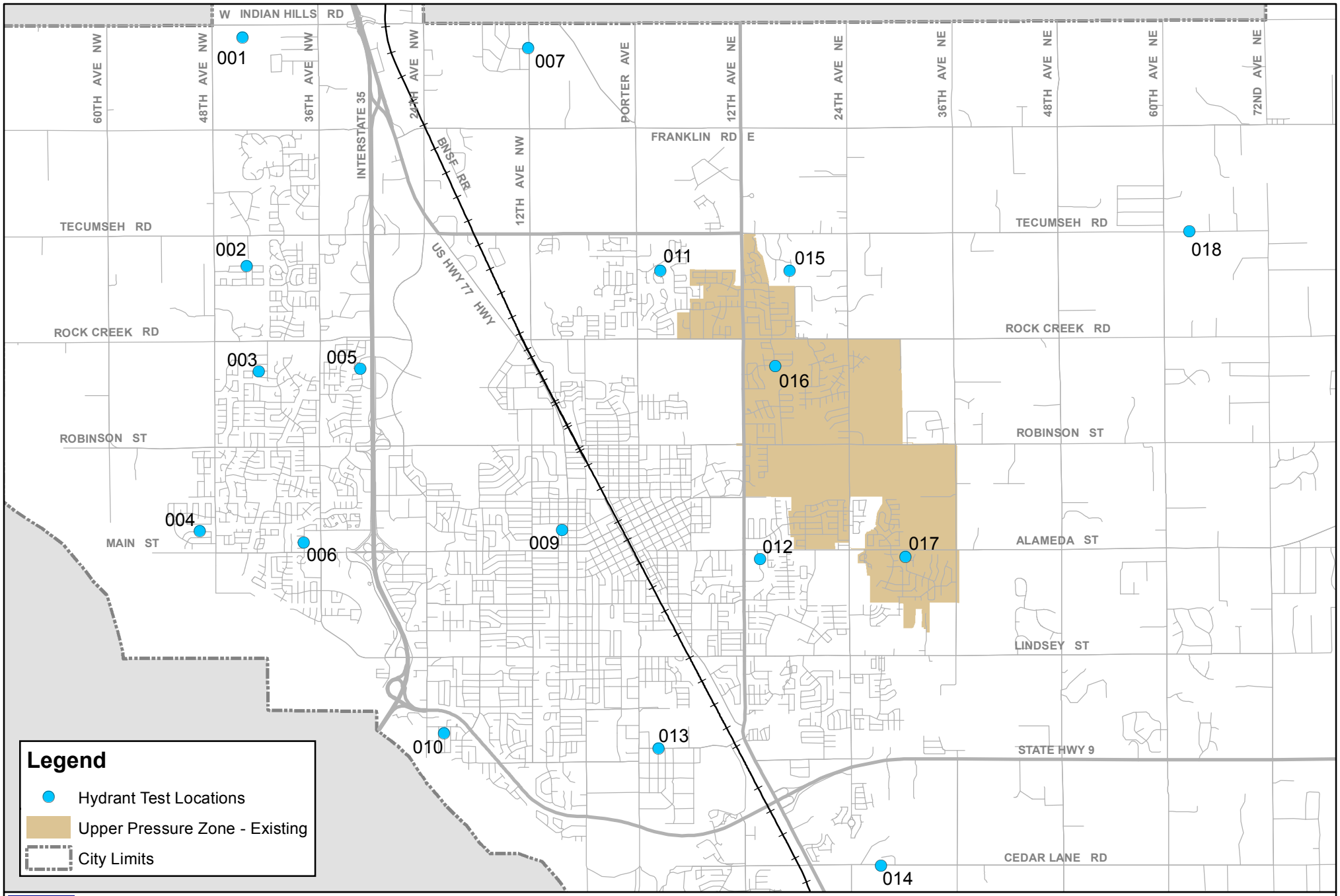

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FIGURE 4-1: Locations of Hydrant Flow Tests

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The hydrant flow tests were used to perform a static model calibration at each hydrant test site prior to flow being drawn through either hydrant. The goal of this calibration run is to accurately represent field pressure data in the model under the same conditions seen in the field at the time of data collection. This first level of calibration is useful in validating node elevations, tower (pressure head) elevations, and operational boundary conditions in the model.

The second calibration step (residual calibration) performed at each site involved opening hydrants to draw larger localized flow at each location. Flows in excess of 3,000 gpm were measured in many areas when both of the test hydrants were flowing. These flows are higher at these pressure testing locations than would be expected during any peak hour demands. The higher flows used in the residual calibration tests assist in evaluating model pipe connectivity, pump operation, pipe roughness factors and system response times.

The hydrant test locations calibrated very well under static conditions and modeled pressures were within five psi of measured pressures at all test locations. The residual calibration was more difficult to refine. APAI and NUA Staff spent considerable time checking pipe sizes and connectivity and through this process discovered several lines or connections that were different in the model (GIS) than field conditions. With the investigation and resolution of each of these hydrant test areas, the residual calibration modeled conditions were brought closer to field measurements. APAI also refined and adjusted pipe friction factors (Hazen Williams C-Factors) as a final calibration step (Appendix F). Table 4-1 (page 19) provides a summary of the final calibration results and model notes according to each hydrant test site. Although calibration at several of the sites did not achieve the target agreement between measured and modeled results (<5 psi difference), significant improvements to the overall calibration were achieved after the initial calibration process, primarily through identification of pipe connectivity errors in the GIS/model. The modeled pressure results presented in Table 4-1 (page 19) are final results, after improvements were made to the model infrastructure. It is recommended that future model updates continue this process of improving GIS/model connectivity accuracy. Graphs showing detailed model and field calibration locations and output from the static and residual calibration are displayed in Appendix G.

Table 4-1: Model Calibration Summary

Test	Reviewed by NUA?	Flow (gpm)	Date	P1 Gage Pressure Difference (psi)[1]			P2 Gage Pressure Difference (psi)[1]			# of Hydrants Flowing	Notes
				Static (Before)	During Flow Test	Static (After)	Static (Before)	During Flow Test	Static (After)		
1	-	3,760	8/23/16	1.6	-6.0	0.3	0.7	-4.0	0.4	2 flows	Calibration complete, test matches well.
2	Yes	3,215	8/24/16	2.3	-12.5	2.6	0.7	-12.1	0.9		Calibration complete. NUA & APAI both checked lines thoroughly in this area.
3	Yes	2,310	8/24/16	1.5	-12.7	1.5	1.2	-13.3	1.3		Calibration complete.
4	Yes	2,660	8/25/16	2.3	-18.1	2.3	2.8	-12.7	2.3		Calibration complete.
5	Yes	2,980	8/24/16	2.0	-7.8	2.2	1.5	-5.2	2.0		Calibration complete. Made +5 psi improvements w/ addition of 12-in line down IH-35 frontage.
6	Yes	5,430	8/25/16	2.9	-5.3	1.6	3.0	2.7	2.0	2 flows	Calibration complete.
7	Yes	1,540	8/25/16	2.8	-14.4	0.5	1.0	-20.1	1.0		Calibration complete. City found an error along Franklin Rd. that will amplify the pressure issues. There is a CIP proposed by City that will help address pressure in this area, so no further adjustments at this time.
8	Site eliminated										
9	Yes	4,300	8/25/16	2.2	-1.4	0.5	1.9	3.3	-0.2	2 flows	Calibration complete. Plus ~ 20 psi for both hydrants. Test matches well now.
10	Yes	3,170	8/25/16	2.4	-12.7	3.4	2.3	-18.4	2.4		Calibration complete. Plus ~ 5 psi for both hydrants with NUA updates to GIS. Test matches better.
11	Yes	3,350	8/30/16	1.6	-1.5	-0.1	1.9	-9.8	1.0		Calibration complete. Plus 4 psi for both hydrants from GIS updates.
12	-	4,895	9/1/16	2.4	-1.5	2.5	4.0	-2.1	3.7	2 flows	Calibration complete, test matches well.
13	Yes	5,630	9/1/16	4.0	-4.3	1.5	-0.2	-6.3	1.7	2 flows	Calibration complete, test matches well. GIS update made slight improvement (+2 psi for P1, -0.4 psi for P2).
14	Yes	3,080	8/30/16	2.5	-6.2	1.5	2.6	-4.3	1.6		Calibration complete, test matches well. GIS update made slight improvement (+<1 psi for P1 & P2).
15	Yes	2,660	8/30/16	2.1	-11.6	1.7	1.7	-15.1	1.3		Calibration complete. APAI did verify wells are acting as they should.
16	Yes	3,215	8/30/16	2.4	-10.9	6.0	1.3	-7.9	3.2		Calibration complete. NUA & APAI both checked lines thoroughly in this area.
17	-	4,380	8/31/16	1.0	-2.2	-1.1	1.9	-4.8	-0.3	2 flows	Calibration complete, test matches well.
18	-	4,718	8/31/16	3.8	-0.2	3.3	4.8	-2.8	2.8		Calibration complete, test matches well.

Key

1	Pressure difference is final “Modeled Pressure” after model improvements minus “Observed Pressure.”
	Pressure difference is greater than 5 psi between modeled pressure and SCADA data.
	Hydrant test is a good match to SCADA data and within an acceptable range.

4.2 EXTENDED PERIOD SIMULATIONS

Following calibration, APAI created an extended period simulation (EPS) to model a three day period of time for both existing and future conditions. As opposed to a steady-state simulation where there is no time variable, an EPS introduces time as a variable in the model for a more realistic evaluation of the distribution system. For example, an EPS can evaluate cycling of elevated storage tanks and the resulting water quality (age) over time. An EPS is also useful for determining pump efficiency by observing the percentage of time throughout the day that the pumps must be online to meet diurnal demands.

Two scenarios were constructed in the model: an existing conditions scenario and a future conditions scenario. Historical water demand was evaluated to determine an average day demand of 16.06 MGD with a max day factor of 1.9 for the existing conditions scenario (see Section 3.1). The future average day demand in 2025 was projected to be 17.95 MGD with 1.62 MGD of this additional flow allocated to future development and the remaining 0.28 MGD allocated to water loss & leakage. The max day factor in the future conditions scenario was assumed to be equal to the max day factor used in the existing conditions scenario. Table 4-2 summarizes the demands used in the EPS scenarios.

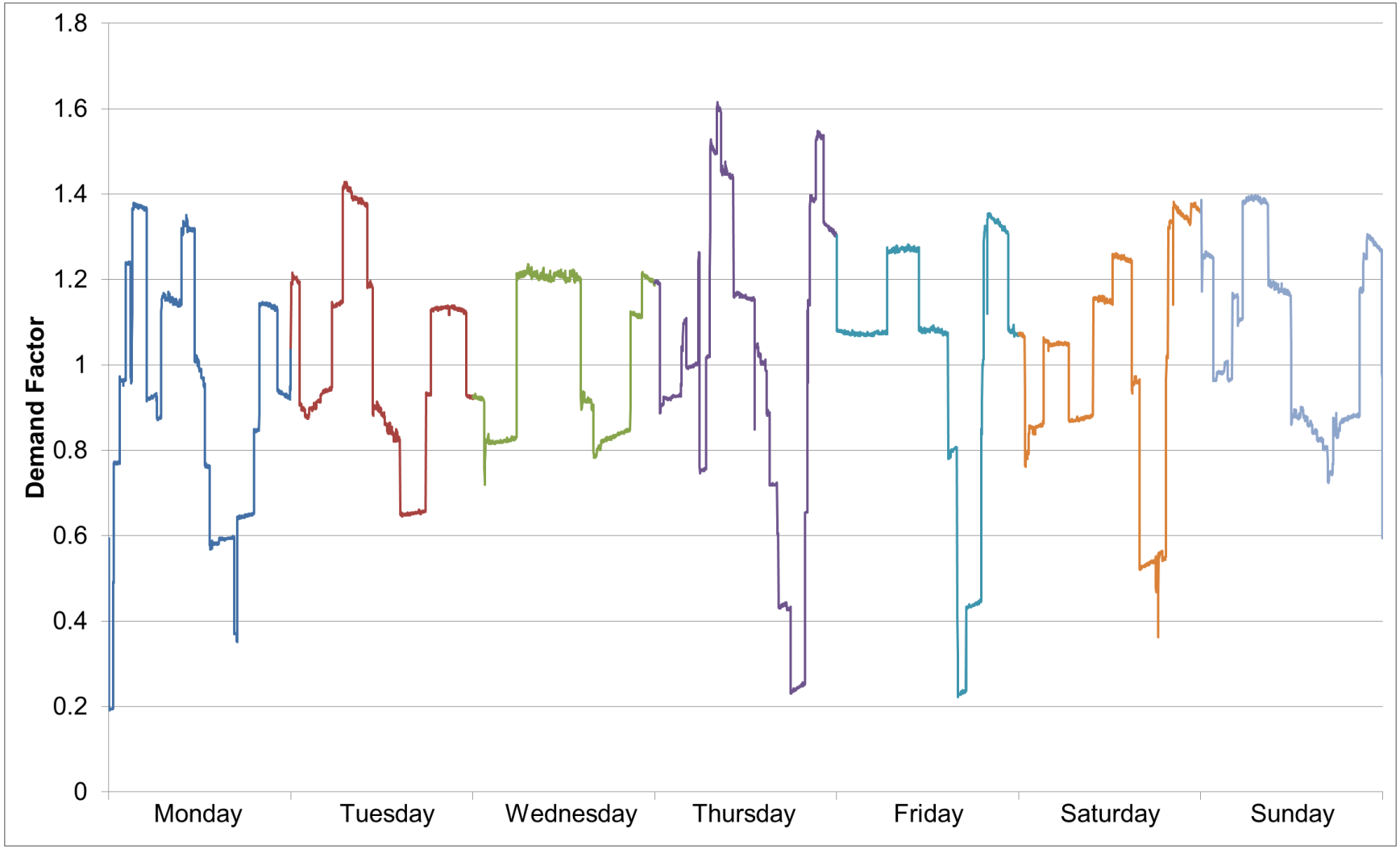
Table 4-2: Extended Period Simulation Scenario Demands

Modeling Scenario	Existing Conditions	Future Conditions
Design Year	FY 2015-2016	2025
Average Day Demand (MGD)	16.06	17.95
Max Day Factor	1.9	1.9
Max Day Demand (MGD)	30.52	34.11

Historical peak hour data was not provided for the system. However, for the model calibration period of August 23, 2016 through September 2, 2016 SCADA data was provided in a fine resolution. Production data in one minute increments for the MDS pumps (1 through 4), the Upper PZ, OKC connection, and active wells during the calibration period were plotted and used to determine the diurnal pattern of demands over time. Since this time frame was during summer, the peak hour demand factors were greater than average. The greatest factor was about 1.6 as shown on Figure 4-2 (page 21), which displays this data over a seven day period. The three day max day simulation began on a “Tuesday” and concluded at the end of the day on “Thursday” to capture the maximum peak on Thursday.

Results from the max day future conditions scenario were used to identify model improvements and recommend CIP projects to meet performance criteria outlined in Section 4.3. Additionally, the average day future conditions scenario was used to evaluate water age in the system since water quality issues typically occur during periods of lower demand. Results from the max day future conditions model run are presented in Section 4.4, and the water quality results are presented in Section 4.5.

Figure 4-2: Diurnal Pattern Measured during Calibration and Used in EPS Simulation



4.3 PERFORMANCE CRITERIA

A number of performance criteria were used to interpret results from the max day future demand scenario related to water pressure, available fire flow, and modeled headloss. The Oklahoma Department of Environmental Quality (DEQ) requires that a municipality provide a minimum water pressure of 25 psi throughout the distribution system, including during fire flow events.[12] However, NUA preferred to improve on this standard by recommending a minimum water pressure of 40 psi, if possible. In the CIP recommendations, projects to improve pressure for any node experiencing 35 psi or less (during the maximum day scenario) were included.

For the minimum required available fire flow, the DEQ defers to requirements presented in publications and standard manuals of practice.[13] The American Water Works Association (AWWA) has published a manual of practice for fire flow requirements in a distribution system, stating that the minimum available fire flow should be 500 gpm at a residual pressure of 20 psi.[14] As a company practice, APAI generally recommends a minimum flow of 1,000 gpm in residential areas and > 1,000 gpm in commercial areas. NUA desired to have a minimum available fire flow of 1,500 gpm at 25 psi, if possible. In the CIP recommendations, projects for hydrants with an available fire flow of less than 1,250 gpm were included. APAI lowered the threshold from NUA's initial recommendation of a minimum flow of 1,500 gpm to 1,250 gpm based upon the large number of fire hydrant nodes that had available fire flows less than 1,500 gpm. A large number of them were in residential or newly developed areas where it did not make sense to upsize lines based upon this parameter alone. Lowering the threshold to 1,250 gpm eliminated a significant number of hydrants to address.

Finally, the maximum unit headloss through each pipe segment in the distribution system during the max day future conditions scenario was evaluated. Any segments with a unit headloss greater than 7 ft/1,000 ft were recommended to be upsized. Some transmission mains were recommended to be upsized when unit headloss was less than 7 ft/1,000 ft due to the potential for accumulated headloss along long stretches of larger diameter lines.

4.4 MODEL ANALYSIS

The calibrated water model was used to analyze the existing water distribution system for potential deficiencies. A projected 2025 max day demand scenario was applied to the calibrated model. Model results were evaluated for minimum node pressures, maximum line head losses, and maximum day available fire flow (numerical criteria given in Section 4.3). Each is described in more detail in the following sections.

4.4.1 Pressure

The existing system was initially run with existing max day demands to simulate the minimum pressures currently experienced throughout the distribution system on a day of maximum demands (Figure 4-3, page 24 and Figure 4-4, page 25).

[12] DEQ 252:626-19-1
[13] DEQ 252:626-3-6(c)(6)
[14] Distribution System Requirements for Fire Protection, AWWA, 4th Edition, pp 13.

In order to successfully run the 2025 max day demand scenario, the fourth MDS pump had to be turned on to provide enough supply to meet the increased max day demands. This means that all four MDS pumps are running and that the MDS PS will need a fifth pump to maintain firm capacity. With this update, the existing distribution system functions well under projected 2025 max day demands, with the majority of minimum pressures above 40 psi (Figure 4-5, page 26 and Figure 4-6, page 27). The exception is the boundary between the MDS and southwest side of the PZ, generally bounded by Highway 9 to the south, 36th Ave. SE to the east, 12th Ave. SE to the west, and E. Robinson St. to the north which experiences minimum pressures below 35 psi (Figure 4-7, page 28). The highest pressures in the system tend to be near the extremes of the system, especially on the southwest edge of the City along the Canadian River, where the ground surface elevation is at a minimum. The model predicts that approximately 420 out of over 27,000 nodes in the model will have a minimum pressure less than 35 psi.

CIP projects improving pressure at these identified locations are presented in Chapter 5. After implementing the recommended CIP projects, all 27,000 nodes had a minimum pressure of 35 psi or greater in the future max day scenario (Figure 4-8, page 29 and Figure 4-9, page 30). A detailed map showing the boundary between the MDS and the southwest area of the PZ is shown in Figure 4-10 (page 31).

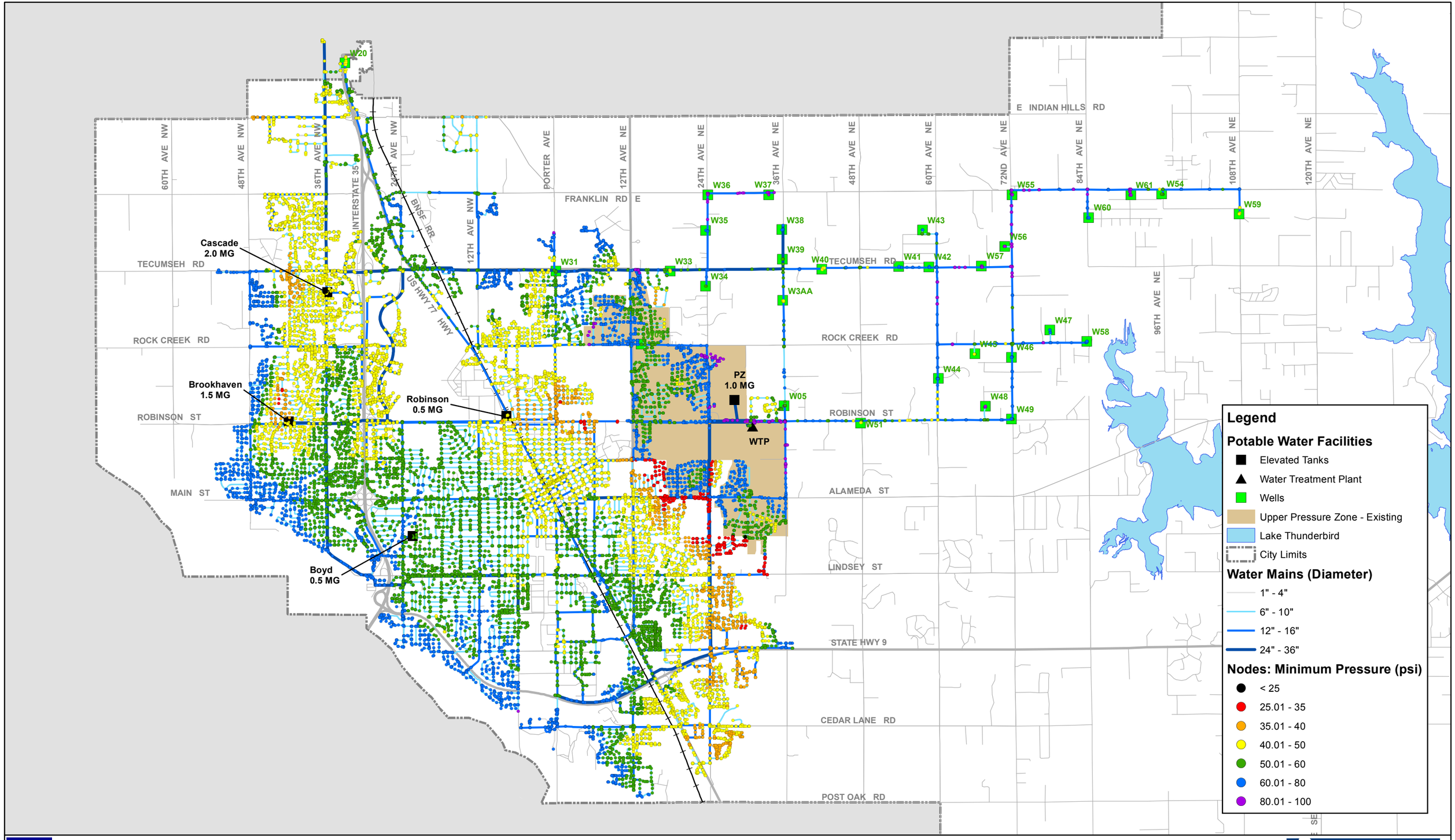


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FIGURE 4-3: Existing Max Day Run
Minimum Node Pressures

0 0.5 1 2 Miles

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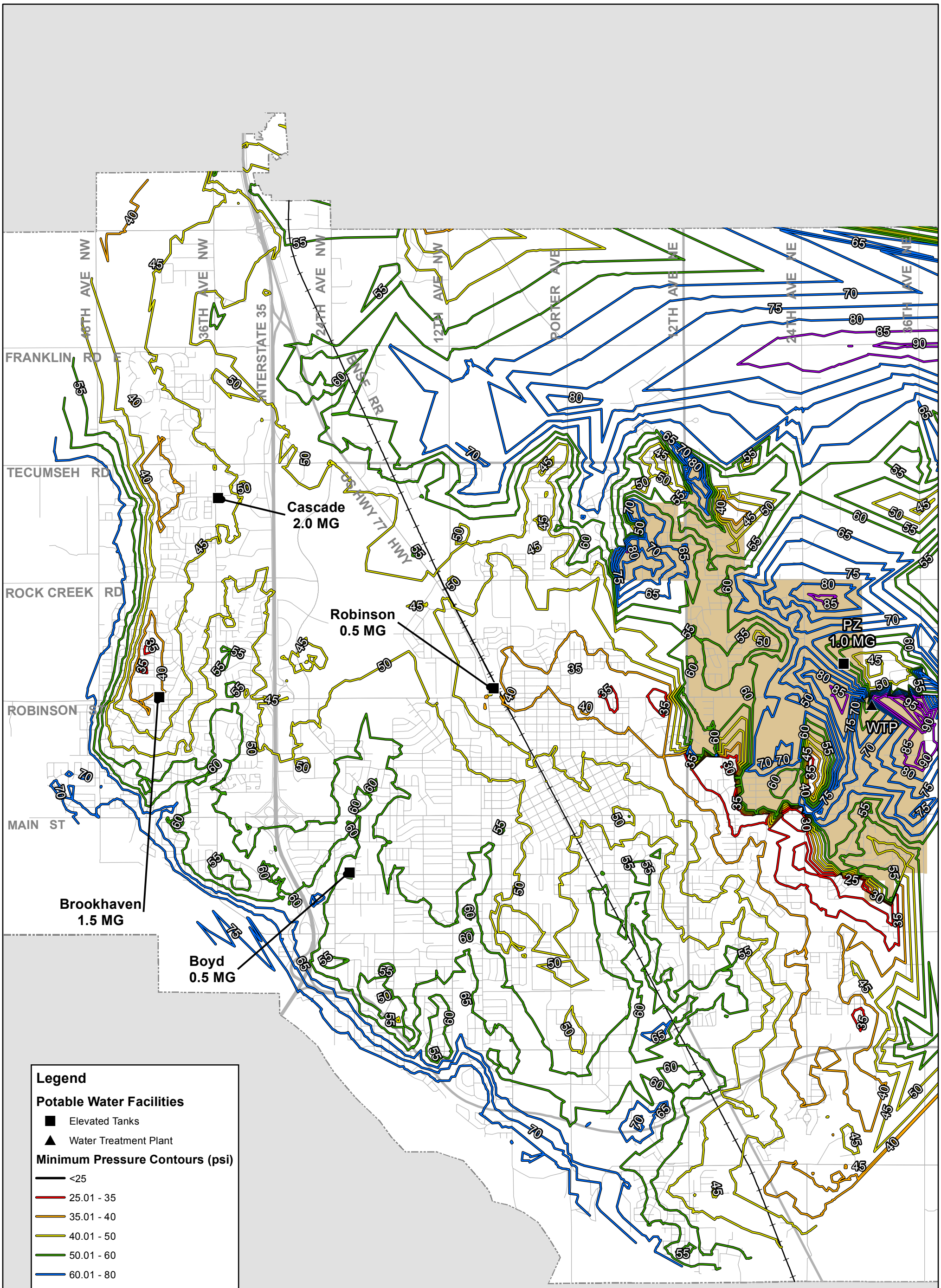

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FIGURE 4-4: Existing Max Day Run
Minimum Pressure Contours

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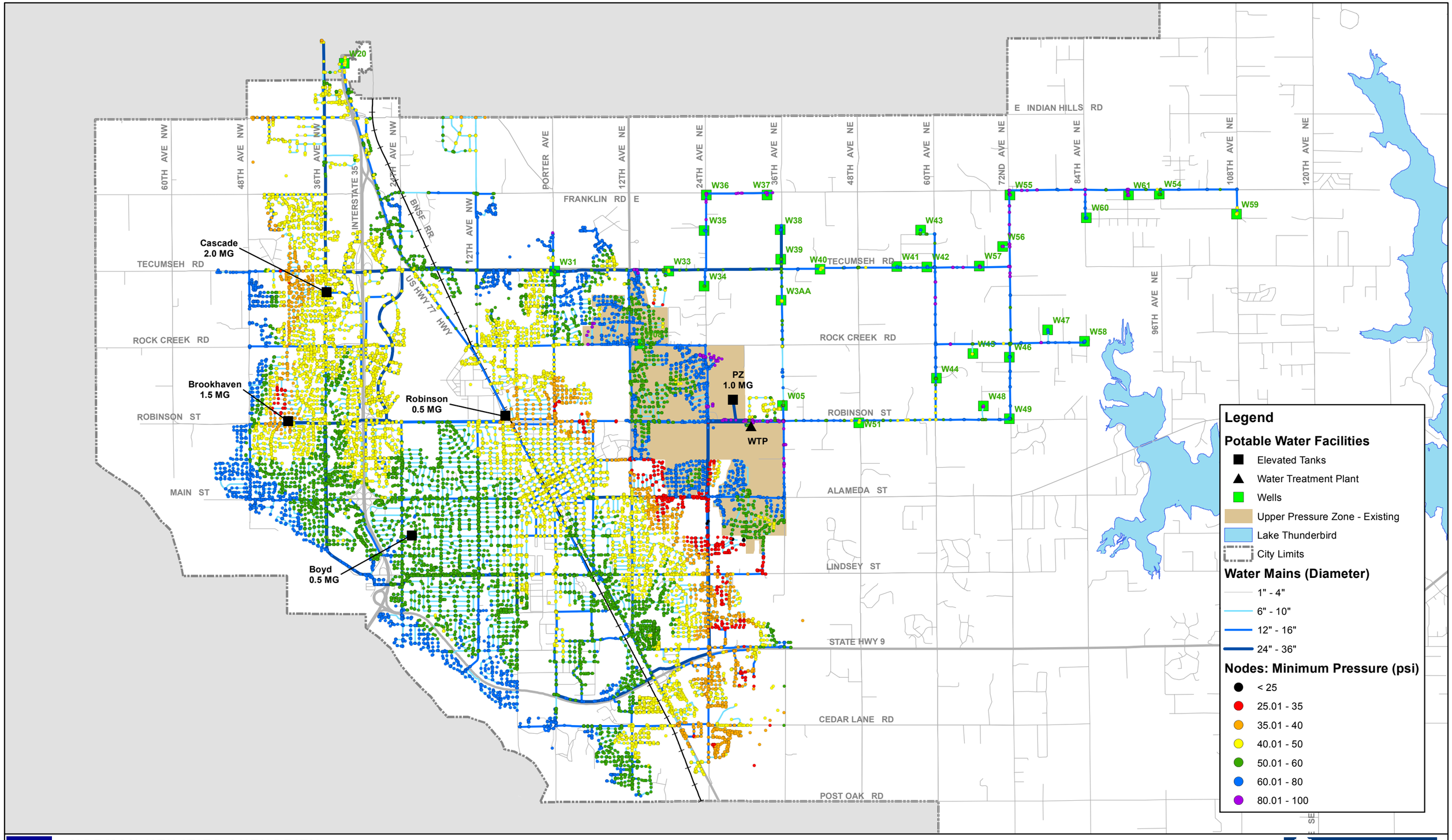

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FIGURE 4-5: Future Max Day Run
Minimum Node Pressures without Recommended CIPs

0 0.5 1 2 Miles

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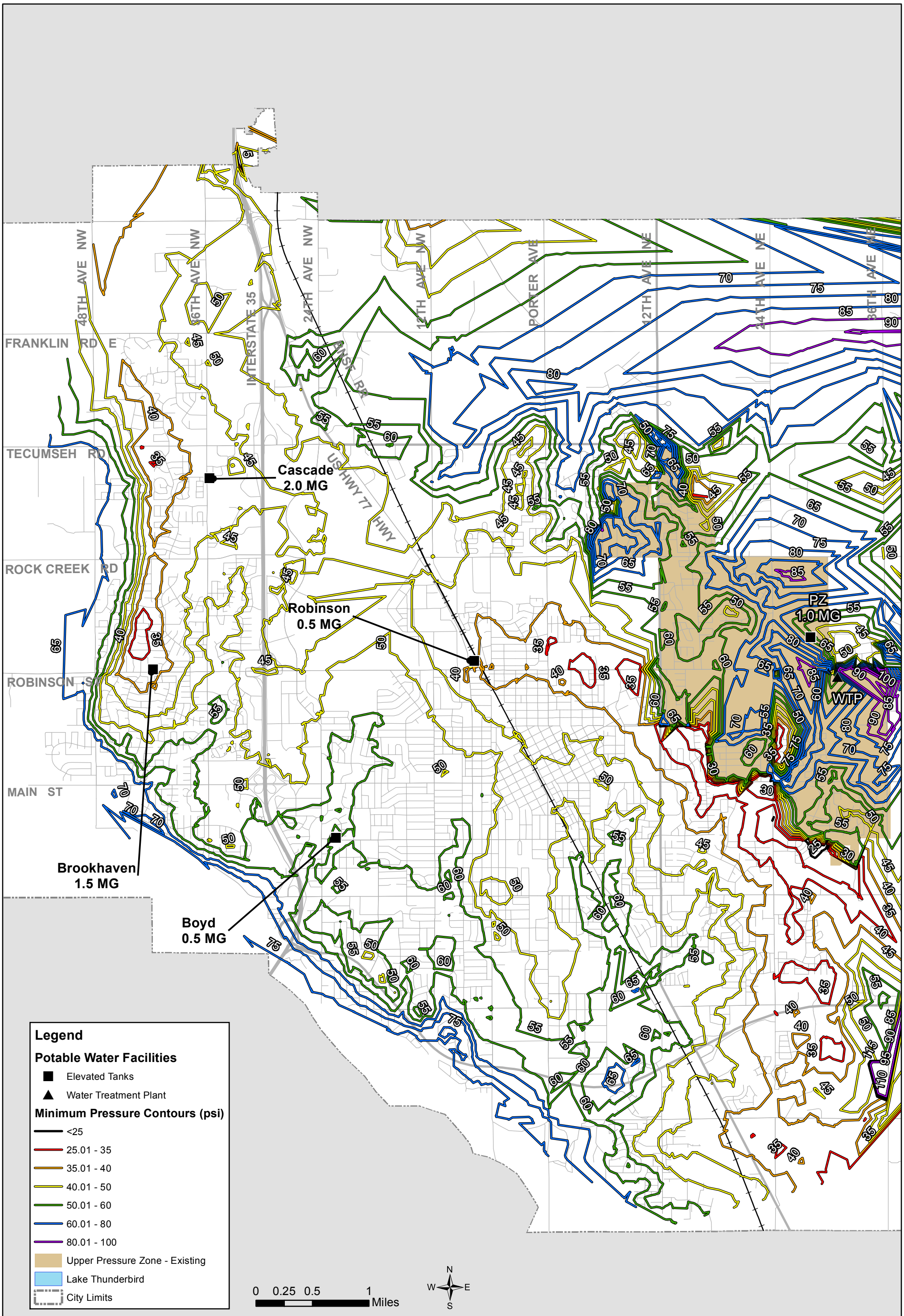

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FIGURE 4-6: Future Max Day Run
Minimum Pressure Contours without Recommended CIPs

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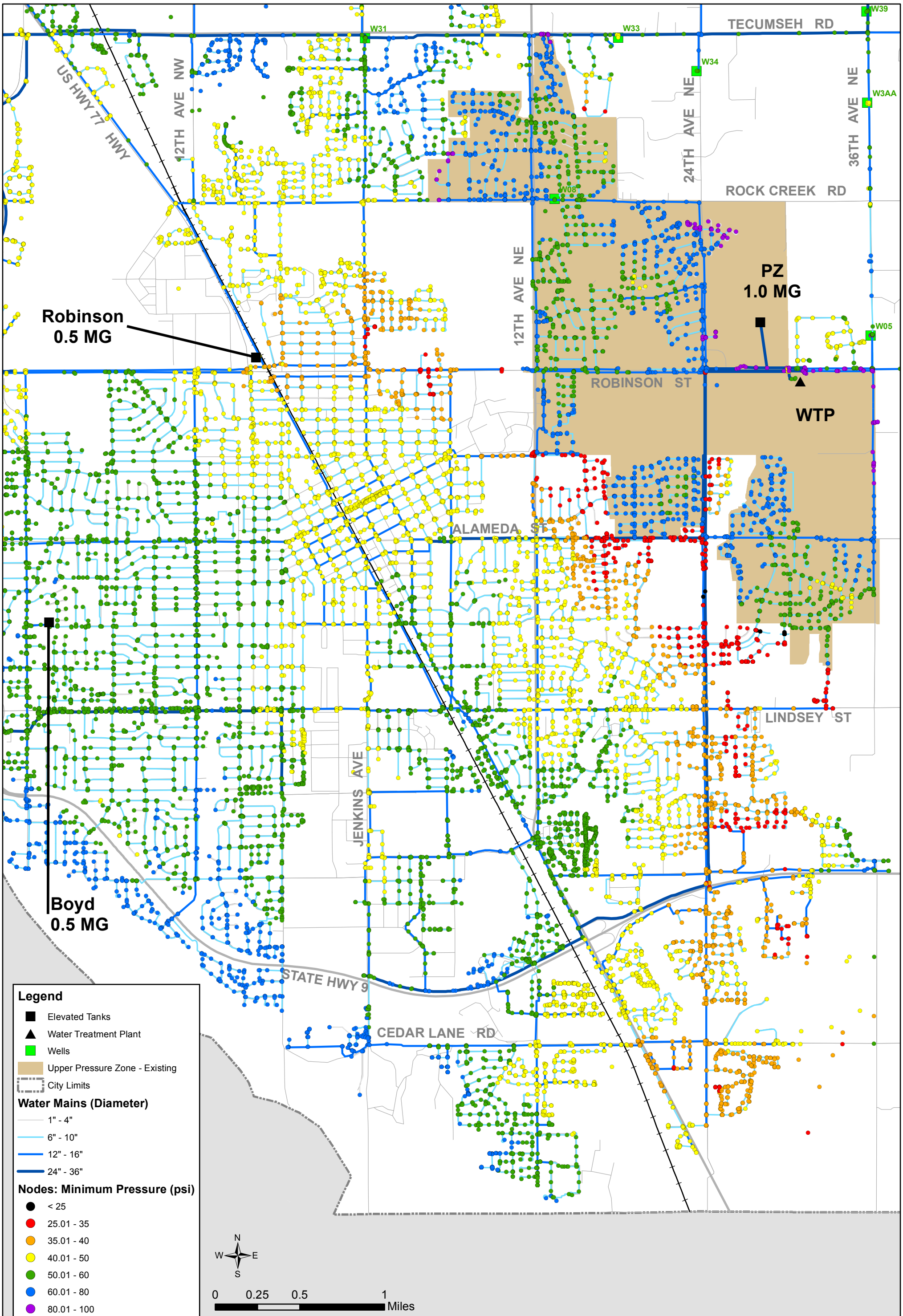

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FIGURE 4-7: Future Max Day Run
Detailed Map of Minimum Pressures without Recommended CIPs

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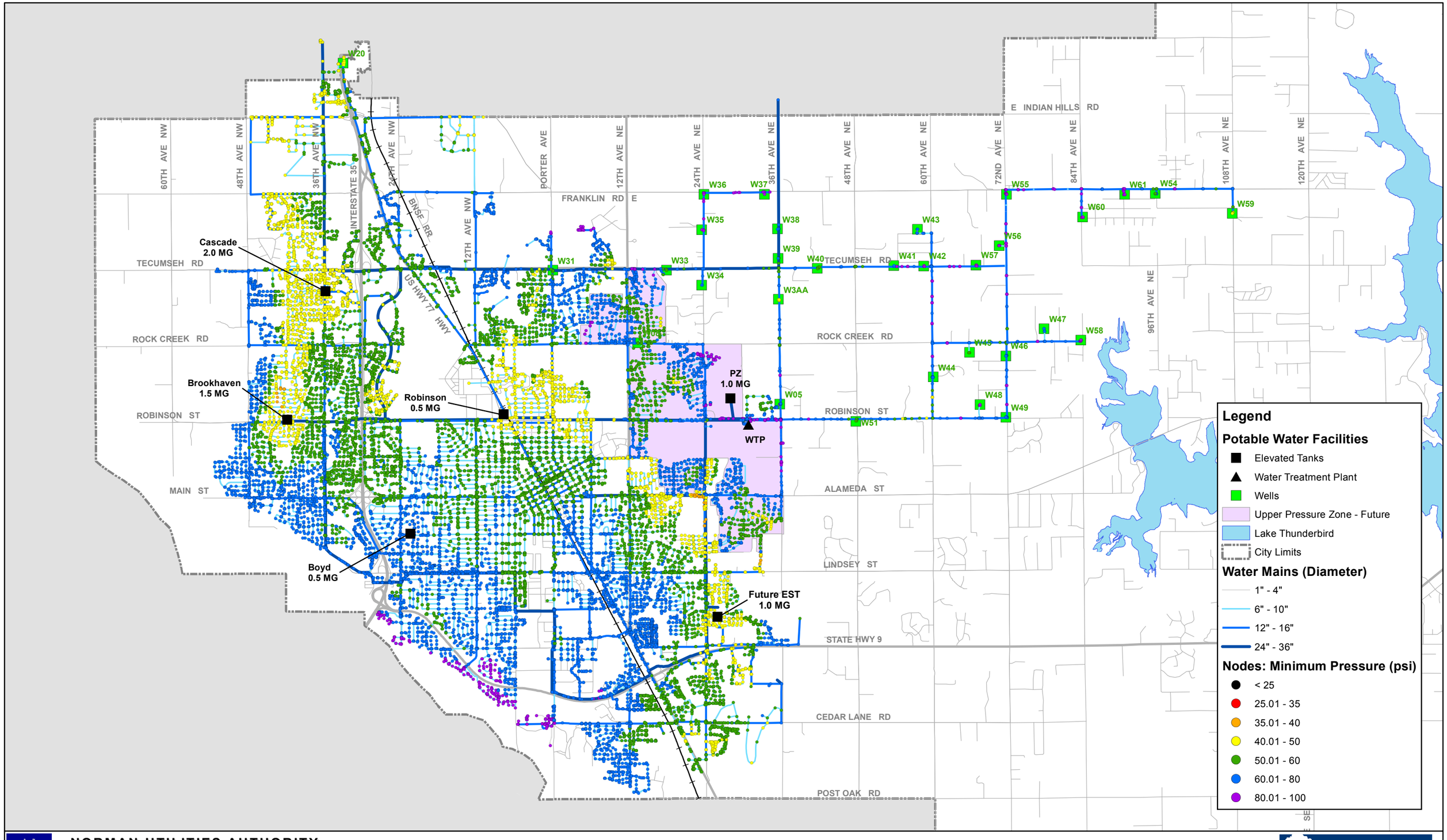

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FIGURE 4-8: Future Max Day Run
Minimum Pressures with Recommended CIPs

0 0.5 1 2 Miles

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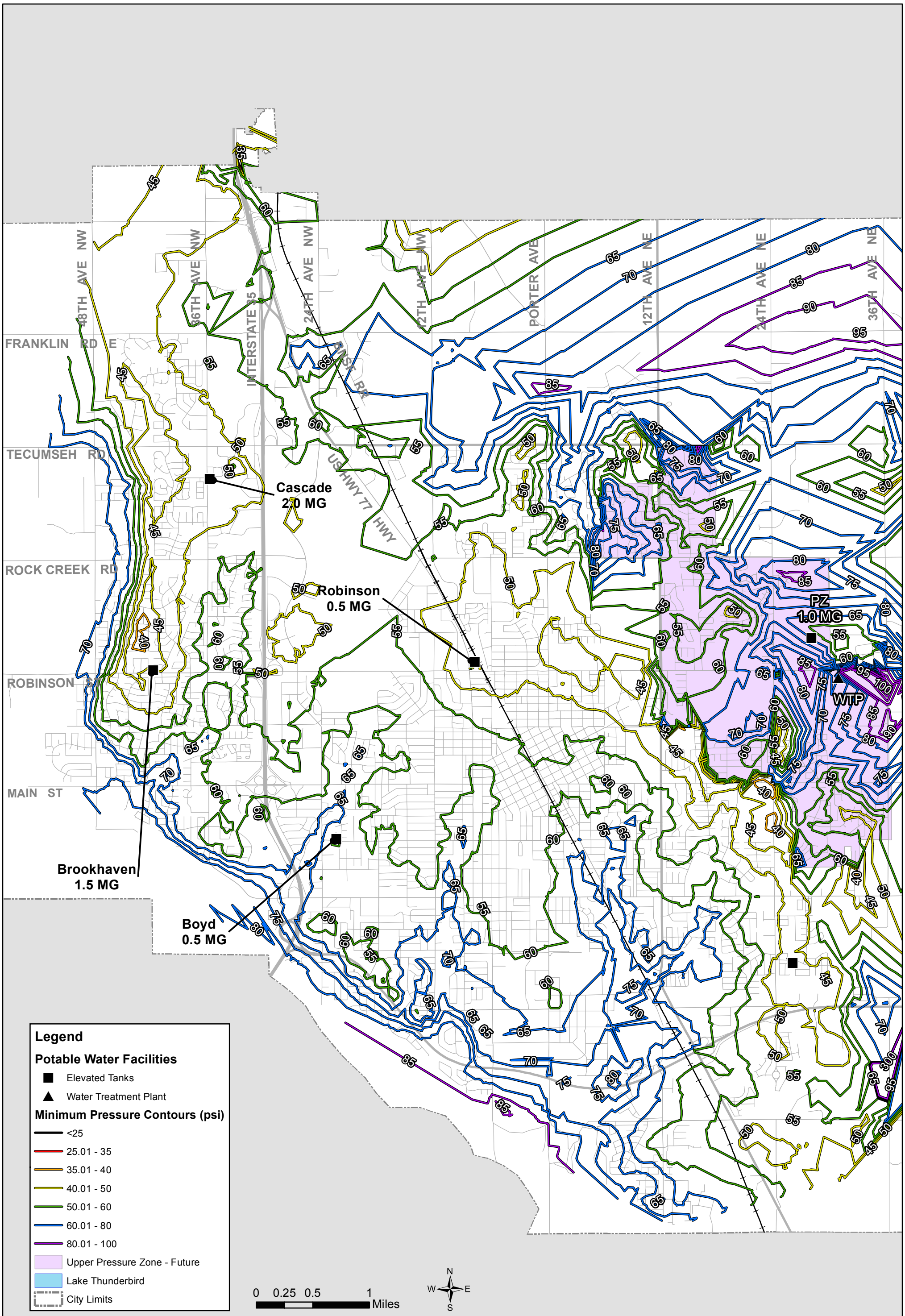

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FIGURE 4-9: Future Max Day Run
Minimum Pressure Contours with Recommended CIPs

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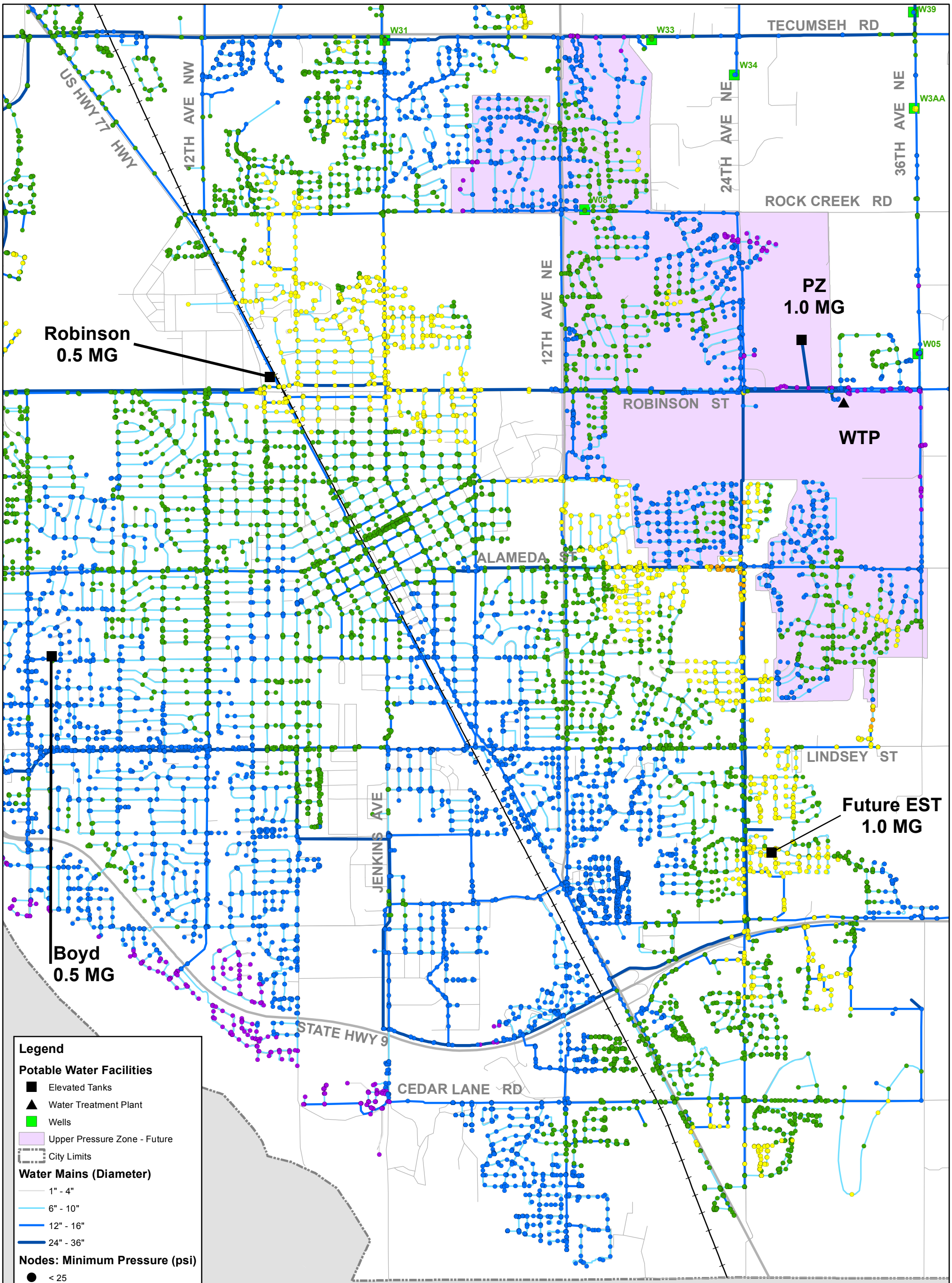

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FIGURE 4-10: Future Max Day Run
Detailed Map of Minimum Pressures with Recommended CIPs

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4.4.2 Fire Protection

Available fire flow was modeled in the existing system and the results are shown in Figure 4-11 (page 33). The existing distribution system also functions well under projected 2025 max day demands to generally provide adequate fire flow to all areas of the City (Figure 4-12, page 34). Without CIP improvements, hydrants below the minimum fire flow requirement of 1,250 gpm are not concentrated in any specific area, though small groupings can be identified in the City (Figure 4-13, page 35). Instead, hydrants not meeting the minimum flow requirements are generally scattered throughout the City. General examples of low flow hydrants include some on small diameter lines; older lines less than 6-inches in diameter. Also, hydrants located at the end of a cul-de-sac or dead end line sometimes exhibited low flow. Of the approximately 5,800 hydrants in the City, 119 of them are not able to provide at least 1,250 gpm at 25 psi at the projected max day 2025 demands. The model predicts that approximately 98% of the City's hydrants will meet the fire flow requirements under future demands. CIP projects improving available fire flow at the remaining locations are presented in Chapter 5. Modeled available fire flow with the recommended CIP projects is shown in Figure 4-14 (page 36).

4.5 WATER QUALITY

Although a detailed evaluation of water quality was beyond the scope of this project, the model was used to evaluate water age in the system. While water age is not a significant concern, in itself, high water age can be an indicator of potential water quality issues, such as nitrification. Nitrification is a biological process where naturally occurring bacteria convert ammonia into nitrate. This can be a problem in distribution systems where ammonia may be present in the water (especially systems that maintain a chloramine residual such as Norman.) As residual chloramines degrade over time, ammonia is released, providing food for nitrifying bacteria. Not only does nitrification increase the concentration of nitrate in a distribution system, it can also reduce alkalinity, pH, and dissolved oxygen. These changes in water chemistry could affect the distribution system infrastructure (especially systems with lead and copper pipes), if not addressed. Furthermore, chlorine residual decreases as a result of nitrification, which could lead to bacterial regrowth in the distribution system. NUA noted that nitrification was recently observed in the distribution system between August 2015 and October 2015.

For the water age evaluation, the existing distribution system was modeled using existing and future average day demands. Water age in the existing system is displayed in Figure 4-15 (page 37).The predicted water age under future average day conditions without CIP projects is shown in Figure 4-16 (page 38). The predicted water age after implementing the CIP projects recommended in Section 5 is shown in Figure 4-17 (page 39).

Appendix H presents modeling results for the water age experienced at each of the ESTs without and with the recommended CIP projects. In general, the simulated water age in the ESTs is acceptable. If water quality issues are observed, water age could be improved by installing mixers in the ESTs where there currently are none (Boyd, Brookhaven, and Cascade).

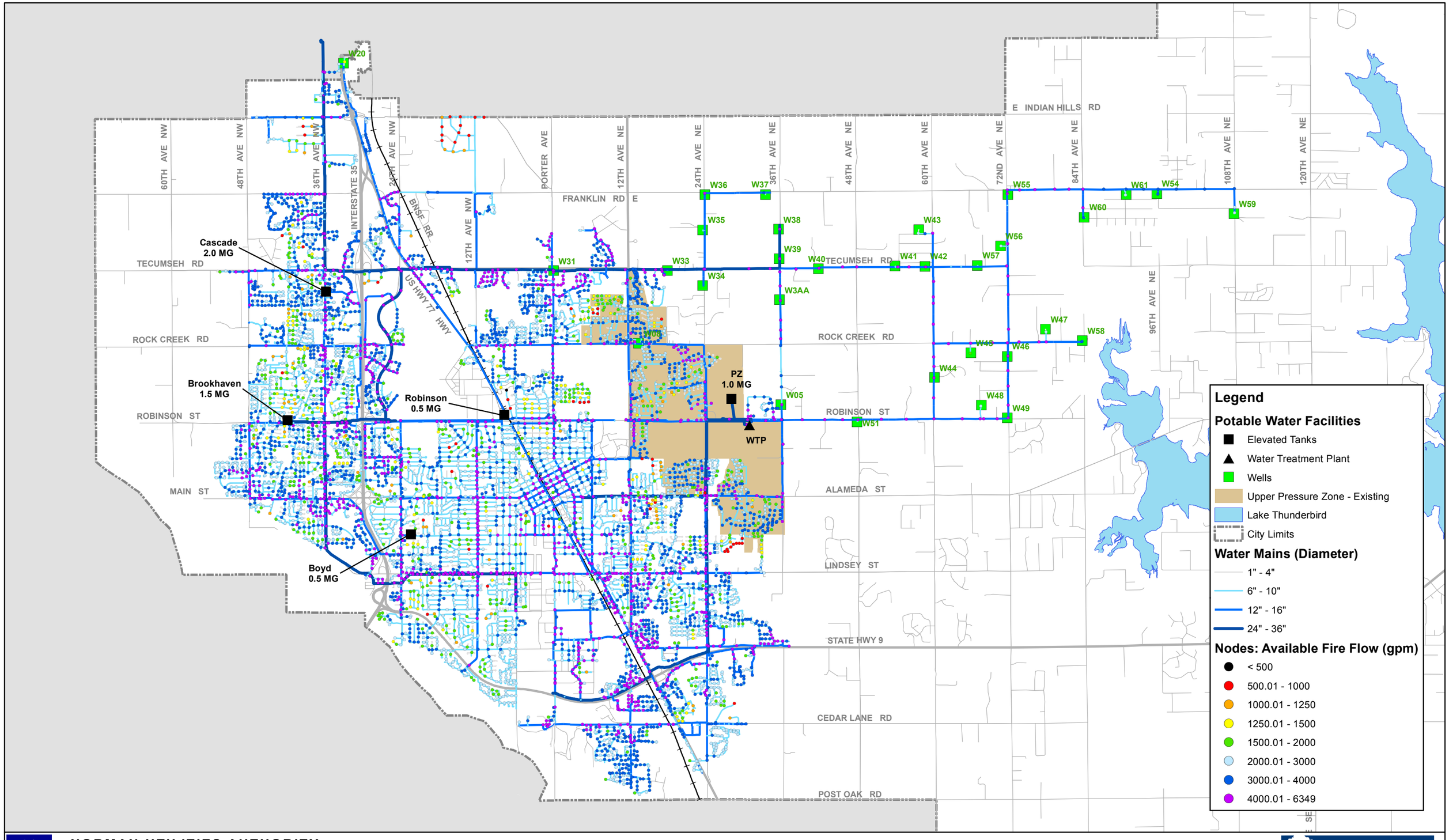

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FIGURE 4-11: Existing Max Day Run Available Fire Flow

Note:
Available fire flow is only shown at fire hydrants in the system.

0 0.5 1 2 Miles

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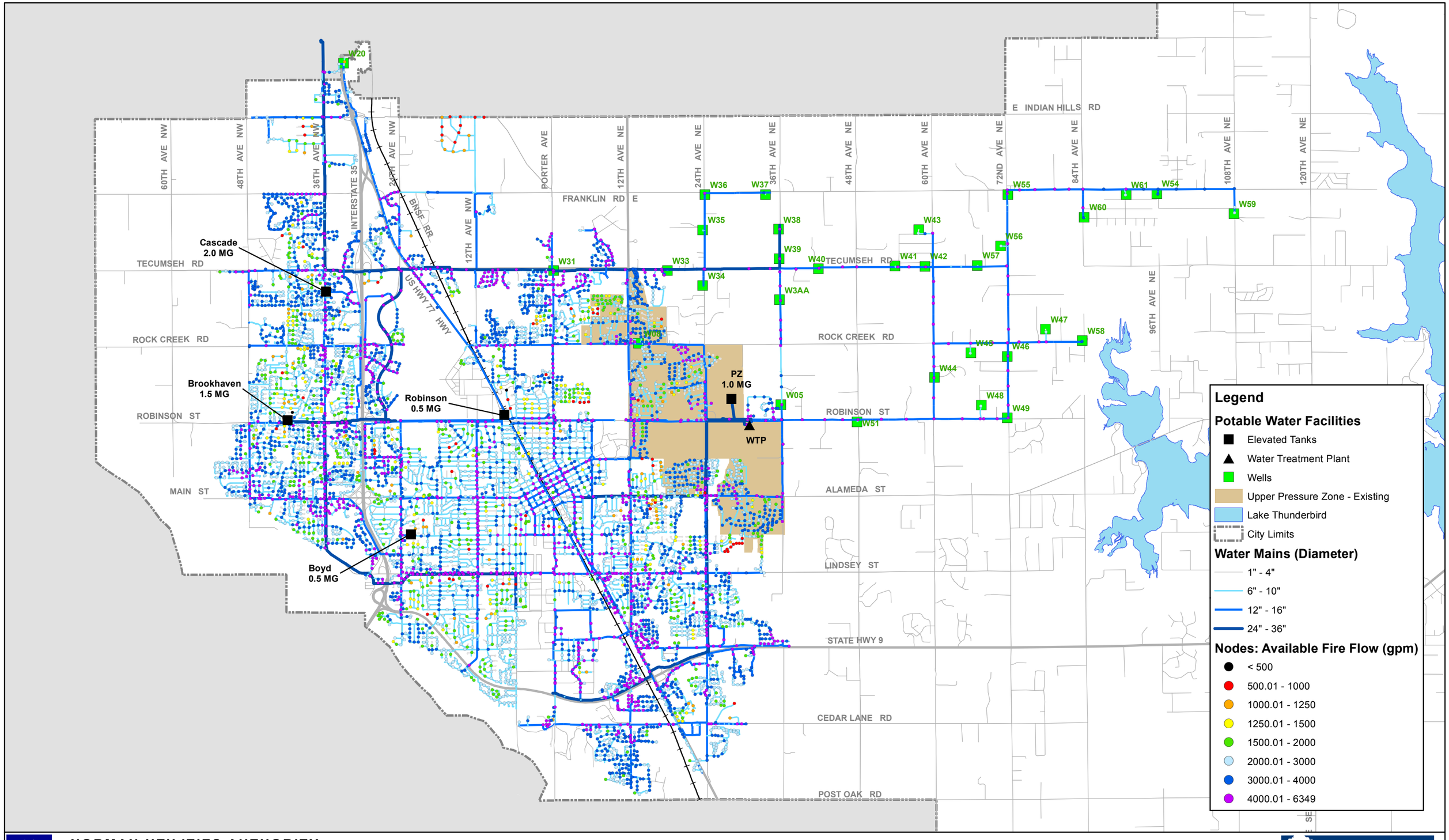

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FIGURE 4-12: Future Max Day Run
Available Fire Flow without Recommended CIPs

Note:
Available fire flow is only shown at fire hydrants in the system.

0 0.5 1 2 Miles

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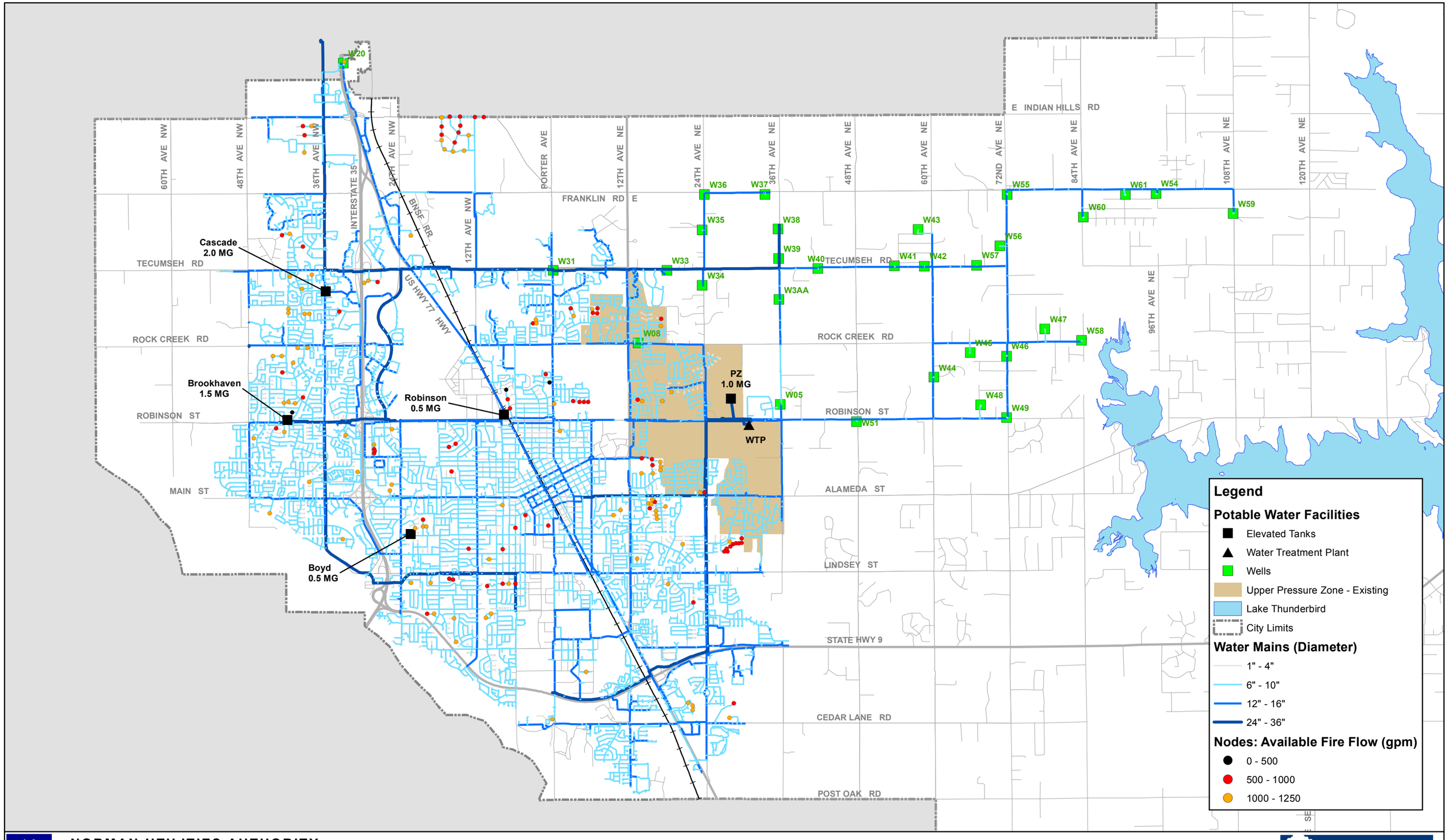

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FIGURE 4-13: Future Max Day Run
Hydrants with Inadequate Fire Flow

Note:
Available fire flow is only shown at fire hydrants in the system.

0 0.5 1 2 Miles

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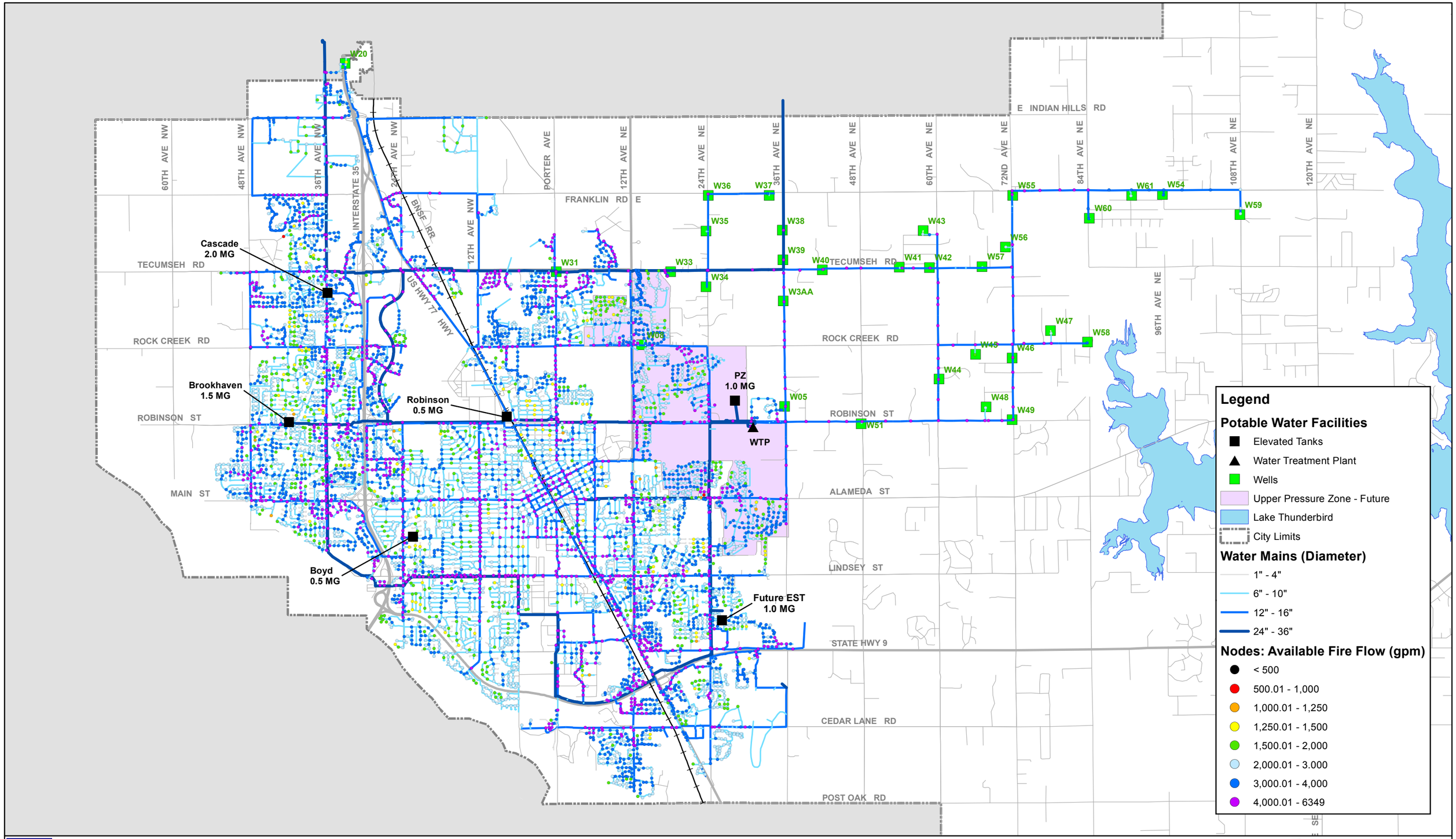

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FIGURE 4-14: Future Max Day Run
Available Fire Flow with Recommended CIPs

Note:
Available fire flow is only shown at fire hydrants in the system.

0 0.5 1 2 Miles

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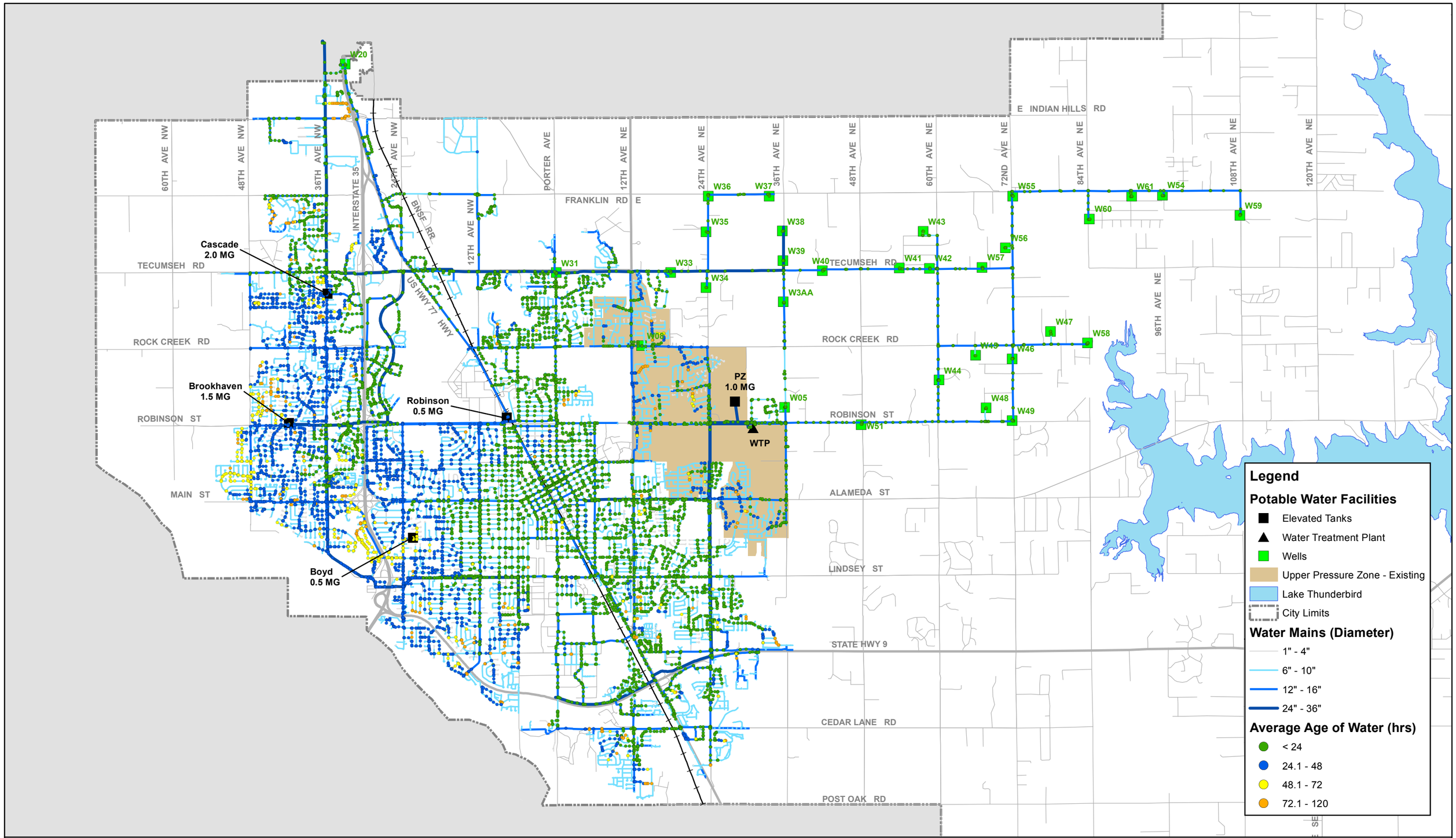

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FIGURE 4-15: Existing Average Day Run Average Water Age

Note:
Available fire flow is only shown at fire hydrants in the system.

0 0.5 1 2 Miles

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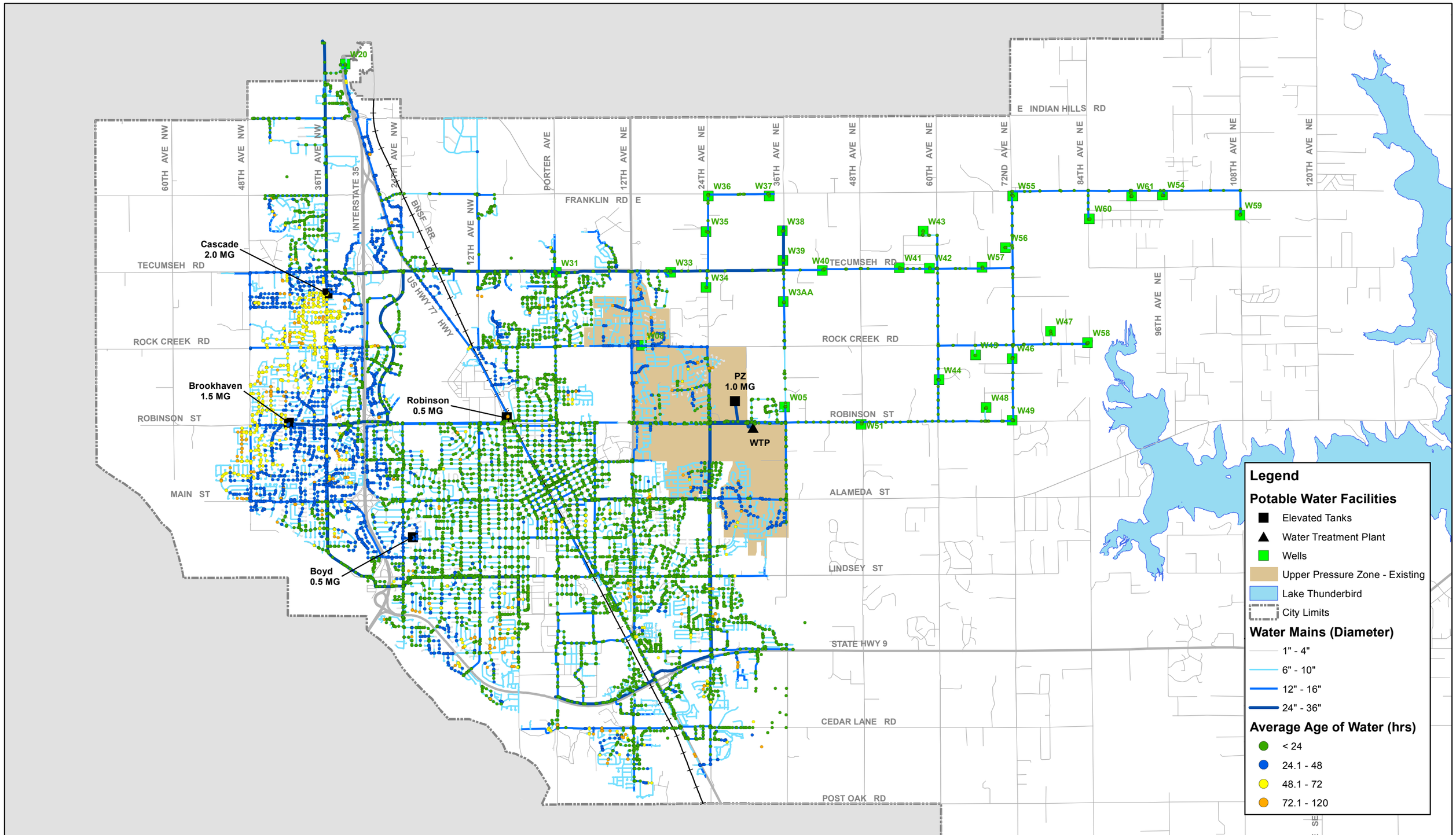

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Water Distribution Model Update

FIGURE 4-16: Future Average Day Run
Average Water Age without Recommended CIPs

Note:
Available fire flow is only shown at fire hydrants in the system.

0 0.5 1 2 Miles

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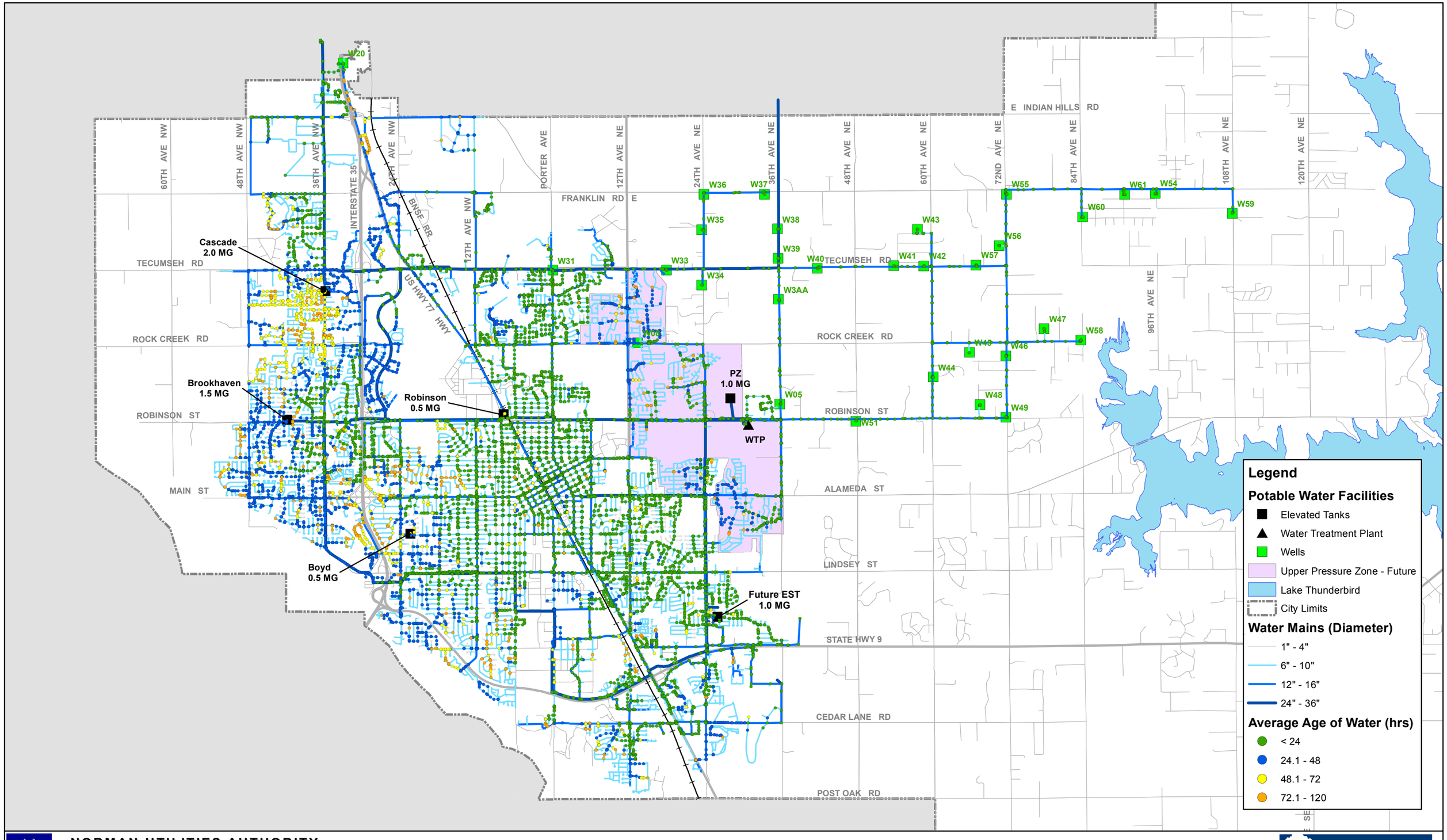

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FIGURE 4-17: Future Average Day Run
Average Water Age with Recommended CIPs

Note:
Available fire flow is only shown at fire hydrants in the system.

0 0.5 1 2 Miles

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5 Water System Capital Improvements Plan

A water system capital improvements plan (CIP) has been created to meet the demands of projected growth in the City through 2025 and to fix existing system deficiencies. A total of 87 projects were identified (Table 5-1, page 41 and Figure 5-1, page 41). The majority of these projects are pipeline infrastructure projects. All together, these projects include construction of approximately 49 miles of water lines in the distribution system with a total opinion of probable cost of approximately $94 million. A large version of Figure 5-1 has been included at the back of this report in the printed copies, following the appendices.

The CIP projects were separated into six categories depending on the main driver for the project, though most projects have benefits in multiple categories. The categories are defined as follows:

- **Future Development**. These projects are located in future development areas and would only be required when growth is experienced in these areas. Consequently, it is assumed that the developer will be responsible for the cost of these projects, not the City. The seven projects in this category account for approximately 4.1 miles of water line installation and approximately $6.4 million.
- **Low Fire Flow**. CIP projects in this category were recommended to increase available fire flows at hydrants throughout the distribution system. This category accounts for the greatest number of projects on the CIP list; however, it does not represent the largest quantity of pipeline installation. The 48 projects identified for low fire flow concerns account for approximately 8.4 miles of pipeline and $10.9 million.
- **High Headloss**. Pipelines experiencing a unit headloss approximately equal to or greater than 7 ft/1,000 ft were identified in the model and a CIP project was created to increase the pipeline size to reduce headloss. There are five CIP projects identified as primarily caused by high headloss that account for 1.6 miles of water lines and approximately $2.8 million.
- **Maintenance**. CIP projects falling under the category of Maintenance have all been previously identified by NUA as pipelines that will need replacement soon due to pipe age or condition. In general, pipelines identified in the Maintenance category are sized appropriately for future flows and do not need to be replaced with larger lines, though there are some exceptions. These pipelines would be replaced to proactively prevent pipe failures in the future. The Maintenance category comprises the majority of CIP projects in total length and cost, accounting for approximately 33 miles of pipelines and $66 million.
- **Low Pressure**. NUA desires to deliver a minimum pressure of 40 psi throughout the distribution system. In the model, nodes with a minimum pressure of 35 psi or less were addressed by recommending CIP projects. Most of these CIP projects are not pipeline infrastructure projects. Instead they include unique projects such as expanding the Upper Pressure Zone, installing a new elevated storage tank, and adding a 5th pump to the MDS PS. The opinion of probable cost for projects in this category is approximately $4 million.
- **High Water Age**. The final CIP project category includes projects that eliminate dead end water lines or create water loops to improve delivery efficiency and reduce water age. These projects account for approximately 2.3 miles of pipeline replacement and $4.8 million.

Table 5-1: List of CIP Projects

Project Code			Description	Linear Feet of Pipe									Cost	Driver	Project Priority
				6"	8"	12"	16"	24"	30"	36"	42"	Total			
W	-	5	Water Line Segment D (Phase 4)	0	0	0	0	8,500	0	0	0	8,500	$3,874,000	High Water Age	Highest
F	-	39	Upsize 8" Line to 12" along Meadowood Blvd	0	1,000	1,030	0	0	0	0	0	2,030	$526,000	Low Fireflow	High
H	-	1	Complete 12" Line Along 36th Ave. NE	0	0	4,080	0	0	0	0	0	4,080	$1,147,000	High Headloss	High
H	-	3	Upsize 6" Line to 12" at Alameda St. and Vicksburg Ave.	0	0	105	0	0	0	0	0	105	$51,000	High Headloss	High
H	-	4	Upsize Lines to Boyd Tower	0	0	300	800	0	0	0	0	1,100	$390,000	High Headloss	High
M	-	5	WL Replacement: Flood: Rock Creek to Venture	0	0	3,400	6,400	0	0	0	0	9,800	$3,355,000	Maint.	High
M	-	7	Robinson Waterline: 24th Ave. NE to 24th Ave. NW	0	0	0	0	0	21,850	0	0	21,850	$11,576,000	Maint.	High
M	-	8	Waterline Replacement: Interstate Drive	0	5,680	0	0	0	0	0	0	5,680	$1,140,000	Maint.	High
M	-	11	Water Line Replacement: Gray St. & Tonhawa St.	430	4,000	1,800	0	0	0	0	0	6,230	$1,002,000	Maint.	High
M	-	12	Water Line Replacement: West of Campus	8,150	1,550	0	0	0	0	0	0	9,700	$1,658,000	Maint.	High
M	-	13	Alameda Waterline Replacement: S. Poncha Ave. to 24th Ave. NE	0	0	0	0	8,500	200	0	0	8,700	$3,741,000	Maint.	High
M	-	15	Robinson Waterline Replacement: WTP to 24th Ave NE	0	0	0	0	80	0	0	2,600	2,680	$3,338,000	Maint.	High
M	-	17	Replace Upper Pressure Zone Pumps	0	0	0	0	0	0	0	0	0	-	Maint.	High
P	-	1	Extend Upper PZ to Hollister Trail and Palomino Way	0	425	0	0	0	0	0	0	425	$142,000	Low Pressure	High
P	-	4	Include Meadowood Blvd in HPP	0	0	0	0	0	0	0	0	0	$0	Low Pressure	High
P	-	5	Future Elevated Storage Tank in MDS	0	0	0	0	800	0	0	0	800	$3,638,000	Low Pressure	High
F	-	4	Upsize 6" Line to 8" along Harriett Road	0	1,160	0	0	0	0	0	0	1,160	$276,000	Low Fireflow	Medium
F	-	6	Complete 6" loop along Thedford Drive	425	0	0	0	0	0	0	0	425	$125,000	Low Fireflow	Medium
F	-	8	Upsize 6" Line to 8" along Willow Creek Drive	0	705	0	0	0	0	0	0	705	$200,000	Low Fireflow	Medium
F	-	9	Extend the HPP to Redwood Drive	0	600	0	0	0	0	0	0	600	$162,000	Low Fireflow	Medium
F	-	16	Upsize 6" Line to 8" Along Eisenhower Rd	500	2,010	0	0	0	0	0	0	2,510	$557,000	Low Fireflow	Medium
F	-	17	Connect 6" dead end to 12" across N. Porter Ave.	85	0	0	0	0	0	0	0	85	$39,000	Low Fireflow	Medium
F	-	25	Upsize 6" Line to 8" along Pinebrooke Court	0	590	0	0	0	0	0	0	590	$151,000	Low Fireflow	Medium
F	-	26	Connect 6" Lines at Westport Dr. and Fairway Dr.	700	0	0	0	0	0	0	0	700	$147,000	Low Fireflow	Medium
F	-	27	Upsize 4" Line to 6" along Foreman Avenue	1,150	0	0	0	0	0	0	0	1,150	$254,000	Low Fireflow	Medium
F	-	28	8" Line along E Main St. Near Beacon Ave.	0	1,180	0	0	0	0	0	0	1,180	$288,000	Low Fireflow	Medium
F	-	30	Upsize 6" Line to 8" along Jean Marie Dr.	0	1,875	0	0	0	0	0	0	1,875	$437,000	Low Fireflow	Medium
F	-	32	Extend 6" line along Elm Avenue to W. Symmes St.	220	0	0	0	0	0	0	0	220	$70,000	Low Fireflow	Medium
F	-	34	Connect Dead-End 6" Line in The Pines Apartments	450	0	0	0	0	0	0	0	450	$110,000	Low Fireflow	Medium
F	-	35	Upsize 4" Lines to 6" along Justin Dr., Bill Carrol Dr., and Cara Jo Dr.	650	0	0	0	0	0	0	0	650	$157,000	Low Fireflow	Medium
F	-	41	Connect 6" Dead-End Line to McGee Drive	600	0	0	0	0	0	0	0	600	$137,000	Low Fireflow	Medium
F	-	42	Complete 6" Loop along Brookside Drive	200	0	0	0	0	0	0	0	200	$85,000	Low Fireflow	Medium
F	-	43	Upsize 6" Line to 8" along Rolling Hills Street	0	820	0	0	0	0	0	0	820	$221,000	Low Fireflow	Medium
F	-	44	Upsize 6" Line to 8" along Whispering Pines Drive	0	460	0	0	0	0	0	0	460	$126,000	Low Fireflow	Medium
H	-	5	Upsize 6" Line to 8" along Chautauqua Ave.	0	400	0	0	0	0	0	0	400	$131,000	High Headloss	Medium
M	-	1	WL Replacement: Classen/Flood: Hwy 9 to Indian Hills	0	0	12,000	24,100	0	0	0	0	36,100	$11,975,000	Maint.	Medium
M	-	2	Water Dist. System Improvements - Segment G	0	0	7,280	0	0	0	0	0	7,280	$1,682,000	Maint.	Medium
M	-	3	WL Replacement: Franklin: RR to 12th NW	0	0	2,170	0	0	0	0	0	2,170	$584,000	Maint.	Medium

Project Code			Description	Linear Feet of Pipe									Cost	Driver	Project Priority
				6"	8"	12"	16"	24"	30"	36"	42"	Total			
M	-	6	Water Line Replacement: Hall Park, Phase 2	4,600	0	0	0	0	0	0	0	4,600	$742,000	Maint.	Medium
M	-	9	WL Replacement: W. Main: Berry to Interstate Drive	0	5,170	6,830	0	0	0	0	0	12,000	$3,025,000	Maint.	Medium
M	-	10	Waterline Replacement: Flood Avenue	0	6,130	0	0	0	0	0	0	6,130	$1,505,000	Maint.	Medium
M	-	14	24th Ave NE Waterline Replacement: Alameda St. to Robinson St.	0	0	0	0	0	0	5,200	0	5,200	$3,920,000	Maint.	Medium
M	-	16	Robinson PZ Waterline Replacement: WTP to 24th Ave NE	0	0	0	0	2,590	0	0	0	2,590	$1,177,000	Maint.	Medium
P	-	3	Expand Upper PZ to Include Crest Place	0	0	0	0	0	0	0	0	0	$0	Low Pressure	Medium
W	-	2	New 12" pipe on Nantucket Blvd	0	0	240	0	0	0	0	0	240	$81,000	High Water Age	Medium
F	-	1	Loop 6" Line on Della St NW and NW Sterling Ct	2,495	0	0	0	0	0	0	0	2,495	$547,000	Low Fireflow	Low
F	-	10	Upsize 6" Line to 8" along Briarcliff Rd	0	1,170	0	0	0	0	0	0	1,170	$53,000	Low Fireflow	Low
F	-	12	Upsize 6" Line to 8" along Hillside Drive	0	910	0	0	0	0	0	0	910	$240,000	Low Fireflow	Low
F	-	14	Upsize 6" Line to 8" along Valley Ridge Road	0	1,250	0	0	0	0	0	0	1,250	$301,000	Low Fireflow	Low
F	-	20	Upsize 6" Line to 8" along Wheaton Dr	0	300	0	0	0	0	0	0	300	$99,000	Low Fireflow	Low
F	-	22	Upsize 6" Line to 8" along Hunter's Hill Road	0	1,440	0	0	0	0	0	0	1,440	$357,000	Low Fireflow	Low
F	-	24	Upsize 6" Line to 8" along Cedar Ridge Drive	0	470	0	0	0	0	0	0	470	$127,000	Low Fireflow	Low
F	-	31	Upsize 6" Line to 8" along McFarland St.	0	530	0	0	0	0	0	0	530	$139,000	Low Fireflow	Low
F	-	36	Upsize 6" Lines to 8" along Brandon Cr., Sheffield Dr., Chamblee Dr., Surrey Dr., & Village Dr.	0	1,725	0	0	0	0	0	0	1,725	$416,000	Low Fireflow	Low
F	-	37	Upsize 6" Line to 8" along Columbia Cr., Atlanta Cr., Montgomery Cr., Raleigh Cr., and Mobile Cr.	0	1,705	0	0	0	0	0	0	1,705	$511,000	Low Fireflow	Low
F	-	38	Upsize 6" Line to 8" along Peppertree Ct.	0	680	0	0	0	0	0	0	680	$195,000	Low Fireflow	Low
F	-	40	Upsize 6" Line to 8" South of Briggs St.	0	410	0	0	0	0	0	0	410	$132,000	Low Fireflow	Low
F	-	45	Upsize 6" Line to 8" along Holly Cir.	0	50	0	0	0	0	0	0	50	$43,000	Low Fireflow	Low
F	-	46	Extend 6" Line Along Twin Creek Village Apartments	360	0	0	0	0	0	0	0	360	$95,000	Low Fireflow	Low
H	-	2	Upsize 12" Line to 16" along Robinson from WTP to 36th Ave. NE	0	0	0	2,730	0	0	0	0	2,730	$1,073,000	High Headloss	Low
M	-	4	Waterline Improvement: OKC Second Feed	0	0	0	0	31,680	0	0	0	31,680	$16,077,000	Maint.	Low
P	-	2	Add 5th 250 HP Pump to MDS PS	0	0	0	0	0	0	0	0	0	$260,000	Low Pressure	Low
W	-	1	Complete 6" loop along Teton Oval culdesac	120	0	0	0	0	0	0	0	120	$53,000	High Water Age	Low
W	-	3	Upsize 6" Line to 8" along Shrill St.	0	2,890	25	0	0	0	0	0	2,915	$683,000	High Water Age	Low
W	-	4	Connect 6" Lines at NW corner of 24th Avenue NW and W. Main Street	540	0	0	0	0	0	0	0	540	$144,000	High Water Age	Low
F	-	2	Upsize 6" Line to 8" along Moor Drive and Nicole Place	0	790	0	0	0	0	0	0	790	$215,000	Low Fireflow	Very Low
F	-	3	Upsize 6" Line to 8" along Nicole Circle	0	675	0	0	0	0	0	0	675	$184,000	Low Fireflow	Very Low
F	-	5	Upsize 6" Line to 8" along Bright St., Glisten Ct., Ripple Ave., & Glisten St.	0	1,615	0	0	0	0	0	0	1,615	$395,000	Low Fireflow	Very Low
F	-	7	Upsize 6" Line to 8" along Sloane St., Shipley Dr., Bishop's Ct., & Victoria Dr.	0	1,600	0	0	0	0	0	0	1,600	$392,000	Low Fireflow	Very Low
F	-	11	Upsize 6" Line to 8" off of Brookhaven Blvd	0	345	0	0	0	0	0	0	345	$101,000	Low Fireflow	Very Low
F	-	13	Upsize 6" Line to 8" on Northhampton Court	334	0	0	0	0	0	0	0	334	$108,000	Low Fireflow	Very Low
F	-	15	Upsize 6" Line to 8" along Warwick Dr. and Waverly Dr.	0	1,970	0	0	0	0	0	0	1,970	$473,000	Low Fireflow	Very Low
F	-	18	Upsize 6" Line to 8" along Wind Hill Rd	0	400	0	0	0	0	0	0	400	$119,000	Low Fireflow	Very Low
F	-	19	Upsize 6" Line to 8" along Ridgemont Circle	0	460	0	0	0	0	0	0	460	$131,000	Low Fireflow	Very Low

Project Code			Description	Linear Feet of Pipe									Cost	Driver	Project Priority
				6"	8"	12"	16"	24"	30"	36"	42"	Total			
F	-	21	Upsize 6" Line to 8" along Sundance Ct.	0	360	0	0	0	0	0	0	360	$105,000	Low Fireflow	Very Low
F	-	23	Upsize 6" Line to 8" along Innsbrook Court	0	350	0	0	0	0	0	0	350	$102,000	Low Fireflow	Very Low
F	-	29	Upsize 6" Line to 8" along Riverwalk Ct.	0	825	0	0	0	0	0	0	825	$206,000	Low Fireflow	Very Low
F	-	33	Upsize 6" Line to 8" along Schulze Dr. and Creston Way	0	1,425	0	0	0	0	0	0	1,425	$337,000	Low Fireflow	Very Low
F	-	47	Upsize 6" Lines to 8" along White Oak Cir., Oak Vista Cir., & Bois-de-arc Cir.	0	1,170	0	0	0	0	0	0	1,170	$286,000	Low Fireflow	Very Low
F	-	48	Loop 6" Line along Black Locust Ct & Black Locust Place	985	1,055	0	0	0	0	0	0	2,040	$459,000	Low Fireflow	Very Low
D	-	1	12" Loop along 48th Avenue NW	0	1,175	6,240	0	0	0	0	0	7,415	$1,877,000	Fut. Dev.	-
D	-	2	Install 12" line along 48th Ave NW between W Rock Creek Rd and Las Colinas Ln	0	0	2,475	0	0	0	0	0	2,475	$663,000	Fut. Dev.	-
D	-	3	Waterline Segment H	0	0	1,500	0	0	0	0	0	1,500	$368,000	Fut. Dev.	-
D	-	4	Add 6" line near Wyckham Pl.	675	0	0	0	0	0	0	0	675	$169,000	Fut. Dev.	-
D	-	5	Add 6" Line Along Kingswood Dr	340	0	0	0	0	0	0	0	340	$89,000	Fut. Dev.	-
D	-	6	Extend 8" Lines to Harbor Dr. and Lyric St.	0	1,335	0	0	0	0	0	0	1,335	$335,000	Fut. Dev.	-
D	-	7	16" Destin Landing Development	0	0	0	8,000	0	0	0	0	8,000	$2,853,000	Fut. Dev.	-

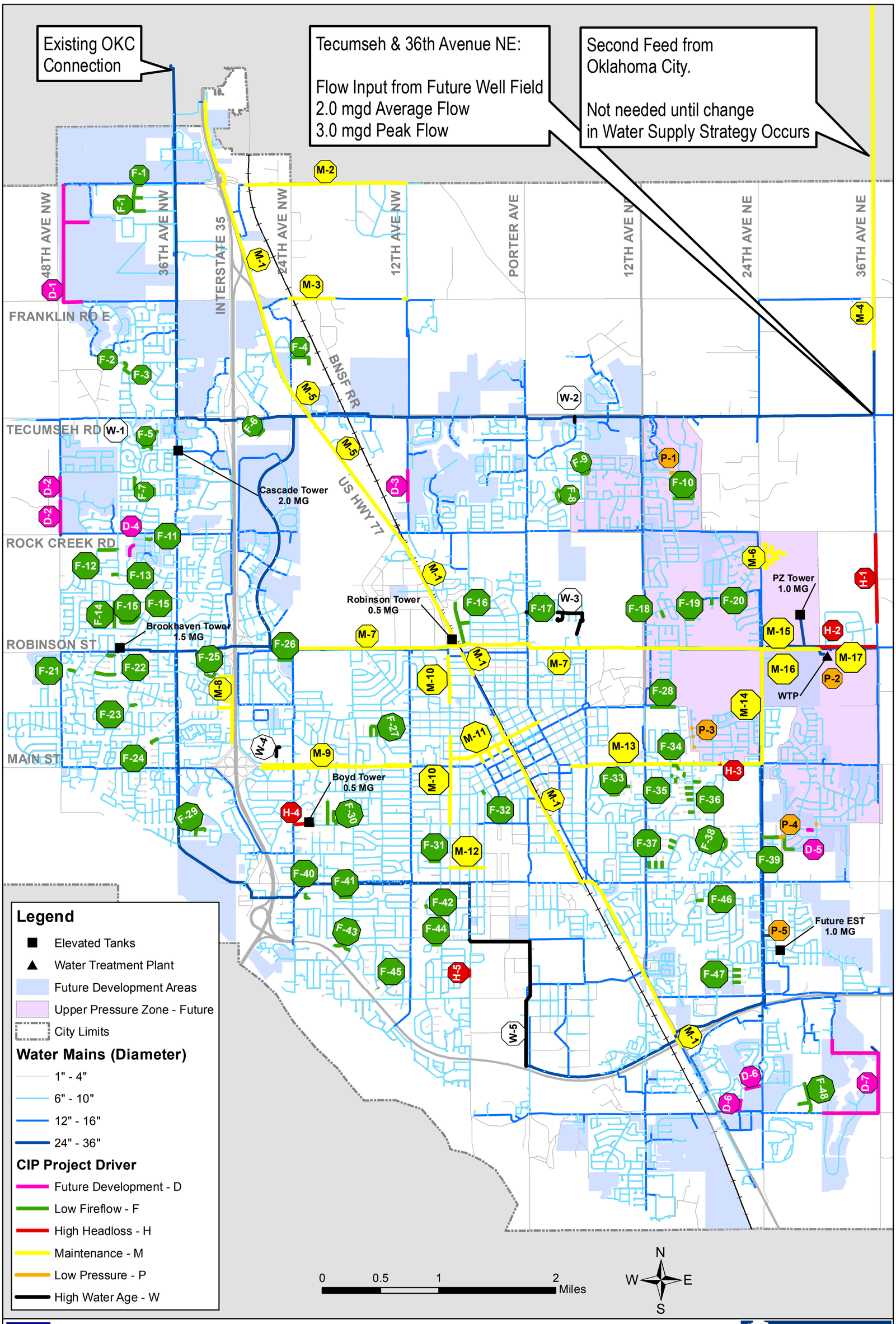

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FIGURE 5-1: 2025 CIP Projects Summary Map

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5.1 CIP LIST AND OPINION OF PROBABLE CONSTRUCTION COST

This section summarizes the list of CIP projects identified during the modeling process along with assumptions and methodology used to develop an opinion of probable construction cost (OPCC) for each project. Table 5-2 summarizes the total number of recommended CIP projects and combined OPCC for each category. All costs are presented in 2017 dollars.

Table 5-2: Summary List of 2025 CIP Projects

Category	Number of Projects	OPCC (million)[A]
Future Development	7	$6.4
Low Fire Flow	48	$11
High Headloss	5	$2.8
Maintenance	17	$66
Low Pressure	5	$4.0
High Water Age	5	$4.8
Total	**87**	**$95.5**
City Responsibility	**80**	**$89.1**

A. Costs are presented in 2017 dollars.

A planning level OPCC was prepared for each CIP project using actual pipeline costs from previous NUA projects along Robinson St., Lindsey St., and Berry Road. Additionally, NUA had prepared planning level OPCCs for a number of projects previously identified (projects in the Maintenance category). APAI maintained several assumptions that NUA used to prepare these previous OPCCs, updating them when necessary. Table 5-3 presents the pipeline unit costs that were used to prepare OPCCs for each CIP project. Additionally, ancillary pipeline costs were included in each OPCC (Table 5-4, page 46). The complete list of recommended CIP projects along with a detailed OPCC for each project is provided in Appendix I. The projects are sorted according to NUA's prioritization.

Table 5-3: Planning Level Pipeline Costs

Diameter (in)	Trenched Unit Cost ($/LF)	Boring and Casing Unit Cost ($/LF)
6	$53	$246
8	$68	$296
12	$84	$371
16	$138	$468
24	$166	$628
30	$230	$1,194
36	$300	$1,719
42	$350	$2,340

Table 5-4: Additional Cost Assumptions

Item	Value
ROW Width	15 ft
ROW Cost	$3/ft^2
Mobilization and Insurance	5% of Subtotal
Contingency	30% of (Subtotal + Mobilization and Insurance)
OPCC	Subtotal + Mobilization and Insurance + Contingency
Design and Inspection During Construction	15% of OPCC

5.2 MAJOR PROJECTS DESCRIPTION

There are a number of major CIP projects that warrant additional discussion. These projects were selected for discussion because of their unique project components or large OPCC. The following sections elaborate on these projects.

5.2.1 WTP Pump Station Projects

NUA is planning to replace the existing four Upper Pressure Zone (PZ) pumps within the next few years (CIP project M-17) with three new pumps. These pumps have already been selected by NUA and the future pump design specifications were used in the model for future scenarios (Table 5-5). The cost for these pumps was not included in the CIP because the pumps have already been selected.

Table 5-5: Future PZ Pump Specifications

Speed Control	Fixed
Pump Speed, rpm	1,770
Design Flow, gpm	1,725
Design Head, ft	253
Minimum Efficiency at Design Point	84%

Additionally, a CIP project was created to add a fifth pump to the MDS PS (CIP project P-2) with identical design parameters to the existing four (Table 2-1, page 5). The model showed that minimum pressures cannot be met in the future max day scenario without 4 MDS pumps operating concurrently. The fifth pump would be required for firm capacity.

5.2.2 Upper Pressure Zone Boundary Changes

It is recommended that NUA extend the PZ boundary in four locations to include areas that are currently served by the MDS due to low water pressure or available fire flow in these areas (Figure 5-2, page 47). Two of these areas can be incorporated into the PZ simply by the addition of new isolation valves or manipulation of existing isolation valves. Two areas (CIP projects P-1 and F-9) would also require short pipelines. Detailed maps for each of the five recommended boundary changes are provided in Appendix J.

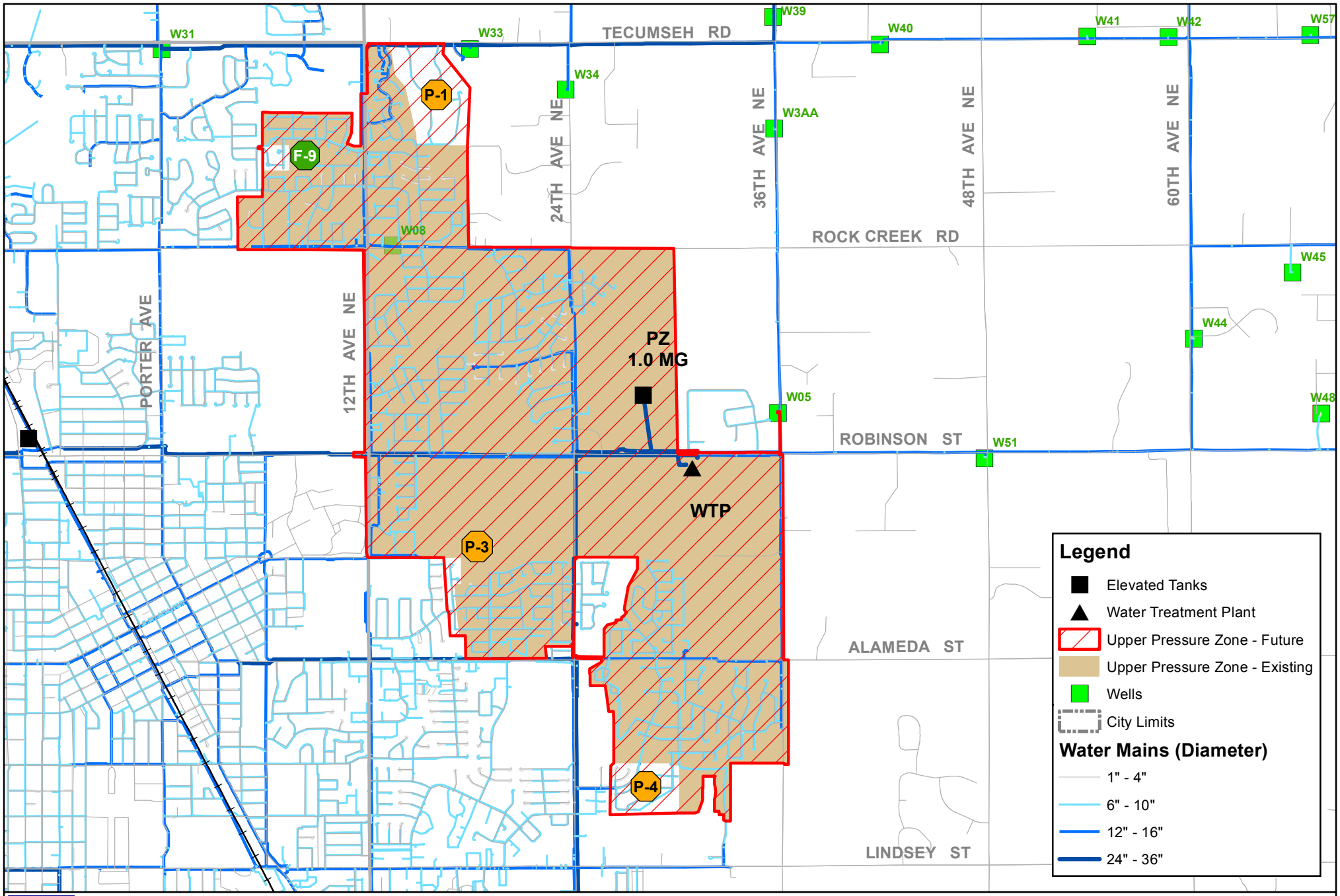

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FIGURE 5-2: Upper Pressure Zone Boundary Changes

N
W E
S

0 0.5 1 Miles

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5.2.3 Water Supply Expansion

There are two future water supplies that were considered in this WDM update: a second connection to the OKC distribution system and an expansion of NUA's groundwater well network. The groundwater expansion project is currently being planned and designed, but the second connection to OKC is a water supply project that NUA will consider in the future.

The future supply from the groundwater project was simulated in the future conditions water model and is expected to provide 2 MGD of annual average supply and 3 MGD of supply for max day. This future supply was added into the model at the intersection of E. Tecumseh Rd. and 36th Ave. NE, at the direction of NUA.

The second feed from OKC is identified as CIP project M-4, which would allow NUA to purchase up to 6 MGD of additional treated water from OKC through a new six mile pipeline. This project was identified in NUA's 2060 Strategic Water Supply Plan as a viable water supply to meet future demands. This project is not necessary to meet the projected 2025 demands, but is included as a potential future option for NUA.

5.2.4 Major Maintenance Projects

There are a number of significant CIP projects in the Maintenance category that should be highlighted. The two overall highest cost CIP projects (not including the project to add a second feed from OKC) are CIP projects M-7 and M-1. Additionally, there are a collection of four related projects that would replace major water lines near the WTP (M-13, M-14, M-15, and M-16). These six projects were all previously identified by NUA due to maintenance reasons, but some of these projects also have a capacity benefit as they will replace lines with a larger size.

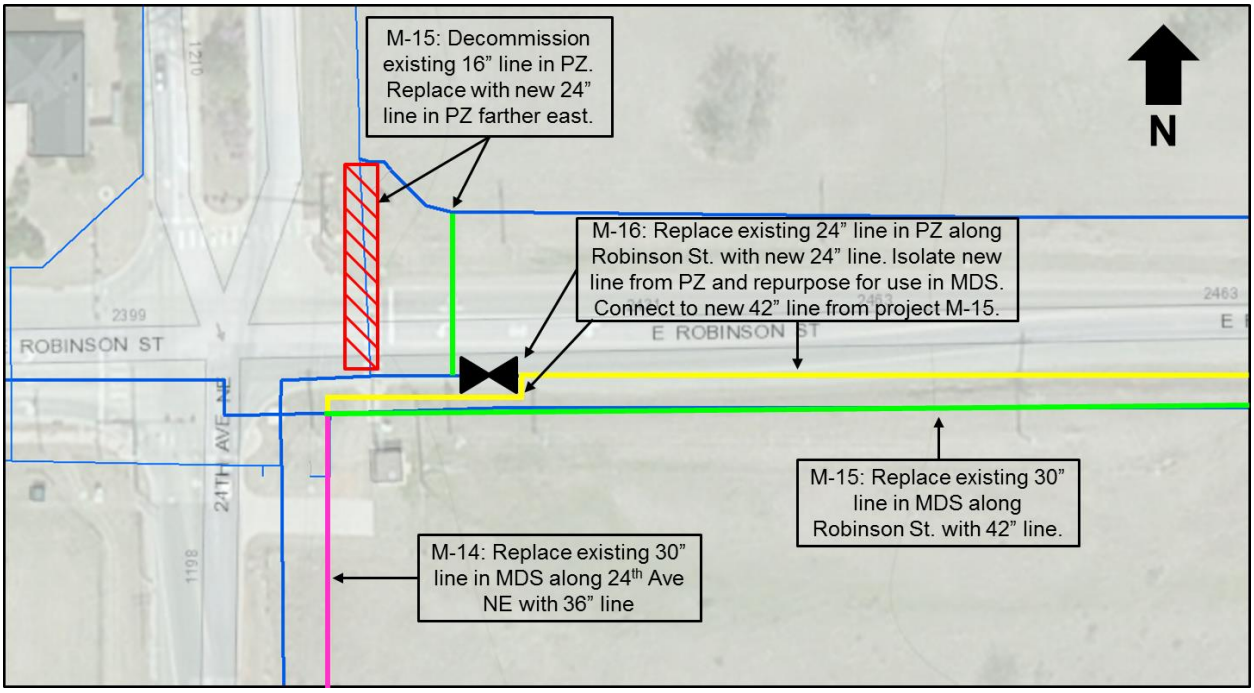
Project M-7 would install approximately 4 miles of 30" PVC pipeline along Robinson Street from 24th Ave. NE to 24th Ave. NW, replacing an existing 16" ductile iron pipe (DIP) for the majority of this route. However, this project would not replace a short segment of 16" pipe that exists underneath the railroad tracks near N. Flood Ave. since that project was completed in recent years. This project increases water pressure on the western side of the City and improves water age near the Westwood Park Golf Course by providing a more direct route to the western part of the City from the WTP. This project also provides a third main path for water to be fed by the WTP to the rest of the City. This helps reduce headloss along the transmission mains and allow the MDS pumps to remain working within their most efficient points.

Project M-1 would replace approximately 7 miles of 12" pipeline along Classen Blvd., James Garner Ave., and N Flood Ave. generally from Highway 9 to Well #20 just north of Indian Hills Road. A subset of this route has been assigned as a separate CIP project (M-5) that would replace approximately 2 miles of existing 16" and 12" lines along N Flood Ave. from Rock Creek Road to Venture Drive. These projects are required primarily for maintenance reasons. The DIP material used along this route is not compatible with the corrosive clay soils in the area and has ruptured in some areas causing extensive damage to driveways, streets, and yards. These lines would be replaced with PVC pipe, which is not as susceptible to corrosion.

Projects M-13, M-14, M-15, and M-16 would replace major waterlines near the City's WTP along Robinson St., 24th Ave. NE, and Alameda St for maintenance and capacity reasons. Combined,

these four projects would replace approximately 3.6 miles of pipelines and cost approximately $12 million. Project M-13 would replace 1.5 miles of 24” pipeline in the MDS along Alameda St. from 24th Ave NE to S. Ponca Ave. with 24” PVC for maintenance reasons. Project M-14 would replace 1 mile of 30” pipeline in the MDS along 24th Ave NE from Alameda St. to Robinson St. with 36” PVC line. Project M-15 would replace the existing 30” MDS pipeline along Robinson St. between the WTP and 24th Ave NE with a 42” line. The water model predicts that this existing 30” MDS line along Robinson St. will experience slightly elevated velocities (~6.5 ft/s) under the future 2025 max day demand scenario. This line will be upsized to a 42” pipe to reduce headloss through this section of line and to provide additional capacity for future growth beyond 2025. Additionally, project M-15 would replace a short section of the 16” PZ pipeline crossing under Robinson St. at the intersection of Robinson St. and 24th Ave NE with a 24” line. The City plans to widen this intersection and the existing line will need to be relocated farther east. Finally, project M-16 would replace an existing 24” PZ line between the WTP and 24th Ave NE south of Robinson St. with a new 24” PVC line for maintenance reasons. After replacement this line would be repurposed for use in the MDS instead of the PZ, as a parallel redundant line to the line replaced in project M-15. Valves will be required to isolate this line from the PZ system once repurposed. The CIP projects at the intersection of Robinson St. and 24th Ave NE are displayed in Figure 5-3.

Figure 5-3: CIP Projects at Intersection of Robinson St. and 24th Ave NE

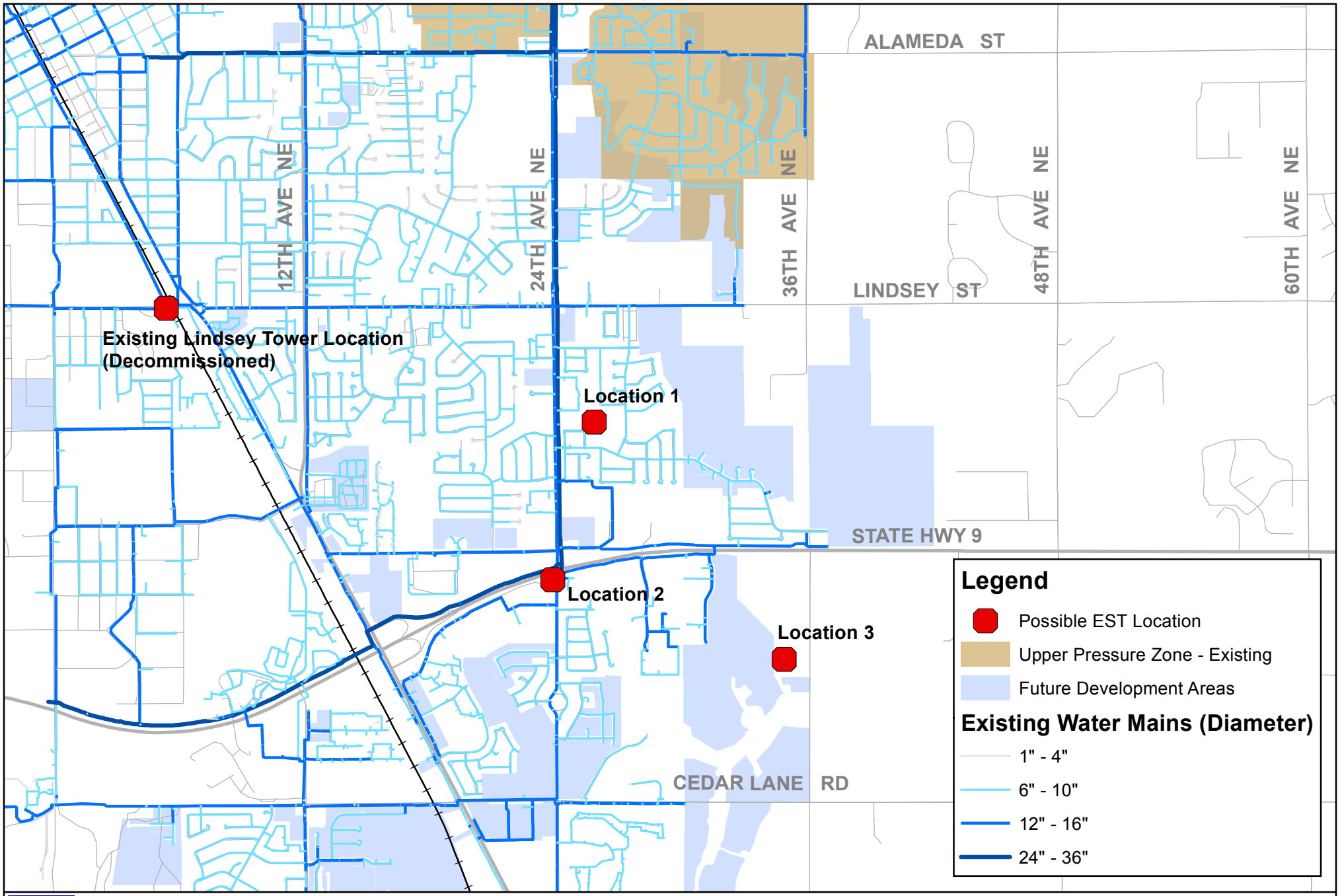


5.2.5 Future MDS Elevated Storage Tank (EST)

To achieve the minimum water pressure criterion of 35 psi along 24 Ave SE in the future max day modeling scenario, it is necessary to add another EST in the MDS (project P-5). Due to the condition of the existing Lindsey EST and site constraints, a new tank would likely need to be located elsewhere in the MDS, instead of rehabilitating the existing tank. At the request of NUA, APAI evaluated a number of alternative locations for the new EST (Figure 5-4, page 51). These possible locations are preliminary and a detailed siting study would be conducted prior to the final selection of a future EST location. It is recommended that the water model be used during the siting study to better inform the selection process. A comparison of the initially identified possible future EST locations based on a number of factors is provided in Table 5-6.

Table 5-6: Comparison of Possible Future EST Locations

Location	1	2	3
Description	Eastridge Park	Highway 9 and 24th Ave SE	Saxon Park
Ground Elevation (ft)	1,191	1,183	1,160
Overflow Elevation (ft)	1,320	1,320	1,320
Height (ft)	129	137	160
Volume (MG)	1	1	1
Mixing Status	Fully Mixed	Fully Mixed	Fully Mixed
Length of Pipeline Required (ft)	800	150	150
Diameter of Connecting Pipeline (in)	24	24	24
Average Water Age in EST (hrs)	33	36	70
Minimum Pressures are Met in System?	Yes	Yes	Yes
Minimum Fire Flows are Met in System?	Yes	Yes	Yes



NORMAN UTILITIES AUTHORITY
Water Distribution Model Update

FIGURE 5-4: Future Possible EST Locations

N
W E
S

0 0.25 0.5 1 Miles

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS
414 NW 4th Street, Suite 150
Oklahoma City, OK 73102

Document Path: F:\projects\1115\004-01\2-0 Wrk Prod\2-9 GIS\MXD\Report\FIG_5-4_Future_EST_Locations.mxd

In summary, all three of the locations will allow the distribution system to meet the performance criteria for minimum water pressure and available fire flow. However, there are slight differences between the locations that should be noted:

1. The ground surface elevation at Location 3 is approximately 30 ft lower than the elevation at Locations 1 and 2, meaning that the EST at Location 3 will need to be physically taller to achieve the same overflow elevation. It should be noted that there are other locations in Saxon Park (Location 3) with a higher ground surface elevation where the EST could be located, instead, but the length of the connecting pipeline would increase as a result.
2. In general, Locations 1, 2, and 3 are all located close to a large water line (≥ 12”). Location 1 would connect into a 30” line, Location 2 would connect into a 12” line, and Location 3 would connect into a future 16” line along the Destin Landing development. Location 2 could connect to a 30” water line running east/west along Highway 9, but this connection would require crossing under Highway 9. The 12” line that Location 2 connects into experiences a slightly greater unit headloss (up to 4.7 ft/1,000 ft), which would add flow to an already hydraulically stressed pipe. Connecting Location 2 to the 30” line along Highway 9 would eliminate the elevated headloss, but would be more expensive to bore under Highway 9. All three of these locations would require a connecting pipeline length of less than 200 ft. However, Location 1 is set back from a major water line and would require approximately 800 ft of pipeline to connect to the 30” line running north/south along 24th Ave SE.
3. The average age of water in the EST at Location 1 and 2 is in the range of 30 to 40 hours. However, the average water age in the EST at Location 3 is approximately 70 hours. This is likely due to the fact that Location 3 is positioned on the fringe of the distribution system.
4. Finally, Location 3 is positioned in an area of the City anticipated to be developed in the future. It is possible that a future developer would be willing to contribute towards the cost of a new EST.

It is recommended that a detailed siting study be conducted prior to selecting a final EST location. This preliminary evaluation does not consider critical site selection components such as land acquisition cost, public opposition to location, or site conditions affecting constructability. The future max day modeling scenario assumes that the new EST is positioned at Location 1, as directed by NUA.

Appendix A – Pump Testing Protocol

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS

DRAFT

TECHNICAL MEMORANDUM

City of Norman
Water Distribution System Hydraulic Modeling
Pump Testing Protocol

Project No.: 1115-004-01

Date: July 8, 2016

Prepared For: Mark Daniels, P.E., Utilities Engineer, Department of Utilities - City of Norman

Prepared By: Brian K. McDonald, P.E., APAI
Sarah Seamands, P.E., APAI

Alan Plummer Associates, Inc. (APAI) is building a new hydraulic model of the City of Norman's water distribution system as part of the updated Water Master Plan. Part of this project includes developing revised pump curves that are representative of current operating conditions for all high service and booster pumps greater than five years old that serve the main distribution system (MDS) or the upper pressure zone (PZ) (Table 1).

Table 1: City of Norman High Service Pumps

Pressure Plane	Pump No.	Nominal Flowrate (gpm)	Horsepower	Installation Date	Status
MDS	1	3,600	250	1982	To be evaluated
	2	3,500	250	1982*	To be evaluated
	3	3,500	250	1982	To be evaluated
	4	3,500	250	1982	To be evaluated
	Total Capacity is 20.3 mgd at 100 psi. Firm Capacity is 15.1 mgd at 100 psi.				
PZ	5	2,083	200	1963	To be replaced
	6	2,083	200	1963	To be replaced
	7	1,388	125	1993	
	8	1,388	125	1993	
	Total Capacity is 10.0 mgd at 125 psi. Firm Capacity is 7.0 mgd at 125 psi.				

* Rehabilitated in 2003.

The two largest pumps serving the PZ are scheduled to be replaced as part of an upcoming water treatment plant (WTP) improvements project[1], but per Chris Mattingly with Norman Utilities Authority (NUA), they will likely not be replaced for another two years. APAI recommends that these two pumps are tested this summer along with the others so that pump curves can be developed and used in the model calibration. If NUA knows what type of pump will be specified or if the manufacturer pump curves for the new pumps is available, this information should be provided to APAI for inclusion in the future model runs.

The pumps that serve the MDS are scheduled to be evaluated for repair or replacement as part of the WTP improvements project, but it is anticipated this project will occur well after the hydraulic water model is developed and calibrated. At the present time, it is anticipated that pumps 1-4 for the MDS plane will each be individually tested. If NUA knows what type of pumps will be specified or if the manufacturer pump curves for new pumps is available, this information should be provided to APAI for inclusion in the future model runs.

Section 1 of this memorandum discusses the field testing protocol for individual pumps. Section 2 describes how all pumps will be included in testing to develop the system curves for each pump station.

SECTION 1. FIELD TESTING PROTOCOL FOR INDIVIDUAL PUMPS

Prior to pump testing, the City should measure discharge shut-off head and lowest discharge head for each pump. Use the following steps to test each pump individually for the development of new pump performance curves:

1. Record the following general items:
    a. Pump station floor elevation (from record drawings),
    b. Centerline elevation of the discharge,
    c. Distance from centerline of the discharge to centerline of the pressure gauge,
    d. Diameter of discharge piping at the pressure gauge, and
    e. Pump nameplate information.
2. Perform testing while the City's elevated storage tanks are at their lowest level (when the static head on the pumps is lowest and will allow the pumps to be tested closer to the run-out condition). Lowest levels in the elevated storage tanks typically occur after the morning peak demand.

[1] City of Norman, Oklahoma: Water Treatment Plant Expansion Study, Carollo Engineers, May 2007.

3. Synchronize the clocks for the various recording equipment (or at a minimum, document the differences in their recorded time). This includes the water treatment plant supervisory control and data acquisition (SCADA) system, the Shermco electrical data recorder, and the manual pressure and wetwell level recordings. This is critical so that data taken for each test can be grouped together correctly.
4. Turn off all pumps in the pump station. For the pump to be tested, install the pressure gauge on the discharge and connect the electrical data recording equipment at the motor control center (MCC). Attach a piece of reflective tape on a visible portion of the pump shaft so that the laser tachometer can read the pump RPM.
5. Verify that personnel and equipment are ready to record the data for Step 8.

Data will be collected at up to five different flowrates. The flowrates will be varied by opening/closing the pump discharge manual butterfly valve. Five data points will be taken, evenly spaced between the lowest discharge head (run-out) and the shut-off head. The measurement data points are at: (1) lowest discharge head, (2) 25 percent of the head range, (3) 50 percent of the head range, (4) 75 percent of the head range, (5) shut-off head.

6. Fully open the pump discharge manual butterfly valve.
7. Turn on the test pump.

When the pump receives the signal to turn on, the SCADA system will start the pump. Once the pump reaches its operating speed and the discharge pressure reaches a set value, the SCADA system will open the automatic valve. With the manual valve open, the pump will operate at its lowest discharge head.

8. Once the pressure gauge reading stabilizes, record the following information:
    a. Pressure (from APAI pressure gauge),
    b. Flowrate (from City flowmeter),
    c. Wetwell level (from City ultrasonic gauge),
    d. Elevated storage tank levels (from City remote instruments),
    e. Pump RPM (from APAI laser tachometer),
    f. Voltage and current for each phase of the motor (Shermco recorder),
    g. Power factor (Shermco recorder), and
    h. Power usage in kilowatts (Shermco recorder).

    Record the time for each measurement.

9. Adjust the manual discharge valve until the discharge pressure reaches the next desired point in the head range. Repeat steps 8 and 9 until the desired points in the head range have been tested.
10. Turn off the test pump; remove the pressure gauge, electrical recording equipment and reflective tape; and install them on the next pump (use a new piece of tape).
11. Repeat steps 4 through 10 until each pump in both pump stations have been tested.

Warning: Testing the shut-off head should be done quickly so that the WTP SCADA will not alarm and automatically shut-off the pump.

SECTION 2. FIELD TESTING PROTOCOL FOR COMBINED PUMPS

Use the following steps to test the pumps at each pump station (MDS and PZ) in combination, by sequentially turning on an additional pump, in order to create the system curve. Only the flowrate, pressure, and tank levels will be collected during this testing. No electrical data will be recorded.

1. Perform the testing while the City's elevated storage tanks are at their lowest level. This is typically after the morning peak demand.
2. Turn off all the pumps in the pump station.
3. Install the pressure gauge on the combined pump discharge header. The discharge header experiences system pressure and can be used to develop the system curve. If there is no tap on the combined header, discuss with APAI options for where to install the pressure gauge.
4. Verify that personnel and equipment are ready to record the data for Steps 6 and 8.
5. With its manual discharge valve fully open, turn on the smallest pump.
6. Once the pressure reading stabilizes, record the time, pressure, flowrate, clearwell level, wetwell level, and elevated storage tank levels.
7. With its manual discharge valve fully open, turn on the next smallest pump.
8. Once the pressure reading stabilizes, record the time, pressure, flowrate, clearwell level, wetwell level, and elevated storage tank levels.
9. Repeat steps 7 and 8 until all pumps in the pump station are running and the data have been collected.
10. Once the testing at the pump station is complete, resume normal operations.

Appendix B – Pump Testing Results

Summary of Main Distribution Pump Station (MDS) Pump Testing

On July 28, 2016, Christopher Haeckler and Robert Weinert performed an in situ pump test at the Main Distribution Pump Station (MDS). The in situ pump curves will be used in the water distribution model to reflect actual pumping conditions. The MDS pump station, located at the Norman Water Treatment Plant, includes four 250 horse power (hp) vertical turbine pumps installed in 1982. Pumps 1 and 3 include vertical frequency drives (VFDs).

Discharge pressure and run time were measured with a pressure transducer attached to each pump's air release valve and connected to a logging software. The butterfly valve was actuated by Andy Bruehl, who also read the flow measurements being recorded by magmeters installed on the outlet of each pump. Speed was measured with a laser tachometer. Input power was measured by attaching a multimeter directly to the electronic components of the pump.

All pumps were run at full speed (~1770 RPM) during the entire pump test. The test began with the controlling butterfly valve on the outlet completely open, in order to measure the pump at the design point. Once discharge pressure leveled out, measurements were taken of time, flow, discharge pressure, shaft speed, and input power at as close to the same point in time as possible. The valve was then closed slightly in order to increase the pressure by 10-15 psi, and another set of data points taken. This process was repeated until five data points had been captured for each pump, enough to create a reasonably accurate pump curve. The pressure, flow, and power were corrected for the design shaft speed of 1770 rpm using the affinity law and then plotted.

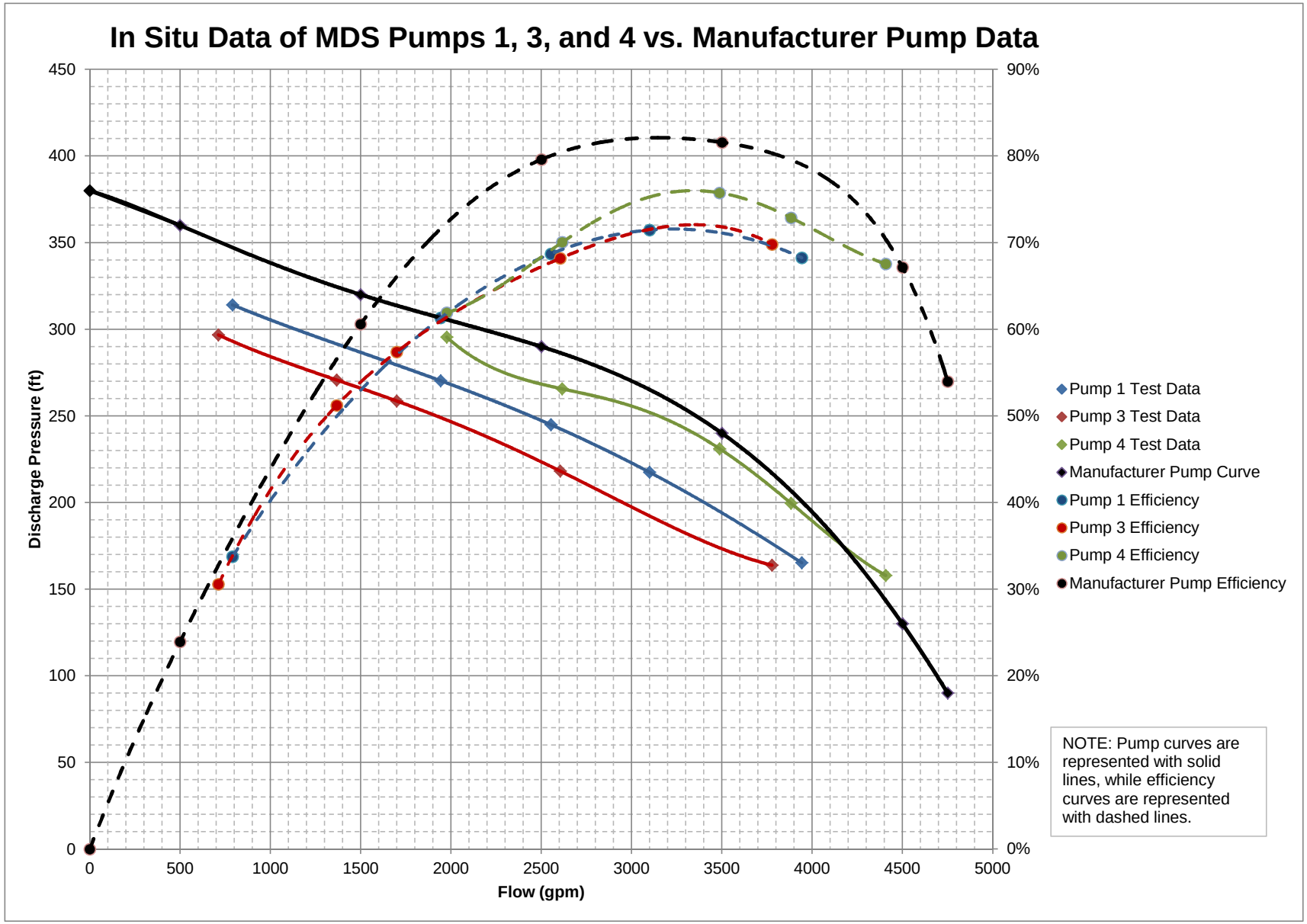
Summary of Upper Pressure Zone (PZ) Pump Testing

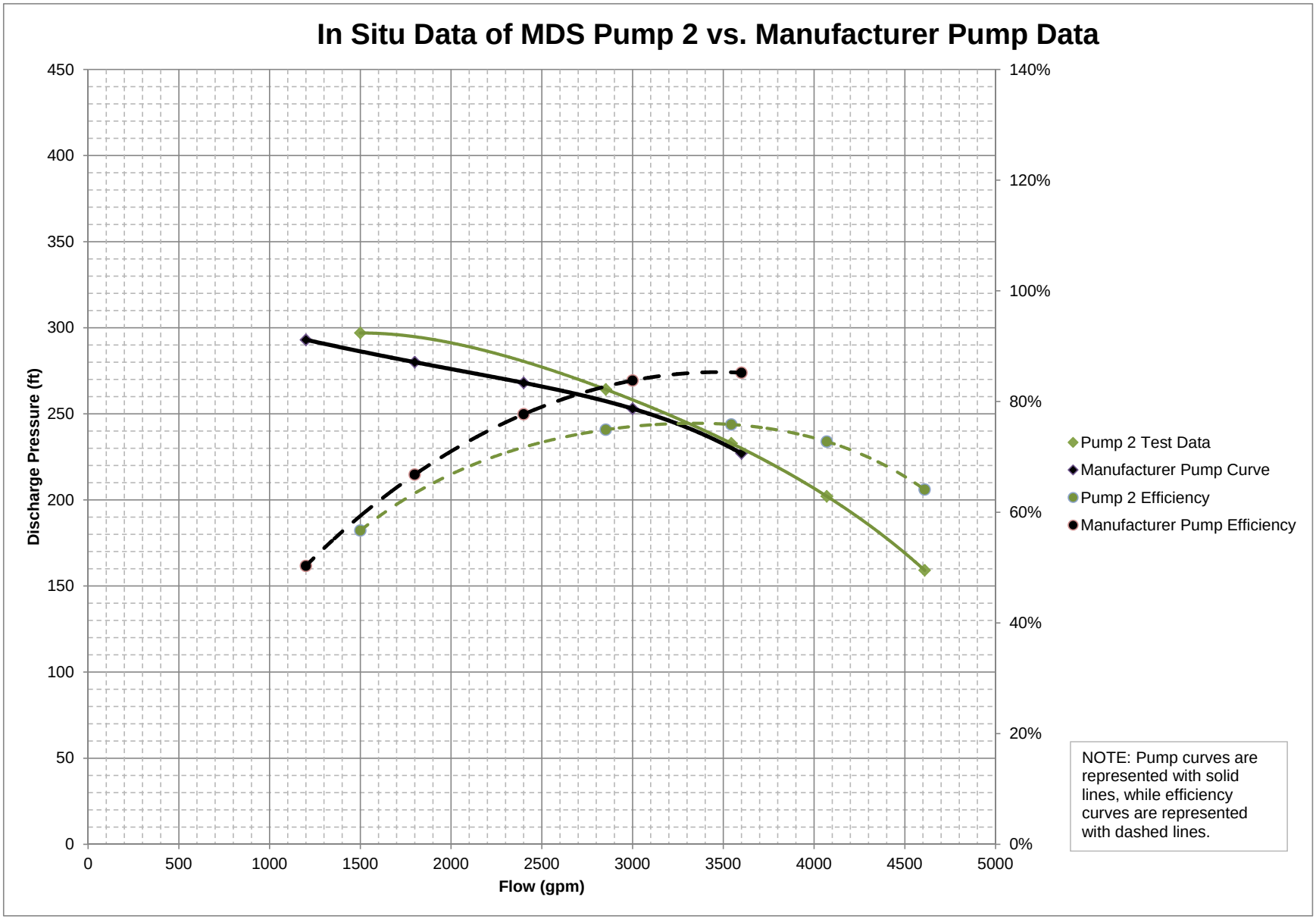
On August 10, 2016, Robert Weinert returned to test the Upper Pressure Zone Pump Station (PZ). The PZ pump station, also located at the Norman Water Treatment Plant, includes two 200 hp and two 125 hp vertical turbine pumps, installed in 1963 and 1993, respectively. The pump testing process intended to follow the same process outlined in the first paragraph above, with one exception: Instead of flow being measured with a magmeter, it was measured with a Venturi flowmeter that was connected to a SCADA system through which data could be accessed after each test. The flowmeter had been calibrated the previous day by Neal Engleman, using drawn down tests and volumetric calculations in the clearwell. However, the flowmeter didn't return reasonable results on the tests of the first pump. Instead of the ~800-1450 GPM range that should have been measured, the results were instead between ~1225-1350 GPM. From this it was concluded that the flowmeter would not return accurate data.

Therefore, two main solutions were proposed:

1. Install an ultrasonic flowmeter to measure results, then correlate the data to a drawn down test done at a later date in order to provide a correction factor. This correction factor was necessary because the pumps did not have the 15 pipe diameter lengths (10 upstream and 5 downstream) of undisturbed piping requisite to return accurate data.
2. Run draw down tests for each individual pump. This test would return accurate data, but would require a minimum of four days of labor for Norman employees.

In the end, it was determined that both results would require too much time and effort for the quality and importance of information being obtained. This was especially true because all four pumps are slated to be replaced within the next few years.


In Situ Data of MDS Pumps 1, 3, and 4 vs. Manufacturer Pump Data
Discharge Pressure (ft)
Flow (gpm)
0
50
100
150
200
250
300
350
400
450
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
Pump 1 Test Data
Pump 3 Test Data
Pump 4 Test Data
Manufacturer Pump Curve
Pump 1 Efficiency
Pump 3 Efficiency
Pump 4 Efficiency
Manufacturer Pump Efficiency
NOTE: Pump curves are represented with solid lines, while efficiency curves are represented with dashed lines.


In Situ Data of MDS Pump 2 vs. Manufacturer Pump Data
Discharge Pressure (ft)
Flow (gpm)
450
400
350
300
250
200
150
100
50
0
0
500
1000
1500
2000
2500
3000
3500
4000
4500
5000
140%
120%
100%
80%
60%
40%
20%
0%
Pump 2 Test Data
Manufacturer Pump Curve
Pump 2 Efficiency
Manufacturer Pump Efficiency
NOTE: Pump curves are represented with solid lines, while efficiency curves are represented with dashed lines.

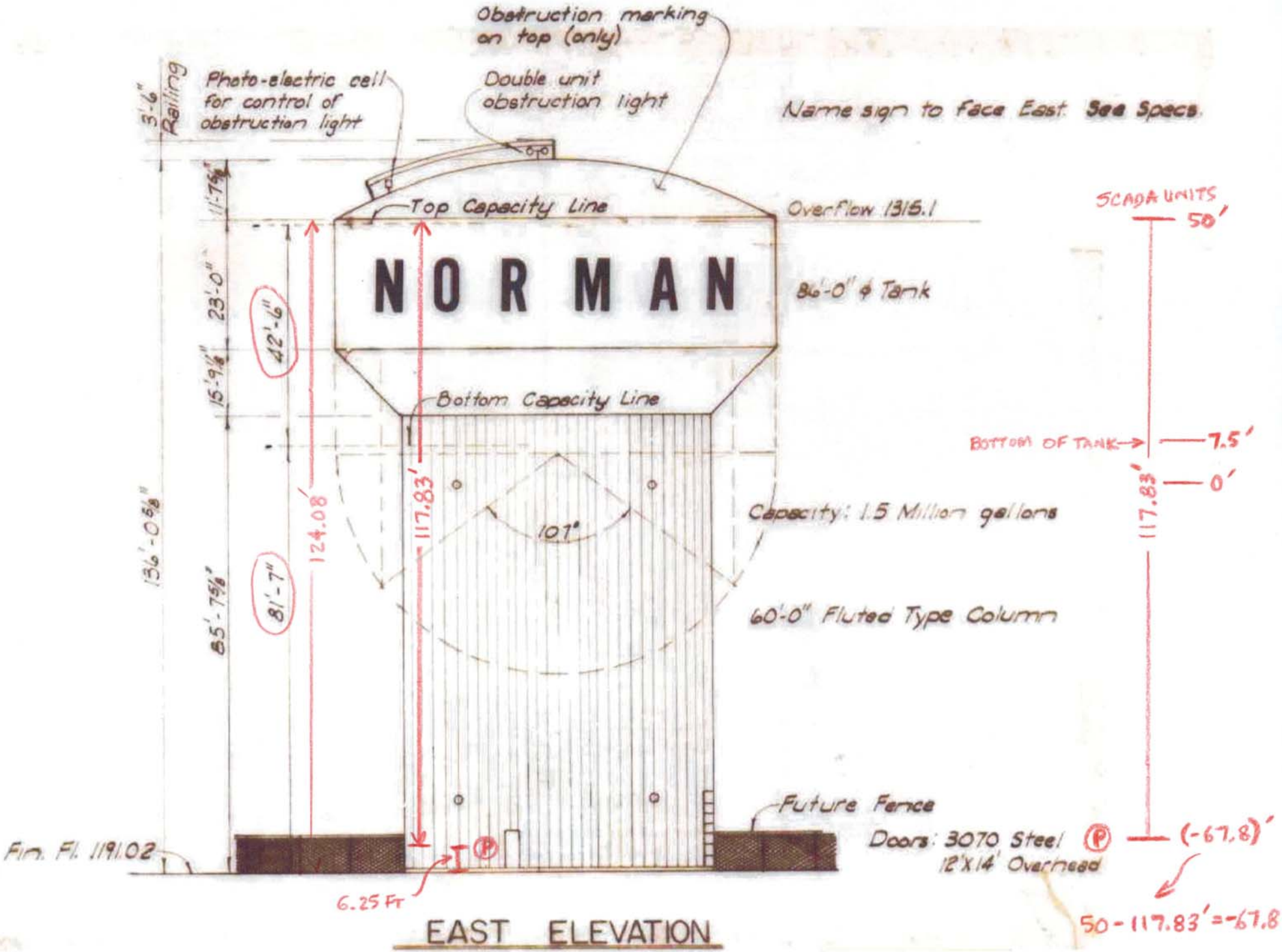
Appendix C – Elevated Storage Tank Information

Elevated Storage Tank Summary Table

	Brookhaven	Boyd	Cascade	Lindsey	Robinson	HPP
Transmitter	Microcomm	Rosemount	Microcomm	Rosemount	Rosemount	Unknown
Capacity (MG)	1.5	0.5	2.0	0.5	0.5	1.0
Bowl Depth (feet)	42.5	40	50	48.2	40	40
Diameter (feet)	N/A	N/A	N/A	N/A	50	74
Overflow Elevation (feet MSL)	1315	1320	1315	1312	1315	1381
Bottom of Bowl Elevation (feet MSL)	1273	1280	1265	1264	1275	1341
Ground Elevation (feet MSL)	1191	1160	1190	1153	1190	1186
Height above ground (ft to overflow)	124	160	126	159	125	196
Gauge reading at overflow (psi)	53.7	69.3	54.3	68.8	54.1	84.7
Height above ground (overall)	136	162	130	N/A	135	205
Gallons per foot capacity[1]	35,294	12,500	46,710	10,373	12,607	32,173
Top elevation	N/A	N/A	N/A	N/A	1325	1391
Year Completed	1975	1965	1999	1950's	1954	2016
Notes	MDS PS controls off this tower.	Altitude valve.	Altitude valve.	Currently decommissioned due to location and changes in distribution system.	Has mixing system installed in tank and altitude valve.	-

1. Calculated from the bottom of the bowl elevation to the overflow elevation

Brookhaven Tower



EAST ELEVATION

Brookhaven Tower

Boyd Tower

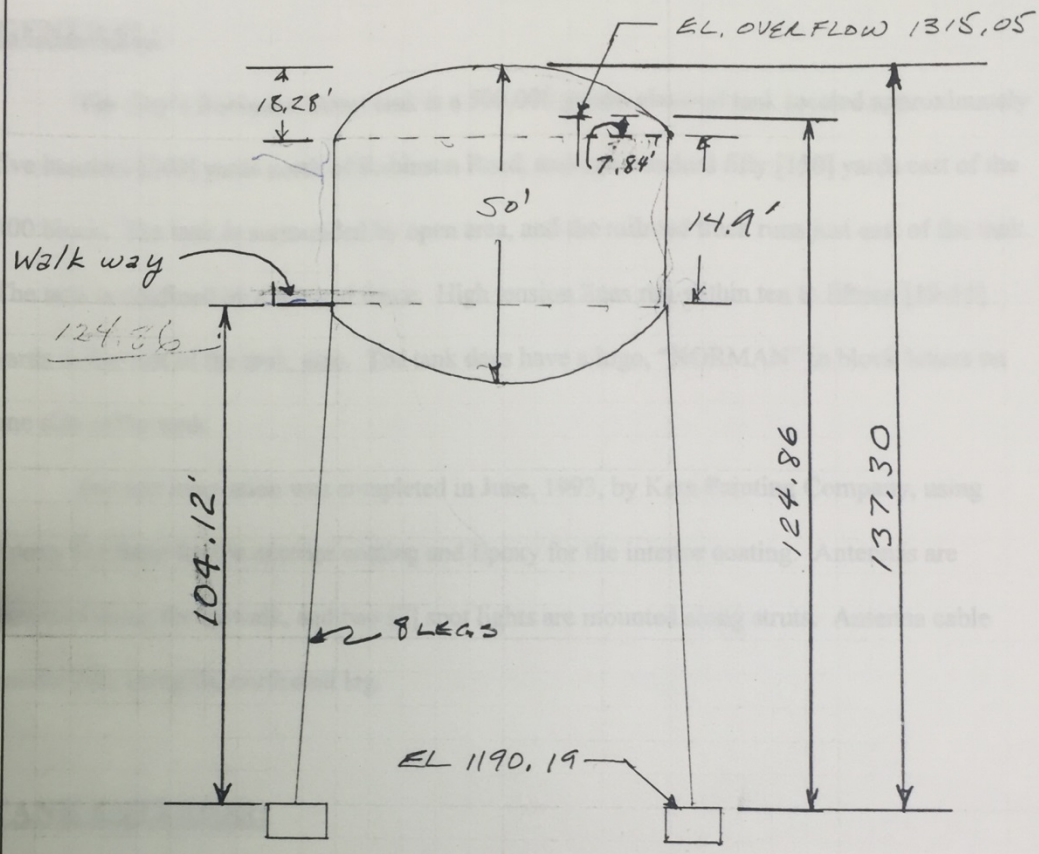
Cascade Tower

Robinson Tower

Robinson Water Tower Sketch

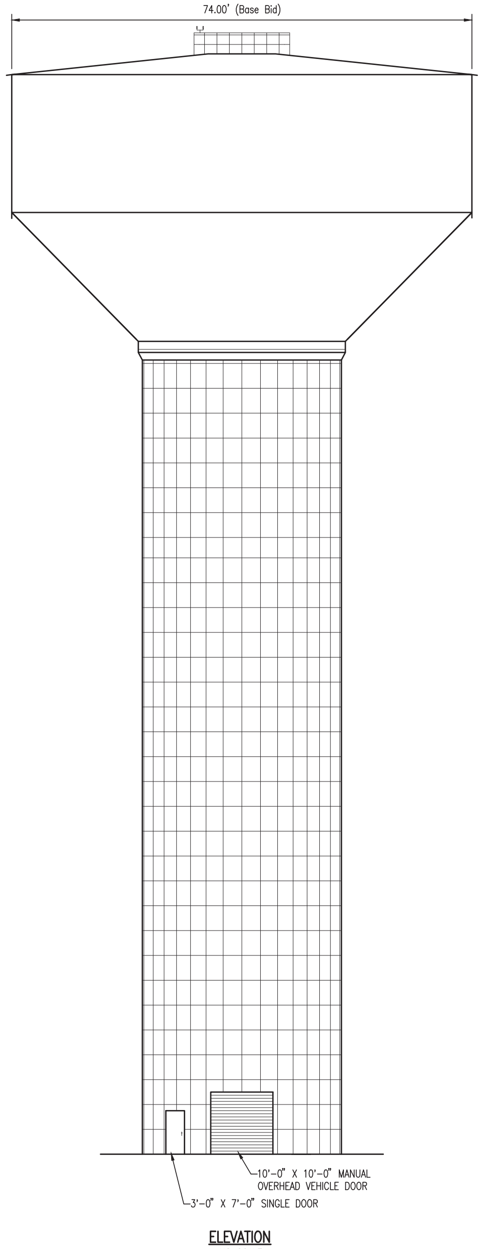
ROBINSON WATER TOWER

2-23-93
BRYAN HAPKE
SUPERVISOR
WATER TREATMENT

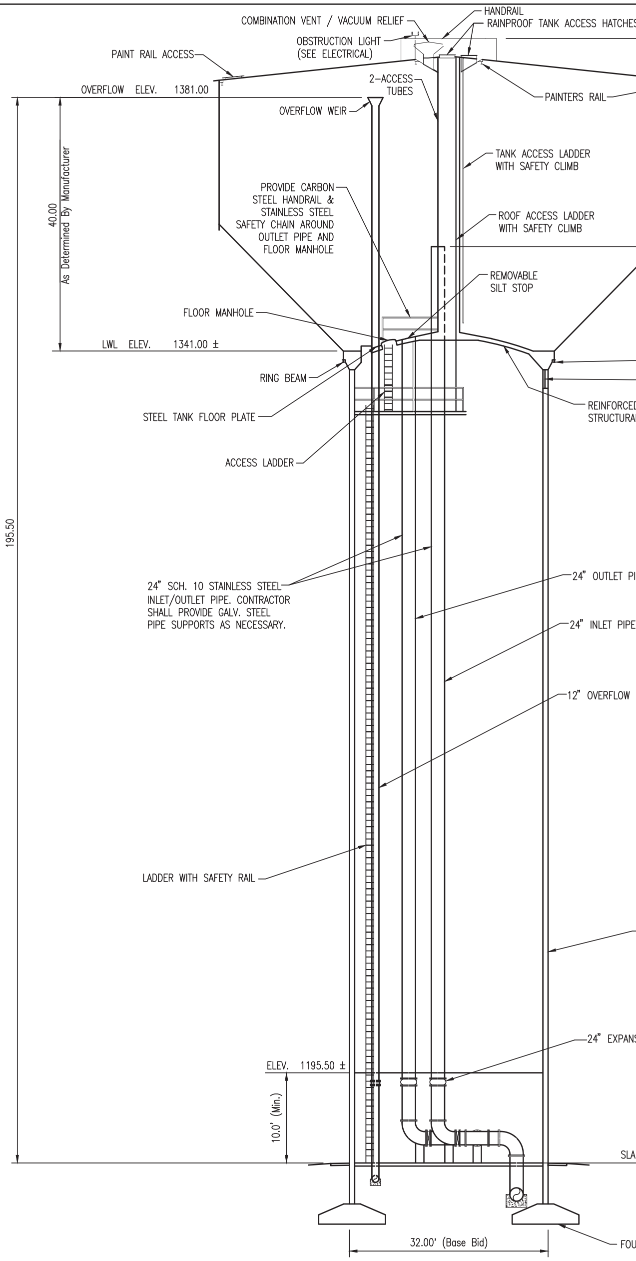


ACTUAL CHAINED CIRCUMFERENCE 157.40'
" " VERT. SIDE 14.9'
" " 1/4 C. OF TOP HEMISPHERE 33.5
" " R" OF BOT, HEMISPHERE 11.9
TOP OF CYLINDER TO OVER FLOW = 7.8'
DIAMETER 50' ERECTED 1954
PITTSBURG, DES MOINES STEEL CO.

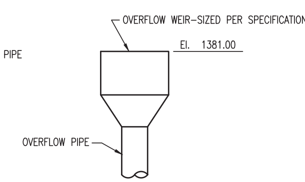
NOTE: COPIED FROM A POOR QUALITY BLUE-LINE DRAWING. BELIEVED TO BE ACCURATE, BUT SOME NUMBERS VERY DIFFICULT TO READ.



ELEVATION
NO SCALE



SECTION
NO SCALE



OVERFLOW WEIR STRUCTURE DETAIL
NO SCALE

NOTES:

GENERAL:

1. SEE CONTRACT SPECIFICATIONS FOR DESIGN CRITERIA AND DETAILS. APPLICABLE ELEVATED TANK SPECIFICATIONS ARE AWWA D100/D107 AND ACI 318/371, MOST RECENT VERSION.
2. STEEL TANK FLOOR WITHIN THE PERIMETER OF THE CONCRETE SUPPORT PEDESTAL SHALL BE SUPPORTED BY A STRUCTURAL CONCRETE SLAB.
3. PROVIDE ADEQUATE FREEBOARD TO ENSURE ROOF PROJECTIONS AND PAINTER RAIL REMAIN ABOVE THE HIGH WATER LEVEL.
4. CONCRETE PEDESTAL EXTERIOR SHALL INCORPORATE HORIZONTAL AND VERTICAL RUSTICATIONS TO CREATE A SYMMETRICAL ARCHITECTURAL PATTERN. SEE CONTRACT SPECIFICATIONS.
5. SEE CONTRACT SPECIFICATIONS FOR STEEL TANK COATING REQUIREMENTS.
6. TANK APPURTENANCES ARE ROTATED FOR CLARITY.
7. DIMENSIONS MAY VARY PER FABRICATOR. CONTRACTOR SHALL MAKE ADJUSTMENTS AS REQUIRED TO ACCOMODATE ACTUAL TANK DIMENSIONS AT NO ADDITIONAL COST TO OWNER.

FOUNDATION:

1. DESIGN LOADS IN ACCORDANCE WITH AWWA D100/D107 (LATEST VERSION).
2. DESIGN CONCRETE FOUNDATION IN ACCORDANCE WITH ACI 318/371 (LATEST VERSION).

MECHANICAL:

1. INLET/OUTLET AND OVERFLOW PIPING WITHIN THE CONCRETE PEDESTAL SHALL BE TYPE 304L STAINLESS STEEL.
2. PROVIDE GALVANIZED STEEL HANGERS, BRACKETS, AND THRUST RESTRAINT AS REQUIRED.
3. OVERFLOW SYSTEM SHALL BE DESIGNED TO ACCOMMODATE MAXIMUM FILL RATE. SEE CONTRACT SPECIFICATION.
4. REMOVABLE SILT STOP SHALL BE 6 INCHES ABOVE TANK FLOOR.

MISCELLANEOUS IRON:

1. ALL LADDERS AND LANDINGS SHALL BE ALUMINUM.
2. PROVIDE ALUMINUM SAFETY RAILS ON ALL LADDERS.
3. ROOF ACCESS TUBES SHALL BE 42" SQUARE.
4. A REMOVABLE ALUMINUM LOUVER SHALL BE INSTALLED AT THE UPPER LANDING FOR ACCESS TO THE EXTERIOR PAINTER RAIL.
5. ACCESS HATCHES SHALL BE 30" IN DIAMETER.
6. ALL INTERNAL TANK CARBON STEEL HANDRAIL SHALL BE COATED IN ACCORDANCE WITH SECTION 09970 OF THE SPECIFICATIONS.

C.O.A. 1046 PE/LS EXPIRES: JUNE 30, 2015

No.	Revision	By	Date

LICENSED PROFESSIONAL ENGINEER — BRAN N. WINTLE 26144 02/06/2015 — OKLAHOMA

CITY OF NORMAN, OKLAHOMA

TOWER ELEVATIONS–BASE BID

HIGH PRESSURE PLANE–ELEVATED WATER TOWER STORAGE

PEC
PROFESSIONAL ENGINEERING CONSULTANTS, P.A.
CHEROKEE BUILDING 4150 S. 100TH E. AVE., SUITE 401
TULSA, OK 74146 918-664-5400 www.pec1.com

Designed by JDK, ABK — Job No. 13K62
Drawn by EMB, SAG — Date FEBRUARY 2015 — Sht. 14 of 25

Saved 02-06-2015 12:35:18 PM by EMC
Plot Scale 1:1 ... ELIZABETH BOLINGER
P:\2013\... erElev-Base

Appendix C-8

High Pressure Plane Tower

Appendix D – Allocation of Future Water Demand Projections

As described in Section 3.2.1, the projected 2025 average day water demand is 17.95 MGD. To model 2025 conditions, this demand must be allocated among existing and future customers and land uses. Projected 2025 annual water demand in the water service area can be divided between existing water use and future development water use (Table 1). The letters from Table 1 correspond to the columns in the next tables in this appendix.

Table 1: Classification of Current and Future Water Uses

<table>
<tr><td rowspan="10">[A] 2025 Water Use</td><td rowspan="3">October 2015 – September 2016 Existing System Use</td><td colspan="2">[B] Customer Use (Metered)</td></tr>
<tr><td colspan="2">[C] Other Uses</td></tr>
<tr><td colspan="2">[D] Water Loss</td></tr>
<tr><td rowspan="7">Future Development Use</td><td rowspan="7">[E] Metered Flow for New Accounts</td><td>Single-Family</td></tr>
<tr><td>Multi-Family</td></tr>
<tr><td>Office/Retail</td></tr>
<tr><td>Industrial/Warehouse</td></tr>
<tr><td>Parks</td></tr>
<tr><td>Schools</td></tr>
<tr><td>Other</td></tr>
<tr><td colspan="2">[F] Other Uses</td></tr>
<tr><td colspan="2">[G] Water Loss</td></tr>
</table>

City staff provided existing water use data for October 2015 through September 2016. As presented in Table 2 (page 2), average day water demands included usage measured by customer meters (10.26 MGD), estimates of other uses[1] (0.24 MGD), and estimated water loss (1.50 MGD). During this time period, actual average water demands were 108.3 gpcd; however, for planning purposes, the projected water demand is based on 145 gpcd of water use.

The first step in the demand allocation is to multiply the 2015-2016 water demands by a scale factor (145 gpcd/108.3 gpcd = 1.34) to bring water use for the existing system to 145 gpcd. This results in an estimated water use of 16.06 MGD for the existing water system. Subtracting this from the total projected 2025 water demand, the additional demand developed between 2016 and 2025 is projected to be 1.89 MGD (Table 3, page 2).

The second step in the demand allocation is to assume that water use from future development will occur in the same proportions as water use in the existing system. From October 2015 through September 2016, the City estimated the volume of metered customer uses, other uses, and water loss to be about 85.5 percent, 2.0 percent, and 12.5 percent of total water use, respectively. The total projected demand for future development is allocated by multiplying 1.89 MGD by these percentages (Table 4, page 2).

[1] Other uses may include water used for fire-fighting, street cleaning, water main and sewer flushing, fire flow tests, and other unmetered uses.

Table 2: 2025 Demand Allocation Starting Point

Labels	Total [A]	Metered [B]	Other [C]	Loss [D]	Total Existing [B]+[C]+[D]	Total New [E]+[F]+[G]	Metered [E]	Other [F]	Loss [G]
Base Year (1)	2025	2015-16	2015-16	2015-16	2015-16	New	New	New	New
Projected Base year Population (2)	*123,821*				*110,765*				
Average Day Water Demand, MGD (3)	*17.95*	*10.26*	*0.24*	*1.50*	*12.00*				
Average Day Water Demand, gpcd (4)	*145.0*				*108.3*				
Historical/Current Scale Factor (5)									
Scaled Average Day Water Demand, MGD (6)									
Scaled Average Day Water Demand, gpcd (7)									
Percentage of Existing Water Use (8)									
Distribute Future Development Use (9)									

Table 3: 2025 Demand Allocation Step 1

Labels	Total [A]	Metered [B]	Other [C]	Loss [D]	Total Existing [B]+[C]+[D]	Total New [E]+[F]+[G]	Metered [E]	Other [F]	Loss [G]
Base Year (1)	2025	2015-16	2015-16	2015-16	2015-16	New	New	New	New
Projected Base year Population (2)	123,821				110,765				
Average Day Water Demand, MGD (3)	17.95	10.26	0.24	1.50	12.00				
Average Day Water Demand, gpcd (4)	145.0				108.3				
Historical/Current Scale Factor (5)		*1.34*	*1.34*	*1.34*					
Scaled Average Day Water Demand, MGD (6)	*17.95*	*13.73*	*0.32*	*2.01*	*16.06*	*1.89*			
Scaled Average Day Water Demand, gpcd (7)	*145.0*				*145.0*				
Percentage of Existing Water Use (8)									
Distribute Future Development Use (9)									

Table 4: 2025 Demand Allocation Step 2

Labels	Total [A]	Metered [B]	Other [C]	Loss [D]	Total Existing [B]+[C]+[D]	Total New [E]+[F]+[G]	Metered [E]	Other [F]	Loss [G]
Base Year (1)	2025	2015-16	2015-16	2015-16	2015-16	New	New	New	New
Projected Base year Population (2)	123,821				110,765				
Average Day Water Demand, MGD (3)	17.95	10.26	0.24	1.50	12.00				
Average Day Water Demand, gpcd (4)	145.0				108.3				
Historical/Current Scale Factor (5)		1.34	1.34	1.34					
Scaled Average Day Water Demand, MGD (6)	17.95	13.73	0.32	2.01	16.06	1.89			
Scaled Average Day Water Demand, gpcd (7)	145.0				145.0				
Percentage of Existing Water Use (8)		*85.5%*	*2.0%*	*12.5%*			*85.5%*	*2.0%*	*12.5%*
Distribute Future Development Use (9)							*1.62*	*0.04*	*0.24*

The third step in the demand allocation is to fill in Table 5 with results from the previous step.

Table 5: 2025 Demand Allocation Step 3

Labels	Total [A]	Metered [B]	Other [C]	Loss [D]	Total Existing [B]+[C]+[D]	Total New [E]+[F]+[G]	Metered [E]	Other [F]	Loss [G]
Base Year (1)	2025	2015-16	2015-16	2015-16	2015-16	New	New	New	New
Projected Base year Population (2)	123,821				110,765				
Average Day Water Demand, MGD (3)	17.95	10.26	0.24	1.50	12.00				
Average Day Water Demand, gpcd (4)	145.0				108.3				
Historical/Current Scale Factor (5)		1.34	1.34	1.34					
Scaled Average Day Water Demand, MGD (6)	17.95	13.73	0.32	2.01	16.06	1.89			
Scaled Average Day Water Demand, gpcd (7)	145.0				145.0				
Percentage of Existing Water Use (8)		85.5%	2.0%	12.5%			85.5%	2.0%	12.5%
Distribute Future Development Use (9)	*17.95*	*13.73*	*0.32*	*2.01*	*16.06*	*1.89*	1.62	0.04	0.24

To model the water distribution system for 2025 conditions, the projected metered use for new development was allocated to different locations in the water service area. The Land Use Plan, existing developments, and future (platted) developments were reviewed to project future numbers of water connections and future acreage by land uses. The City also provided information about planned parks, schools, and a University of Oklahoma (OU) development. The projected metered use was then allocated for new development to the land use categories as shown in Table 6 (page 4).

The primary assumptions in the allocation process are:

- Projections based on numbers of connections:
    - 17.25 multi-family units per multi-family water connection. This was estimated from the average day water use for a multi-family connection (1,859 gallons per day) and the average day water use for an independently metered apartment (102 gallons per day), with adjustments for differences in irrigation between these types of connections.
    - For each category, the unit water use was estimated to be the average of the 2015-16 average day water uses for all existing meters.
    - Based on these procedures and the estimated population densities, these assumptions result in projected single-family water use of 77 gpcd and projected multi-family water use of 56 gpcd. Based on literature values and experience with other utilities, these are reasonable estimates.
- Projections based on information provided by the City
    - The City provided information on parks and schools that are expected to be developed before 2025. For each new park and school, the City also identified an existing park or school with expected similar water use. Metered data from these comparable properties were used to estimate future water use at the new parks and schools.

Table 6: Allocation of Projected Average Water Demand by Land Use Category

Projections Based on Numbers of Connections

Land Use Category	Projected 2016-2025 New Housing Units	Estimated Housing Units per Connection	Projected 2016-2025 New Connections	2015-16 Category Average Usage* (gal/conn/day)	Projected Add'l Average Demand (mgd)	Projected Add'l Average Demand (%)	People per Unit	Per Capita Use (gpcd)
Single-Family	3,892	1.00	3,892	195	0.759	46.93%	2.55	77
Multi-Family	1,367	17.25	79	1,859	0.147	9.10%	1.91	56
Subtotal					*0.907*	*56.03%*		

Projections Based on Information from City

Land Use Category	Identified Potential Acreage	Projected 2016-2025 New Acreage	Connections per Acre	2015-16 Category Usage (gal/conn/day)	Projected Add'l Average Demand (mgd)	Projected Add'l Average Demand (%)
Parks	379.3	153.0			0.011	0.67%
Schools	20.0	40.0			0.001	0.07%
OU Jenkins/Timberdell	20.0	20.0			0.068	4.18%
Subtotal					*0.080*	*4.92%*

Projections Based on Acreage

Land Use Category	Identified Potential Acreage	Projected 2016-2025 New Acreage	Connections per Acre	2015-16 Category 69th Percentile Usage* (gal/conn/day)	Projected Add'l Average Demand (mgd)	Projected Add'l Average Demand (%)
Office/Retail	745.40	436.5	1.421	396	0.246	15.20%
Industrial/Warehouse	220.68	98.7	0.443	8,817	0.386	23.85%
Subtotal					*0.632*	*39.05%*
TOTAL					**1.618**	

- A 20-acre future OU development with 1,200-bed student housing and an office building was also identified by the City. Unit water use of 56 gallons per bed per day was assumed for student housing (same value as multi-family per capita water use). Projected water use for the office building is described in the next bulleted items.

- Projections based on land use acreage:
  - For each category (office/retail and industrial/warehouse), the number of connections per acre was projected by identifying the existing total acreage of this land use and existing total number of meters for developed parcels with similar land use.
  - Water use in the office/retail and industrial/warehouse land use categories is highly variable, depending on the property, with the average water use skewed by a few large water users (For each category, the average of the average day water use for all meters is about the 83rd percentile value). In addition, there are only 19 existing connections in the industrial/warehouse category that had metered 2015-16 water use. For these reasons, smaller percentile values were used that would also make the total allocated metered water use equal the amount projected based on the 2060 Strategic Water Supply Plan (Tables 2 and 3).:
    - 69th percentile average day water use for existing meters for the projections without water conservation and
    - 63rd percentile average day water use for existing meters for the projections with water conservation.

Appendix E – Hydrant Flow and Pressure Testing Procedures and Locations

1 Hydraulic Model Calibration Procedures

This memorandum addresses Task B-3c from the project scope. It provides Norman Utilities Authority (NUA) with protocols to use for system flow and pressure testing during the summer of 2016. Pressure testing should be performed after the main distribution system (MDS) is separated from the new upper pressure zone.

1.1 INTRODUCTION

A successfully calibrated hydraulic model can be leveraged to evaluate the impact of proposed operational changes on the water system and to guide capital improvement decisions. To achieve an acceptable calibration, comparison and refinement of the model results based on measured field conditions is fundamental. Typically, a model is first calibrated to steady-state conditions, or a fixed set of conditions such as the peak demand hour on a maximum demand day. Then the model is calibrated to reflect extended-period simulation (EPS) conditions, or variable demand conditions that capture diurnal patterns during a period of high demand. Both steady-state and EPS simulations use historical conditions and field data for calibration. After calibration, a correlation between field data and model results of 5 to 10 percent is desirable[1].

1.2 FLOW AND PRESSURE TESTING

Flow and pressure testing will be conducted to support the static and residual calibration of a newly created water distribution model for NUA. Testing will be performed during the summer of 2016 at approximately eighteen hydrant sites throughout the City. Four fire hydrants will be utilized at each site. Two fire hydrants (Q1, Q2) will be used to measure flow with a hydrant Pitot gauge. This device measures flow by recording the velocity head in the flow stream. Two additional fire hydrants will be used to measure pressure. A data logger and pressure gauge will be installed at both of the pressure hydrants. NUA supervisory control and data acquisition (SCADA) equipment, including all pump station flows and pressures and tank levels, will be used to collect additional system data while each test is being conducted. Figure 1 displays the proposed locations for hydrant testing. Appendix A provides a blank hydrant test paper form with pertinent information that should be collected during each hydrant test.

Each flow test is estimated to take one hour, which includes installing the equipment, running the test under five flow conditions, and disassembling the equipment. A crew of three can quickly and safely perform the testing procedure at each site. Generally one person is stationed at each of the two flow gauges, and a third person is stationed at one of the pressure gauges.

1.2.1 Calibration of Testing Equipment

Before beginning the flow and pressure testing, all testing equipment should be gathered and proper operation should be verified. The hydrant flow gauge (Pitot gauge) that will be used to measure flow must be calibrated. Calibration of the Pitot gauge is most effective when a 'dead-weight' tester is used. Following gauge calibration, comparison of gauge pressure to the dead-weight tester pressure should fall within 0.5 psi.

The timekeeping of all recording equipment needs to be synchronized (or at a minimum, the difference in their recorded time must be known). This includes all data logger clocks as well as staff watches. This is critical so that the data recorded for each test can be grouped by time-step correctly.

[1] P. Boulos, K. Lansey, and B. Karney (2006). *Comprehensive Water Distribution Systems Analysis Handbook for Engineers and Planners*, MWH Soft. Pasadena, CA. Section 7.3.3.

1.2.2 Installation of Testing Equipment Basic Site Information

The proposed hydrant test sites are displayed on a map in Figure 1, and site detail maps with specific hydrant assignments are provided in Appendix B. At the hydrant test site, the two pressure test hydrants should each be outfitted with a data logger (set for data readings of 30-seconds or finer) and a pressure gauge. Each of the flow hydrants should be outfitted with a calibrated Pitot gauge. The use of a flow diffuser (wire-cage or similar) after the Pitot gauge is recommended, and the environment around the hydrant flow trajectory should be checked and modified as needed to prevent site damage and erosion. Note that the flow hydrants must be unique from the pressure hydrants and should never be used to measure system pressure - friction loss in the hydrant valve and barrel will cause errors.

1.2.3 Basic Site Information

Once the testing equipment is installed, fill out the hydrant test paper form with the basic site and gauge information. At the pressure hydrants (P1 and P2), use a tape measure to record the height above ground level for each gauge. Take a photo at each of the flow hydrants (Q1, Q2) to document initial site conditions, and record the photo number. At all hydrants, collect a GPS coordinate. Verify that a hydrant wrench of the correct size is available at each of the flow hydrants.

1.2.4 Static Condition Measurement

The static condition represents the pressure during typical demands with no hydrants flowing. Static pressure is measured for two 5-minute periods at each pressure test hydrant, once before the three flow condition tests, and once after the flow tests are completed. During the static pressure measurements, both flow hydrants (Q1, Q2) remain closed and only pressure is measured at the two pressure hydrants (P1, P2). The goal of the static pressure measurement is to accurately record field pressure data under baseline conditions, when no additional demand is present. It is used to validate major connectivity and operational boundary conditions in the model like the head in elevated tanks. The second static pressure measurement checks that the system returns to the conditions obtained before the test was initiated.

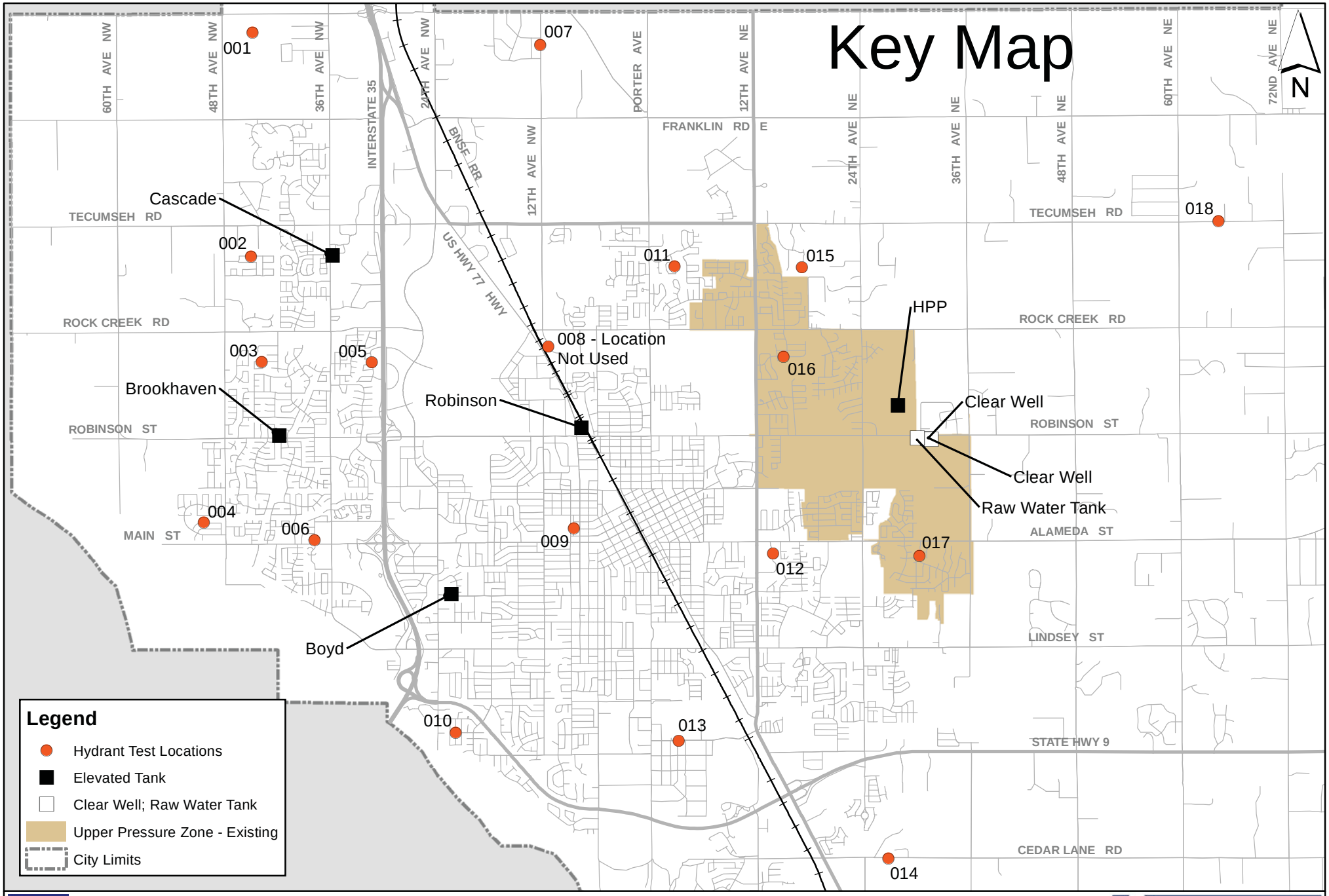
1.2.5 Residual Condition Measurement

The residual condition represents the pressure while the flow hydrant(s) are open. After the first static condition measurement, flow and pressures are measured for 5-minute periods for three different flow conditions:

1. Water is released from flow hydrant Q1. Meanwhile, flow is recorded at hydrant Q1 and pressure is recorded continuously at pressure hydrants P1 and P2. Confirm that pressure drop from static conditions at P1 and P2 is sufficient.[2] Verify that measured pressure at P1 and P2 does not drop below 20 psi.
2. Water is released from Q1 and Q2 simultaneously. Meanwhile, flow is recorded at Q1 and Q2, and pressure is recorded at P1 and P2. Confirm that the maximum pressure drop is sufficient during this flow condition.[2] Verify that the measured pressure at P1 and P2 does not drop below 20 psi.
3. Hydrant Q1 is closed and flow is stopped. Water continues to be released from Q2. Meanwhile, flow is recorded at Q2 and pressure is recorded at P1 and P2. Verify that measured pressure at P1 and P2 does not drop below 20 psi.

After the three flow tests are complete, make the second static condition measurement at P1 and P2. Confirm that the second static measurement is near the first static measurement.

[2] A sufficient pressure drop is indicated by at least a 10 percent drop in pressure (static to residual condition) or up to a 10 psi drop in pressure. The maximum pressure drop will occur when the two flow hydrants are open simultaneously. (Source: AWWA Manual: Installation, Field Testing, and Maintenance of Fire Hydrants [2006])



Norman Water Distribution Model Update

Figure 1: Hydrant Test Locations
Norman, OK

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ENVIRONMENTAL ENGINEERS AND SCIENTISTS
414 NW 4th Street, Suite 150
Oklahoma City, OK 73102

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The goal of the residual pressure measurements is to accurately record field pressure data under active flow conditions, when an outflow higher than any peak hour demand is present. The flow and pressure data will be used for calibration of the model under the same conditions seen in the field at the time the tests were performed.

The hydrant flow and pressure testing procedure is conceptually displayed in Table 1. Hydrant flows that are higher than any peak hour demand will typically be produced when each test hydrant is flowing. The flows from the residual calibration tests will be used to evaluate the hydraulic model for connectivity (both pipes and valve status), pump operation, roughness factors, and system response times. Pipe friction factors (Hazen Williams C-Factors) will be adjusted so that the model represents data collected in the field.

Table 1: Hydrant Flow Test Procedures

Location	Time Periods				
	Time 1	Time 2	Time 3	Time 4	Time 5
	Prior to Hydrant Test	0-5 Minutes	5-10 Minutes	10-15 Minutes	After Hydrant Test
Pressure Hydrant P1	Record Static Pressure (Start)	Record Residual Pressure	Record Residual Pressure	Record Residual Pressure	Record Static Pressure (End)
Pressure Hydrant P2	Record Static Pressure (Start)	Record Residual Pressure	Record Residual Pressure	Record Residual Pressure	Record Static Pressure (End)
Flow Hydrant Q1	OFF	ON - Record Residual Flow	ON - Record Residual Flow	OFF	OFF
Flow Hydrant Q1	OFF	OFF	ON - Record Residual Flow	ON - Record Residual Flow	OFF

1.3 SUMMARY

The use of continuously-recording pressure data loggers in conjunction with simultaneously releasing flow from multiple flow hydrants is recommended by the American Water Works Association (AWWA) and others as an efficient and accurate way to conduct hydrant flow test. Benefits of this approach for the City of Norman, OK include faster tests, a feasible crew size, budget-minded equipment costs, and more data that can be used for model calibration.

Performing flow testing during the summer, higher demand period, is ideal. It should also be performed after the upper pressure zone is separated from the MDS in order to produce an up to date model. APAI will also need SCADA data for the period when hydrant flow testing was performed for accurate model calibration. Required SCADA data includes the following:

- Elevated and ground storage tank levels,
- Pump on/off status and flows, and
- Well on/off status and flows.

APPENDIX A

Hydrant test form

Hydrant Test Data Form
City of Norman, OK
Water System Master Plan

Date: _____
Test Site ID: _____ **Site Description:** _____
Notes:

Flow Hydrant - Q1		**Pressure Hydrant - P1**	
Hydrant ID:		Hydrant ID:	
Location:		Location:	
GPS Lat/Lon:		GPS Lat/Lon:	
Photo ID:		Photo ID:	
Time 1:	am / pm	Gauge height above ground (ft):	
Pressure 1:	psi	Data Logger ID:	
Time 2:	am / pm	Time ON:	am / pm
Pressure 2:	psi	Begin Static Pressure:	psi
Time 3:	am / pm	Time OFF:	am / pm
Pressure 3:	psi	End Static Pressure:	psi
Time 4:	am / pm		
Pressure 4:	psi	Notes:	
Time 5:	am / pm		
Pressure 5:	psi		
Notes:			
Flow Hydrant - Q2		**Pressure Hydrant - P2**	
Hydrant ID:		Hydrant ID:	
Location:		Location:	
GPS Lat/Lon:		GPS Lat/Lon:	
Photo ID:		Photo ID:	
Time 1:	am / pm	Gauge height above ground (ft):	
Pressure 1:	psi	Data Logger ID:	
Time 2:	am / pm	Time ON:	am / pm
Pressure 2:	psi	Begin Static Pressure:	psi
Time 3:	am / pm	Time OFF:	am / pm
Pressure 3:	psi	End Static Pressure:	psi
Time 4:	am / pm		
Pressure 4:	psi	Notes:	
Time 5:	am / pm		
Pressure 5:	psi		
Notes:			

APPENDIX B

Site detail maps

Norman Water Distribution Model Update
Hydrant Test Locations
Norman, OK

Hydrant Types
- Q1
- Q2
- P1
- P2

Hydrant
- Hydrant

Water Mains Diameter
- 1 - 6 inch
- 7 - 12 inch
- 13 - 24 inch
- 25 - 30 inch

- Storage Tank
- Upper Pressure Zone - Existing

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FAX: (817) 870-2536

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Norman Water Distribution Model Update
Hydrant Test Locations
Norman, OK

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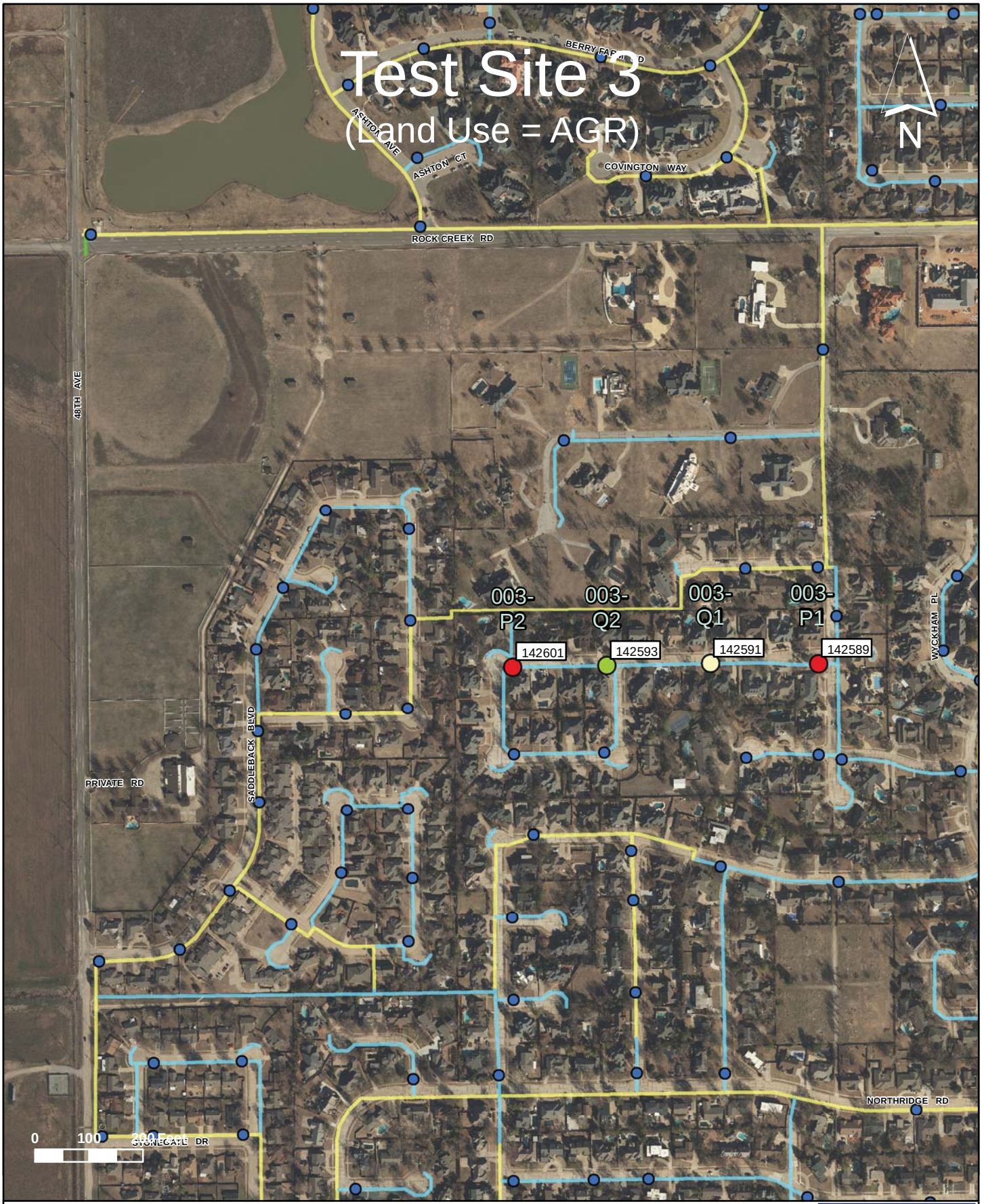

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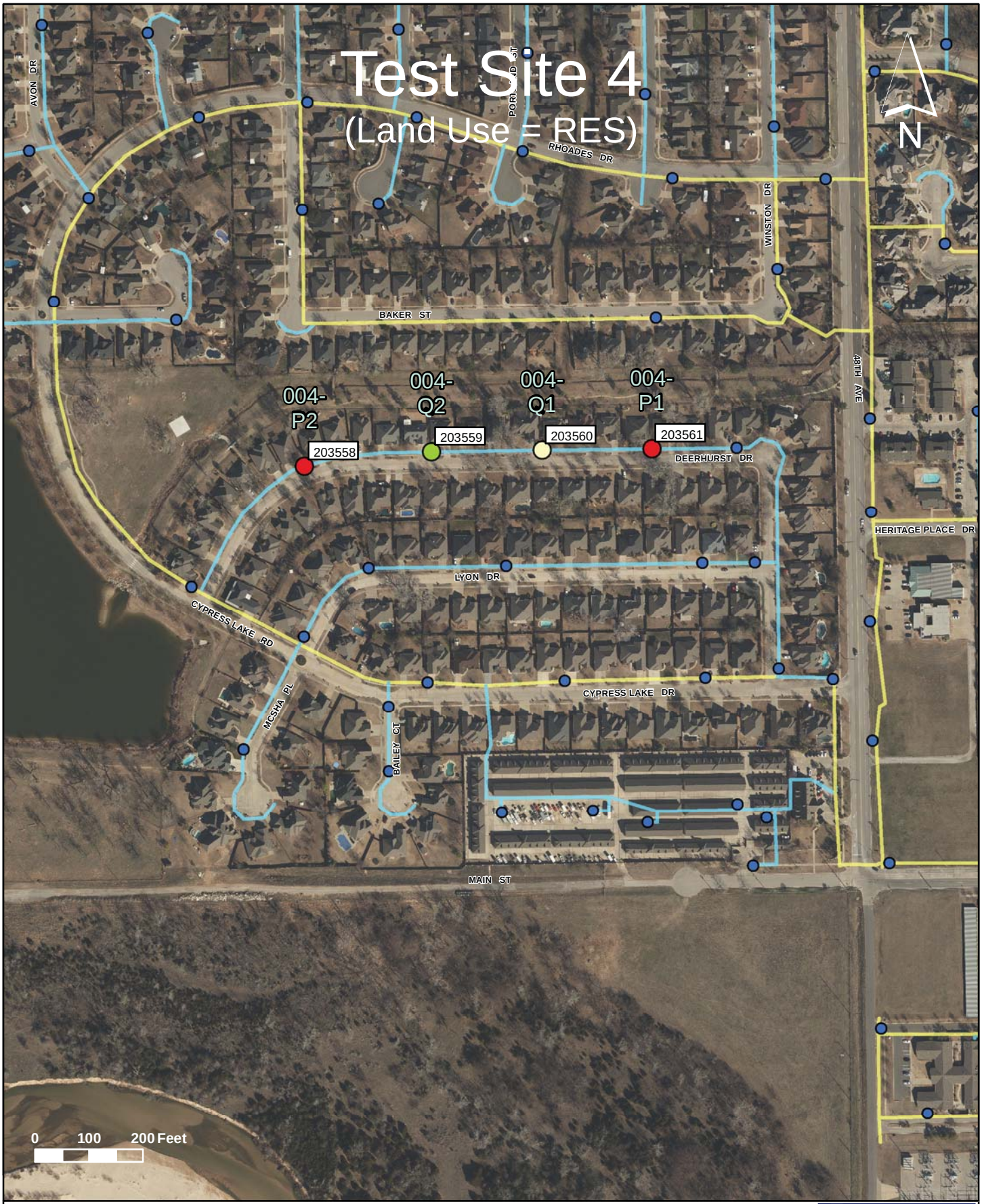

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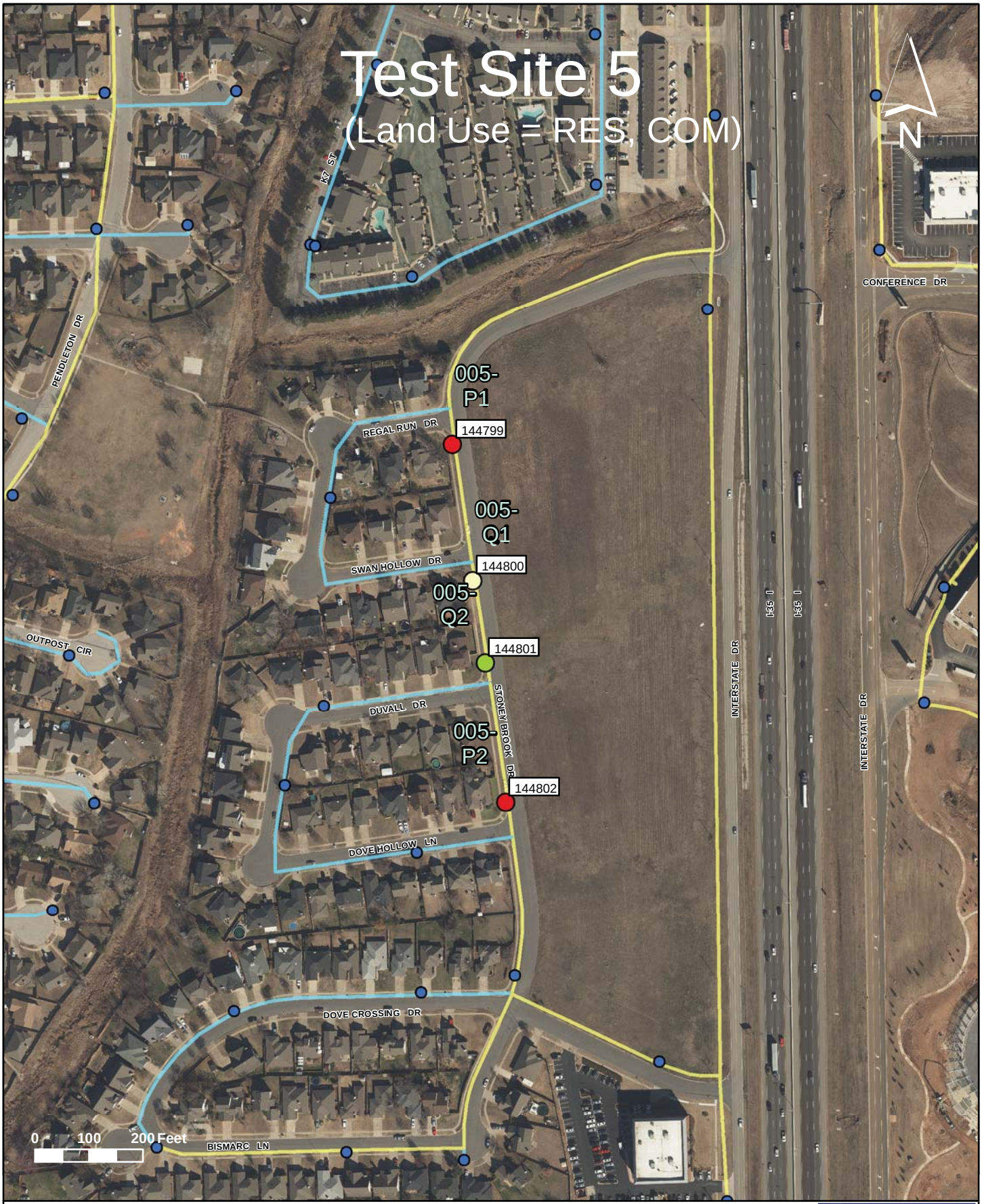

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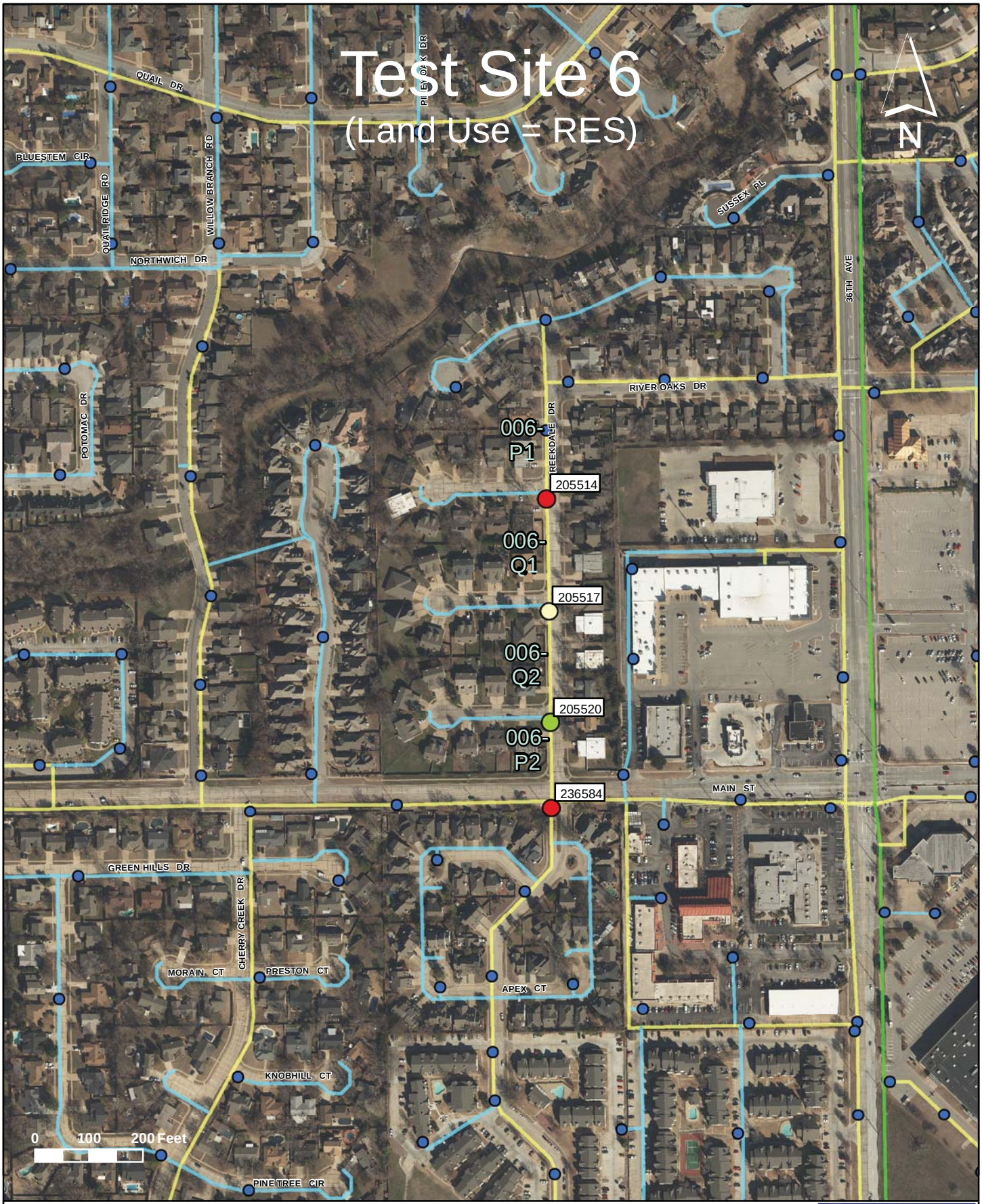

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- 13 - 24 inch
- 25 - 30 inch

- Storage Tank
- Upper Pressure Zone - Existing

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FORT WORTH, TEXAS 76107
PHONE: (817) 806-1700
FAX: (817) 870-2536

PATH: F:\projects\1115\004-01\2-0 Wrk Prod\2-9 GIS\MXD\Hydrant Tests - Mapbook1 v2.mxd

DATE: 2/13/2018

Norman Water Distribution Model Update
Hydrant Test Locations
Norman, OK

Hydrant Types
- Q1
- Q2
- P1
- P2

Hydrant
- Hydrant

Water Mains Diameter
- 1 - 6 inch
- 7 - 12 inch
- 13 - 24 inch
- 25 - 30 inch

- Storage Tank
- Upper Pressure Zone - Existing

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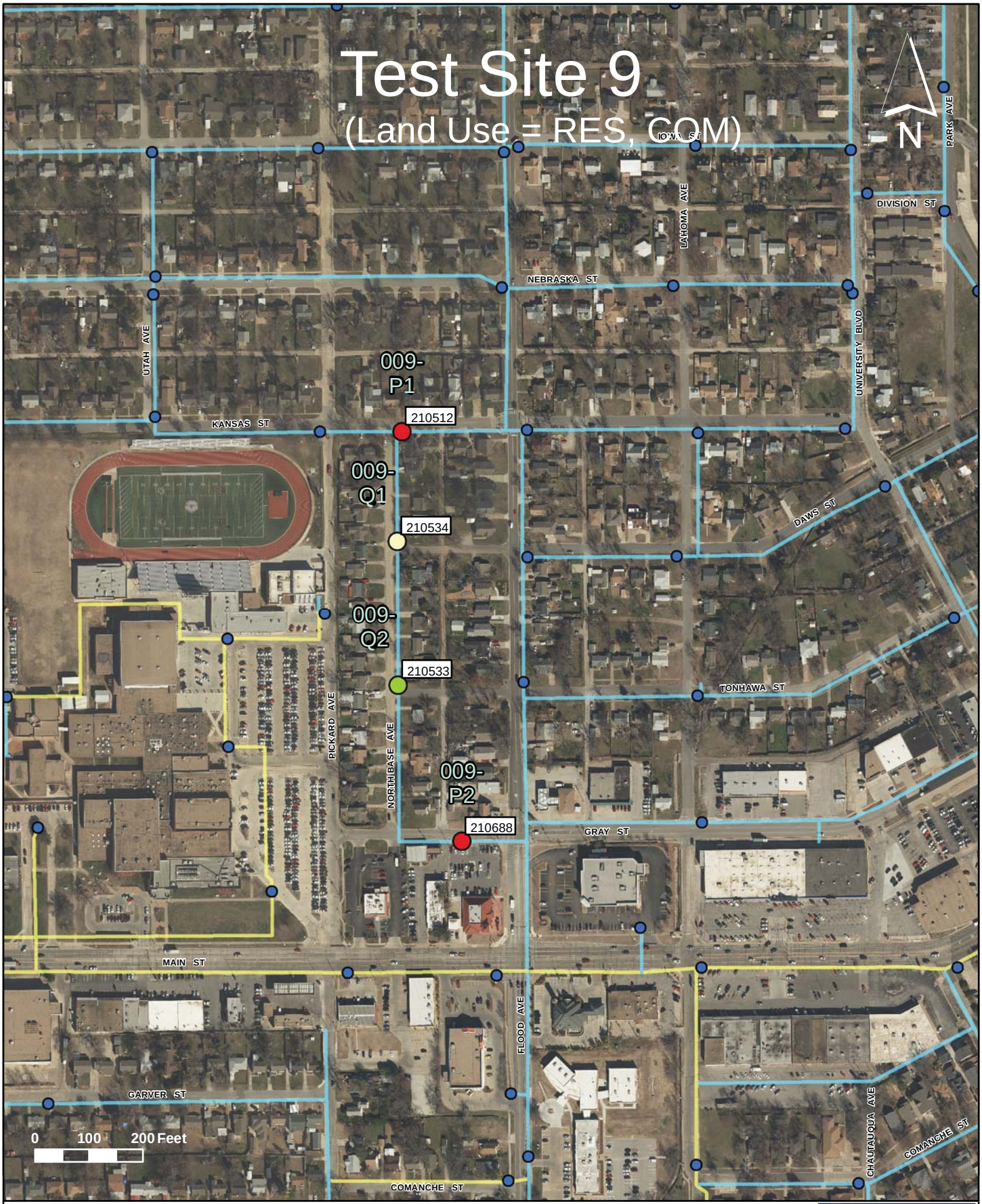
DATE: 2/13/2018



Norman Water Distribution Model Update
Hydrant Test Locations
Norman, OK

Hydrant Types
- Q1
- Q2
- P1
- P2

Hydrant
- Hydrant

Water Mains Diameter
- 1 - 6 inch
- 7 - 12 inch
- 13 - 24 inch
- 25 - 30 inch

- Storage Tank
- Upper Pressure Zone - Existing

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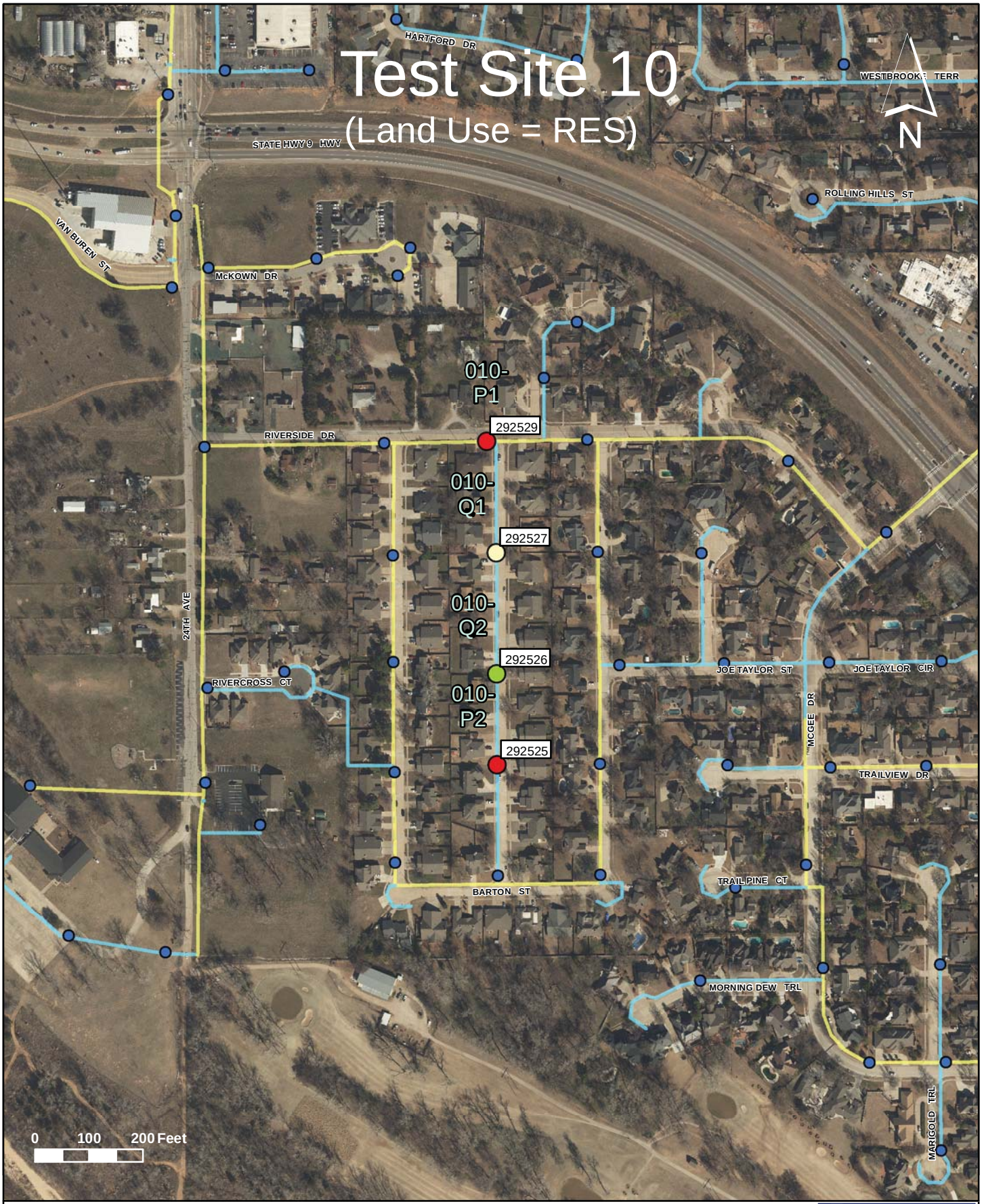
DATE: 2/13/2018



Norman Water Distribution Model Update
Hydrant Test Locations
Norman, OK

Hydrant Types
- Q1
- Q2
- P1
- P2

Hydrant
- Hydrant

Water Mains Diameter
- 1 - 6 inch
- 7 - 12 inch
- 13 - 24 inch
- 25 - 30 inch

- Storage Tank
- Upper Pressure Zone - Existing

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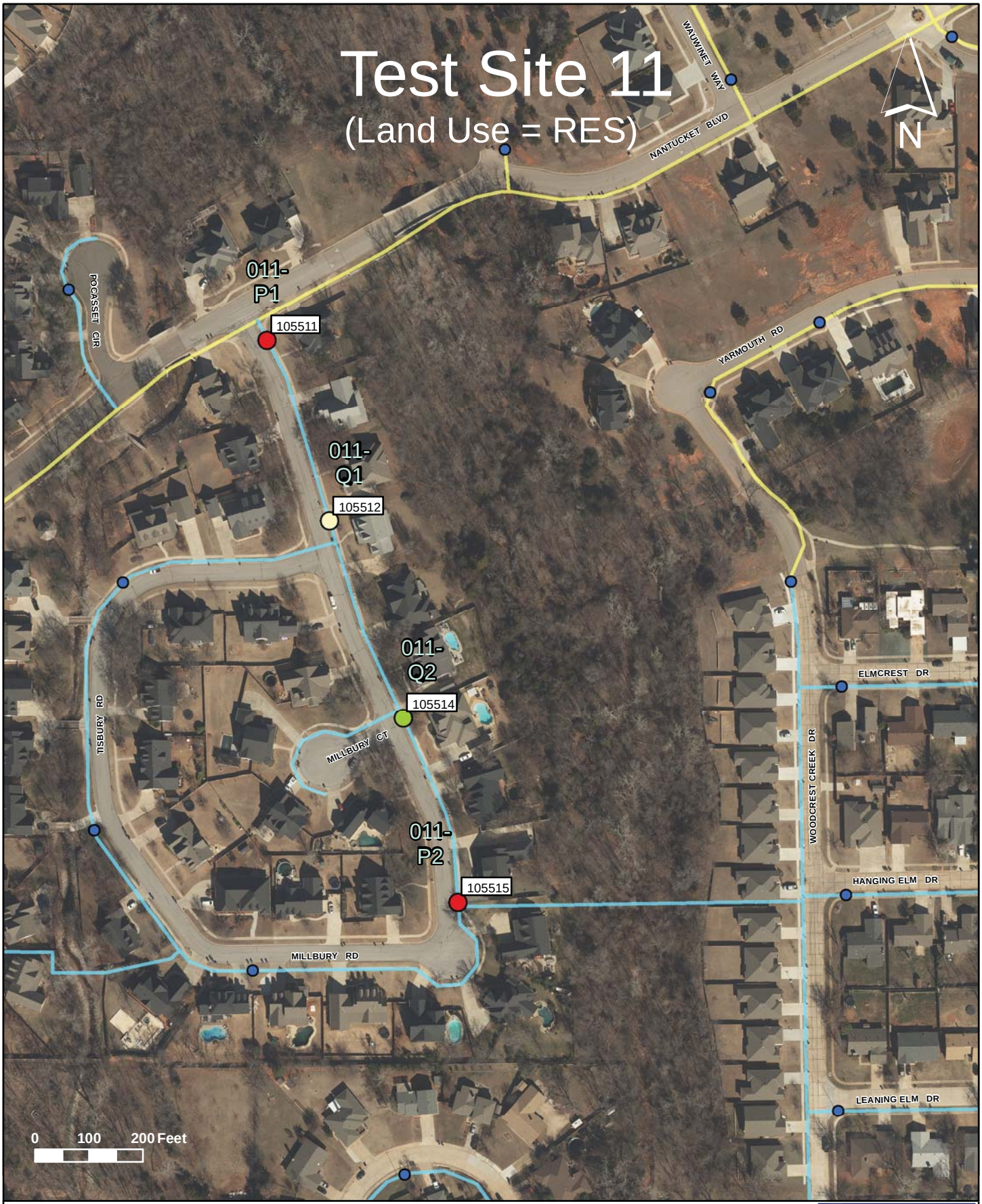
DATE: 2/13/2018



Norman Water Distribution Model Update
Hydrant Test Locations
Norman, OK

Hydrant Types
- Q1
- Q2
- P1
- P2

Hydrant
- Hydrant

Water Mains Diameter
- 1 - 6 inch
- 7 - 12 inch
- 13 - 24 inch
- 25 - 30 inch

- Storage Tank
- Upper Pressure Zone - Existing

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DATE: 2/13/2018

Norman Water Distribution Model Update
Hydrant Test Locations
Norman, OK

Hydrant Types
- Q1
- Q2
- P1
- P2

Hydrant
- Hydrant

Water Mains Diameter
- 1 - 6 inch
- 7 - 12 inch
- 13 - 24 inch
- 25 - 30 inch

- Storage Tank
- Upper Pressure Zone - Existing

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DATE: 2/13/2018

Norman Water Distribution Model Update
Hydrant Test Locations
Norman, OK

Hydrant Types
- Q1
- Q2
- P1
- P2

Hydrant
- Hydrant

Water Mains Diameter
- 1 - 6 inch
- 7 - 12 inch
- 13 - 24 inch
- 25 - 30 inch

- Storage Tank
- Upper Pressure Zone - Existing

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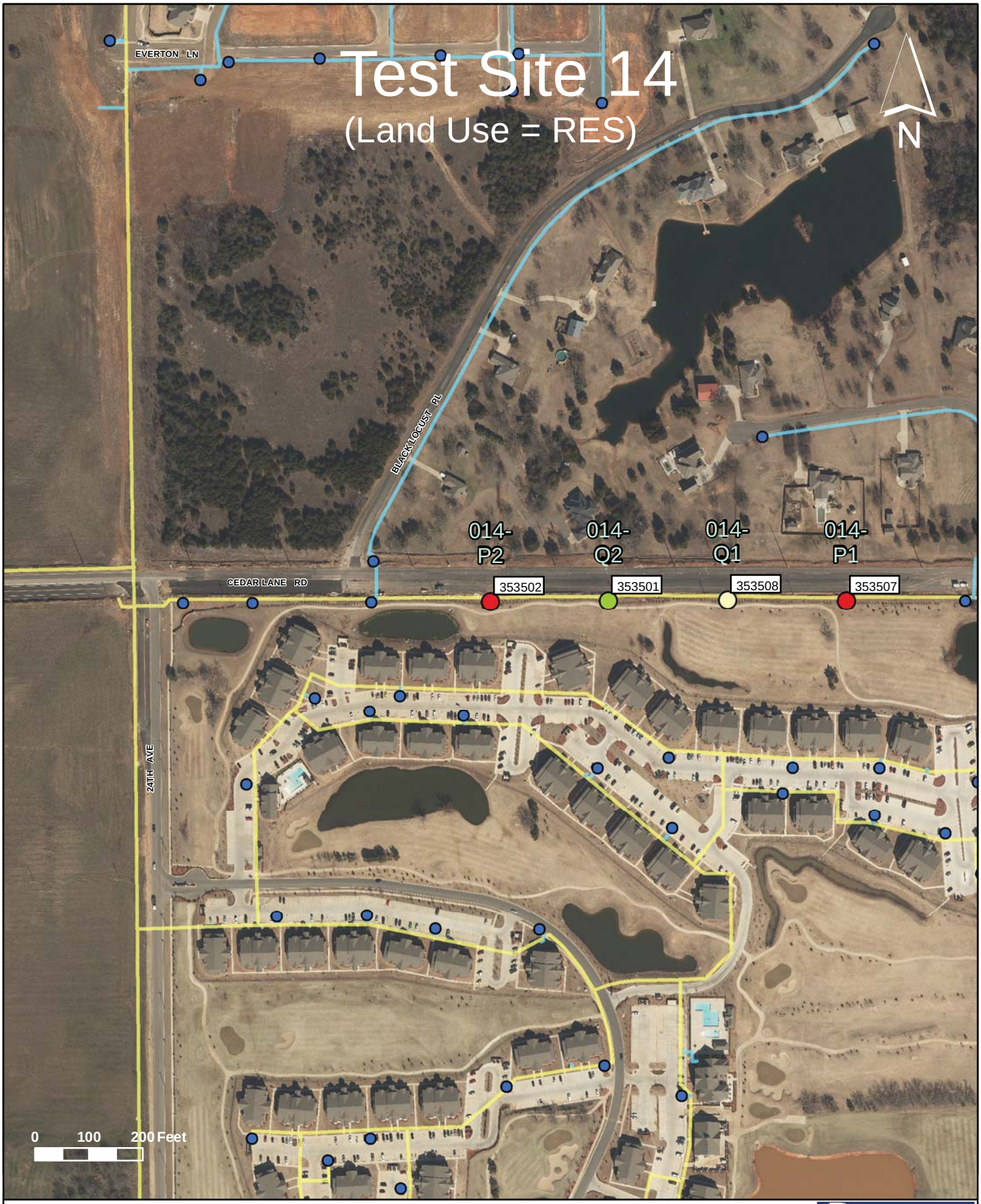
DATE: 2/13/2018



Norman Water Distribution Model Update
Hydrant Test Locations
Norman, OK

Hydrant Types
- Q1
- Q2
- P1
- P2

Hydrant
- Hydrant

Water Mains Diameter
- 1 - 6 inch
- 7 - 12 inch
- 13 - 24 inch
- 25 - 30 inch

- Storage Tank
- Upper Pressure Zone - Existing

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DATE: 2/13/2018

Norman Water Distribution Model Update
Hydrant Test Locations
Norman, OK

Hydrant Types
- Q1
- Q2
- P1
- P2

Hydrant
- Hydrant

Water Mains Diameter
- 1 - 6 inch
- 7 - 12 inch
- 13 - 24 inch
- 25 - 30 inch

- Storage Tank
- Upper Pressure Zone - Existing

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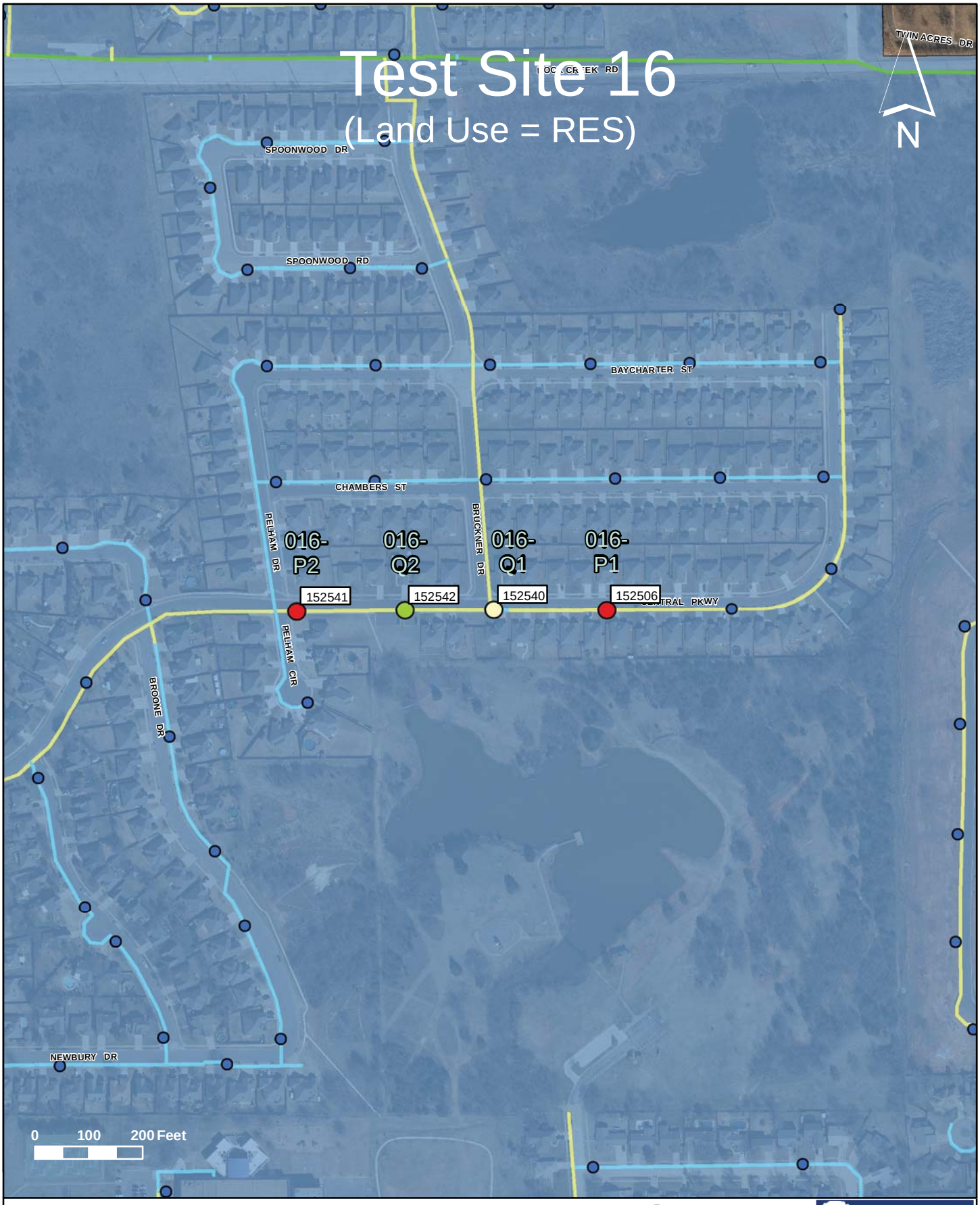
DATE: 2/13/2018



Norman Water Distribution Model Update
Hydrant Test Locations
Norman, OK

Hydrant Types
- Q1
- Q2
- P1
- P2

Hydrant
- Hydrant

Water Mains Diameter
- 1 - 6 inch
- 7 - 12 inch
- 13 - 24 inch
- 25 - 30 inch

- Storage Tank
- Upper Pressure Zone - Existing

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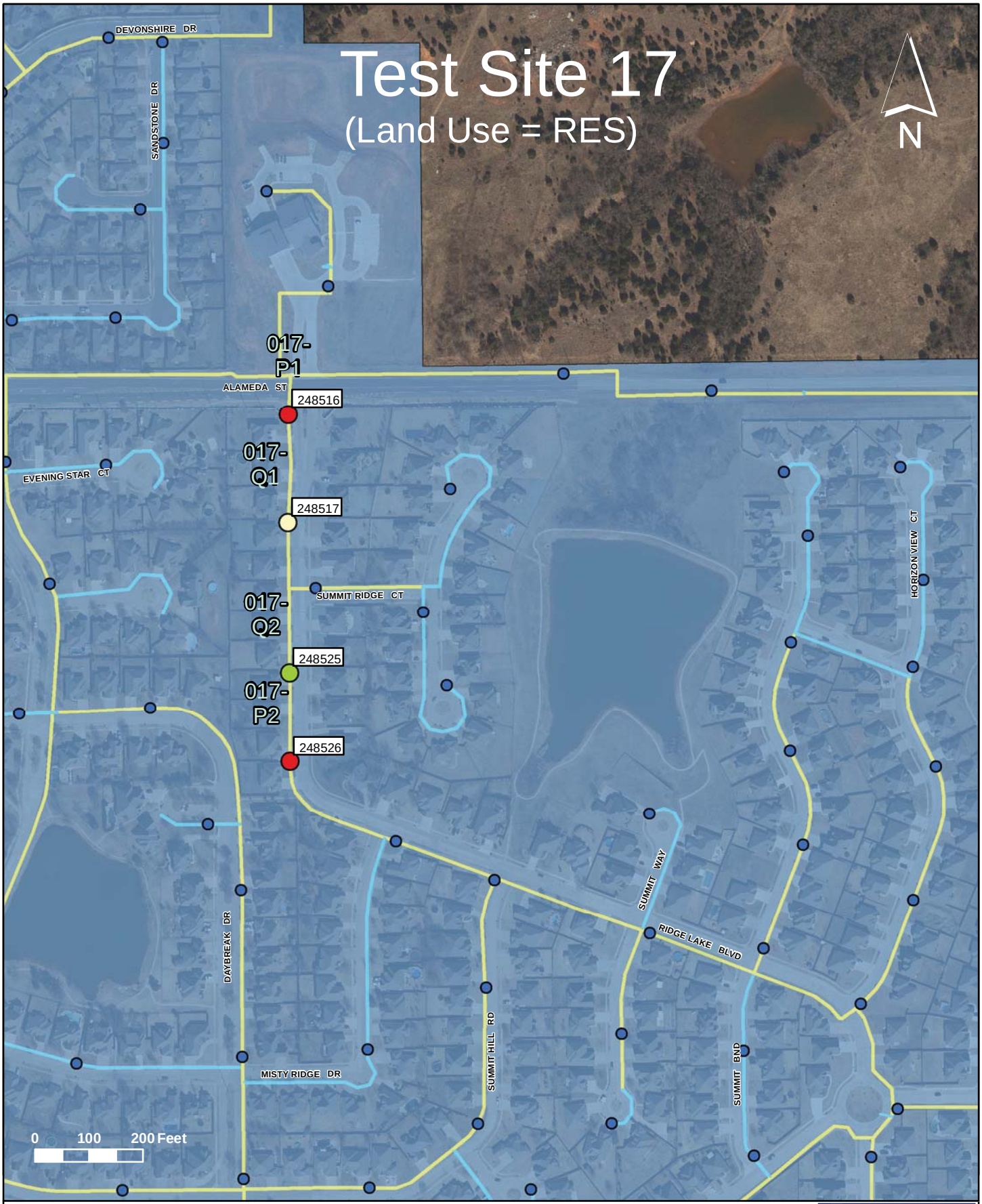
PATH: F:\projects\1115\004-01\2-0 Wrk Prod\2-9 GIS\MXD\Hydrant Tests - Mapbook1 v2.mxd

DATE: 2/13/2018



Norman Water Distribution Model Update
Hydrant Test Locations
Norman, OK

Hydrant Types
- Q1
- Q2
- P1
- P2

Hydrant
- Hydrant

Water Mains Diameter
- 1 - 6 inch
- 7 - 12 inch
- 13 - 24 inch
- 25 - 30 inch

- Storage Tank
- Upper Pressure Zone - Existing

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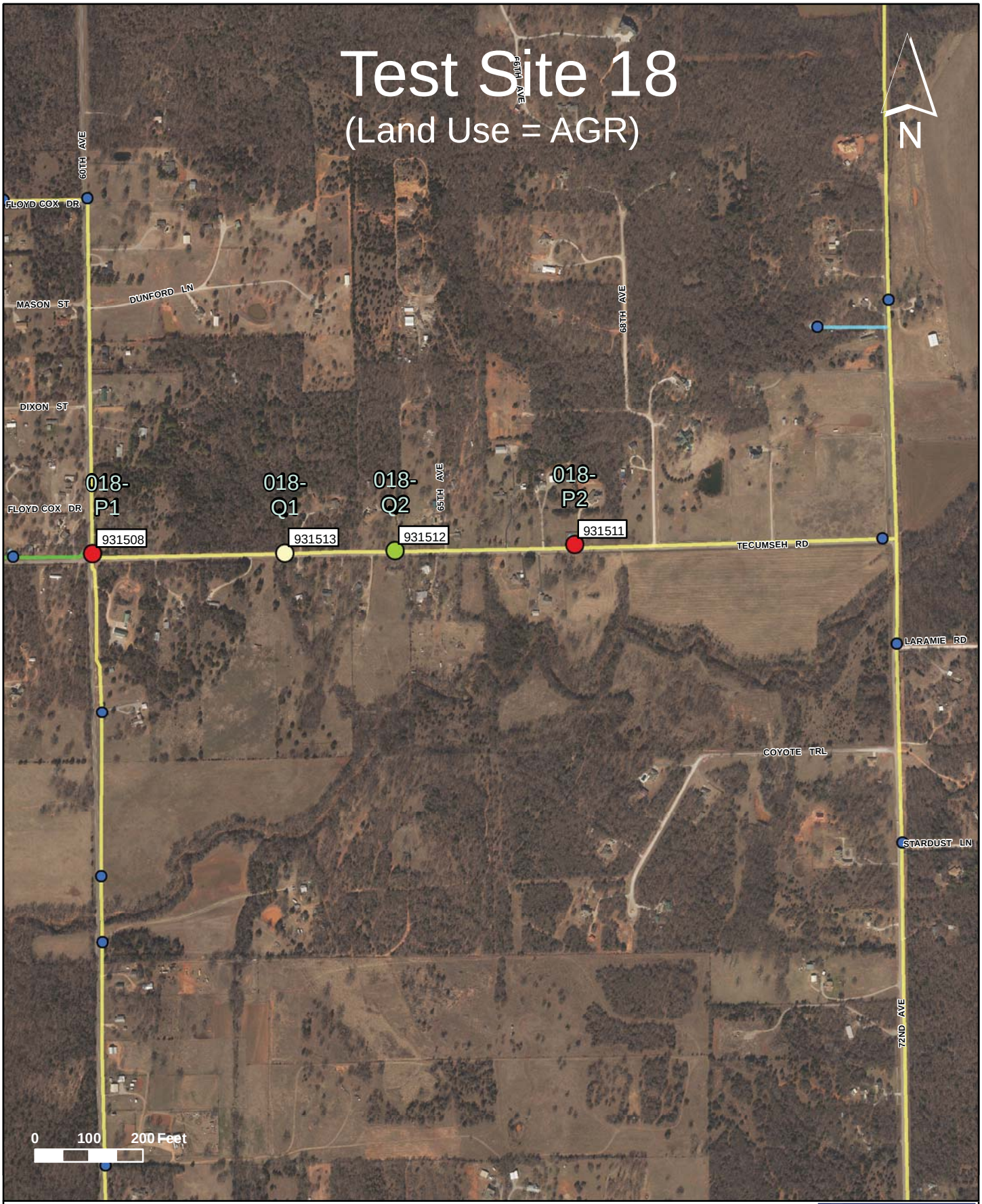
PATH: F:\projects\1115\004-01\2-0 Wrk Prod\2-9 GIS\MXD\Hydrant Tests - Mapbook1 v2.mxd

DATE: 2/13/2018



Norman Water Distribution Model Update
Hydrant Test Locations
Norman, OK

Hydrant Types: Q1, Q2, P1, P2

Hydrant: Hydrant

Water Mains Diameter: 1 - 6 inch; 7 - 12 inch; 13 - 24 inch; 25 - 30 inch

Storage Tank

Upper Pressure Zone - Existing

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PATH: F:\projects\1115\004-01\2-0 Wrk Prod\2-9 GIS\MXD\Hydrant Tests - Mapbook1 v2.mxd

DATE: 2/13/2018

Appendix F – Friction Factors used in Water Model

Friction Factors used in Model (Hazen-Williams C-Factors)

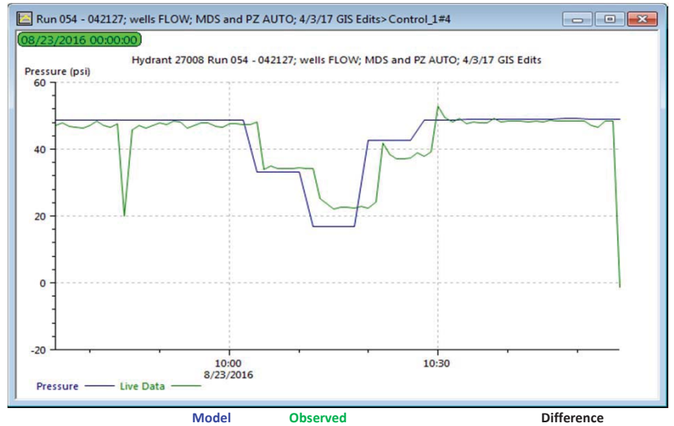
Pipe Material	Diameter (inches)														
	1	2	3	4	6	8	10	12	14	15	16	24	30	36	42
Asbestos Cement	-	-	-	142	145	145	147	147	-	-	-	-	-	-	-
Cast Iron	100	100	100	100	102	107	107	107	109	-	109	110	110	-	-
Concrete	-	-	-	-	-	-	120	120	120	120	120	120	120	-	-
Copper	140	140	-	-	149	-	-	-	-	-	-	-	-	-	-
Ductile Iron	130	130	130	130	133	133	133	138	138	-	138	140	140	-	140
Galvanized Pipe	120	120	-	-	120	-	-	-	-	-	-	-	-	-	-
High Density Polyethylene	150	150	-	-	150	150	150	150	150	-	150	150	150	-	-
Polyvinyl Chloride	134	134	142	142	145	145	147	147	147	147	147	150	150	-	150
Reinforced Concrete Pipe	-	-	-	-	120	-	-	-	-	-	-	120	-	-	-
Steel	-	120	-	120	-	-	-	-	-	-	-	-	-	-	-

Appendix G – Calibration Detailed Results

Test Site: 001

TEST TYPE	P1
NODE ID	27008

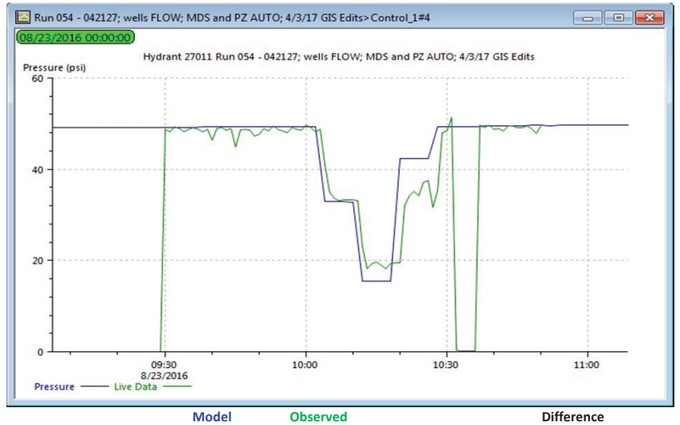
	Model	Observed	Diff (%; abs)
P AVG (psi)	43.9	43.5	1%
P MAX (psi)	49.2	52.9	-3.8
P MIN (psi)	16.7	22.3	-5.6



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	Difference (psi)
8/23/2016 9:24	48.55	47.9	1	0.65
8/23/2016 9:26	48.56	47.1	1	1.46
8/23/2016 9:28	48.57	43.9	1	4.67
8/23/2016 9:30	48.57	46.5	1	2.07
8/23/2016 9:32	48.58	47	1	1.58
8/23/2016 9:34	48.58	47.9	1	0.68
8/23/2016 9:36	48.59	46.6	1	1.99
8/23/2016 9:38	48.6	47.2	1	1.4
8/23/2016 9:40	48.61	47	1	1.61
8/23/2016 9:42	48.62	47.5	1	1.12
8/23/2016 9:44	48.62	45.9	1	2.72
8/23/2016 9:46	48.63	46.4	1	2.23
8/23/2016 9:48	48.63	47.8	1	0.83
8/23/2016 9:50	48.65	48.5	1	0.15
8/23/2016 9:52	48.65	46.4	1	2.25
8/23/2016 9:54	48.65	47.8	1	0.85
8/23/2016 9:56	48.66	46.9	1	1.76
8/23/2016 9:58	48.67	47.5	1	1.17
8/23/2016 10:00	48.67	47.4	1	1.27
8/23/2016 10:02	48.68	48.1	1	0.58
8/23/2016 10:04	33.13	35	1	-1.87
8/23/2016 10:06	33.12	34.3	1	-1.18
8/23/2016 10:08	33.1	34.6	1	-1.5
8/23/2016 10:10	33.06	34.3	1	-1.24
8/23/2016 10:12	16.8	23.7	1	-6.9
8/23/2016 10:14	16.77	22.6	1	-5.83
8/23/2016 10:16	16.76	22.3	1	-5.54
8/23/2016 10:18	16.71	22.3	1	-5.59
8/23/2016 10:20	42.45	41.9	1	0.55
8/23/2016 10:22	42.44	37.2	1	5.24
8/23/2016 10:24	42.45	37.3	1	5.15
8/23/2016 10:26	42.46	37.9	1	4.56
8/23/2016 10:28	48.64	52.9	1	-4.26
8/23/2016 10:30	48.69	48.2	1	0.49
8/23/2016 10:32	48.7	47.5	1	1.2
8/23/2016 10:34	48.73	47.9	1	0.83
8/23/2016 10:36	48.74	49.3	1	-0.56
8/23/2016 10:38	48.77	48.4	1	0.37
8/23/2016 10:40	48.8	48.3	1	0.5
8/23/2016 10:42	48.82	48.3	1	0.52
8/23/2016 10:44	48.84	48.6	1	0.24
8/23/2016 10:46	48.87	48.3	1	0.57
8/23/2016 10:48	49.08	48.3	1	0.78
8/23/2016 10:50	49.1	47.1	1	2
8/23/2016 10:52	49.15	48.3	1	0.85

TEST TYPE	P2
NODE ID	27011

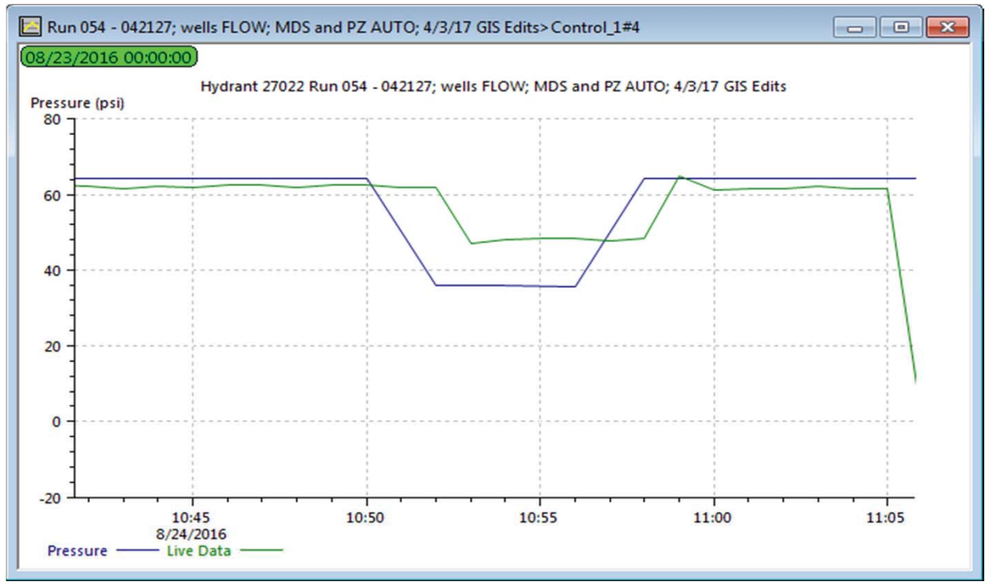
	Model	Observed	Diff (%; abs)
P AVG (psi)	43.2	42.1	3%
P MAX (psi)	49.7	49.7	-0.1
P MIN (psi)	15.3	19.0	-3.7



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	Difference (psi)
8/23/2016 9:24	49.12			
8/23/2016 9:26	49.12			
8/23/2016 9:28	49.14	48.7	1	0.44
8/23/2016 9:30	49.14	49.4	1	-0.26
8/23/2016 9:32	49.15	48.3	1	0.85
8/23/2016 9:34	49.15	49.2	1	-0.05
8/23/2016 9:36	49.15	48.2	1	0.95
8/23/2016 9:38	49.16	46.3	1	2.86
8/23/2016 9:40	49.17	49.1	1	0.07
8/23/2016 9:42	49.18	49	1	0.18
8/23/2016 9:44	49.18	48.6	1	0.58
8/23/2016 9:46	49.2	48.5	1	0.7
8/23/2016 9:48	49.2	47.7	1	1.5
8/23/2016 9:50	49.22	48.4	1	0.82
8/23/2016 9:52	49.21	48.8	1	0.41
8/23/2016 9:54	49.22	48	1	1.22
8/23/2016 9:56	49.23	48.7	1	0.53
8/23/2016 9:58	49.24	49.7	1	-0.46
8/23/2016 10:00	49.24	48.3	1	0.94
8/23/2016 10:02	49.25	41	1	8.25
8/23/2016 10:04	32.81	33.7	1	-0.89
8/23/2016 10:06	32.81	33.4	1	-0.59
8/23/2016 10:08	32.78	33.4	1	-0.62
8/23/2016 10:10	32.74	23	1	9.74
8/23/2016 10:12	15.36	19.3	1	-3.94
8/23/2016 10:14	15.33	19	1	-3.67
8/23/2016 10:16	15.32	19.3	1	-3.98
8/23/2016 10:18	15.28	19.5	1	-4.22
8/23/2016 10:20	42.24	34.2	1	8.04
8/23/2016 10:22	42.23	34.3	1	7.93
8/23/2016 10:24	42.24	37.5	1	4.74
8/23/2016 10:26	42.25	35.3	1	6.95
8/23/2016 10:28	49.21	48.4	1	0.81
8/23/2016 10:30	49.26	0.3		
8/23/2016 10:32	49.27	0.2		
8/23/2016 10:34	49.3	0.2		
8/23/2016 10:36	49.31	49.2	1	0.11
8/23/2016 10:38	49.34	48.7	1	0.64
8/23/2016 10:40	49.37	48.4	1	0.97
8/23/2016 10:42	49.38	49.6	1	-0.22
8/23/2016 10:44	49.4	49.1	1	0.3
8/23/2016 10:46	49.44	49	1	0.44
8/23/2016 10:48	49.65	49.6	1	0.05
8/23/2016 10:50	49.67			
8/23/2016 10:52	49.72			

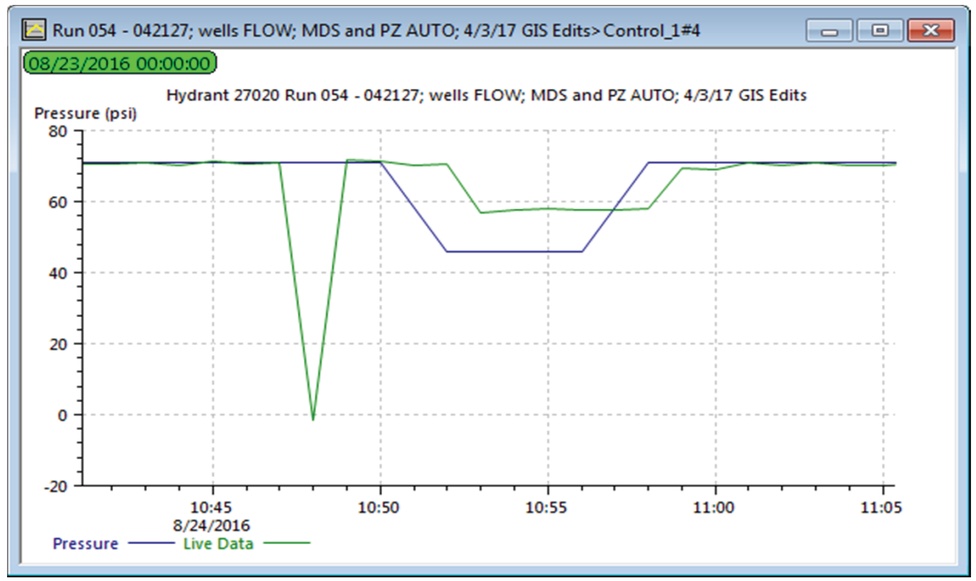
Test Site: 002

			Model	Observed	Diff (%; abs)
TEST TYPE	P1	P AVG (psi)	58.5	59.1	-1%
NODE ID	27022	P MAX (psi)	64.2	62.6	1.6
		P MIN (psi)	35.8	48.0	-12.2



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter		10:30 11:05
8/24/2016 10:20	64.16	0			
8/24/2016 10:22	64.17	-0.3			
8/24/2016 10:24	64.17	-0.3			
8/24/2016 10:26	64.17	-0.3			
8/24/2016 10:28	64.18	-0.3			
8/24/2016 10:30	64.19	-0.3			
8/24/2016 10:32	64.19	-0.3			
8/24/2016 10:34	64.2	60	1	4.2	
8/24/2016 10:36	64.2	62.2	1	2	
8/24/2016 10:38	64.2	62.1	1	2.1	
8/24/2016 10:40	64.21	62.3	1	1.91	
8/24/2016 10:42	64.21	62.2	1	2.01	
8/24/2016 10:44	64.22	62.4	1	1.82	
8/24/2016 10:46	64.22	62	1	2.22	
8/24/2016 10:48	64.22	62.6	1	1.62	
8/24/2016 10:50	64.23	61.8	1	2.43	
8/24/2016 10:52	35.88	48	1	-12.12	
8/24/2016 10:54	35.83	48.3	1	-12.47	
8/24/2016 10:56	35.8	48.6	1	-12.8	
8/24/2016 10:58	64.14	61.1	1	3.04	
8/24/2016 11:00	64.14	61.7	1	2.44	
8/24/2016 11:02	64.15	61.7	1	2.45	

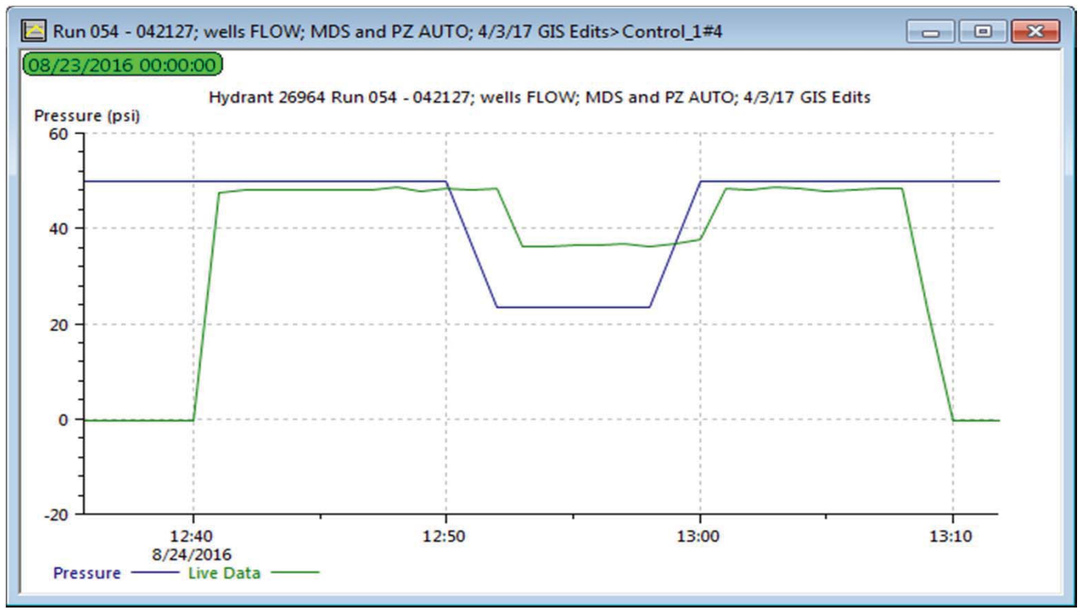
			Model	Observed	Diff (%; abs
TEST TYPE	P2	P AVG (psi)	66.5	68.0	-2%
NODE ID	27020	P MAX (psi)	71.0	71.2	-0.2
		P MIN (psi)	45.6	57.7	-12.1



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter		
8/24/2016 10:20	70.95	0			
8/24/2016 10:22	70.95	-0.1			
8/24/2016 10:24	70.96	-0.1			
8/24/2016 10:26	70.96	-0.1			
8/24/2016 10:28	70.97	70.3	1	0.67	
8/24/2016 10:30	70.97	69.5	1	1.47	
8/24/2016 10:32	70.98	70.8	1	0.18	
8/24/2016 10:34	70.98	68.9	1	2.08	
8/24/2016 10:36	70.99	69.4	1	1.59	
8/24/2016 10:38	70.99	70.5	1	0.49	
8/24/2016 10:40	70.99	70.7	1	0.29	
8/24/2016 10:42	71	70.2	1	0.8	
8/24/2016 10:44	71	70.7	1	0.3	
8/24/2016 10:46	71.01	-1.7			anomaly
8/24/2016 10:48	71.01	71.2	1	-0.19	
8/24/2016 10:50	71.02	70.7	1	0.32	
8/24/2016 10:52	45.7	57.8	1	-12.1	
8/24/2016 10:54	45.66	57.7	1	-12.04	
8/24/2016 10:56	45.63	57.9	1	-12.27	
8/24/2016 10:58	70.92	68.9	1	2.02	
8/24/2016 11:00	70.93	70	1	0.93	
8/24/2016 11:02	70.93	70.2	1	0.73	

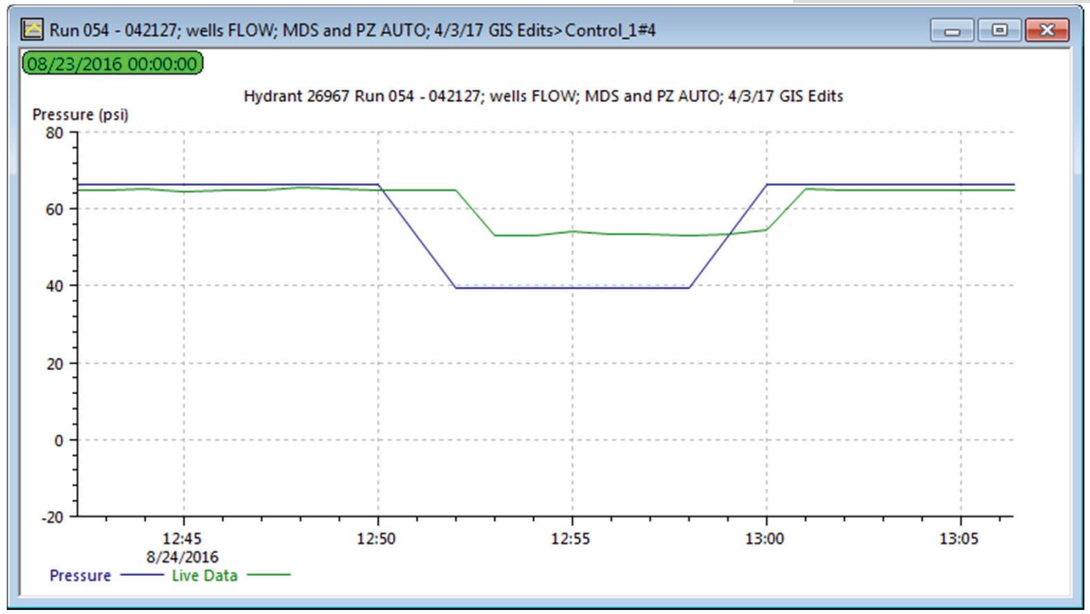
Test Site: 003

			Model	Observed	Diff (%; abs)
TEST TYPE	P1	P AVG (psi)	42.4	45.0	-6%
NODE ID	26964	P MAX (psi)	49.8	48.8	1.0
		P MIN (psi)	23.9	36.1	-12.2



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	24-Aug	12:35
					13:10
8/24/2016 12:34	49.77	-0.4			
8/24/2016 12:36	49.77	-0.4			
8/24/2016 12:38	49.78	-0.4			
8/24/2016 12:40	49.78	48.2	1	1.58	
8/24/2016 12:42	49.79	48	1	1.79	
8/24/2016 12:44	49.79	48	1	1.79	
8/24/2016 12:46	49.8	48.8	1	1	
8/24/2016 12:48	49.8	48.4	1	1.4	
8/24/2016 12:50	49.8	48.4	1	1.4	
8/24/2016 12:52	23.92	36.3	1	-12.38	
8/24/2016 12:54	23.91	36.4	1	-12.49	
8/24/2016 12:56	23.89	36.1	1	-12.21	
8/24/2016 12:58	23.89	37.7	1	-13.81	
8/24/2016 13:00	49.72	48.2	1	1.52	
8/24/2016 13:02	49.73	48.3	1	1.43	
8/24/2016 13:04	49.73	48.2	1	1.53	
8/24/2016 13:06	49.74	48.4	1	1.34	

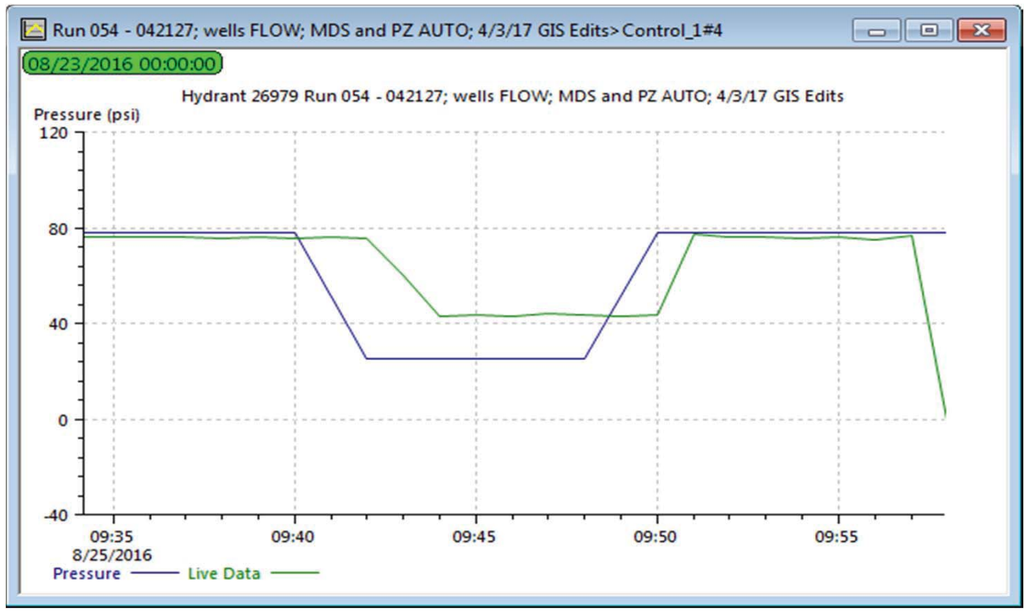
			Model	Observed	Diff (%; abs
TEST TYPE	P2	P AVG (psi)	60.1	62.3	-4%
NODE ID	26967	P MAX (psi)	66.3	65.5	1
		P MIN (psi)	40.3	53.1	-13



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	24-Aug	12:45
					13:05
8/24/2016 12:34	66.22	64.7	1	1.52	
8/24/2016 12:36	66.23	65.1	1	1.13	
8/24/2016 12:38	66.24	65.2	1	1.04	
8/24/2016 12:40	66.24	65	1	1.24	
8/24/2016 12:42	66.25	65.3	1	0.95	
8/24/2016 12:44	66.25	64.9	1	1.35	
8/24/2016 12:46	66.26	65.5	1	0.76	
8/24/2016 12:48	66.26	64.8	1	1.46	
8/24/2016 12:50	66.26	64.7	1	1.56	
8/24/2016 12:52	40.3	53.1	1	-12.8	
8/24/2016 12:54	40.28	53.4	1	-13.12	
8/24/2016 12:56	40.26	53.2	1	-12.94	
8/24/2016 12:58	40.26	54.5	1	-14.24	
8/24/2016 13:00	66.18	64.8	1	1.38	
8/24/2016 13:02	66.18	64.9	1	1.28	
8/24/2016 13:04	66.19	65	1	1.19	
8/24/2016 13:06	66.2	65.4	1	0.8	

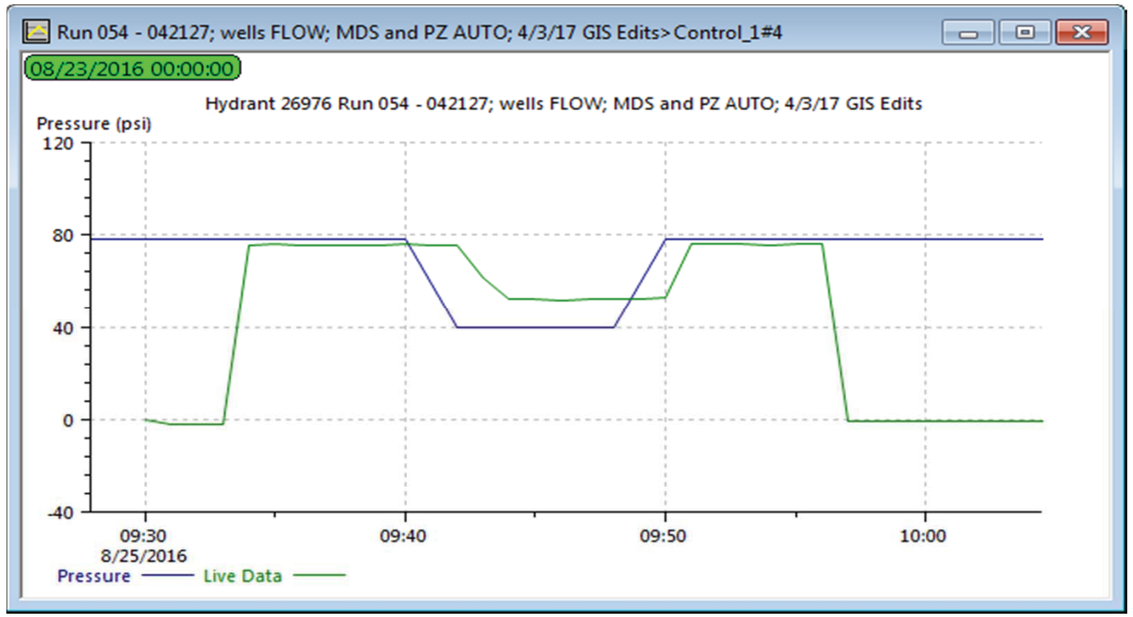
Test Site: 004

			Model	Observed	Diff (%; abs)
TEST TYPE	P1	P AVG (psi)	61.7	65.7	-6%
NODE ID	26979	P MAX (psi)	78.1	76.2	2
		P MIN (psi)	24.9	42.8	-18



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter		25-Aug	9:35
						9:55
8/25/2016 9:30	78.08	75.5	1	2.58		
8/25/2016 9:32	78.09	76.2	1	1.89		
8/25/2016 9:34	78.09	76.1	1	1.99		
8/25/2016 9:36	78.09	75.6	1	2.49		
8/25/2016 9:38	78.09	75.5	1	2.59		
8/25/2016 9:40	78.1	75.6	1	2.5		
8/25/2016 9:42	24.92	42.8	1	-17.88		
8/25/2016 9:44	25.12	43.1	1	-17.98		
8/25/2016 9:46	25.09	43.3	1	-18.21		
8/25/2016 9:48	25.05	43.5	1	-18.45		
8/25/2016 9:50	77.96	76.2	1	1.76		
8/25/2016 9:52	77.97	75.8	1	2.17		
8/25/2016 9:54	77.97	75.1	1	2.87		

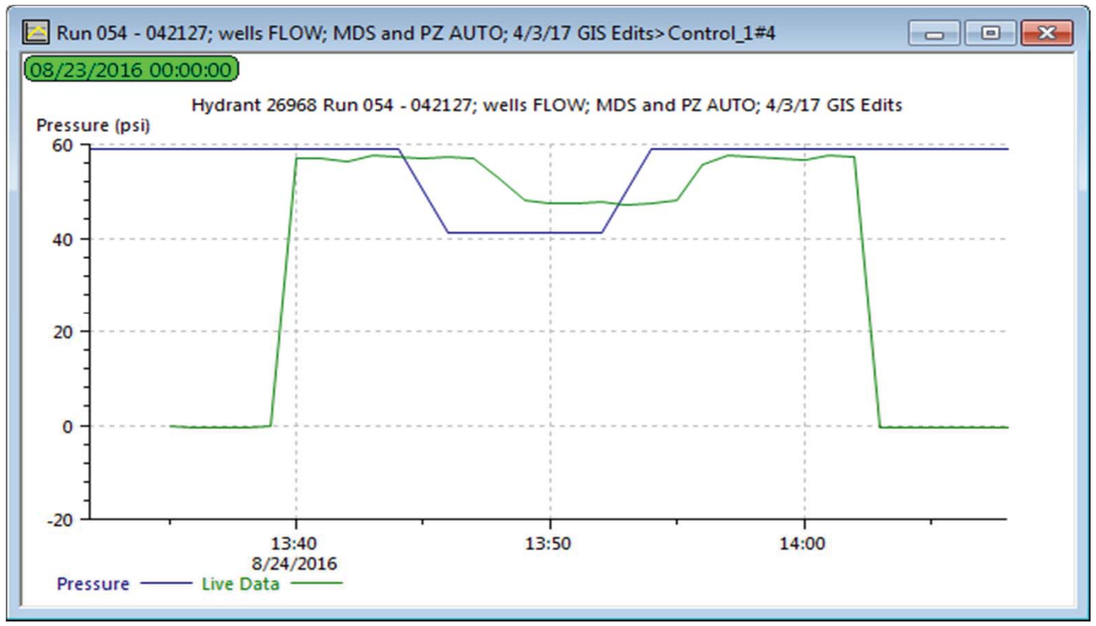
			Model	Observed	Diff (%; abs
TEST TYPE	P2	P AVG (psi)	65.5	68.0	-4%
NODE ID	26976	P MAX (psi)	78.5	76.5	2
		P MIN (psi)	39.7	51.9	-12



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter		25-Aug
8/25/2016 9:30	78.45	-2			
8/25/2016 9:32	78.46	75.8	1	2.66	
8/25/2016 9:34	78.46	75.3	1	3.16	
8/25/2016 9:36	78.46	75.5	1	2.96	
8/25/2016 9:38	78.47	76.3	1	2.17	
8/25/2016 9:40	78.47	75.5	1	2.97	
8/25/2016 9:42	39.66	52.3	1	-12.64	
8/25/2016 9:44	39.76	51.9	1	-12.14	
8/25/2016 9:46	39.74	52.3	1	-12.56	
8/25/2016 9:48	39.7	53.1	1	-13.4	
8/25/2016 9:50	78.33	76.2	1	2.13	
8/25/2016 9:52	78.34	75.3	1	3.04	
8/25/2016 9:54	78.34	76.5	1	1.84	

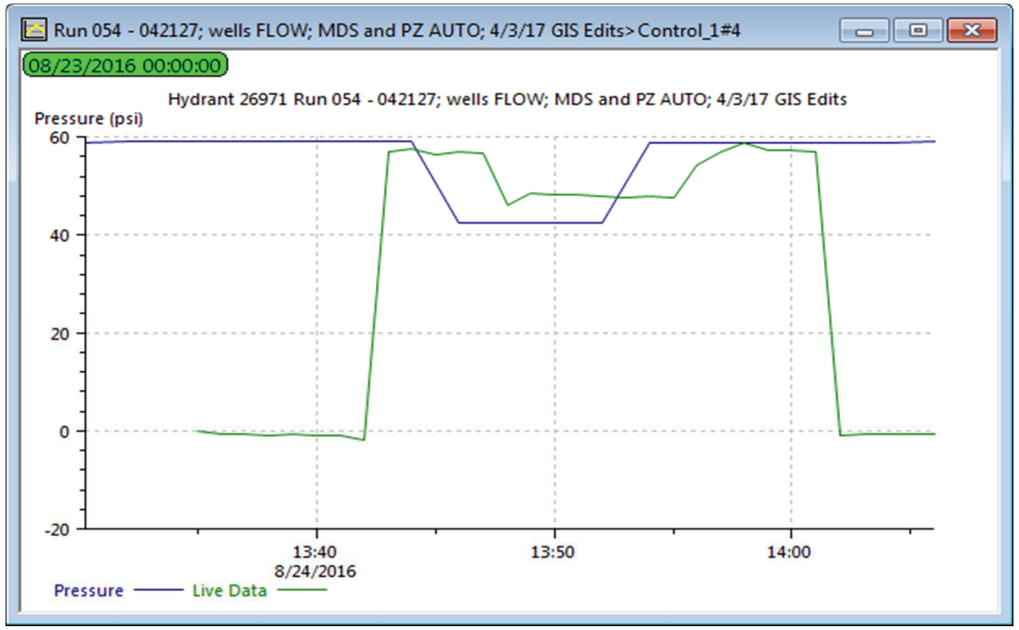
Test Site: 005

			Model	Observed	Diff (%; abs)
TEST TYPE	P1	P AVG (psi)	53.0	54.2	-2%
NODE ID	26968	P MAX (psi)	59.0	57.5	1.5
		P MIN (psi)	41.1	47.5	-6.4



	Model	Observed			24-Aug	13:45
Date/Time	Pressure (psi)	Observed Pressure (psi)	filter			14:00
8/24/2016 13:38	59	56.9	1	2.1		
8/24/2016 13:40	59	56.5	1	2.5		
8/24/2016 13:42	59.01	57.4	1	1.61		
8/24/2016 13:44	59.01	57.3	1	1.71		
8/24/2016 13:46	41.15	52.6	1	-11.45		
8/24/2016 13:48	41.12	47.6	1	-6.48		
8/24/2016 13:50	41.1	47.9	1	-6.8		
8/24/2016 13:52	41.07	47.5	1	-6.43		
8/24/2016 13:54	58.93	55.6	1	3.33		
8/24/2016 13:56	58.94	57.5	1	1.44		
8/24/2016 13:58	58.94	56.6	1	2.34		
8/24/2016 14:00	58.95	57.4	1	1.55		

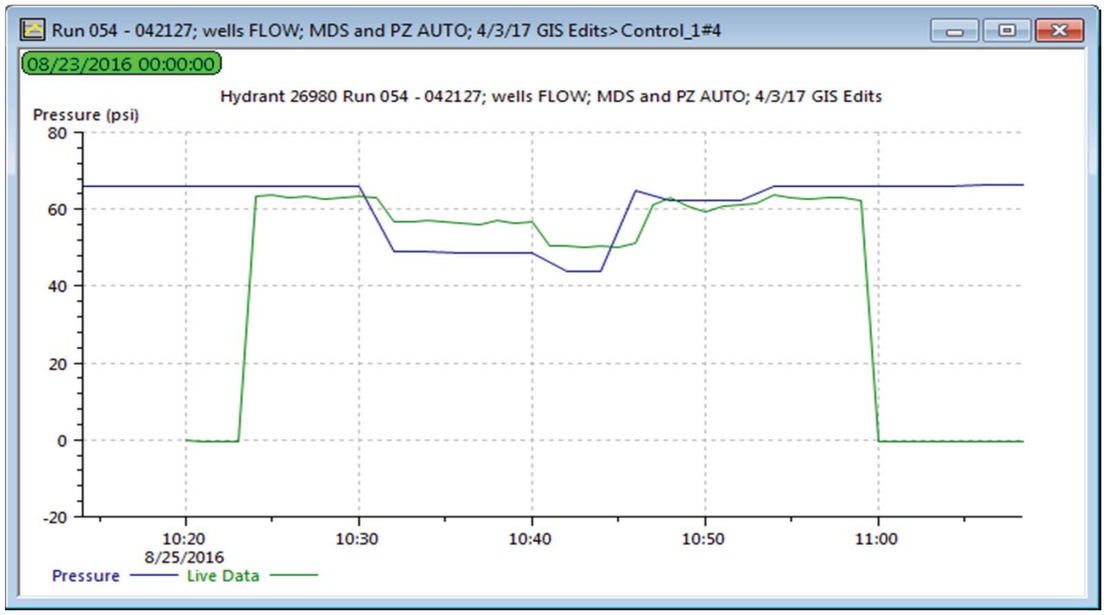
			Model	Observed	Diff (%; abs)
TEST TYPE	P2	P AVG (psi)	51.5	52.8	-2%
NODE ID	26971	P MAX (psi)	58.8	58.7	0.1
		P MIN (psi)	42.3	46.1	-3.8



	Model	Observed		
Date/Time	Pressure (psi)	Observed Pressure (psi)	filter	
8/24/2016 13:38	58.81	-0.9		
8/24/2016 13:40	58.82	-1.9		
8/24/2016 13:42	58.82	57.7	1	1.12
8/24/2016 13:44	58.83	56.9	1	1.93
8/24/2016 13:46	42.39	46.1	1	-3.71
8/24/2016 13:48	42.36	48.1	1	-5.74
8/24/2016 13:50	42.33	48	1	-5.67
8/24/2016 13:52	42.31	47.8	1	-5.49
8/24/2016 13:54	58.74	54.3	1	4.44
8/24/2016 13:56	58.75	58.7	1	0.05
8/24/2016 13:58	58.76	57.2	1	1.56
8/24/2016 14:00	58.76	-0.9		

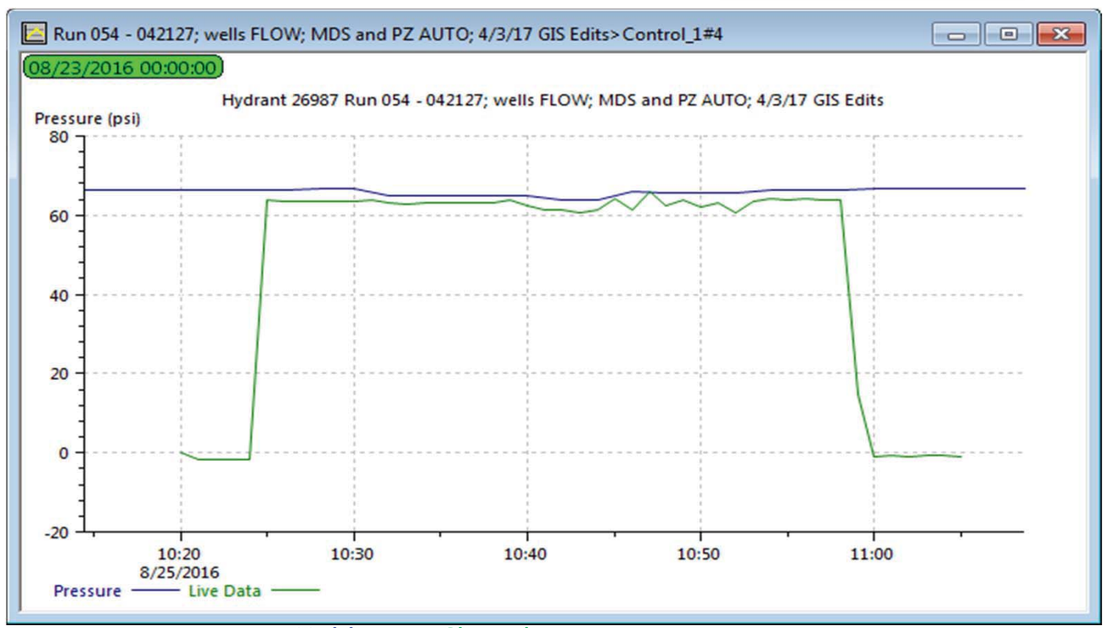
Test Site: 006

			Model	Observed	Diff (%; abs)
TEST TYPE	P1	P AVG (psi)	58.1	59.0	-1%
NODE ID	26980	P MAX (psi)	66.1	63.9	2.2
		P MIN (psi)	43.7	50.4	-6.7



	Model	Observed			25-Aug	10:25
Date/Time	Pressure (psi)	Observed Pressure (psi)	filter			10:55
8/25/2016 10:22	66.03	63.3	1	2.73		
8/25/2016 10:24	66.06	63.1	1	2.96		
8/25/2016 10:26	66.09	62.8	1	3.29		
8/25/2016 10:28	66.11	63.3	1	2.81		
8/25/2016 10:30	66.13	56.6	1	9.53		
8/25/2016 10:32	48.85	57	1	-8.15		
8/25/2016 10:34	48.83	56.4	1	-7.57		
8/25/2016 10:36	48.81	57	1	-8.19		
8/25/2016 10:38	48.79	56.7	1	-7.91		
8/25/2016 10:40	48.77	50.5	1	-1.73		
8/25/2016 10:42	43.77	50.4	1	-6.63		
8/25/2016 10:44	43.74	51.3	1	-7.56		
8/25/2016 10:46	64.92	63	1	1.92		
8/25/2016 10:48	62.22	59.3	1	2.92		
8/25/2016 10:50	62.25	61	1	1.25		
8/25/2016 10:52	62.25	63.9	1	-1.65		
8/25/2016 10:54	66.02	62.6	1	3.42		
8/25/2016 10:56	66.05	62.9	1	3.15		

			Model	Observed	Diff (%; abs)
TEST TYPE	P2	P AVG (psi)	65.6	62.8	4%
NODE ID	26987	P MAX (psi)	66.6	64.2	2.4
		P MIN (psi)	63.8	60.7	3.1

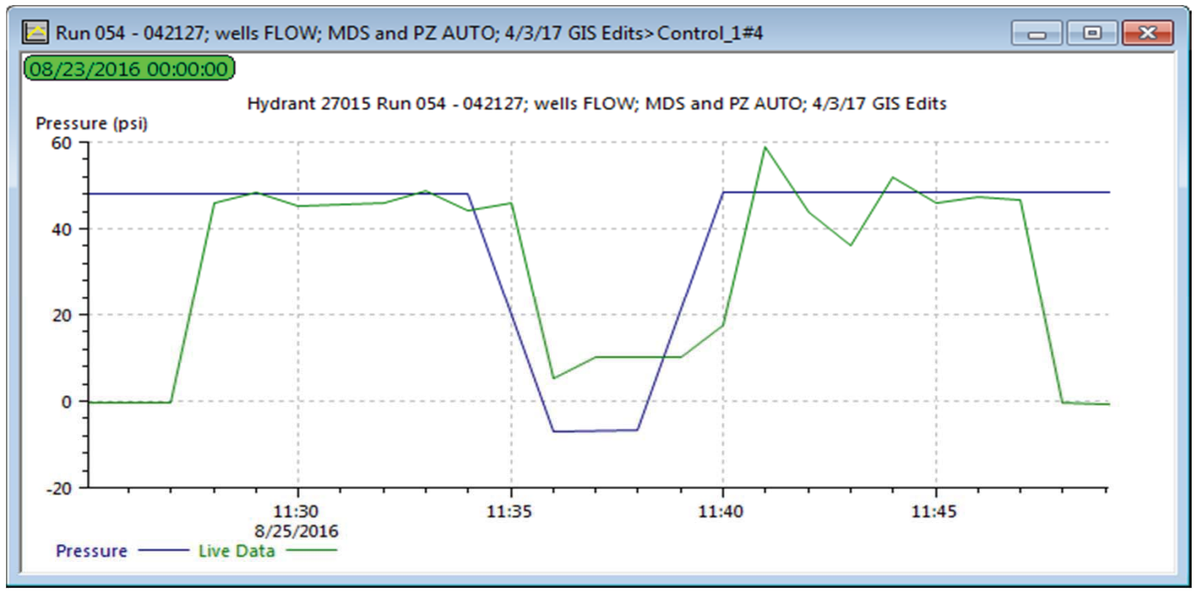


	Model	Observed		
Date/Time	Pressure (psi)	Observed Pressure (psi)	filter	
8/25/2016 10:22	66.5	-1.7		
8/25/2016 10:24	66.53	63.6	1	2.93
8/25/2016 10:26	66.56	63.5	1	3.06
8/25/2016 10:28	66.58	63.6	1	2.98
8/25/2016 10:30	66.6	63	1	3.6
8/25/2016 10:32	65.03	63.3	1	1.73
8/25/2016 10:34	65	63.1	1	1.9
8/25/2016 10:36	64.99	63.2	1	1.79
8/25/2016 10:38	64.96	62.5	1	2.46
8/25/2016 10:40	64.94	61.5	1	3.44
8/25/2016 10:42	63.87	61.4	1	2.47
8/25/2016 10:44	63.83	61.5	1	2.33
8/25/2016 10:46	66.07	62.3	1	3.77
8/25/2016 10:48	65.52	61.9	1	3.62
8/25/2016 10:50	65.52	60.7	1	4.82
8/25/2016 10:52	65.52	64.2	1	1.32
8/25/2016 10:54	66.48	64.2	1	2.28
8/25/2016 10:56	66.51	64	1	2.51

Test Site: 007

TEST TYPE	P1
NODE ID	27015

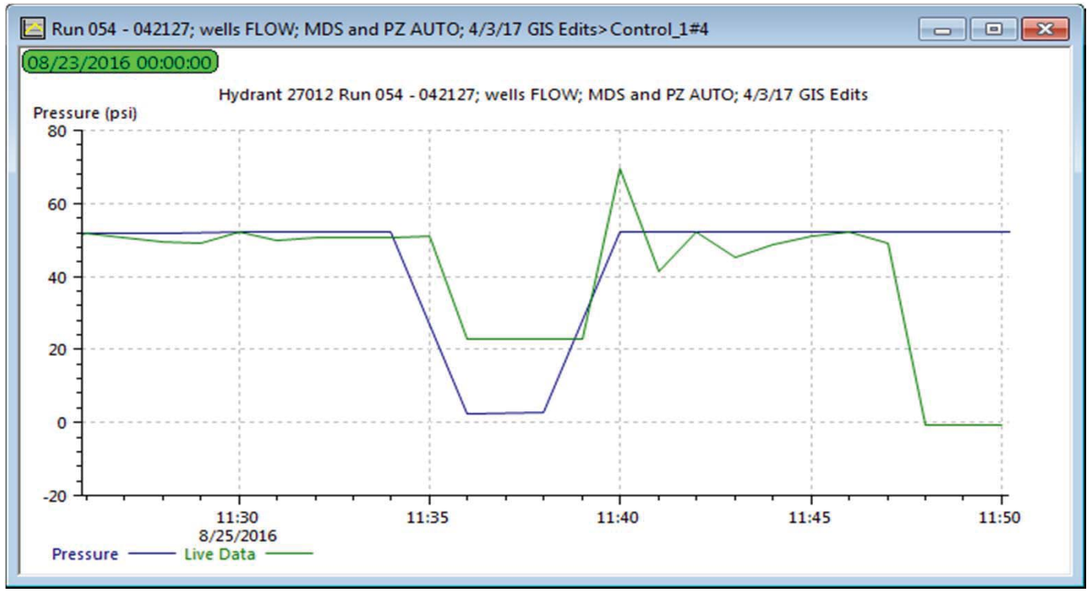
	Model	Observed	Diff (%; abs)
P AVG (psi)	37.2	35.8	4%
P MAX (psi)	48.3	52.1	-3.8
P MIN (psi)	-6.8	5.1	-11.9



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/25/2016 11:24	48.11	-0.5		
8/25/2016 11:26	48.12	-0.5		
8/25/2016 11:28	48.14	46	1	2.14
8/25/2016 11:30	48.16	45.1	1	3.06
8/25/2016 11:32	48.17	45.9	1	2.27
8/25/2016 11:34	48.19	44.3	1	3.89
8/25/2016 11:36	-6.84	5.1	1	-11.94
8/25/2016 11:38	-6.84	10.1	1	-16.94
8/25/2016 11:40	48.22	17.7	1	30.52
8/25/2016 11:42	48.24	43.7	1	4.54
8/25/2016 11:44	48.26	52.1	1	-3.84
8/25/2016 11:46	48.27	47.5	1	0.77

TEST TYPE	P2
NODE ID	27012

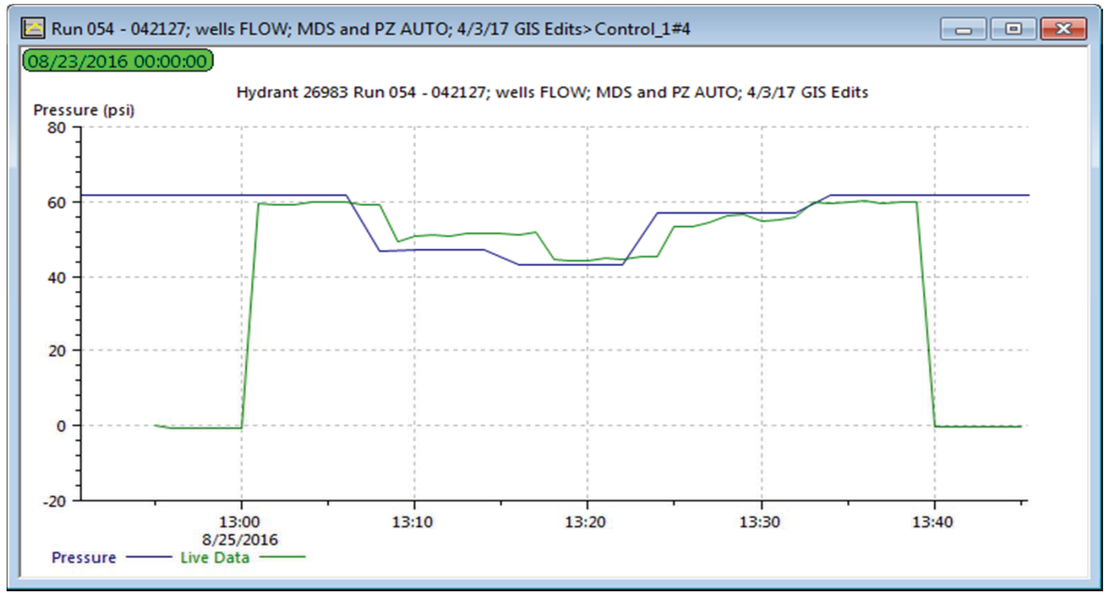
	Model	Observed	Diff (%; abs)
P AVG (psi)	43.8	47.8	-9%
P MAX (psi)	52.1	69.6	-17.5
P MIN (psi)	2.7	22.7	-20.0



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/25/2016 11:24	51.91	50.6	1	1.31
8/25/2016 11:26	51.93	51.8	1	0.13
8/25/2016 11:28	51.95	49.6	1	2.35
8/25/2016 11:30	51.96	52.3	1	-0.34
8/25/2016 11:32	51.98	50.7	1	1.28
8/25/2016 11:34	51.99	50.5	1	1.49
8/25/2016 11:36	2.72	22.7	1	-19.98
8/25/2016 11:38	2.72	23	1	-20.28
8/25/2016 11:40	52.03	69.6	1	-17.57
8/25/2016 11:42	52.04	52.3	1	-0.26
8/25/2016 11:44	52.06	48.6	1	3.46
8/25/2016 11:46	52.08	52.2	1	-0.12

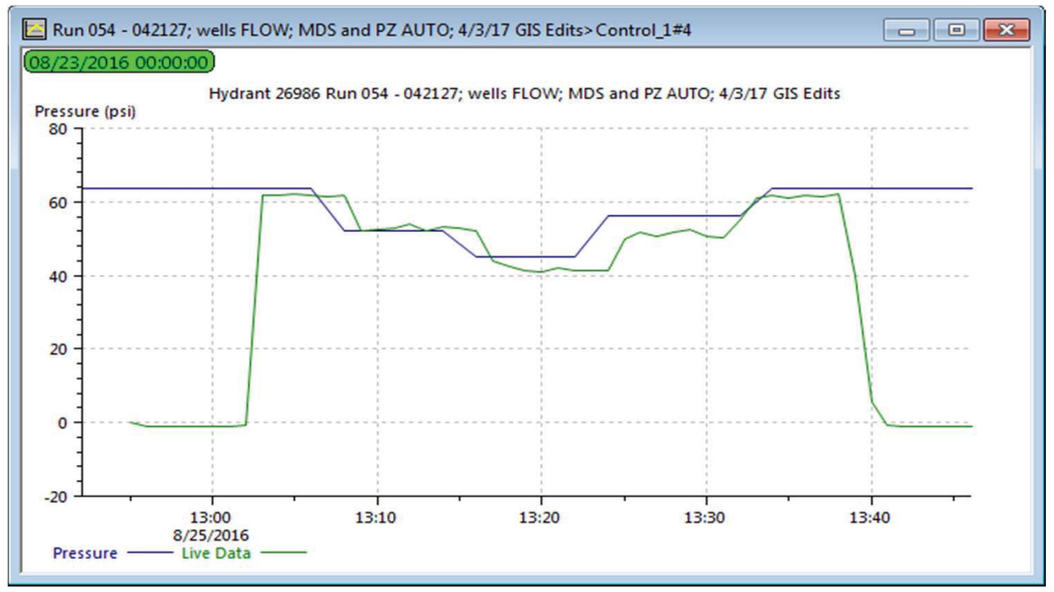
Test Site: 009

			Model	Observed	Diff (%; abs)
TEST TYPE	P1	P AVG (psi)	53.5	53.7	0%
NODE ID	26983	P MAX (psi)	61.8	60.4	1
		P MIN (psi)	43.2	44.1	-1



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/25/2016 13:00	61.79	59.3	1	2.49
8/25/2016 13:02	61.78	59.8	1	1.98
8/25/2016 13:04	61.78	59.9	1	1.88
8/25/2016 13:06	61.79	59.2	1	2.59
8/25/2016 13:08	46.82	50.9	1	-4.08
8/25/2016 13:10	47.09	50.9	1	-3.81
8/25/2016 13:12	47.05	51.4	1	-4.35
8/25/2016 13:14	47.04	51.1	1	-4.06
8/25/2016 13:16	43.21	44.5	1	-1.29
8/25/2016 13:18	43.2	44.1	1	-0.9
8/25/2016 13:20	43.18	44.5	1	-1.32
8/25/2016 13:22	43.17	45.3	1	-2.13
8/25/2016 13:24	57.12	53.2	1	3.92
8/25/2016 13:26	57.08	56.3	1	0.78
8/25/2016 13:28	57.08	54.7	1	2.38
8/25/2016 13:30	57.07	55.9	1	1.17
8/25/2016 13:32	57.06	59.5	1	-2.44
8/25/2016 13:34	61.77	60.4	1	1.37
8/25/2016 13:36	61.78	60	1	1.78

			Model	Observed	Diff (%; abs)
TEST TYPE	P2	P AVG (psi)	54.8	53.2	3%
NODE ID	26986	P MAX (psi)	63.6	62.0	2
		P MIN (psi)	44.8	40.9	4

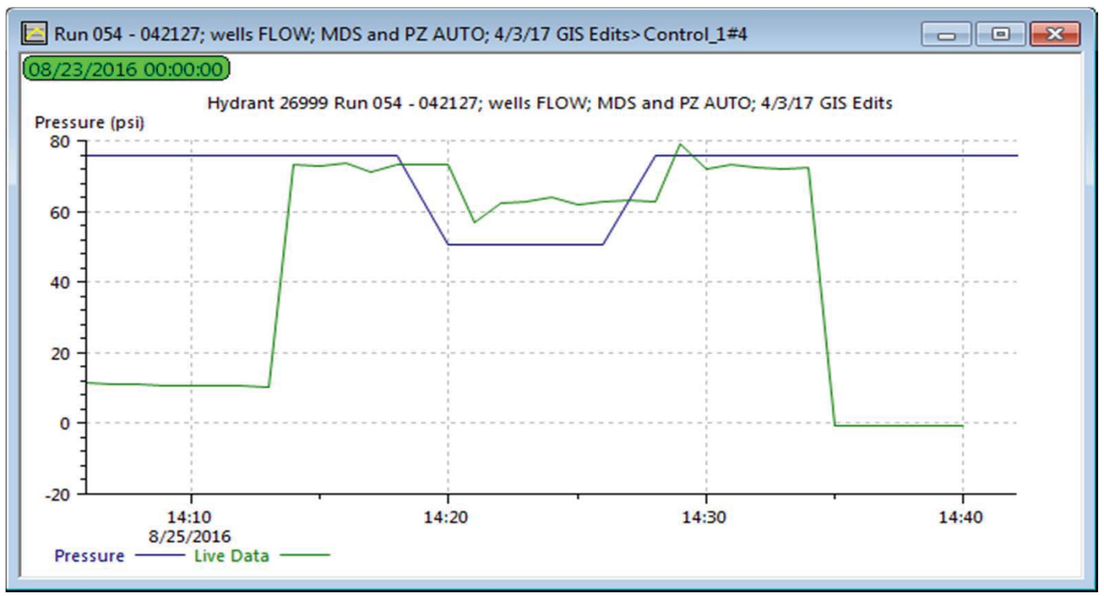


Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/25/2016 13:00	63.59	-0.7		
8/25/2016 13:02	63.58	61.8	1	1.78
8/25/2016 13:04	63.58	61.6	1	1.98
8/25/2016 13:06	63.59	61.6	1	1.99
8/25/2016 13:08	51.93	52.4	1	-0.47
8/25/2016 13:10	52.2	53.8	1	-1.6
8/25/2016 13:12	52.15	53.4	1	-1.25
8/25/2016 13:14	52.14	52.2	1	-0.06
8/25/2016 13:16	44.87	42.3	1	2.57
8/25/2016 13:18	44.86	40.9	1	3.96
8/25/2016 13:20	44.84	41.5	1	3.34
8/25/2016 13:22	44.83	41.4	1	3.43
8/25/2016 13:24	56.15	51.6	1	4.55
8/25/2016 13:26	56.14	51.8	1	4.34
8/25/2016 13:28	56.15	50.5	1	5.65
8/25/2016 13:30	56.14	55.2	1	0.94
8/25/2016 13:32	56.12	61.6	1	-5.48
8/25/2016 13:34	63.59	61.6	1	1.99
8/25/2016 13:36	63.6	62	1	1.6

Test Site: 010

TEST TYPE	P1
NODE ID	26999

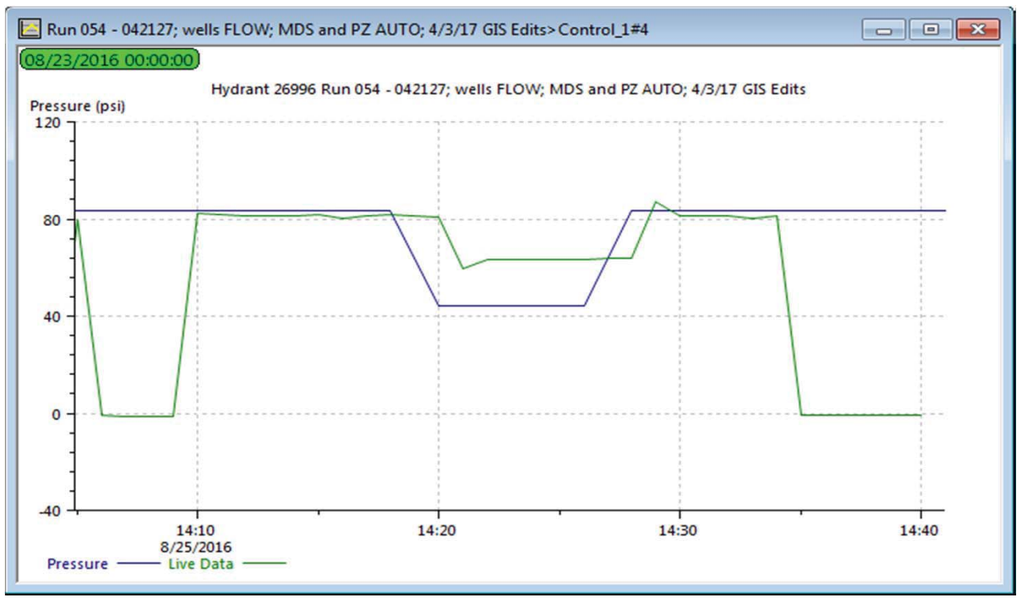
	Model	Observed	Diff (%; abs)
P AVG (psi)	66.5	69.3	-4%
P MAX (psi)	75.8	73.6	2.2
P MIN (psi)	50.3	62.4	-12.1



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/25/2016 14:08	75.73	10.7		
8/25/2016 14:10	75.75	10.5		
8/25/2016 14:12	75.76	73.4	1	2.36
8/25/2016 14:14	75.76	73.6	1	2.16
8/25/2016 14:16	75.78	73.2	1	2.58
8/25/2016 14:18	75.79	73.4	1	2.39
8/25/2016 14:20	50.38	62.4	1	-12.02
8/25/2016 14:22	50.34	64	1	-13.66
8/25/2016 14:24	50.33	62.9	1	-12.57
8/25/2016 14:26	50.31	62.7	1	-12.39
8/25/2016 14:28	75.71	72.2	1	3.51
8/25/2016 14:30	75.73	72.4	1	3.33
8/25/2016 14:32	75.75	72.5	1	3.25

TEST TYPE	P2
NODE ID	26996

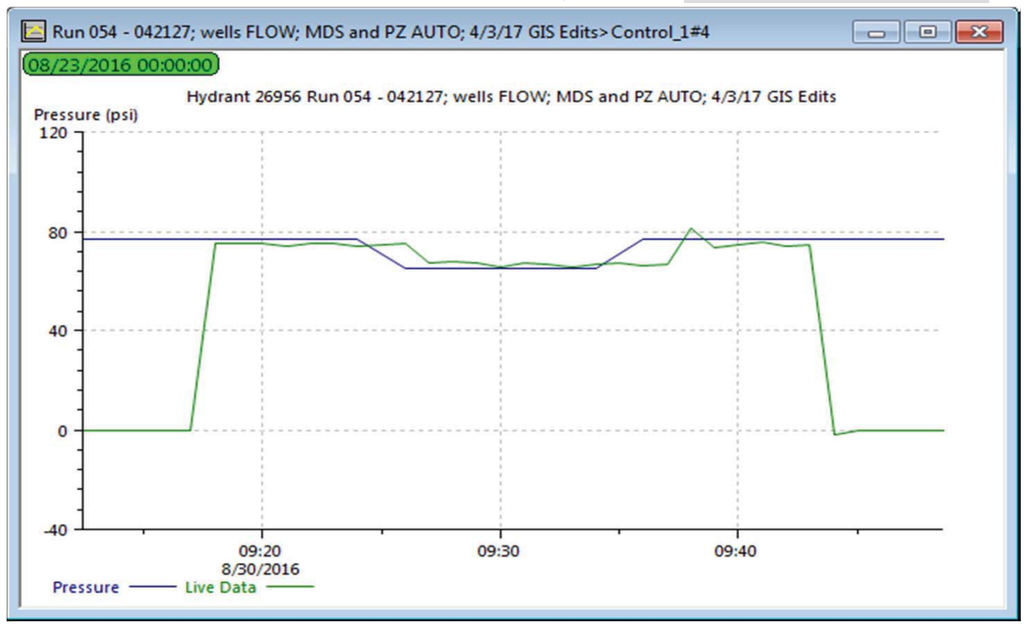
	Model	Observed	Diff (%; abs)
P AVG (psi)	71.7	75.7	-6%
P MAX (psi)	83.6	82.5	1
P MIN (psi)	44.9	63.1	-18



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/25/2016 14:08	83.52	82.5	1	1.02
8/25/2016 14:10	83.54	81.1	1	2.44
8/25/2016 14:12	83.55	81.1	1	2.45
8/25/2016 14:14	83.55	80.2	1	3.35
8/25/2016 14:16	83.57	81.7	1	1.87
8/25/2016 14:18	83.58	80.7	1	2.88
8/25/2016 14:20	45.0	63.1	1	-18.1
8/25/2016 14:22	44.96	63.4	1	-18.44
8/25/2016 14:24	44.95	63.1	1	-18.15
8/25/2016 14:26	44.93	64	1	-19.07
8/25/2016 14:28	83.5	81.3	1	2.2
8/25/2016 14:30	83.51	81.1	1	2.41
8/25/2016 14:32	83.54	81.1	1	2.44

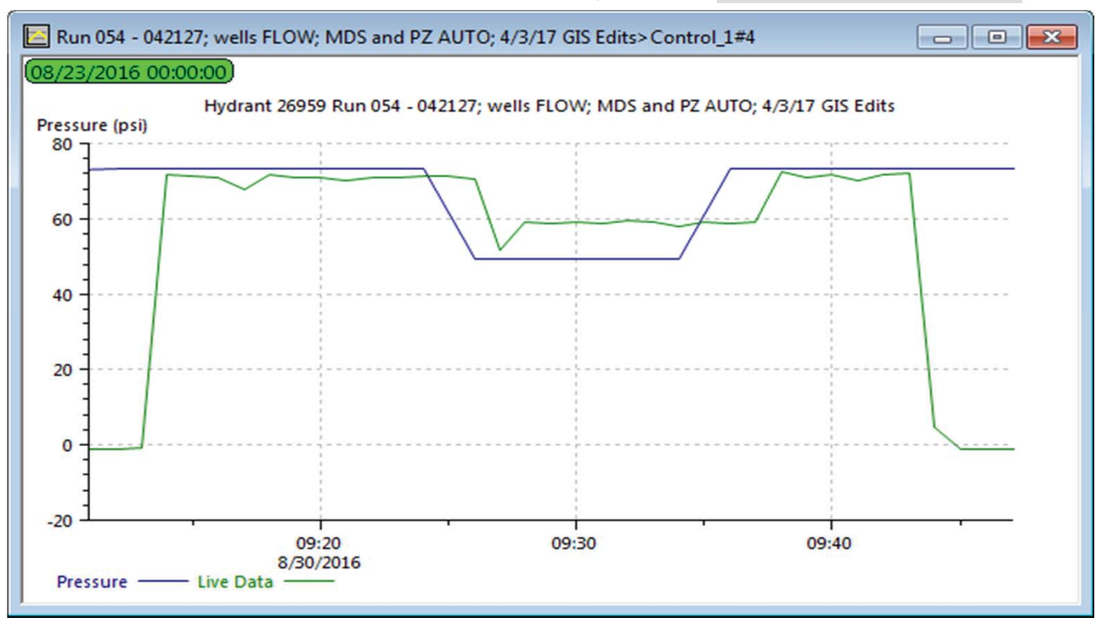
Test Site: 011

			Model	Observed	Diff (%; abs)
TEST TYPE	P1	P AVG (psi)	72.3	72.3	0%
NODE ID	26956	P MAX (psi)	76.7	81.4	-4.7
		P MIN (psi)	65.3	66.0	-0.7



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/30/2016 9:12	76.63	-0.3		
8/30/2016 9:14	76.65	-0.3		
8/30/2016 9:16	76.63	75.5	1	1.13
8/30/2016 9:18	76.65	75.1	1	1.55
8/30/2016 9:20	76.65	75	1	1.65
8/30/2016 9:22	76.67	74.3	1	2.37
8/30/2016 9:24	76.67	75.3	1	1.37
8/30/2016 9:26	65.36	67.8	1	-2.44
8/30/2016 9:28	65.35	66	1	-0.65
8/30/2016 9:30	65.33	66.8	1	-1.47
8/30/2016 9:32	65.31	67	1	-1.69
8/30/2016 9:34	65.31	66.5	1	-1.19
8/30/2016 9:36	76.64	81.4	1	-4.76
8/30/2016 9:38	76.64	74.8	1	1.84
8/30/2016 9:40	76.66	74.1	1	2.56

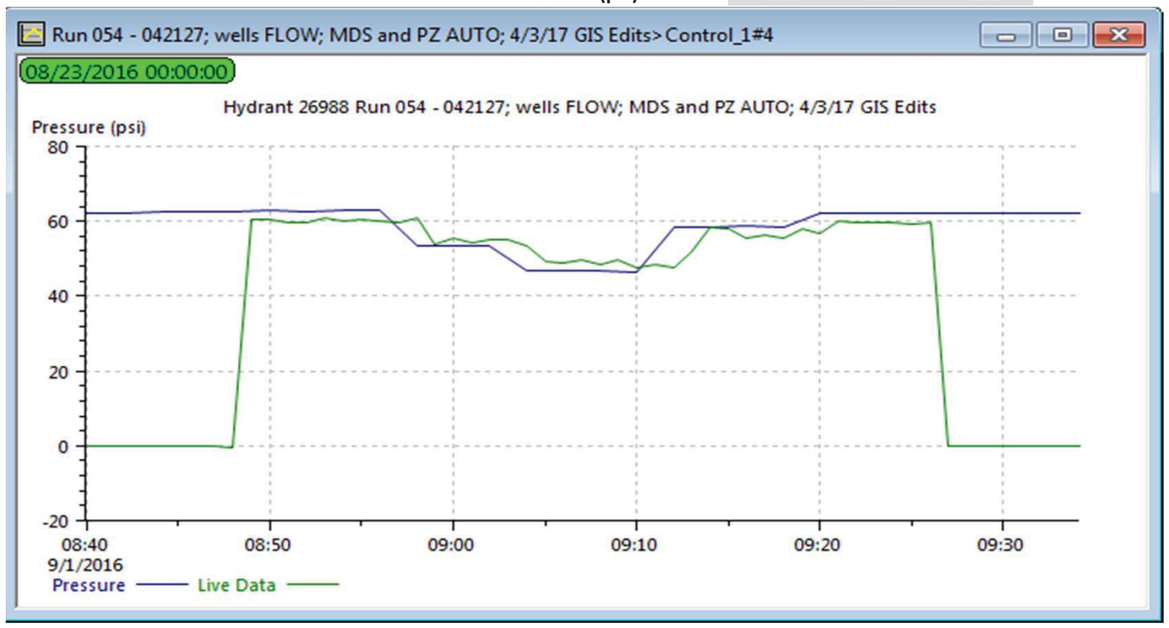
			Model	Observed	Diff (%; abs)
TEST TYPE	P2	P AVG (psi)	65.1	67.3	-3%
NODE ID	26959	P MAX (psi)	73.1	72.6	0.5
		P MIN (psi)	49.2	58.2	-9.0



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/30/2016 9:12	73.05	71.7	1	1.35
8/30/2016 9:14	73.07	70.8	1	2.27
8/30/2016 9:16	73.05	71.7	1	1.35
8/30/2016 9:18	73.07	71	1	2.07
8/30/2016 9:20	73.07	70.9	1	2.17
8/30/2016 9:22	73.09	71.5	1	1.59
8/30/2016 9:24	73.09	70.6	1	2.49
8/30/2016 9:26	49.28	59.1	1	-9.82
8/30/2016 9:28	49.26	59.3	1	-10.04
8/30/2016 9:30	49.24	59.6	1	-10.36
8/30/2016 9:32	49.22	58.2	1	-8.98
8/30/2016 9:34	49.22	59	1	-9.78
8/30/2016 9:36	73.06	72.6	1	0.46
8/30/2016 9:38	73.06	71.7	1	1.36
8/30/2016 9:40	73.08	71.9	1	1.18

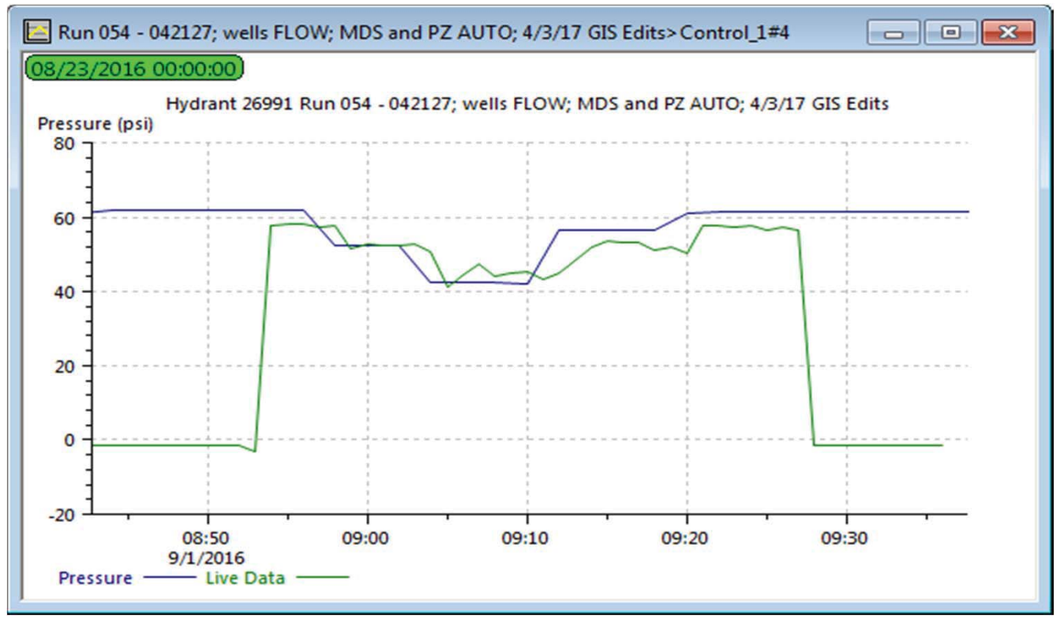
Test Site: 012

			Model	Observed	Diff (%; abs)
TEST TYPE	P1	P AVG (psi)	56.8	55.9	2%
NODE ID	26988	P MAX (psi)	62.7	60.9	1.8
		P MIN (psi)	46.4	47.5	-1.1



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
9/1/2016 8:48	62.62	60.3	1	2.32
9/1/2016 8:50	62.69	59.8	1	2.89
9/1/2016 8:52	62.62	60.1	1	2.52
9/1/2016 8:54	62.71	60.2	1	2.51
9/1/2016 8:56	62.72	60.9	1	1.82
9/1/2016 8:58	53.33	55.4	1	-2.07
9/1/2016 9:00	53.33	55	1	-1.67
9/1/2016 9:02	53.31	53.4	1	-0.09
9/1/2016 9:04	46.84	48.9	1	-2.06
9/1/2016 9:06	46.84	48.6	1	-1.76
9/1/2016 9:08	46.77	47.7	1	-0.93
9/1/2016 9:10	46.4	47.5	1	-1.1
9/1/2016 9:12	58.28	58.4	1	-0.12
9/1/2016 9:14	58.38	55.7	1	2.68
9/1/2016 9:16	58.57	55.7	1	2.87
9/1/2016 9:18	58.47	56.6	1	1.87
9/1/2016 9:20	62.05	59.5	1	2.55
9/1/2016 9:22	62.1	59.6	1	2.5
9/1/2016 9:24	62.07	59.5	1	2.57

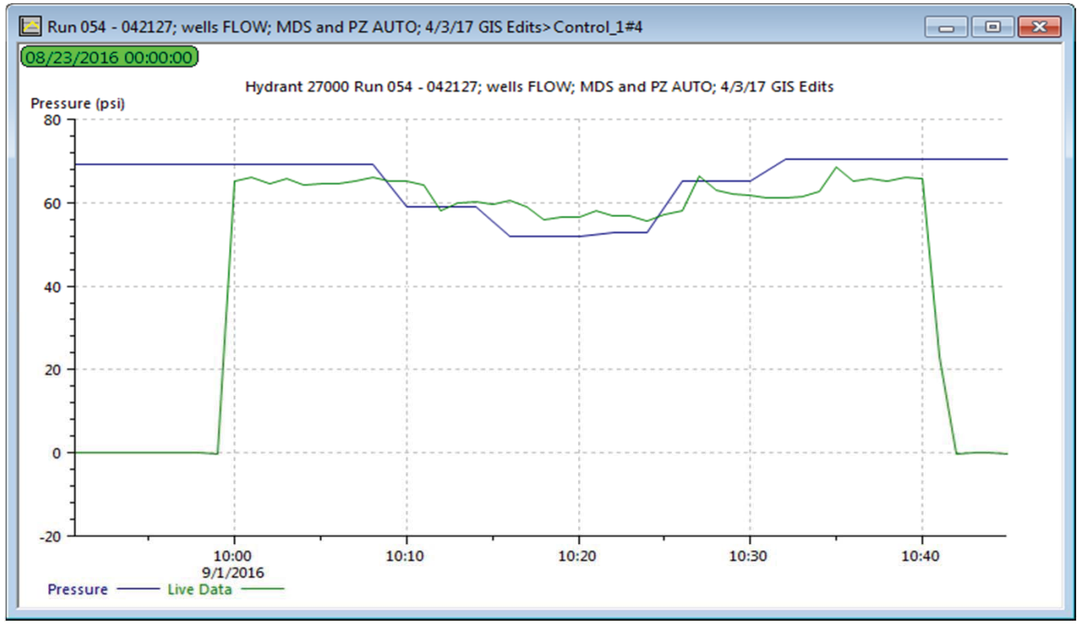
			Model	Observed	Diff (%; abs)
TEST TYPE	P2	P AVG (psi)	54.3	52.2	4%
NODE ID	26991	P MAX (psi)	61.8	58.0	3.8
		P MIN (psi)	42.4	44.0	-1.6



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
9/1/2016 8:48	61.74	-1.3		
9/1/2016 8:50	61.81	-1.6		
9/1/2016 8:52	61.74	57.6	1	4.14
9/1/2016 8:54	61.83	58	1	3.83
9/1/2016 8:56	61.84	57.9	1	3.94
9/1/2016 8:58	52.31	52.9	1	-0.59
9/1/2016 9:00	52.31	52.5	1	-0.19
9/1/2016 9:02	52.28	50.7	1	1.58
9/1/2016 9:04	42.82	44.7	1	-1.88
9/1/2016 9:06	42.81	44	1	-1.19
9/1/2016 9:08	42.75	45.4	1	-2.65
9/1/2016 9:10	42.37	45.2	1	-2.83
9/1/2016 9:12	56.35	52	1	4.35
9/1/2016 9:14	56.45	53.1	1	3.35
9/1/2016 9:16	56.64	51.2	1	5.44
9/1/2016 9:18	56.54	50.4	1	6.14
9/1/2016 9:20	61.17	57.7	1	3.47
9/1/2016 9:22	61.22	57.7	1	3.52
9/1/2016 9:24	61.19	57.2	1	3.99

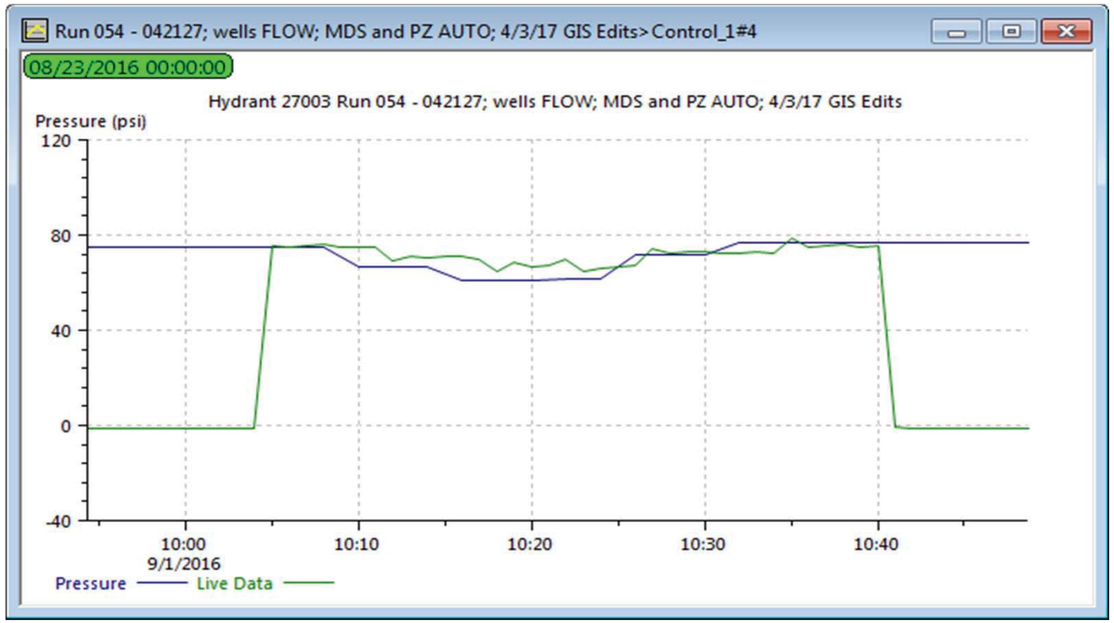
Test Site: 013

			Model	Observed	Diff (%; abs)
TEST TYPE	P1	P AVG (psi)	62.7	61.5	2%
NODE ID	27000	P MAX (psi)	70.4	66.1	4.3
		P MIN (psi)	52.0	55.7	-3.7



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
9/1/2016 10:02	69.05	64.3	1	4.75
9/1/2016 10:04	69.05	64.6	1	4.45
9/1/2016 10:06	69.04	66.1	1	2.94
9/1/2016 10:08	69.04	65.2	1	3.84
9/1/2016 10:10	58.91	58.3	1	0.61
9/1/2016 10:12	58.89	60.4	1	-1.51
9/1/2016 10:14	58.87	60.7	1	-1.83
9/1/2016 10:16	52.03	55.9	1	-3.87
9/1/2016 10:18	52.01	56.5	1	-4.49
9/1/2016 10:20	51.97	56.9	1	-4.93
9/1/2016 10:22	52.7	55.7	1	-3
9/1/2016 10:24	52.74	58	1	-5.26
9/1/2016 10:26	65.02	63	1	2.02
9/1/2016 10:28	64.99	61.9	1	3.09
9/1/2016 10:30	65	61.3	1	3.7
9/1/2016 10:32	70.35	62.7	1	7.65
9/1/2016 10:34	70.35	65.2	1	5.15
9/1/2016 10:36	70.38	65.3	1	5.08
9/1/2016 10:38	70.37	65.8	1	4.57

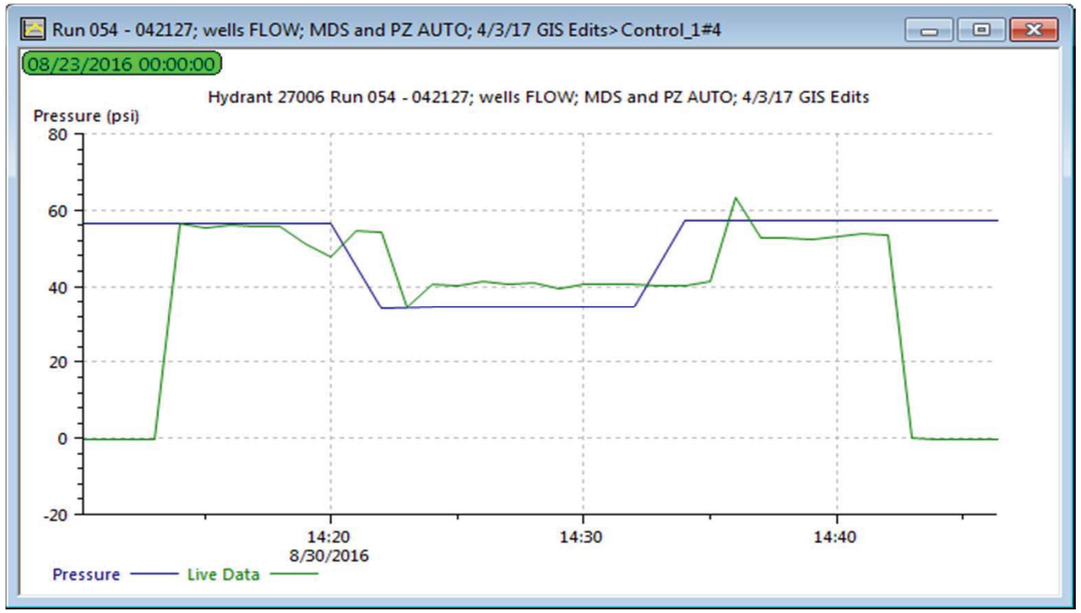
			Model	Observed	Diff (%; abs)
TEST TYPE	P2	P AVG (psi)	69.5	71.5	-3%
NODE ID	27003	P MAX (psi)	76.4	76.2	0.2
		P MIN (psi)	60.7	64.9	-4.2



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
9/1/2016 10:02	75.09	-1.2		
9/1/2016 10:04	75.09	74.7	1	0.39
9/1/2016 10:06	75.09	76.2	1	-1.11
9/1/2016 10:08	75.09	75	1	0.09
9/1/2016 10:10	66.85	69	1	-2.15
9/1/2016 10:12	66.83	70.7	1	-3.87
9/1/2016 10:14	66.8	70.8	1	-4
9/1/2016 10:16	60.77	64.9	1	-4.13
9/1/2016 10:18	60.76	66.6	1	-5.84
9/1/2016 10:20	60.72	69.6	1	-8.88
9/1/2016 10:22	61.45	66.1	1	-4.65
9/1/2016 10:24	61.49	67.5	1	-6.01
9/1/2016 10:26	71.39	72.6	1	-1.21
9/1/2016 10:28	71.35	72.7	1	-1.35
9/1/2016 10:30	71.36	72.5	1	-1.14
9/1/2016 10:32	76.39	72.1	1	4.29
9/1/2016 10:34	76.39	75	1	1.39
9/1/2016 10:36	76.42	76	1	0.42
9/1/2016 10:38	76.41	75.7	1	0.71

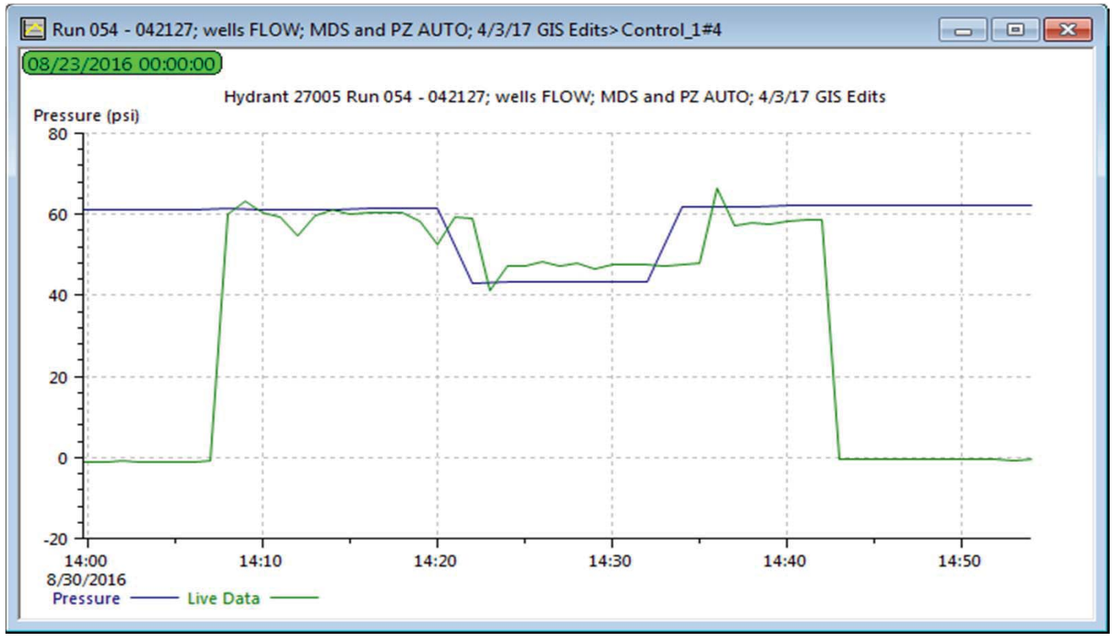
Test Site: 014

			Model	Observed	Diff (%; abs)
TEST TYPE	P1	P AVG (psi)	47.9	49.2	-3%
NODE ID	27006	P MAX (psi)	57.3	63.2	-6.0
		P MIN (psi)	34.0	40.3	-6.3



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/30/2016 14:06	56.54	-0.3		
8/30/2016 14:08	56.54	-0.3		
8/30/2016 14:10	56.52	-0.3		
8/30/2016 14:12	56.53	56.6	1	-0.07
8/30/2016 14:14	56.53	56	1	0.53
8/30/2016 14:16	56.54	55.6	1	0.94
8/30/2016 14:18	56.55	47.9	1	8.65
8/30/2016 14:20	56.61	54.4	1	2.21
8/30/2016 14:22	34.04	40.5	1	-6.46
8/30/2016 14:24	34.6	41.3	1	-6.7
8/30/2016 14:26	34.57	41.1	1	-6.53
8/30/2016 14:28	34.58	40.5	1	-5.92
8/30/2016 14:30	34.57	40.5	1	-5.93
8/30/2016 14:32	34.57	40.3	1	-5.73
8/30/2016 14:34	57.18	63.2	1	-6.02
8/30/2016 14:36	57.21	52.9	1	4.31
8/30/2016 14:38	57.23	53.2	1	4.03
8/30/2016 14:40	57.25	53.6	1	3.65

			Model	Observed	Diff (%; abs)
TEST TYPE	P2	P AVG (psi)	55.4	55.3	0%
NODE ID	27005	P MAX (psi)	61.9	66.6	-4.7
		P MIN (psi)	42.9	47.1	-4.2

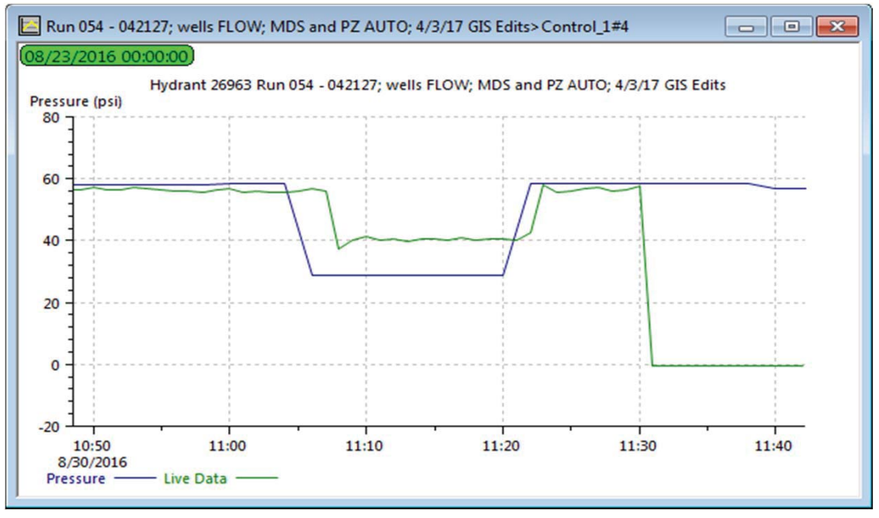


Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/30/2016 14:06	61.23	60	1	1.23
8/30/2016 14:08	61.23	60.4	1	0.83
8/30/2016 14:10	61.21	54.7	1	6.51
8/30/2016 14:12	61.22	61	1	0.22
8/30/2016 14:14	61.22	60.6	1	0.62
8/30/2016 14:16	61.23	60.3	1	0.93
8/30/2016 14:18	61.24	52.7	1	8.54
8/30/2016 14:20	61.3	59	1	2.3
8/30/2016 14:22	42.9	47.1	1	-4.2
8/30/2016 14:24	43.45	48.2	1	-4.75
8/30/2016 14:26	43.43	47.8	1	-4.37
8/30/2016 14:28	43.43	47.5	1	-4.07
8/30/2016 14:30	43.42	47.7	1	-4.28
8/30/2016 14:32	43.42	47.5	1	-4.08
8/30/2016 14:34	61.87	66.6	1	-4.73
8/30/2016 14:36	61.9	57.9	1	4
8/30/2016 14:38	61.92	58.3	1	3.62
8/30/2016 14:40	61.94	58.5	1	3.44

Test Site: 015

TEST TYPE	P1
NODE ID	26963

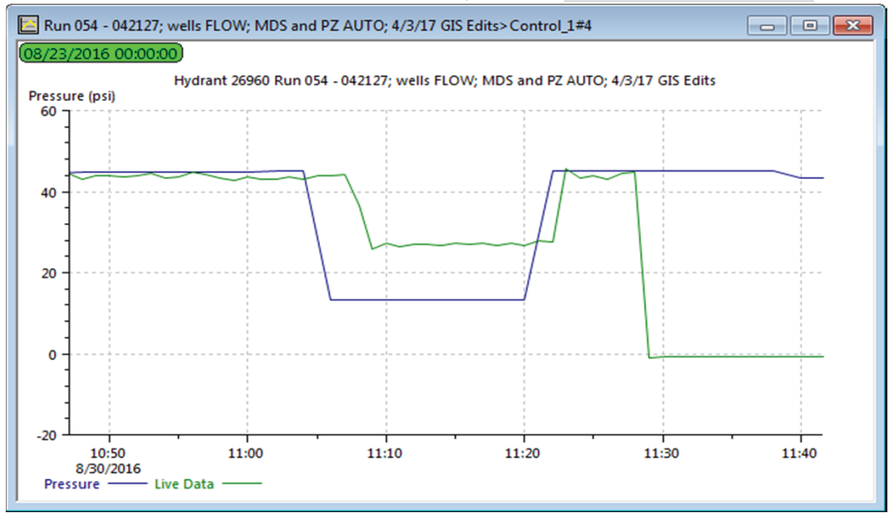
	Model	Observed	Diff (%; abs)
P AVG (psi)	50.6	52.2	-3%
P MAX (psi)	59.7	57.8	1.9
P MIN (psi)	28.8	37.2	-8.4



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/30/2016 10:30	58.84	57	1	1.84
8/30/2016 10:32	58.87	57.1	1	1.77
8/30/2016 10:34	58.88	56.9	1	1.98
8/30/2016 10:36	58.91	57.3	1	1.61
8/30/2016 10:38	58.93	56.1	1	2.83
8/30/2016 10:40	58.95	55.9	1	3.05
8/30/2016 10:42	58.97	56.5	1	2.47
8/30/2016 10:44	58.99	57	1	1.99
8/30/2016 10:46	59.02	56.4	1	2.62
8/30/2016 10:48	59.68	57.1	1	2.58
8/30/2016 10:50	58.15	56.6	1	1.55
8/30/2016 10:52	58.16	56.7	1	1.46
8/30/2016 10:54	58.16	55.9	1	2.26
8/30/2016 10:56	58.17	55.6	1	2.57
8/30/2016 10:58	58.2	56.7	1	1.5
8/30/2016 11:00	58.22	56.1	1	2.12
8/30/2016 11:02	58.24	55.6	1	2.64
8/30/2016 11:04	58.26	56.8	1	1.46
8/30/2016 11:06	28.77	37.2	1	-8.43
8/30/2016 11:08	28.76	41.3	1	-12.54
8/30/2016 11:10	28.77	40.4	1	-11.63
8/30/2016 11:12	28.77	40.5	1	-11.73
8/30/2016 11:14	28.76	40	1	-11.24
8/30/2016 11:16	28.77	40.2	1	-11.43
8/30/2016 11:18	28.76	40.5	1	-11.74
8/30/2016 11:20	28.76	42.7	1	-13.94
8/30/2016 11:22	58.29	55.6	1	2.69
8/30/2016 11:24	58.28	57	1	1.28
8/30/2016 11:26	58.33	56.1	1	2.23
8/30/2016 11:28	58.35	57.8	1	0.55

TEST TYPE	P2
NODE ID	26960

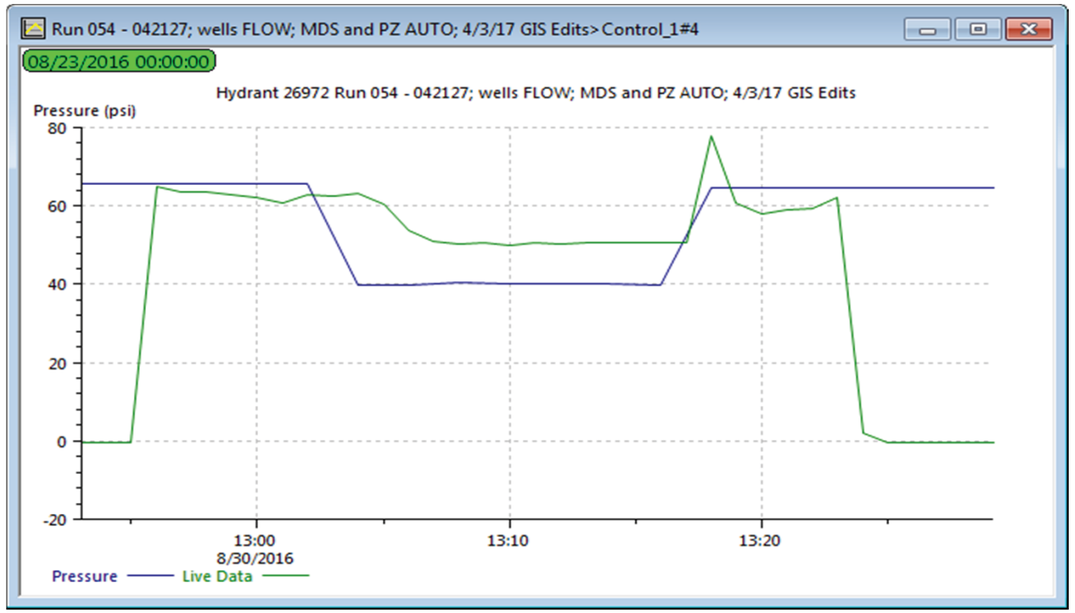
	Model	Observed	Diff (%; abs)
P AVG (psi)	36.1	39.2	-9%
P MAX (psi)	46.4	44.7	1.7
P MIN (psi)	13.1	26.7	-13.6



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/30/2016 10:30	45.53	-1.9		
8/30/2016 10:32	45.56	43.7	1	1.86
8/30/2016 10:34	45.57	43.8	1	1.77
8/30/2016 10:36	45.6	43	1	2.6
8/30/2016 10:38	45.62	43.9	1	1.72
8/30/2016 10:40	45.65	43.6	1	2.05
8/30/2016 10:42	45.66	43.2	1	2.46
8/30/2016 10:44	45.68	44	1	1.68
8/30/2016 10:46	45.71	43.1	1	2.61
8/30/2016 10:48	46.37	43.9	1	2.47
8/30/2016 10:50	44.84	43.9	1	0.94
8/30/2016 10:52	44.85	43.4	1	1.45
8/30/2016 10:54	44.85	44.7	1	0.15
8/30/2016 10:56	44.87	43.5	1	1.37
8/30/2016 10:58	44.89	43.7	1	1.19
8/30/2016 11:00	44.91	43.1	1	1.81
8/30/2016 11:02	44.93	43	1	1.93
8/30/2016 11:04	44.95	43.8	1	1.15
8/30/2016 11:06	13.14	36.6	1	-23.46
8/30/2016 11:08	13.14	27.2	1	-14.06
8/30/2016 11:10	13.15	27	1	-13.85
8/30/2016 11:12	13.14	26.7	1	-13.56
8/30/2016 11:14	13.14	27	1	-13.86
8/30/2016 11:16	13.15	26.7	1	-13.55
8/30/2016 11:18	13.14	26.7	1	-13.56
8/30/2016 11:20	13.14	27.7	1	-14.56
8/30/2016 11:22	44.99	43.3	1	1.69
8/30/2016 11:24	44.97	43.2	1	1.77
8/30/2016 11:26	45.02	44.7	1	0.32
8/30/2016 11:28	45.04	-0.7		

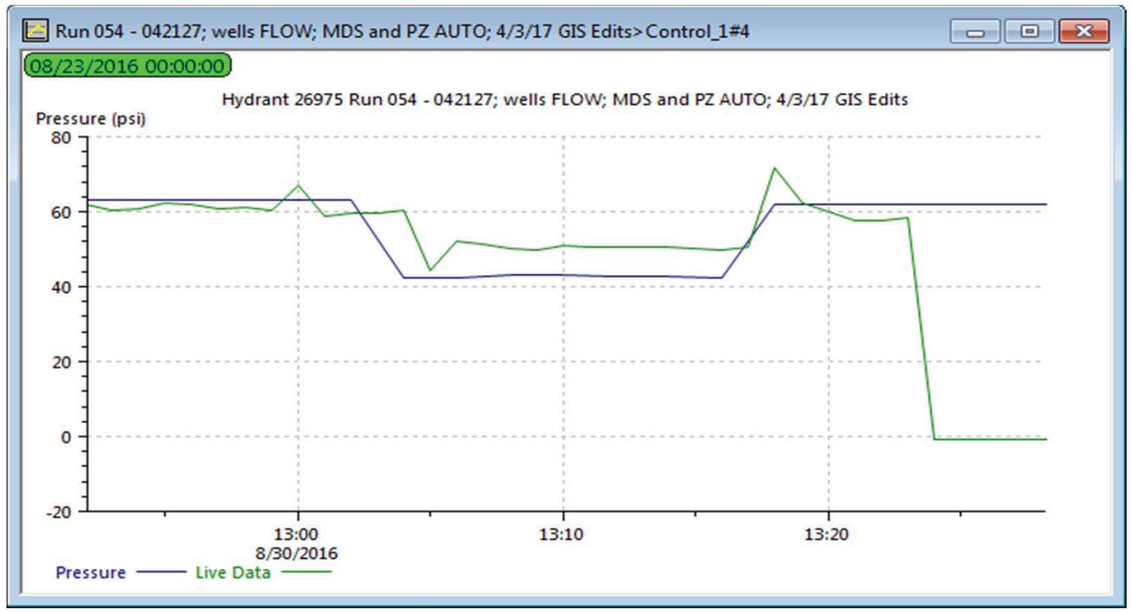
Test Site: 016

			Model	Observed	Diff (%; abs)
TEST TYPE	P1	P AVG (psi)	52.7	58.4	-11%
NODE ID	26972	P MAX (psi)	65.7	77.9	-12.2
		P MIN (psi)	39.8	50.1	-10.3



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/30/2016 12:50	65.75	-0.4		
8/30/2016 12:52	65.73	-0.4		
8/30/2016 12:54	65.71	64.9	1	0.81
8/30/2016 12:56	65.69	63.4	1	2.29
8/30/2016 12:58	65.66	62	1	3.66
8/30/2016 13:00	65.64	62.8	1	2.84
8/30/2016 13:02	65.62	63.2	1	2.42
8/30/2016 13:04	39.76	53.7	1	-13.94
8/30/2016 13:06	39.78	50.3	1	-10.52
8/30/2016 13:08	40.41	50.1	1	-9.69
8/30/2016 13:10	40.27	50.3	1	-10.03
8/30/2016 13:12	40.12	50.5	1	-10.38
8/30/2016 13:14	39.99	50.6	1	-10.61
8/30/2016 13:16	39.85	77.9	1	-38.05
8/30/2016 13:18	64.72	58	1	6.72
8/30/2016 13:20	64.7	59.5	1	5.2

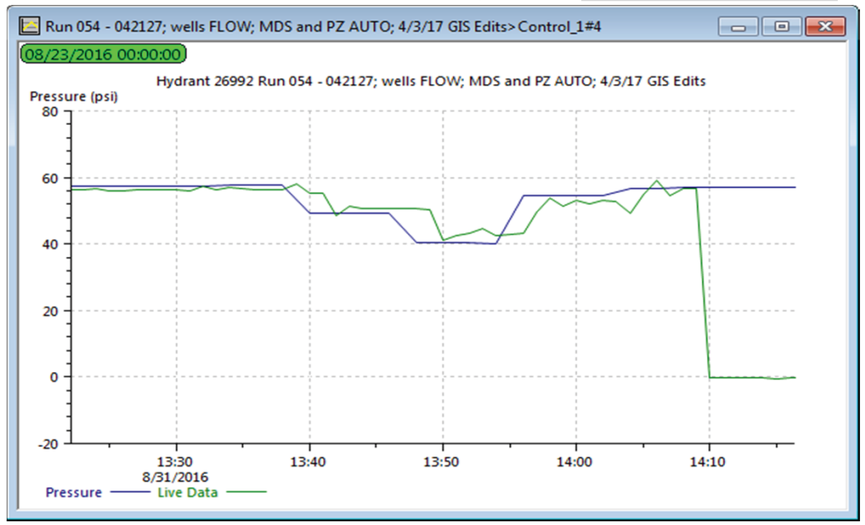
			Model	Observed	Diff (%; abs)
TEST TYPE	P2	P AVG (psi)	54.1	57.9	-7%
NODE ID	26975	P MAX (psi)	63.2	71.6	-8.4
		P MIN (psi)	42.5	49.9	-7.4



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/30/2016 12:50	63.18	61.8	1	1.38
8/30/2016 12:52	63.16	60.9	1	2.26
8/30/2016 12:54	63.14	61.8	1	1.34
8/30/2016 12:56	63.11	61	1	2.11
8/30/2016 12:58	63.09	67	1	-3.91
8/30/2016 13:00	63.07	59.5	1	3.57
8/30/2016 13:02	63.05	60.5	1	2.55
8/30/2016 13:04	42.5	52	1	-9.5
8/30/2016 13:06	42.47	50.1	1	-7.63
8/30/2016 13:08	43.09	50.8	1	-7.71
8/30/2016 13:10	42.95	50.6	1	-7.65
8/30/2016 13:12	42.81	50.5	1	-7.69
8/30/2016 13:14	42.68	49.9	1	-7.22
8/30/2016 13:16	42.54	71.6	1	-29.06
8/30/2016 13:18	62.15	60.1	1	2.05
8/30/2016 13:20	62.13	57.8	1	4.33

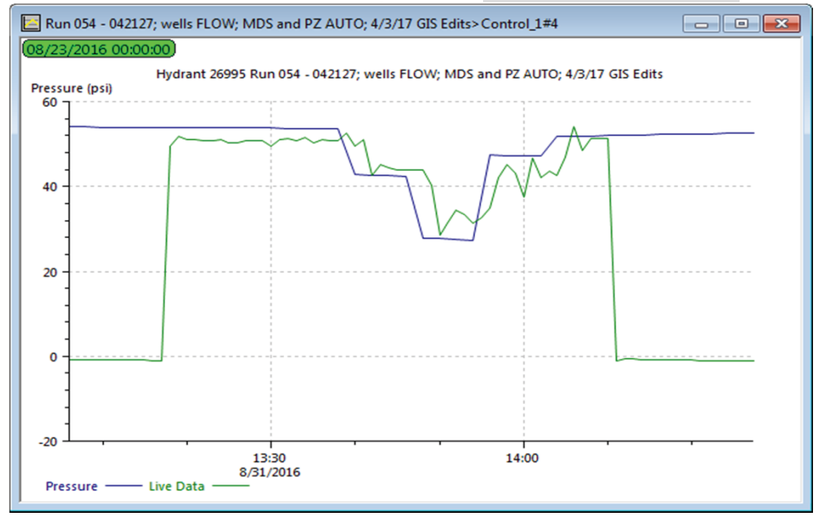
Test Site: 017

				Model	Observed	Diff (%; abs)
TEST TYPE	P1	P325B	P AVG (psi)	53.4	53.1	1%
NODE ID	26992		P MAX (psi)	57.7	59.1	-1.4
			P MIN (psi)	40.1	41.0	-0.9



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/31/2016 13:10	56.9	55.8	1	1.1
8/31/2016 13:12	56.96	56.5	1	0.46
8/31/2016 13:14	57.02	56.9	1	0.12
8/31/2016 13:16	57.08	55.1	1	1.98
8/31/2016 13:18	57.14	56.6	1	0.54
8/31/2016 13:20	57.2	56.2	1	1
8/31/2016 13:22	57.26	56.6	1	0.66
8/31/2016 13:24	57.32	55.9	1	1.42
8/31/2016 13:26	57.37	56.4	1	0.97
8/31/2016 13:28	57.43	56.2	1	1.23
8/31/2016 13:30	57.49	57.4	1	0.09
8/31/2016 13:32	57.54	56.9	1	0.64
8/31/2016 13:34	57.6	56.4	1	1.2
8/31/2016 13:36	57.65	56.5	1	1.15
8/31/2016 13:38	57.7	55.2	1	2.5
8/31/2016 13:40	49.43	48.7	1	0.73
8/31/2016 13:42	49.39	50.6	1	-1.21
8/31/2016 13:44	49.31	50.6	1	-1.29
8/31/2016 13:46	49.23	50.8	1	-1.57
8/31/2016 13:48	40.58	41	1	-0.42
8/31/2016 13:50	40.43	43.4	1	-2.97
8/31/2016 13:52	40.28	42.5	1	-2.22
8/31/2016 13:54	40.11	43.4	1	-3.29
8/31/2016 13:56	54.48	53.9	1	0.58
8/31/2016 13:58	54.46	53.3	1	1.16
8/31/2016 14:00	54.45	53.1	1	1.35
8/31/2016 14:02	54.43	49.2	1	5.23
8/31/2016 14:04	56.75	59.1	1	-2.35
8/31/2016 14:06	56.81	56.6	1	0.21

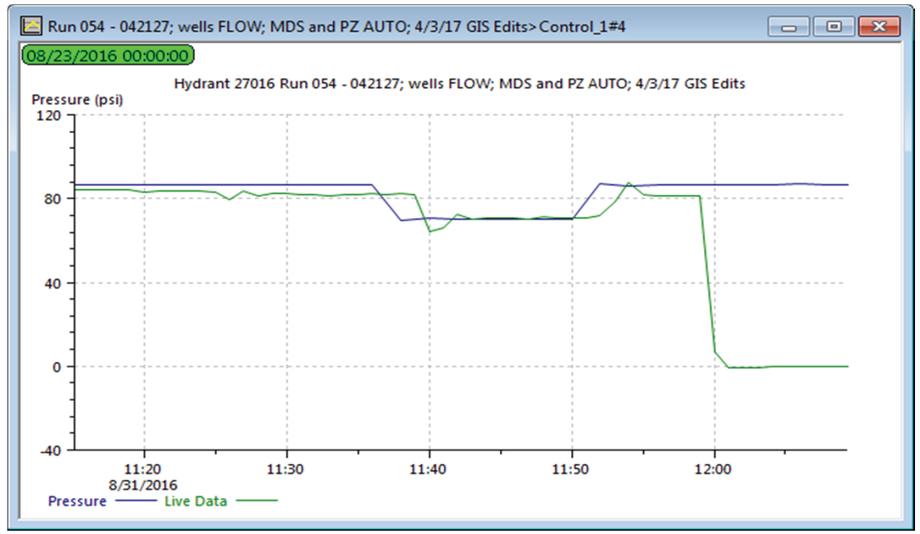
				Model	Observed	Diff (%; abs)
TEST TYPE	P2	P325A	P AVG (psi)	46.2	45.6	1%
NODE ID	26995		P MAX (psi)	52.8	54.1	-1.3
			P MIN (psi)	27.4	28.6	-1.2



Date/Time	Model Pressure (psi)	Observed Observed Pressure (psi)	filter	
8/31/2016 13:10	51.99	-0.8		
8/31/2016 13:12	52.05	-0.8		
8/31/2016 13:14	52.11	-1		
8/31/2016 13:16	52.16	49.4	1	2.76
8/31/2016 13:18	52.22	51.1	1	1.12
8/31/2016 13:20	52.28	50.7	1	1.58
8/31/2016 13:22	52.34	51.1	1	1.24
8/31/2016 13:24	52.4	50.4	1	2
8/31/2016 13:26	52.46	50.8	1	1.66
8/31/2016 13:28	52.51	49.6	1	2.91
8/31/2016 13:30	52.57	51.4	1	1.17
8/31/2016 13:32	52.62	51.6	1	1.02
8/31/2016 13:34	52.68	51	1	1.68
8/31/2016 13:36	52.73	50.8	1	1.93
8/31/2016 13:38	52.78	49.6	1	3.18
8/31/2016 13:40	42.33	42.7	1	-0.37
8/31/2016 13:42	42.3	44.3	1	-2
8/31/2016 13:44	42.22	43.8	1	-1.58
8/31/2016 13:46	42.15	43.9	1	-1.75
8/31/2016 13:48	27.87	28.6	1	-0.73
8/31/2016 13:50	27.73	34.5	1	-6.77
8/31/2016 13:52	27.57	31.5	1	-3.93
8/31/2016 13:54	27.4	35	1	-7.6
8/31/2016 13:56	47.3	45.3	1	2
8/31/2016 13:58	47.29	37.5	1	9.79
8/31/2016 14:00	47.27	42.2	1	5.07
8/31/2016 14:02	47.26	42.5	1	4.76
8/31/2016 14:04	51.83	54.1	1	-2.27
8/31/2016 14:06	51.89	51.2	1	0.69

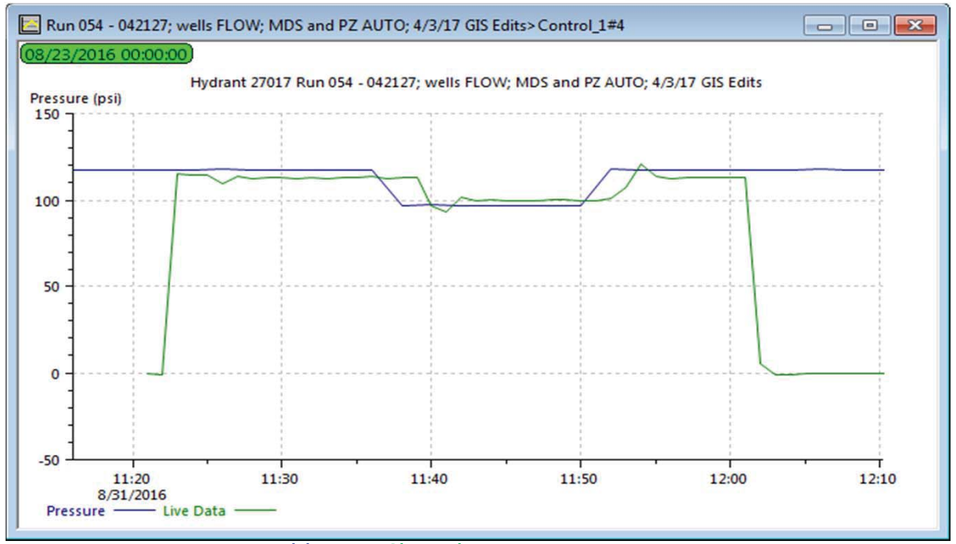
Test Site: 018

				Model	Observed	Diff (%; abs)
TEST TYPE	P1	PR325B	P AVG (psi)	82.2	79.5	3%
NODE ID	27016		P MAX (psi)	87.2	88.0	-0.8
			P MIN (psi)	69.8	64.3	5.5



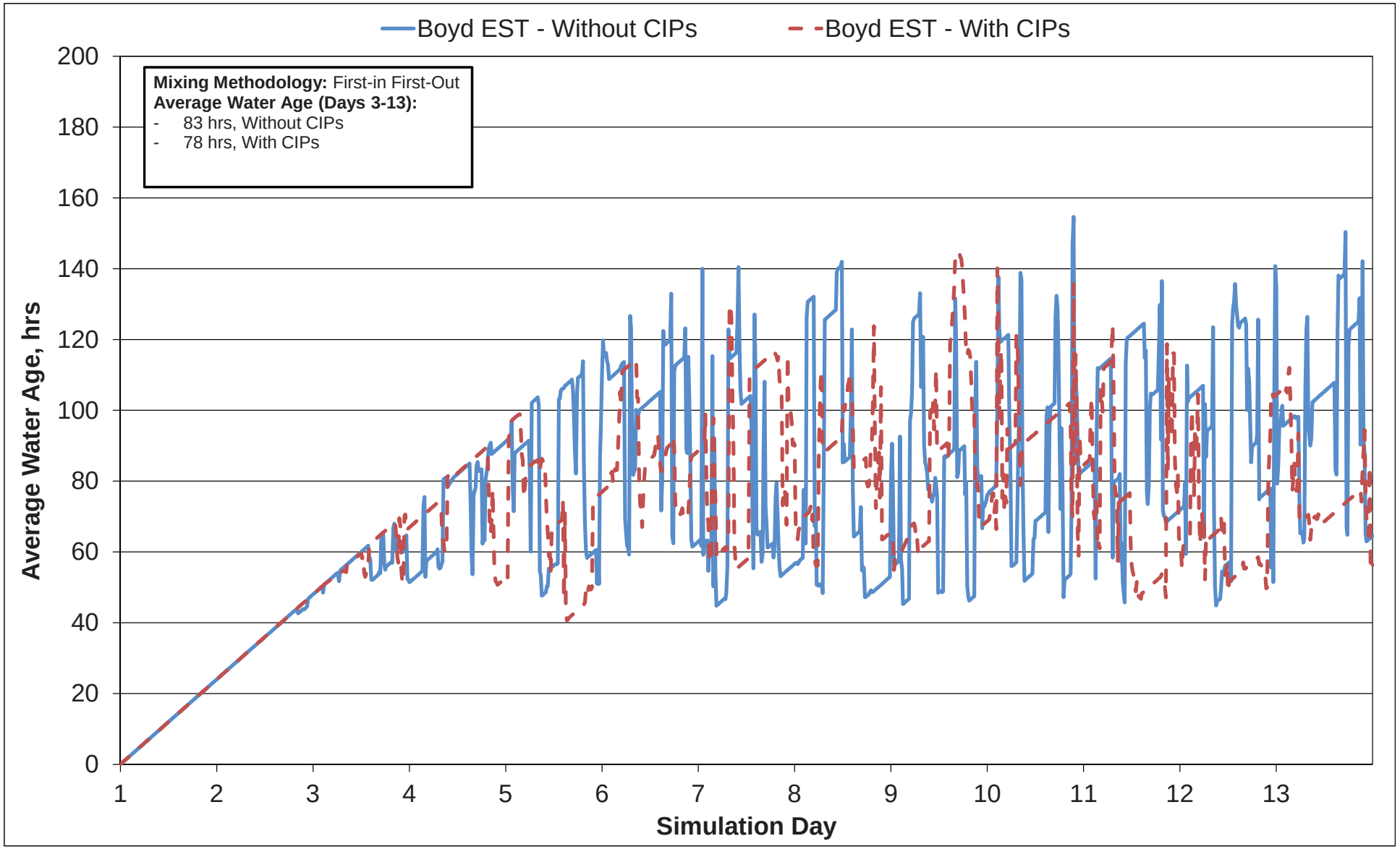
Date/Time	Model Pressure (psi)	Observed Pressure (psi)	filter	
8/31/2016 11:06	86.49	82.7	1	3.79
8/31/2016 11:08	86.57	83.9	1	2.67
8/31/2016 11:10	86.53	84.1	1	2.43
8/31/2016 11:12	86.52	84.5	1	2.02
8/31/2016 11:14	86.51	84	1	2.51
8/31/2016 11:16	86.52	84	1	2.52
8/31/2016 11:18	86.57	83.2	1	3.37
8/31/2016 11:20	86.6	83.7	1	2.9
8/31/2016 11:22	86.61	83.7	1	2.91
8/31/2016 11:24	86.64	79.4	1	7.24
8/31/2016 11:26	86.86	81.5	1	5.36
8/31/2016 11:28	86.78	82.3	1	4.48
8/31/2016 11:30	86.75	82	1	4.75
8/31/2016 11:32	86.76	81.9	1	4.86
8/31/2016 11:34	86.79	82.2	1	4.59
8/31/2016 11:36	86.72	82.3	1	4.42
8/31/2016 11:38	69.76	64.3	1	5.46
8/31/2016 11:40	70.48	72.7	1	-2.22
8/31/2016 11:42	70.04	70.8	1	-0.76
8/31/2016 11:44	70.08	70.5	1	-0.42
8/31/2016 11:46	70.06	71.2	1	-1.14
8/31/2016 11:48	70.03	70.7	1	-0.67
8/31/2016 11:50	70.04	72	1	-1.96
8/31/2016 11:52	87.16	88	1	-0.84
8/31/2016 11:54	86.29	81.1	1	5.19
8/31/2016 11:56	86.76	81.3	1	5.46
8/31/2016 11:58	86.73	6.8		

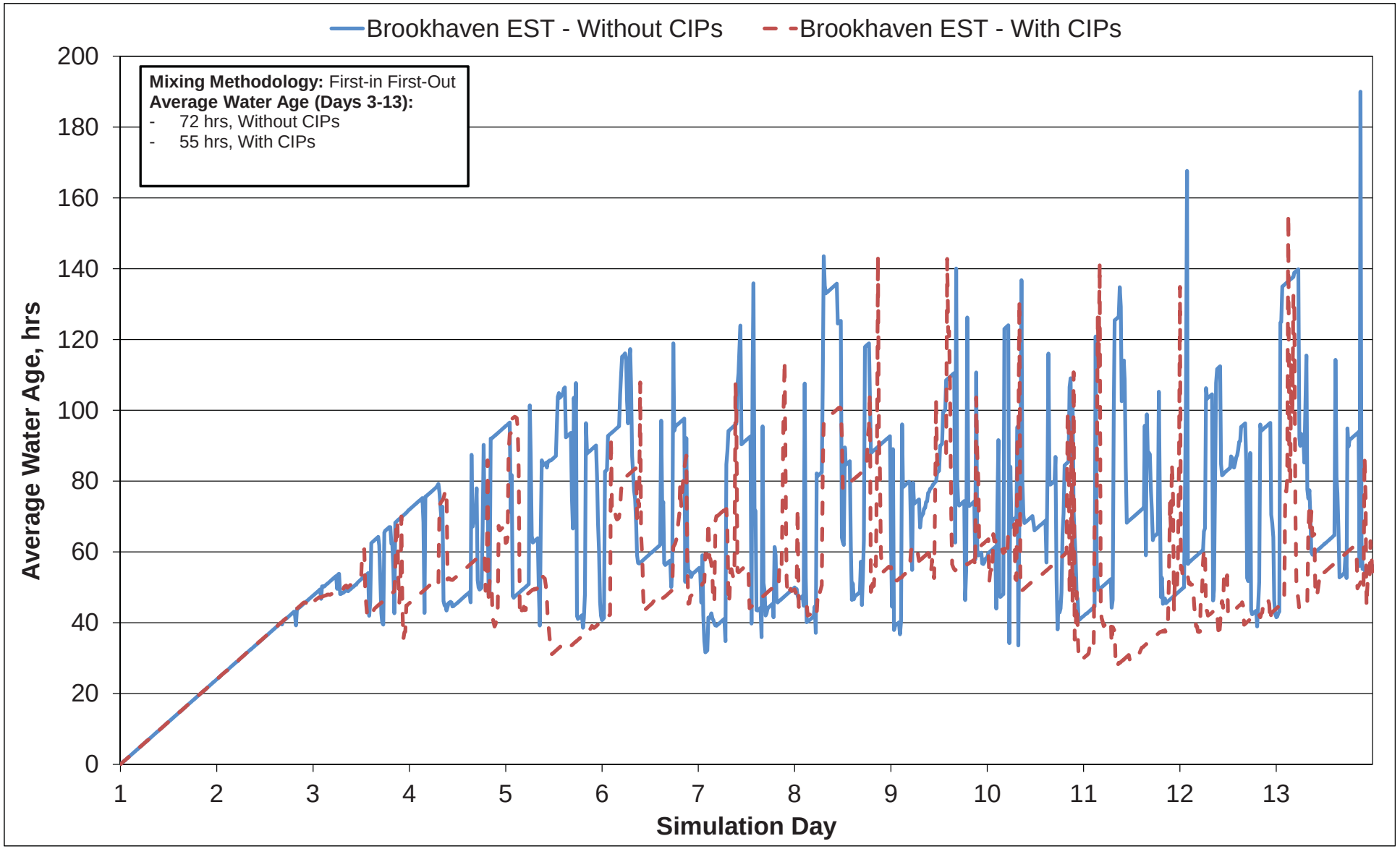
				Model	Observed	Diff (%; abs)
TEST TYPE	P2	PR325A	P AVG (psi)	110.1	108.5	1%
NODE ID	27017		P MAX (psi)	118.1	120.6	-2.5
			P MIN (psi)	96.6	96.9	-0.3

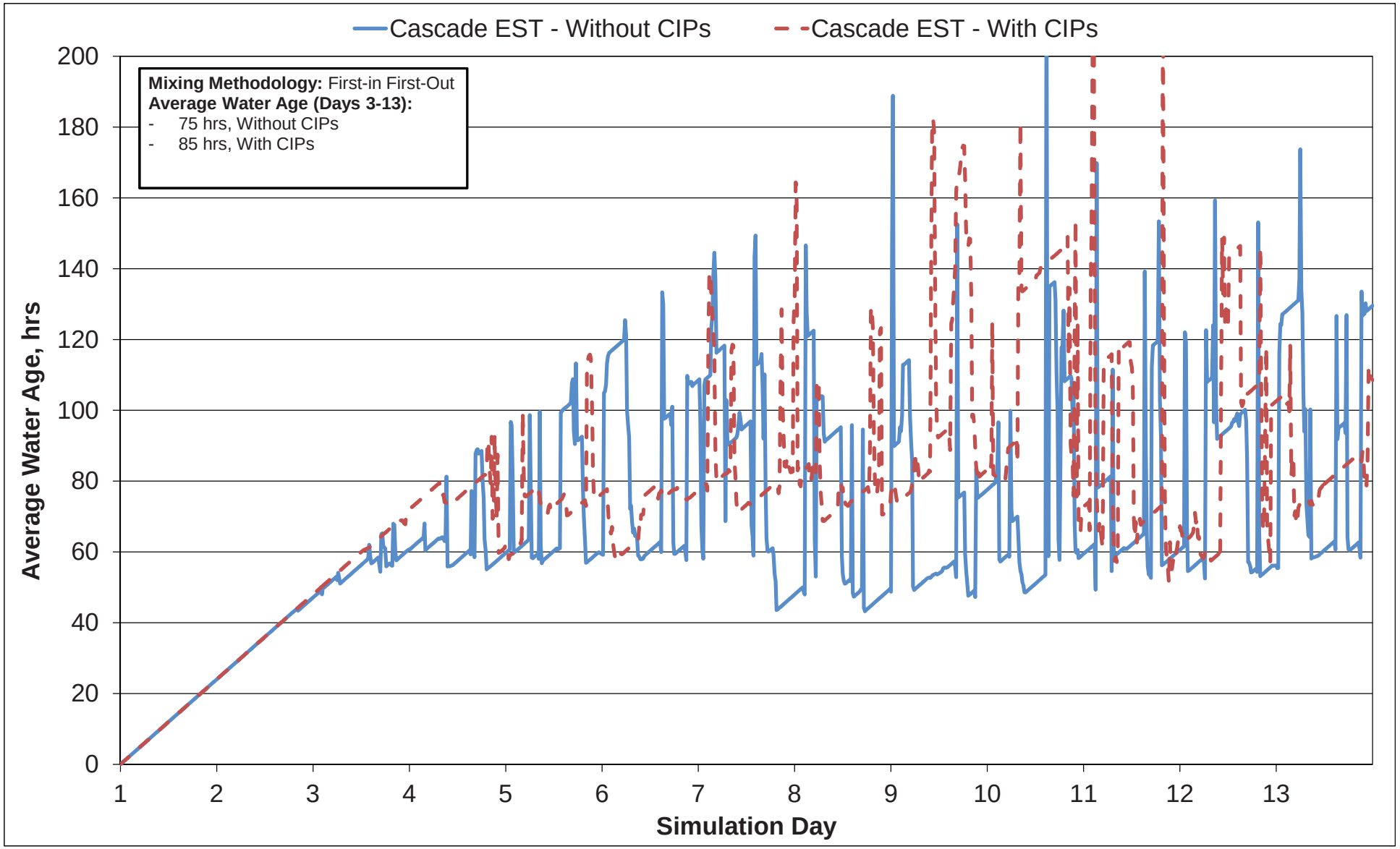


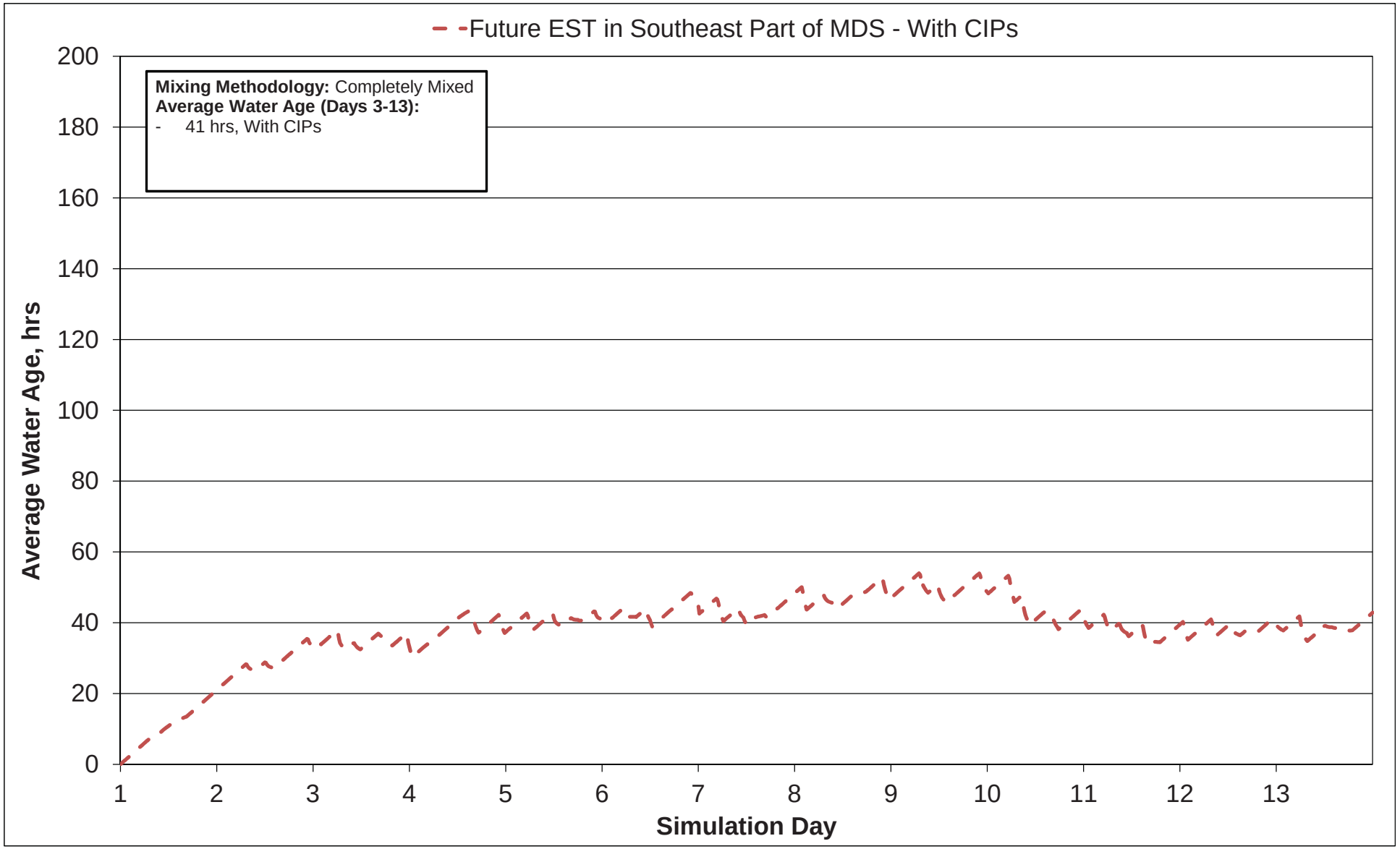
Date/Time	Model Pressure (psi)	Observed Pressure (psi)	filter	
8/31/2016 11:06	117.32			
8/31/2016 11:08	117.42			
8/31/2016 11:10	117.37			
8/31/2016 11:12	117.35			
8/31/2016 11:14	117.33			
8/31/2016 11:16	117.35			
8/31/2016 11:18	117.4			
8/31/2016 11:20	117.43	-1		
8/31/2016 11:22	117.44	114.3	1	3.14
8/31/2016 11:24	117.49	109.6	1	7.89
8/31/2016 11:26	117.74	112.4	1	5.34
8/31/2016 11:28	117.65	113.2	1	4.45
8/31/2016 11:30	117.6	113.2	1	4.4
8/31/2016 11:32	117.62	112.9	1	4.72
8/31/2016 11:34	117.65	113.8	1	3.85
8/31/2016 11:36	117.56	113.2	1	4.36
8/31/2016 11:38	96.58	96.9	1	-0.32
8/31/2016 11:40	97.86	102.1	1	-4.24
8/31/2016 11:42	97.07	100.1	1	-3.03
8/31/2016 11:44	97.16	99.8	1	-2.64
8/31/2016 11:46	97.14	100.1	1	-2.96
8/31/2016 11:48	97.11	99.5	1	-2.39
8/31/2016 11:50	97.12	101.3	1	-4.18
8/31/2016 11:52	118.13	120.6	1	-2.47
8/31/2016 11:54	117.03	112.1	1	4.93
8/31/2016 11:56	117.63	113.1	1	4.53
8/31/2016 11:58	117.59	113.2	1	4.39

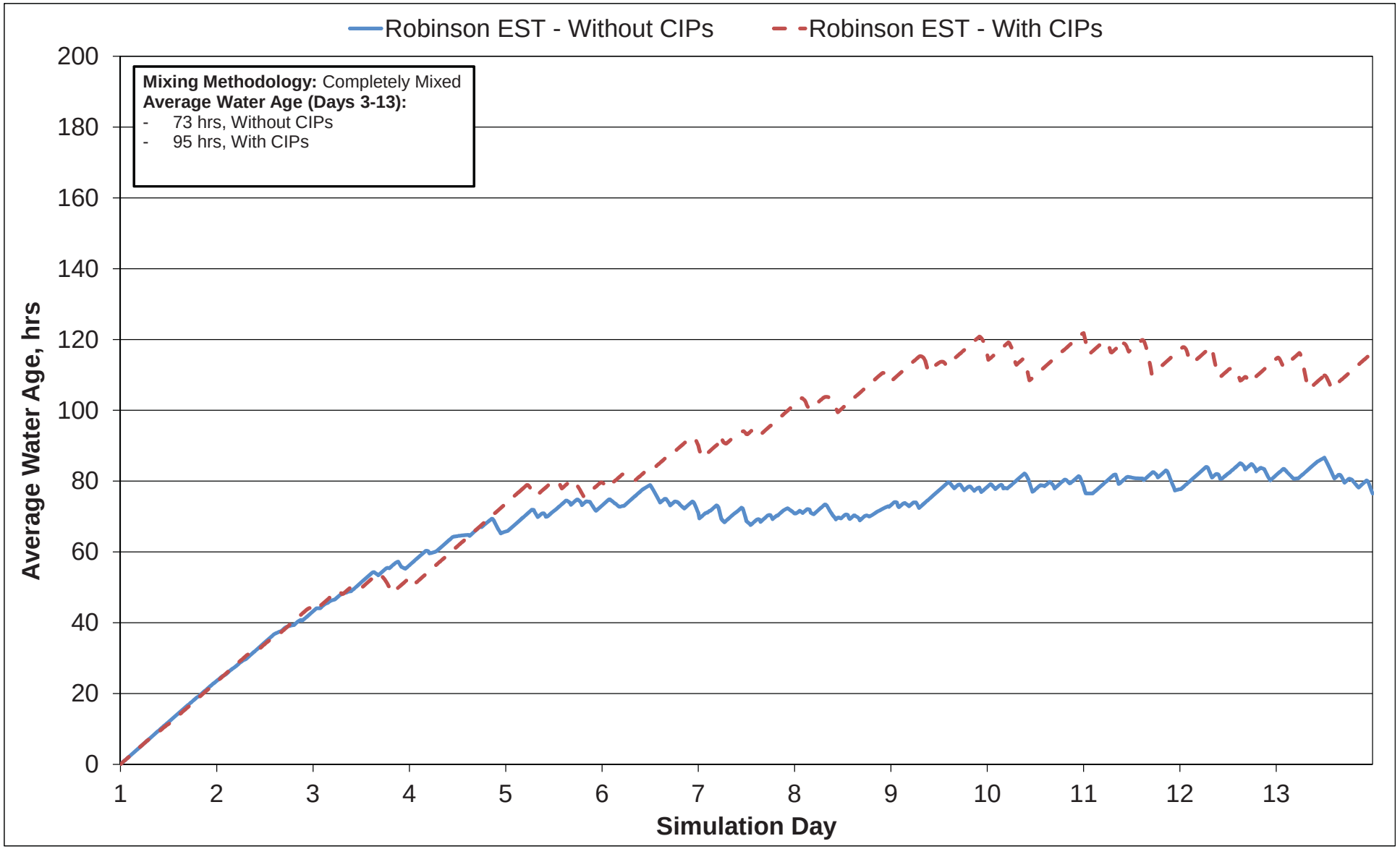
Appendix H – EST Water Age Modeling Results

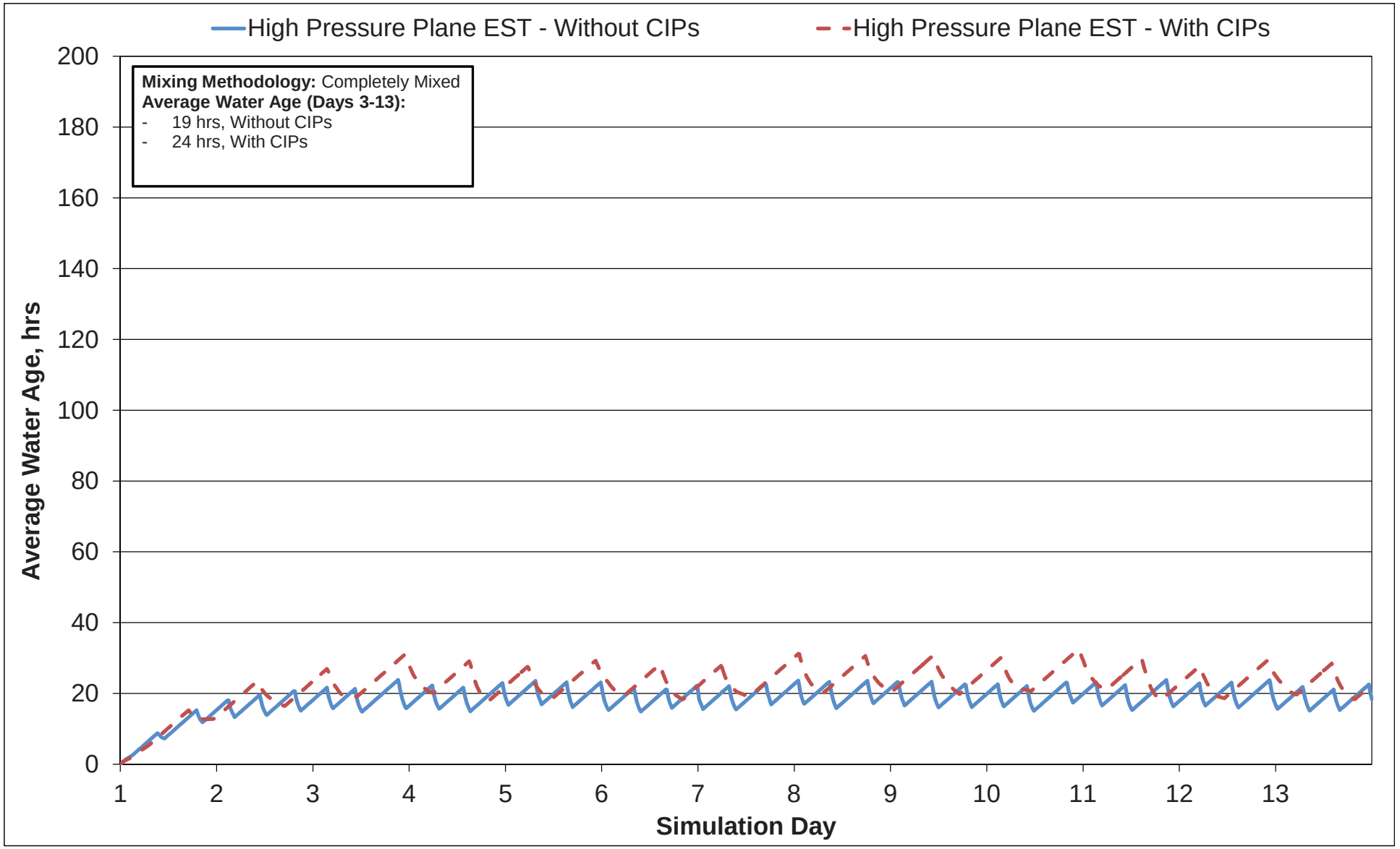

Boyd EST - Without CIPs
Boyd EST - With CIPs
Mixing Methodology: First-in First-Out
Average Water Age (Days 3-13):
- 83 hrs, Without CIPs
- 78 hrs, With CIPs
Average Water Age, hrs
Simulation Day
0
20
40
60
80
100
120
140
160
180
200
1
2
3
4
5
6
7
8
9
10
11
12
13


Brookhaven EST - Without CIPs
Brookhaven EST - With CIPs
Mixing Methodology: First-in First-Out
Average Water Age (Days 3-13):
- 72 hrs, Without CIPs
- 55 hrs, With CIPs
Average Water Age, hrs
Simulation Day
0
20
40
60
80
100
120
140
160
180
200
1
2
3
4
5
6
7
8
9
10
11
12
13


Cascade EST - Without CIPs
Cascade EST - With CIPs
Mixing Methodology: First-in First-Out
Average Water Age (Days 3-13):
- 75 hrs, Without CIPs
- 85 hrs, With CIPs
Average Water Age, hrs
Simulation Day
0
20
40
60
80
100
120
140
160
180
200
1
2
3
4
5
6
7
8
9
10
11
12
13


Future EST in Southeast Part of MDS - With CIPs
Mixing Methodology: Completely Mixed
Average Water Age (Days 3-13):
- 41 hrs, With CIPs
Average Water Age, hrs
0
20
40
60
80
100
120
140
160
180
200
1
2
3
4
5
6
7
8
9
10
11
12
13
Simulation Day


Robinson EST - Without CIPs
Robinson EST - With CIPs
Mixing Methodology: Completely Mixed
Average Water Age (Days 3-13):
- 73 hrs, Without CIPs
- 95 hrs, With CIPs
Average Water Age, hrs
0
20
40
60
80
100
120
140
160
180
200
1
2
3
4
5
6
7
8
9
10
11
12
13
Simulation Day


High Pressure Plane EST - Without CIPs
High Pressure Plane EST - With CIPs
Mixing Methodology: Completely Mixed
Average Water Age (Days 3-13):
- 19 hrs, Without CIPs
- 24 hrs, With CIPs
Average Water Age, hrs
0
20
40
60
80
100
120
140
160
180
200
1
2
3
4
5
6
7
8
9
10
11
12
13
Simulation Day

Appendix I – Capital Improvements Plan Detailed Opinions of Probable Construction Cost

Project Code			Description	Linear Feet of Pipe									City Cost	Developer Cost	Driver	Project Priority
				6"	8"	12"	16"	24"	30"	36"	42"	Total				
W	-	5	Water Line Segment D (Phase 4)	0	0	0	0	8,500	0	0	0	8,500	3,874,000		High Water Age	Highest
F	-	39	Upsize 8" Line to 12" along Meadowood Blvd	0	1,000	1,030	0	0	0	0	0	2,030	526,000		Low Fireflow	High
H	-	1	Complete 12" Line Along 36th Ave. NE	0	0	4,080	0	0	0	0	0	4,080	1,147,000		High Headloss	High
H	-	3	Upsize 6" Line to 12" at Alameda St. and Vicksburg Ave.	0	0	105	0	0	0	0	0	105	51,000		High Headloss	High
H	-	4	Upsize Lines to Boyd Tower	0	0	300	800	0	0	0	0	1,100	390,000		High Headloss	High
M	-	5	WL Replacement: Flood: Rock Creek to Venture	0	0	3,400	6,400	0	0	0	0	9,800	3,355,000		Maintenance	High
M	-	7	Robinson Waterline: 24th Ave. NE to 24th Ave. NW	0	0	0	0	0	21,850	0	0	21,850	11,576,000		Maintenance	High
M	-	8	Waterline Replacement: Interstate Drive	0	5,680	0	0	0	0	0	0	5,680	1,140,000		Maintenance	High
M	-	11	Water Line Replacement: Gray St. & Tonhawa St.	430	4,000	1,800	0	0	0	0	0	6,230	1,002,000		Maintenance	High
M	-	12	Water Line Replacement: West of Campus	8,150	1,550	0	0	0	0	0	0	9,700	1,658,000		Maintenance	High
M	-	13	Alameda Waterline Replacement: S. Poncha Ave. to 24th Ave. NE	0	0	0	0	8,500	200	0	0	8,700	3,741,000		Maintenance	High
M	-	15	Robinson Waterline Replacement: WTP to 24th Ave NE	0	0	0	0	80	0	0	2,600	2,680	3,338,000		Maintenance	High
M	-	17	Replace Upper Pressure Zone Pumps	0	0	0	0	0	0	0	0	0	-		Maintenance	High
P	-	1	Extend Upper PZ to Hollister Trail and Palomino Way	0	425	0	0	0	0	0	0	425	142,000		Low Pressure	High
P	-	4	Include Meadowood Blvd in HPP	0	0	0	0	0	0	0	0	0	0		Low Pressure	High
P	-	5	Future Elevated Storage Tank in MDS	0	0	0	0	800	0	0	0	800	3,638,000		Low Pressure	High
F	-	4	Upsize 6" Line to 8" along Harriett Road	0	1,160	0	0	0	0	0	0	1,160	276,000		Low Fireflow	Medium
F	-	6	Complete 6" loop along Thedford Drive	425	0	0	0	0	0	0	0	425	125,000		Low Fireflow	Medium
F	-	8	Upsize 6" Line to 8" along Willow Creek Drive	0	705	0	0	0	0	0	0	705	200,000		Low Fireflow	Medium
F	-	9	Extend the HPP to Redwood Drive	0	600	0	0	0	0	0	0	600	162,000		Low Fireflow	Medium
F	-	16	Upsize 6" Line to 8" Along Eisenhower Rd	500	2,010	0	0	0	0	0	0	2,510	557,000		Low Fireflow	Medium
F	-	17	Connect 6" dead end to 12" across N. Porter Ave.	85	0	0	0	0	0	0	0	85	39,000		Low Fireflow	Medium
F	-	25	Upsize 6" Line to 8" along Pinebrooke Court	0	590	0	0	0	0	0	0	590	151,000		Low Fireflow	Medium
F	-	26	Connect 6" Lines at Westport Dr. and Fairway Dr.	700	0	0	0	0	0	0	0	700	147,000		Low Fireflow	Medium
F	-	27	Upsize 4" Line to 6" along Foreman Avenue	1,150	0	0	0	0	0	0	0	1,150	254,000		Low Fireflow	Medium
F	-	28	8" Line along E Main St. Near Beacon Ave.	0	1,180	0	0	0	0	0	0	1,180	288,000		Low Fireflow	Medium
F	-	30	Upsize 6" Line to 8" along Jean Marie Dr.	0	1,875	0	0	0	0	0	0	1,875	437,000		Low Fireflow	Medium
F	-	32	Extend 6" line along Elm Avenue to W. Symmes St.	220	0	0	0	0	0	0	0	220	70,000		Low Fireflow	Medium
F	-	34	Connect Dead-End 6" Line in The Pines Apartments	450	0	0	0	0	0	0	0	450	110,000		Low Fireflow	Medium
F	-	35	Upsize 4" Lines to 6" along Justin Dr., Bill Carrol Dr., and Cara Jo Dr.	650	0	0	0	0	0	0	0	650	157,000		Low Fireflow	Medium
F	-	41	Connect 6" Dead-End Line to McGee Drive	600	0	0	0	0	0	0	0	600	137,000		Low Fireflow	Medium
F	-	42	Complete 6" Loop along Brookside Drive	200	0	0	0	0	0	0	0	200	85,000		Low Fireflow	Medium
F	-	43	Upsize 6" Line to 8" along Rolling Hills Street	0	820	0	0	0	0	0	0	820	221,000		Low Fireflow	Medium
F	-	44	Upsize 6" Line to 8" along Whispering Pines Drive	0	460	0	0	0	0	0	0	460	126,000		Low Fireflow	Medium
H	-	5	Upsize 6" Line to 8" along Chautauqua Ave.	0	400	0	0	0	0	0	0	400	131,000		High Headloss	Medium
M	-	1	WL Replacement: Classen/Flood: Hwy 9 to Indian Hills	0	0	12,000	24,100	0	0	0	0	36,100	11,975,000		Maintenance	Medium
M	-	2	Water Dist. System Improvements - Segment G	0	0	7,280	0	0	0	0	0	7,280	1,682,000		Maintenance	Medium
M	-	3	WL Replacement: Franklin: RR to 12th NW	0	0	2,170	0	0	0	0	0	2,170	584,000		Maintenance	Medium
M	-	6	Water Line Replacement: Hall Park, Phase 2	4,600	0	0	0	0	0	0	0	4,600	742,000		Maintenance	Medium
M	-	9	WL Replacement: W. Main: Berry to Interstate Drive	0	5,170	6,830	0	0	0	0	0	12,000	3,025,000		Maintenance	Medium
M	-	10	Waterline Replacement: Flood Avenue	0	6,130	0	0	0	0	0	0	6,130	1,505,000		Maintenance	Medium
M	-	14	24th Ave NE Waterline Replacement: Alameda St. to Robinson St.	0	0	0	0	0	0	5,200	0	5,200	3,920,000		Maintenance	Medium
M	-	16	Robinson PZ Waterline Replacement: WTP to 24th Ave NE	0	0	0	0	2,590	0	0	0	2,590	1,177,000		Maintenance	Medium
P	-	3	Expand Upper PZ to Include Crest Place	0	0	0	0	0	0	0	0	0	0		Low Pressure	Medium
W	-	2	New 12" pipe on Nantucket Blvd	0	0	240	0	0	0	0	0	240	81,000		High Water Age	Medium
F	-	1	Loop 6" Line on Della St NW and NW Sterling Ct	2,495	0	0	0	0	0	0	0	2,495	547,000		Low Fireflow	Low
F	-	10	Upsize 6" Line to 8" along Briarcliff Rd	0	1,170	0	0	0	0	0	0	1,170	53,000		Low Fireflow	Low
F	-	12	Upsize 6" Line to 8" along Hillside Drive	0	910	0	0	0	0	0	0	910	240,000		Low Fireflow	Low
F	-	14	Upsize 6" Line to 8" along Valley Ridge Road	0	1,250	0	0	0	0	0	0	1,250	301,000		Low Fireflow	Low
F	-	20	Upsize 6" Line to 8" along Wheaton Dr	0	300	0	0	0	0	0	0	300	99,000		Low Fireflow	Low
F	-	22	Upsize 6" Line to 8" along Hunter's Hill Road	0	1,440	0	0	0	0	0	0	1,440	357,000		Low Fireflow	Low
F	-	24	Upsize 6" Line to 8" along Cedar Ridge Drive	0	470	0	0	0	0	0	0	470	127,000		Low Fireflow	Low
F	-	31	Upsize 6" Line to 8" along McFarland St.	0	530	0	0	0	0	0	0	530	139,000		Low Fireflow	Low
F	-	36	Upsize 6" Lines to 8" along Brandon Cr., Sheffield Dr., Chamblee Dr., Surrey Dr., & Village Dr.	0	1,725	0	0	0	0	0	0	1,725	416,000		Low Fireflow	Low
F	-	37	Upsize 6" Line to 8" along Columbia Cr., Atlanta Cr., Montgomery Cr., Raleigh Cr., and Mobile Cr.	0	1,705	0	0	0	0	0	0	1,705	511,000		Low Fireflow	Low
F	-	38	Upsize 6" Line to 8" along Peppertree Ct.	0	680	0	0	0	0	0	0	680	195,000		Low Fireflow	Low
F	-	40	Upsize 6" Line to 8" South of Briggs St.	0	410	0	0	0	0	0	0	410	132,000		Low Fireflow	Low
F	-	45	Upsize 6" Line to 8" along Holly Cir.	0	50	0	0	0	0	0	0	50	43,000		Low Fireflow	Low
F	-	46	Extend 6" Line Along Twin Creek Village Apartments	360	0	0	0	0	0	0	0	360	95,000		Low Fireflow	Low
H	-	2	Upsize 12" Line to 16" along Robinson from WTP to 36th Ave. NE	0	0	0	2,730	0	0	0	0	2,730	1,073,000		High Headloss	Low
M	-	4	Waterline Improvement: OKC Second Feed	0	0	0	0	31,680	0	0	0	31,680	16,077,000		Maintenance	Low
P	-	2	Add 5th 250 HP Pump to MDS PS	0	0	0	0	0	0	0	0	0	260,000		Low Pressure	Low
W	-	1	Complete 6" loop along Teton Oval culdesac	120	0	0	0	0	0	0	0	120	53,000		High Water Age	Low
W	-	3	Upsize 6" Line to 8" along Shrill St.	0	2,890	25	0	0	0	0	0	2,915	683,000		High Water Age	Low
W	-	4	Connect 6" Lines at NW corner of 24th Avenue NW and W. Main Street	540	0	0	0	0	0	0	0	540	144,000		High Water Age	Low
F	-	2	Upsize 6" Line to 8" along Moor Drive and Nicole Place	0	790	0	0	0	0	0	0	790	215,000		Low Fireflow	Very Low
F	-	3	Upsize 6" Line to 8" along Nicole Circle	0	675	0	0	0	0	0	0	675	184,000		Low Fireflow	Very Low
F	-	5	Upsize 6" Line to 8" along Bright St., Glisten Ct., Ripple Ave., & Glisten St.	0	1,615	0	0	0	0	0	0	1,615	395,000		Low Fireflow	Very Low
F	-	7	Upsize 6" Line to 8" along Sloane St., Shipley Dr., Bishop's Ct., & Victoria Dr.	0	1,600	0	0	0	0	0	0	1,600	392,000		Low Fireflow	Very Low
F	-	11	Upsize 6" Line to 8" off of Brookhaven Blvd	0	345	0	0	0	0	0	0	345	101,000		Low Fireflow	Very Low
F	-	13	Upsize 6" Line to 8" on Northhampton Court	334	0	0	0	0	0	0	0	334	108,000		Low Fireflow	Very Low
F	-	15	Upsize 6" Line to 8" along Warwick Dr. and Waverly Dr.	0	1,970	0	0	0	0	0	0	1,970	473,000		Low Fireflow	Very Low
F	-	18	Upsize 6" Line to 8" along Wind Hill Rd	0	400	0	0	0	0	0	0	400	119,000		Low Fireflow	Very Low
F	-	19	Upsize 6" Line to 8" along Ridgemont Circle	0	460	0	0	0	0	0	0	460	131,000		Low Fireflow	Very Low
F	-	21	Upsize 6" Line to 8" along Sundance Ct.	0	360	0	0	0	0	0	0	360	105,000		Low Fireflow	Very Low
F	-	23	Upsize 6" Line to 8" along Innsbrook Court	0	350	0	0	0	0	0	0	350	102,000		Low Fireflow	Very Low
F	-	29	Upsize 6" Line to 8" along Riverwalk Ct.	0	825	0	0	0	0	0	0	825	206,000		Low Fireflow	Very Low
F	-	33	Upsize 6" Line to 8" along Schulze Dr. and Creston Way	0	1,425	0	0	0	0	0	0	1,425	337,000		Low Fireflow	Very Low
F	-	47	Upsize 6" Lines to 8" along White Oak Cir., Oak Vista Cir., & Bois-de-arc Cir.	0	1,170	0	0	0	0	0	0	1,170	286,000		Low Fireflow	Very Low
F	-	48	Loop 6" Line along Black Locust Ct & Black Locust Place	985	1,055	0	0	0	0	0	0	2,040	459,000		Low Fireflow	Very Low
D	-	1	12" Loop along 48th Avenue NW	0	1,175	6,240	0	0	0	0	0	7,415	0	1,877,000	Future Development	-
D	-	2	Install 12" line along 48th Ave NW between W Rock Creek Rd and Las Colinas Ln	0	0	2,475	0	0	0	0	0	2,475	0	663,000	Future Development	-
D	-	3	Waterline Segment H	0	0	1,500	0	0	0	0	0	1,500	0	368,000	Future Development	-
D	-	4	Add 6" line near Wyckham Pl.	675	0	0	0	0	0	0	0	675	0	169,000	Future Development	-
D	-	5	Add 6" Line Along Kingswood Dr	340	0	0	0	0	0	0	0	340	0	89,000	Future Development	-
D	-	6	Extend 8" Lines to Harbor Dr. and Lyric St.	0	1,335	0	0	0	0	0	0	1,335	0	335,000	Future Development	-
D	-	7	16" Destin Landing Development	0	0	0	8,000	0	0	0	0	8,000	0	2,853,000	Future Development	-

CITY OF NORMAN

APAI PROJECT NUMBER	D-1		
PROJECT TITLE:	12" Loop along 48th Avenue NW	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Future Development	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	-

DETAILED PROJECT DESCRIPTION:

Add 12" line to loop down 48th Avenue NW to accomodate future development and reduce water age in this part of the system. The total length of 8" line is approximately 1,175 LF. The total length of 12" line is approximately 6,240 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,175	LF	$ 68	$ 79,313
3	12-inch Pipe	6,240	LF	$ 84	$ 521,040
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	3	EA	$ 1,452	$ 4,355
15	12-inch Gate Valve with Valve Box	13	EA	$ 2,543	$ 33,055
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	4	EA	$ 5,000	$ 20,000
21	New Fire Hydrant Assembly	13	EA	$ 5,164	$ 67,128
22	Remove Existing Fire Hydrant Assembly	8	EA	$ 601	$ 4,805
23	Pipeline Markers	7	EA	$ 150	$ 1,050
24	Utility location	7,415	LF	$ 1	$ 7,415
25	Trench Safety for pipeline	7,415	LF	$ 2	$ 14,830
26	Construction Site Restoration and Seeding	12,359	SY	$ 3.58	$ 44,286
27	Pavement Repair	1,236	SY	$ 128	$ 158,208
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 10,000	$ 10,000
31	Erosion Control	1	LS	$ 5,000	$ 5,000
32	Mobilization and Insurance (5%)	1	LS	$ 50,000	$ 50,000
				Subtotal	$ 1,032,000
				Contingency (30%)	$ 310,000
				Construction	**$ 1,342,000**
				Design (15%)	**$ 201,000**
				ROW	**$ 334,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	201,000								
	Const	1,342,000								
	ROW	334,000								
	Total	1,877,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	201,000			201,000
ROW	334,000			334,000
Utilities				0
Const.	1,342,000			1,342,000
Materials				0
Total	1,877,000	0	0	1,877,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	D-2		
PROJECT TITLE:	Install 12" line along 48th Ave NW between W Rock Creek Rd and Las Colinas Ln	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Future Development	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	-

DETAILED PROJECT DESCRIPTION:

Install 12" line along 48th Ave NW between W Rock Creek Rd and Las Colinas Ln. Length of segment is approximately 2,475 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe	2,475	LF	$ 84	$ 206,663
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	5	EA	$ 2,543	$ 12,713
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	2	EA	$ 5,000	$ 10,000
21	New Fire Hydrant Assembly	5	EA	$ 5,164	$ 25,818
22	Remove Existing Fire Hydrant Assembly	3	EA	$ 601	$ 1,802
23	Pipeline Markers	2	EA	$ 150	$ 300
24	Utility location	2,475	LF	$ 1	$ 2,475
25	Trench Safety for pipeline	2,475	LF	$ 2	$ 4,950
26	Construction Site Restoration and Seeding	4,125	SY	$ 3.58	$ 14,781
27	Pavement Repair	413	SY	$ 128	$ 52,864
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 18,000	$ 18,000
				Subtotal	$ 369,000
				Contingency (30%)	$ 111,000
				Construction	**$ 480,000**
				Design (15%)	**$ 72,000**
				ROW	**$ 111,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	72,000								
	Const	480,000								
	ROW	111,000								
	Total	663,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	72,000			72,000
ROW	111,000			111,000
Utilities				0
Const.	480,000			480,000
Materials				0
Total	663,000	0	0	663,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

				APAI PROJECT NUMBER	D-3		
PROJECT TITLE:	Waterline Segment H			PROJECT TYPE:	Water System		Improvt.
PROJ. CATEGORY:	Water Distribution System			PROJECT NUMBER:	WA		
DEPARTMENT:	Utilities			ACCOUNT NUMBER:	031-9360-462		
MANAGER:	Mark Daniels			BEGIN & END DATES:	7/1/22	to	6/30/23
WARD(s):	8	6		LIFE EXPECTANCY:	50 Years		
PROJECT DRIVER:	Future Development			PREVIOUS CITY PROJECT:	Yes		
				PROJECT PRIORITY:	-		

DETAILED PROJECT DESCRIPTION:

The original Segment H project included 3,000 LF of 12-inch waterline along 12th Avenue NW between Rock Creek and Tecumseh. A portion of this project has been completed, but approximately 1,500 LF has yet to be replaced. This project would replace the remaining section.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe	1,500	LF	$ 84	$ 125,250
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	3	EA	$ 2,543	$ 7,628
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	-	EA	$ 5,164	$ -
22	Remove Existing Fire Hydrant Assembly	-	EA	$ 601	$ -
23	Pipeline Markers	2	EA	$ 150	$ 300
24	Utility location	1,500	LF	$ 1	$ 1,500
25	Trench Safety for pipeline	1,500	LF	$ 2	$ 3,000
26	Construction Site Restoration and Seeding	2,500	SY	$ 3.58	$ 8,958
27	Pavement Repair	250	SY	$ 128	$ 32,000
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 10,000	$ 10,000
				Subtotal	$ 201,000
				Contingency (30%)	$ 60,000
				Construction	**$ 261,000**
				Design (15%)	**$ 39,000**
				ROW	**$ 68,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	39,000								
	Const	261,000								
	ROW	68,000								
	Total	368,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	39,000			39,000
ROW	68,000			68,000
Utilities				0
Const.	261,000			261,000
Materials				0
Total	368,000	0	0	368,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Add 6" line near Wyckham Pl.	APAI PROJECT NUMBER	D-4
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Future Development	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	-

DETAILED PROJECT DESCRIPTION:

Add 6" line at the end of Wyckham Pl. to improve FF at nodes 2275 and 2274. FF increased from <1,000 gpm to 1,400 gpm. Line segment is approximately 675 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	675	LF	$ 53	$ 35,775
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	675	LF	$ 1	$ 675
25	Trench Safety for pipeline	675	LF	$ 2	$ 1,350
26	Construction Site Restoration and Seeding	1,125	SY	$ 3.58	$ 4,031
27	Pavement Repair	113	SY	$ 128	$ 14,464
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 5,000	$ 5,000
				Subtotal	$ 93,000
				Contingency (30%)	$ 28,000
				Construction	**$ 121,000**
				Design (15%)	**$ 18,000**
				ROW	**$ 30,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	18,000								
	Const	121,000								
	ROW	30,000								
	Total	169,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	18,000			18,000
ROW	30,000			30,000
Utilities				0
Const.	121,000			121,000
Materials				0
Total	169,000	0	0	169,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	D-5		
PROJECT TITLE:	Add 6" Line Along Kingswood Dr	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Future Development	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	-

DETAILED PROJECT DESCRIPTION:

This project would add a 6" PVC line along Kingswood Dr to connect the existing 6" lines between Summit Hollow Dr. and Richardson Dr. This segment would be approximately 340 ft long.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	340	LF	$ 53	$ 18,020
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	-	EA	$ 601	$ -
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	340	LF	$ 1	$ 340
25	Trench Safety for pipeline	340	LF	$ 2	$ 680
26	Construction Site Restoration and Seeding	567	SY	$ 3.58	$ 2,032
27	Pavement Repair	-	SY	$ 128	$ -
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	-	LS	$ 5,000	$ -
31	Erosion Control	1	LS	$ 1,000	$ 1,000
32	Mobilization and Insurance (5%)	1	LS	$ 3,000	$ 3,000
				Subtotal	$ 49,000
				Contingency (30%)	$ 15,000
				Construction	**$ 64,000**
				Design (15%)	**$ 10,000**
				ROW	**$ 15,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	10,000								
	Const	64,000								
	ROW	15,000								
	Total	89,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	10,000			10,000
ROW	15,000			15,000
Utilities				0
Const.	64,000			64,000
Materials				0
Total	89,000	0	0	89,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Extend 8" Lines to Harbor Dr. and Lyric St.	APAI PROJECT NUMBER	D-6
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Future Development	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	-

DETAILED PROJECT DESCRIPTION:

Extend 8" lines to Harbor Drive & Lyric Street from existing 12" mains along and running n/s crossing E. Cedar Lane. This will address low FF at four nodes in this neighborhood and link neighborhood to future development to the east and south. This will also reduce water age by extending dead-end lines. (Nodes: 15260, 15188, 15189 & 15285 - increase FF from range of 1,152-1,140 gpm to range of 2,057-3,106 gpm). Length of line segment is approximately 1,335 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,335	LF	$ 68	$ 90,113
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	3	EA	$ 1,452	$ 4,355
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	3	EA	$ 5,164	$ 15,491
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	1,335	LF	$ 1	$ 1,335
25	Trench Safety for pipeline	1,335	LF	$ 2	$ 2,670
26	Construction Site Restoration and Seeding	2,225	SY	$ 3.58	$ 7,973
27	Pavement Repair	223	SY	$ 128	$ 28,544
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 9,000	$ 9,000
				Subtotal	$ 184,000
				Contingency (30%)	$ 55,000
				Construction	**$ 239,000**
				Design (15%)	**$ 36,000**
				ROW	**$ 60,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	36,000								
	Const	239,000								
	ROW	60,000								
	Total	335,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	36,000			36,000
ROW	60,000			60,000
Utilities				0
Const.	239,000			239,000
Materials				0
Total	335,000	0	0	335,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	16" Destin Landing Development	APAI PROJECT NUMBER	D-7
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Future Development	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	-

DETAILED PROJECT DESCRIPTION:

This project would add a 16" line south along John Saxon Rd, east to 36th Ave SE, south to E Cedar Lane Rd, then west along E. Cedar Lane Rd for the Destin Landing Development. The approximate length of this segment is 8,000 LF. This project would be a developer paid project.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe	8,000	LF	$ 138	$ 1,100,000
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	16	EA	$ 4,446	$ 71,136
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	4	EA	$ 5,000	$ 20,000
21	New Fire Hydrant Assembly	14	EA	$ 5,164	$ 72,291
22	Remove Existing Fire Hydrant Assembly	-	EA	$ 601	$ -
23	Pipeline Markers	8	EA	$ 150	$ 1,200
24	Utility location	8,000	LF	$ 1	$ 8,000
25	Trench Safety for pipeline	8,000	LF	$ 2	$ 16,000
26	Construction Site Restoration and Seeding	13,334	SY	$ 3.58	$ 47,780
27	Pavement Repair	1,334	SY	$ 128	$ 170,752
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 30,000	$ 30,000
30	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
31	Erosion Control	1	LS	$ 9,000	$ 9,000
32	Mobilization and Insurance (5%)	1	LS	$ 80,000	$ 80,000
				Subtotal	$ 1,668,000
				Contingency (30%)	$ 500,000
				Construction	**$ 2,168,000**
				Design (15%)	**$ 325,000**
				ROW	**$ 360,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	325,000								
	Const	2,168,000								
	ROW	360,000								
	Total	2,853,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	325,000			325,000
ROW	360,000			360,000
Utilities				0
Const.	2,168,000			2,168,000
Materials				0
Total	2,853,000	0	0	2,853,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-1		
PROJECT TITLE:	Loop 6" Line on Della St NW and NW Sterling Ct	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Looped a 6" line along Delta St. NW & NW Sterling Court to address FF issues on these streets. The total length of 6" line is approximately 2,495 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	2,495	LF	$ 53	$ 132,235
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	5	EA	$ 1,087	$ 5,433
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	2	EA	$ 5,000	$ 10,000
21	New Fire Hydrant Assembly	5	EA	$ 5,164	$ 25,818
22	Remove Existing Fire Hydrant Assembly	3	EA	$ 601	$ 1,802
23	Pipeline Markers	2	EA	$ 150	$ 300
24	Utility location	2,495	LF	$ 1	$ 2,495
25	Trench Safety for pipeline	2,495	LF	$ 2	$ 4,990
26	Construction Site Restoration and Seeding	4,159	SY	$ 3.58	$ 14,903
27	Pavement Repair	416	SY	$ 128	$ 53,248
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 10,000	$ 10,000
31	Erosion Control	1	LS	$ 5,000	$ 5,000
32	Mobilization and Insurance (5%)	1	LS	$ 14,000	$ 14,000
				Subtotal	$ 291,000
				Contingency (30%)	$ 87,000
				Construction	**$ 378,000**
				Design (15%)	**$ 57,000**
				ROW	**$ 112,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	57,000								
	Const	378,000								
	ROW	112,000								
	Total	547,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	57,000			57,000
ROW	112,000			112,000
Utilities				0
Const.	378,000			378,000
Materials				0
Total	547,000	0	0	547,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 6" Line to 8" along Moor Drive and Nicole Place	APAI PROJECT NUMBER	F-2
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

Upsizing 6" line to 8" along Moor Drive and Nicole Place to address low FF in culdesac of Nicole Place. FF increases from 1008 to 1730 gpm at Node 3187. The length of this pipeline segment is approximately 790 LF

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	790	LF	$ 68	$ 53,325
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	790	LF	$ 1	$ 790
25	Trench Safety for pipeline	790	LF	$ 2	$ 1,580
26	Construction Site Restoration and Seeding	1,317	SY	$ 3.58	$ 4,719
27	Pavement Repair	132	SY	$ 128	$ 16,896
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 6,000	$ 6,000
				Subtotal	$ 120,000
				Contingency (30%)	$ 36,000
				Construction	**$ 156,000**
				Design (15%)	**$ 23,000**
				ROW	**$ 36,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	23,000								
	Const	156,000								
	ROW	36,000								
	Total	215,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	23,000			23,000
ROW	36,000			36,000
Utilities				0
Const.	156,000			156,000
Materials				0
Total	215,000	0	0	215,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-3		
PROJECT TITLE:	Upsize 6" Line to 8" along Nicole Circle	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

Addressing low FF at hydrant on the culdesac of Nicole Circle by increasing line from 6" to 8". FF at Node 652 increases from 996 to 1896 gpm. Length of pipeline segment is approximately 675 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	675	LF	$ 68	$ 45,563
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	675	LF	$ 1	$ 675
25	Trench Safety for pipeline	675	LF	$ 2	$ 1,350
26	Construction Site Restoration and Seeding	1,125	SY	$ 3.58	$ 4,031
27	Pavement Repair	113	SY	$ 128	$ 14,464
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 5,000	$ 5,000
				Subtotal	$ 103,000
				Contingency (30%)	$ 31,000
				Construction	**$ 134,000**
				Design (15%)	**$ 20,000**
				ROW	**$ 30,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	20,000								
	Const	134,000								
	ROW	30,000								
	Total	184,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	20,000			20,000
ROW	30,000			30,000
Utilities				0
Const.	134,000			134,000
Materials				0
Total	184,000	0	0	184,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-4		
PROJECT TITLE:	Upsize 6" Line to 8" along Harriett Road	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Upsize existing 6" line to 8" to address low FF at hydrant on dead-end node on Harriett Road. FF at Node 536 increases from 1060 to 2340 gpm. The length of line segment is approximately 1,160 LF

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,160	LF	$ 68	$ 78,300
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	3	EA	$ 1,452	$ 4,355
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	1,160	LF	$ 1	$ 1,160
25	Trench Safety for pipeline	1,160	LF	$ 2	$ 2,320
26	Construction Site Restoration and Seeding	1,934	SY	$ 3.58	$ 6,930
27	Pavement Repair	194	SY	$ 128	$ 24,832
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 8,000	$ 8,000
				Subtotal	$ 150,000
				Contingency (30%)	$ 45,000
				Construction	**$ 195,000**
				Design (15%)	**$ 29,000**
				ROW	**$ 52,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	29,000								
	Const	195,000								
	ROW	52,000								
	Total	276,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	29,000			29,000
ROW	52,000			52,000
Utilities				0
Const.	195,000			195,000
Materials				0
Total	276,000	0	0	276,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-5		
PROJECT TITLE:	Upsize 6" Line to 8" along Bright St., Glisten Ct., Ripple Ave., & Glisten St.	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

No

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,615	LF	$ 68	$ 109,013
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	4	EA	$ 1,452	$ 5,807
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	3	EA	$ 5,164	$ 15,491
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	2	EA	$ 150	$ 300
24	Utility location	1,615	LF	$ 1	$ 1,615
25	Trench Safety for pipeline	1,615	LF	$ 2	$ 3,230
26	Construction Site Restoration and Seeding	2,692	SY	$ 3.58	$ 9,646
27	Pavement Repair	270	SY	$ 128	$ 34,560
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 11,000	$ 11,000
				Subtotal	$ 215,000
				Contingency (30%)	$ 65,000
				Construction	**$ 280,000**
				Design (15%)	**$ 42,000**
				ROW	**$ 73,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	42,000								
	Const	280,000								
	ROW	73,000								
	Total	395,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	42,000			42,000
ROW	73,000			73,000
Utilities				0
Const.	280,000			280,000
Materials				0
Total	395,000	0	0	395,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Complete 6" loop along Thedford Drive	APAI PROJECT NUMBER	F-6
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Complete 6" line loop along Thedford Drive to improve water age and increase low FF at previously dead end nodes. (Node 993 went from 926 to 2054 gpm. Node 996 went from 1,016 to 1,333 gpm. Node 990 went from 1,225 to 1,891 gpm.). Line segment is approximately 425 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	425	LF	$ 53	$ 22,525
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	425	LF	$ 1	$ 425
25	Trench Safety for pipeline	425	LF	$ 2	$ 850
26	Construction Site Restoration and Seeding	709	SY	$ 3.58	$ 2,541
27	Pavement Repair	71	SY	$ 128	$ 9,088
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 4,000	$ 4,000
				Subtotal	$ 71,000
				Contingency (30%)	$ 21,000
				Construction	**$ 92,000**
				Design (15%)	**$ 14,000**
				ROW	**$ 19,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	14,000								
	Const	92,000								
	ROW	19,000								
	Total	125,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	14,000			14,000
ROW	19,000			19,000
Utilities				0
Const.	92,000			92,000
Materials				0
Total	125,000	0	0	125,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 6" Line to 8" along Sloane St., Shipley Dr., Bishop's Ct., & Victoria Dr.	APAI PROJECT NUMBER	F-7
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

Upsize 6" lines to 8" along Sloane St, Shipley Dr, Bishop's Court, & Victoria Dr. to address low FF issues. Nodes 1341, 1345, 22065, & 22071 increased FF from a range of about 1074-1248 to 1425-1480 gpm. Total length of pipeline is approximately 1,600 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,600	LF	$ 68	$ 108,000
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	4	EA	$ 1,452	$ 5,807
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	3	EA	$ 5,164	$ 15,491
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	2	EA	$ 150	$ 300
24	Utility location	1,600	LF	$ 1	$ 1,600
25	Trench Safety for pipeline	1,600	LF	$ 2	$ 3,200
26	Construction Site Restoration and Seeding	2,667	SY	$ 3.58	$ 9,557
27	Pavement Repair	267	SY	$ 128	$ 34,176
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 11,000	$ 11,000
				Subtotal	$ 214,000
				Contingency (30%)	$ 64,000
				Construction	**$ 278,000**
				Design (15%)	**$ 42,000**
				ROW	**$ 72,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	42,000								
	Const	278,000								
	ROW	72,000								
	Total	392,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	42,000			42,000
ROW	72,000			72,000
Utilities				0
Const.	278,000			278,000
Materials				0
Total	392,000	0	0	392,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-8		
PROJECT TITLE:	Upsize 6" Line to 8" along Willow Creek Drive	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Upsizing 6" line to 8" along Willow Creek Drive to address low FF. Node 1353 will increase from 943 to 1435 gpm. Node 1316 will increase from 1178 to 2396 gpm. The length of this segment is approximately 705 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	705	LF	$ 68	$ 47,588
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	705	LF	$ 1	$ 705
25	Trench Safety for pipeline	705	LF	$ 2	$ 1,410
26	Construction Site Restoration and Seeding	1,175	SY	$ 3.58	$ 4,210
27	Pavement Repair	118	SY	$ 128	$ 15,104
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 6,000	$ 6,000
				Subtotal	$ 112,000
				Contingency (30%)	$ 34,000
				Construction	**$ 146,000**
				Design (15%)	**$ 22,000**
				ROW	**$ 32,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	22,000								
	Const	146,000								
	ROW	32,000								
	Total	200,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	22,000			22,000
ROW	32,000			32,000
Utilities				0
Const.	146,000			146,000
Materials				0
Total	200,000	0	0	200,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-9		
PROJECT TITLE:	Extend the HPP to Redwood Drive	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Extend the HPP boundary to include Redwood Drive (open valve on Redwood) & Leaning Elm Drive west of Woodbriar Dr. Provide a second feed to these streets via a new 8" line extended from the culdesac on Shadowlake Rd. This will increase FF at Nodes 1301, 1305, 1333, & 1331 from low levels (696 to 1,111 gpm) to > 1,500 gpm each. New 8" line is approximately 600 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	600	LF	$ 68	$ 40,500
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly		EA	$ 5,164	$ -
22	Remove Existing Fire Hydrant Assembly		EA	$ 601	$ -
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	600	LF	$ 1	$ 600
25	Trench Safety for pipeline	600	LF	$ 2	$ 1,200
26	Construction Site Restoration and Seeding	1,000	SY	$ 3.58	$ 3,583
27	Pavement Repair	100	SY	$ 128	$ 12,800
28	Storm Water Pollution Prevention Plan		LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 5,000	$ 5,000
				Subtotal	$ 90,000
				Contingency (30%)	$ 27,000
				Construction	**$ 117,000**
				Design (15%)	**$ 18,000**
				ROW	**$ 27,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	18,000								
	Const	117,000								
	ROW	27,000								
	Total	162,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	18,000			18,000
ROW	27,000			27,000
Utilities				0
Const.	117,000			117,000
Materials				0
Total	162,000	0	0	162,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 6" Line to 8" along Briarcliff Rd	APAI PROJECT NUMBER	F-10
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

This project would upsize the 6" line along Briarcliff Rd to a 8" line to increase FF to Node 01447. Upsizing this line will increase the available FF at Node 01447 from less than 1,000 gpm to greater than 1,800 gpm. This section of the line is approximately 1,170 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,170	LF	$ 68	$ 78,975
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	3	EA	$ 1,452	$ 4,355
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	1,170	LF	$ 1	$ 1,170
25	Trench Safety for pipeline	1,170	LF	$ 2	$ 2,340
26	Construction Site Restoration and Seeding	1,950	SY	$ 3.58	$ 6,988
27	Pavement Repair	195	SY	$ 128	$ 24,960
28	Storm Water Pollution Prevention Plan		LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 1,000	$ 1,000
32	Mobilization and Insurance (5%)	1	LS	$ 8,000	$ 8,000
				Subtotal	$ 161,000
				Contingency (30%)	$ 48,000
				Construction	**$ 209,000**
				Design (15%)	**$ 31,000**
				ROW	**$ 53,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	31,000								
	Const	209,000								
	ROW	53,000								
	Total	293,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	31,000			31,000
ROW	53,000			53,000
Utilities				0
Const.	209,000			209,000
Materials				0
Total	293,000	0	0	293,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-11		
PROJECT TITLE:	Upsize 6" Line to 8" off of Brookhaven Blvd	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

Upsized 6" line to 8" to address low FF node at culdesac off of Brookhaven Blvd just south of W. Rock Creek Road. (New street, so not likely to upsize.) FF at Node 24093 increases from 1,136 to 1,435 gpm. Length of line segment is approximately 345 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	345	LF	$ 68	$ 23,288
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	345	LF	$ 1	$ 345
25	Trench Safety for pipeline	345	LF	$ 2	$ 690
26	Construction Site Restoration and Seeding	575	SY	$ 3.58	$ 2,060
27	Pavement Repair	58	SY	$ 128	$ 7,424
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 3,000	$ 3,000
				Subtotal	$ 57,000
				Contingency (30%)	$ 17,000
				Construction	**$ 74,000**
				Design (15%)	**$ 11,000**
				ROW	**$ 16,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	11,000								
	Const	74,000								
	ROW	16,000								
	Total	101,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	11,000			11,000
ROW	16,000			16,000
Utilities				0
Const.	74,000			74,000
Materials				0
Total	101,000	0	0	101,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 6" Line to 8" along Hillside Drive	APAI PROJECT NUMBER	F-12
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Upsized 6" line to 8" on Hillside Drive to address low FF. Node 2188 went from 1072 to 1779 gpm. Node 2191 went from 1000 to 1852 gpm. This segment of line has a length of approximately 910 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	910	LF	$ 68	$ 61,425
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	910	LF	$ 1	$ 910
25	Trench Safety for pipeline	910	LF	$ 2	$ 1,820
26	Construction Site Restoration and Seeding	1,517	SY	$ 3.58	$ 5,436
27	Pavement Repair	152	SY	$ 128	$ 19,456
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 7,000	$ 7,000
				Subtotal	$ 133,000
				Contingency (30%)	$ 40,000
				Construction	**$ 173,000**
				Design (15%)	**$ 26,000**
				ROW	**$ 41,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	26,000								
	Const	173,000								
	ROW	41,000								
	Total	240,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	26,000			26,000
ROW	41,000			41,000
Utilities				0
Const.	173,000			173,000
Materials				0
Total	240,000	0	0	240,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 6" Line to 8" on Northhampton Court	APAI PROJECT NUMBER	F-13
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

Upsize 6" line to 8" on Northhampton Court to address low FF. Node 2345 went from 833.5 to 1323.8 gpm. Node 2344 went from 1290 to 1519.3 gpm. Pipeline segment length is approximately 334 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	334	LF	$ 53	$ 17,702
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	334	LF	$ 1	$ 334
25	Trench Safety for pipeline	334	LF	$ 2	$ 668
26	Construction Site Restoration and Seeding	557	SY	$ 3.58	$ 1,996
27	Pavement Repair	56	SY	$ 128	$ 7,168
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 3,000	$ 3,000
				Subtotal	$ 62,000
				Contingency (30%)	$ 19,000
				Construction	**$ 81,000**
				Design (15%)	**$ 12,000**
				ROW	**$ 15,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	12,000								
	Const	81,000								
	ROW	15,000								
	Total	108,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	12,000			12,000
ROW	15,000			15,000
Utilities				0
Const.	81,000			81,000
Materials				0
Total	108,000	0	0	108,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 6" Line to 8" along Valley Ridge Road	APAI PROJECT NUMBER	F-14
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Upsize 6" line to 8" along Valley Ridge Road to help feed better FF to Brookview and Valley Vis culdesac streets. Node 3450 FF increases from 1,227 to 1,733 gpm. Node 3446 FF increases from 1,316 to 1,886 gpm. Length of pipe segment is approximately 1,250 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,250	LF	$ 68	$ 84,375
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	3	EA	$ 1,452	$ 4,355
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	3	EA	$ 5,164	$ 15,491
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	1,250	LF	$ 1	$ 1,250
25	Trench Safety for pipeline	1,250	LF	$ 2	$ 2,500
26	Construction Site Restoration and Seeding	2,084	SY	$ 3.58	$ 7,468
27	Pavement Repair	209	SY	$ 128	$ 26,752
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 8,000	$ 8,000
				Subtotal	$ 164,000
				Contingency (30%)	$ 49,000
				Construction	**$ 213,000**
				Design (15%)	**$ 32,000**
				ROW	**$ 56,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	32,000								
	Const	213,000								
	ROW	56,000								
	Total	301,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	32,000			32,000
ROW	56,000			56,000
Utilities				0
Const.	213,000			213,000
Materials				0
Total	301,000	0	0	301,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-15		
PROJECT TITLE:	Upsize 6" Line to 8" along Warwick Dr. and Waverly Dr.	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

Upsize 6" line to 8" along Warwick Dr. & Waverly Dr. to address low FF hydrants. Node 3472 increases from 1006 to 1711 gpm. Node 3473 increases from 1,184 to 1,906 gpm. Length of segment is approximately 1,970 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,970	LF	$ 68	$ 132,975
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	4	EA	$ 1,452	$ 5,807
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	4	EA	$ 5,164	$ 20,655
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	2	EA	$ 150	$ 300
24	Utility location	1,970	LF	$ 1	$ 1,970
25	Trench Safety for pipeline	1,970	LF	$ 2	$ 3,940
26	Construction Site Restoration and Seeding	3,284	SY	$ 3.58	$ 11,768
27	Pavement Repair	329	SY	$ 128	$ 42,112
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 13,000	$ 13,000
				Subtotal	$ 257,000
				Contingency (30%)	$ 77,000
				Construction	**$ 334,000**
				Design (15%)	**$ 50,000**
				ROW	**$ 89,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	50,000								
	Const	334,000								
	ROW	89,000								
	Total	473,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	50,000			50,000
ROW	89,000			89,000
Utilities				0
Const.	334,000			334,000
Materials				0
Total	473,000	0	0	473,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-16		
PROJECT TITLE:	Upsize 6" Line to 8" Along Eisenhower Rd	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Fixed low FF at Node 02642 (451 gpm to 1,680 gpm) & Node 03246 (557 gpm to 2,385 gpm) by upsizing 6" line to 8" along Eisenhower Rd. Also, added a 6" line along W. Ridge Road to loop the dead end line along Eisenhower Rd.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	500	LF	$ 53	$ 26,500
2	8-inch Pipe	2,010	LF	$ 68	$ 135,675
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	5	EA	$ 1,452	$ 7,258
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	3	EA	$ 150	$ 450
24	Utility location	2,510	LF	$ 1	$ 2,510
25	Trench Safety for pipeline	2,510	LF	$ 2	$ 5,020
26	Construction Site Restoration and Seeding	4,184	SY	$ 3.58	$ 14,993
27	Pavement Repair	419	SY	$ 128	$ 53,632
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 1,000	$ 1,000
32	Mobilization and Insurance (5%)	1	LS	$ 15,000	$ 15,000
				Subtotal	$ 297,000
				Contingency (30%)	$ 89,000
				Construction	**$ 386,000**
				Design (15%)	**$ 58,000**
				ROW	**$ 113,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	58,000								
	Const	386,000								
	ROW	113,000								
	Total	557,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	58,000			58,000
ROW	113,000			113,000
Utilities				0
Const.	386,000			386,000
Materials				0
Total	557,000	0	0	557,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Connect 6" dead end to 12" across N. Porter Ave.	APAI PROJECT NUMBER	F-17
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Connect 6" dead-end line to 12" across N. Porter Avenue with 6" line to increase FF at Node 18013 (1148 to 3,504 gpm). The length of this segment is approximately 85 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	85	LF	$ 53	$ 4,505
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	-	EA	$ 5,164	$ -
22	Remove Existing Fire Hydrant Assembly	-	EA	$ 601	$ -
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	85	LF	$ 1	$ 85
25	Trench Safety for pipeline	85	LF	$ 2	$ 170
26	Construction Site Restoration and Seeding	142	SY	$ 3.58	$ 509
27	Pavement Repair	15	SY	$ 128	$ 1,920
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 2,000	$ 2,000
				Subtotal	$ 23,000
				Contingency (30%)	$ 7,000
				Construction	**$ 30,000**
				Design (15%)	**$ 5,000**
				ROW	**$ 4,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	5,000								
	Const	30,000								
	ROW	4,000								
	Total	39,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	5,000			5,000
ROW	4,000			4,000
Utilities				0
Const.	30,000			30,000
Materials				0
Total	39,000	0	0	39,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-18		
PROJECT TITLE:	Upsize 6" Line to 8" along Wind Hill Rd	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

This project would upsize the 6" line along Wind Hill Road to an 8" line to increase FF to Node 25353. Upsizing this line will increase the available FF at Node 25353 from 1,205 gpm to 2,257 gpm. This line is approximately 400 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	400	LF	$ 68	$ 27,000
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	400	LF	$ 1	$ 400
25	Trench Safety for pipeline	400	LF	$ 2	$ 800
26	Construction Site Restoration and Seeding	667	SY	$ 3.58	$ 2,390
27	Pavement Repair	67	SY	$ 128	$ 8,576
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 1,000	$ 1,000
32	Mobilization and Insurance (5%)	1	LS	$ 4,000	$ 4,000
				Subtotal	$ 68,000
				Contingency (30%)	$ 20,000
				Construction	**$ 88,000**
				Design (15%)	**$ 13,000**
				ROW	**$ 18,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	13,000								
	Const	88,000								
	ROW	18,000								
	Total	119,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	13,000			13,000
ROW	18,000			18,000
Utilities				0
Const.	88,000			88,000
Materials				0
Total	119,000	0	0	119,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-19		
PROJECT TITLE:	Upsize 6" Line to 8" along Ridgemont Circle	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

This project would upsize the 6" line along Ridgemont Circle to an 8" line to increase FF to Node 03249. Upsizing this line will increase the available FF at Node 03249 from 1,147 gpm to 2,342 gpm. This section of the line is approximately 460 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	460	LF	$ 68	$ 31,050
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	460	LF	$ 1	$ 460
25	Trench Safety for pipeline	460	LF	$ 2	$ 920
26	Construction Site Restoration and Seeding	767	SY	$ 3.58	$ 2,748
27	Pavement Repair	77	SY	$ 128	$ 9,856
28	Storm Water Pollution Prevention Plan		LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 1,000	$ 1,000
32	Mobilization and Insurance (5%)	1	LS	$ 4,000	$ 4,000
				Subtotal	$ 74,000
				Contingency (30%)	$ 22,000
				Construction	**$ 96,000**
				Design (15%)	**$ 14,000**
				ROW	**$ 21,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	14,000								
	Const	96,000								
	ROW	21,000								
	Total	131,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	14,000			14,000
ROW	21,000			21,000
Utilities				0
Const.	96,000			96,000
Materials				0
Total	131,000	0	0	131,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 6" Line to 8" along Wheaton Dr	APAI PROJECT NUMBER	F-20
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

This project would upsize the 6" line along Wheaton Dr. to a 8" line to increase FF to Node 13138. Upsizing this line will increase the available FF at Node 13138 from 1,196 gpm to 1,785 gpm. This line is approximately 300 LF. Upsizing this line will also increase FF in nearby Node 17991 from 1,307 gpm to 1,949 gpm.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	300	LF	$ 68	$ 20,250
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	300	LF	$ 1	$ 300
25	Trench Safety for pipeline	300	LF	$ 2	$ 600
26	Construction Site Restoration and Seeding	500	SY	$ 3.58	$ 1,792
27	Pavement Repair	50	SY	$ 128	$ 6,400
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 1,000	$ 1,000
32	Mobilization and Insurance (5%)	1	LS	$ 3,000	$ 3,000
				Subtotal	$ 57,000
				Contingency (30%)	$ 17,000
				Construction	**$ 74,000**
				Design (15%)	**$ 11,000**
				ROW	**$ 14,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	11,000								
	Const	74,000								
	ROW	14,000								
	Total	99,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	11,000			11,000
ROW	14,000			14,000
Utilities				0
Const.	74,000			74,000
Materials				0
Total	99,000	0	0	99,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-21		
PROJECT TITLE:	Upsize 6" Line to 8" along Sundance Ct.	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

Upsize part of 6" line to 8" along Sundance Court to increase FF at hydrant Node 4232 from 1,194 to 1,590 gpm. The length of this segment is approximately 360 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	360	LF	$ 68	$ 24,300
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	360	LF	$ 1	$ 360
25	Trench Safety for pipeline	360	LF	$ 2	$ 720
26	Construction Site Restoration and Seeding	600	SY	$ 3.58	$ 2,150
27	Pavement Repair	60	SY	$ 128	$ 7,680
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 3,000	$ 3,000
				Subtotal	$ 59,000
				Contingency (30%)	$ 18,000
				Construction	**$ 77,000**
				Design (15%)	**$ 12,000**
				ROW	**$ 16,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	12,000								
	Const	77,000								
	ROW	16,000								
	Total	105,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	12,000			12,000
ROW	16,000			16,000
Utilities				0
Const.	77,000			77,000
Materials				0
Total	105,000	0	0	105,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 6" Line to 8" along Hunter's Hill Road	APAI PROJECT NUMBER	F-22
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Upsizing 6" line to 8" along Blue Sage Road & Hunter's Hill Road to address low FF nodes. Node 4342 increased in FF from 1,246 to 1,913 gpm. Node 4341 increased FF from 1,255 to 2,393 gpm. Total pipe length is approximately 1,440 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,440	LF	$ 68	$ 97,200
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	3	EA	$ 1,452	$ 4,355
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	3	EA	$ 5,164	$ 15,491
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	1,440	LF	$ 1	$ 1,440
25	Trench Safety for pipeline	1,440	LF	$ 2	$ 2,880
26	Construction Site Restoration and Seeding	2,400	SY	$ 3.58	$ 8,600
27	Pavement Repair	240	SY	$ 128	$ 30,720
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 10,000	$ 10,000
				Subtotal	$ 195,000
				Contingency (30%)	$ 59,000
				Construction	**$ 254,000**
				Design (15%)	**$ 38,000**
				ROW	**$ 65,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	38,000								
	Const	254,000								
	ROW	65,000								
	Total	357,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	38,000			38,000
ROW	65,000			65,000
Utilities				0
Const.	254,000			254,000
Materials				0
Total	357,000	0	0	357,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 6" Line to 8" along Innsbrook Court	APAI PROJECT NUMBER	F-23
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

Upsize 6" line to 8" along Innsbrook Court with hydrant at end of culdesac to increase FF at Node 5707 from 1,238 to 2,555 gpm. Length of line segment is approximately 350 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	350	LF	$ 68	$ 23,625
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	350	LF	$ 1	$ 350
25	Trench Safety for pipeline	350	LF	$ 2	$ 700
26	Construction Site Restoration and Seeding	584	SY	$ 3.58	$ 2,093
27	Pavement Repair	59	SY	$ 128	$ 7,552
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 3,000	$ 3,000
				Subtotal	$ 58,000
				Contingency (30%)	$ 17,000
				Construction	**$ 75,000**
				Design (15%)	**$ 11,000**
				ROW	**$ 16,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	11,000								
	Const	75,000								
	ROW	16,000								
	Total	102,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	11,000			11,000
ROW	16,000			16,000
Utilities				0
Const.	75,000			75,000
Materials				0
Total	102,000	0	0	102,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-24		
PROJECT TITLE:	Upsize 6" Line to 8" along Cedar Ridge Drive	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Upsize 6" line to 8" line along culdesac of Cedar Ridge Drive to address low FF at hydrant at end of the street. FF at Node 6739 increases from 1,211 to 2,589 gpm. Length of line segment is approximately 470 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	470	LF	$ 68	$ 31,725
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	470	LF	$ 1	$ 470
25	Trench Safety for pipeline	470	LF	$ 2	$ 940
26	Construction Site Restoration and Seeding	784	SY	$ 3.58	$ 2,809
27	Pavement Repair	79	SY	$ 128	$ 10,112
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 4,000	$ 4,000
				Subtotal	$ 71,000
				Contingency (30%)	$ 21,000
				Construction	**$ 92,000**
				Design (15%)	**$ 14,000**
				ROW	**$ 21,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	14,000								
	Const	92,000								
	ROW	21,000								
	Total	127,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	14,000			14,000
ROW	21,000			21,000
Utilities				0
Const.	92,000			92,000
Materials				0
Total	127,000	0	0	127,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 6" Line to 8" along Pinebrooke Court	APAI PROJECT NUMBER	F-25
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Upsize 6" line to 8" along Pinebrooke Court to address low FF. Node 4619 increased from 1,127 to 1,716 gpm. Length of pipeline segment is approximately 590 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	590	LF	$ 68	$ 39,825
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	590	LF	$ 1	$ 590
25	Trench Safety for pipeline	590	LF	$ 2	$ 1,180
26	Construction Site Restoration and Seeding	984	SY	$ 3.58	$ 3,526
27	Pavement Repair	99	SY	$ 128	$ 12,672
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 4,000	$ 4,000
				Subtotal	$ 83,000
				Contingency (30%)	$ 25,000
				Construction	**$ 108,000**
				Design (15%)	**$ 16,000**
				ROW	**$ 27,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	16,000								
	Const	108,000								
	ROW	27,000								
	Total	151,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	16,000			16,000
ROW	27,000			27,000
Utilities				0
Const.	108,000			108,000
Materials				0
Total	151,000	0	0	151,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-26		
PROJECT TITLE:	Connect 6" Lines at Westport Dr. and Fairway Dr.	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Connect two dead-end 6" lines in commercial area across Fairway Drive to improve FF and reduce water age. (FF at Node 4425 increases from 1,024 to 2,343 gpm)

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	700	LF	$ 53	$ 37,100
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	-	EA	$ 5,164	$ -
22	Remove Existing Fire Hydrant Assembly	-	EA	$ 601	$ -
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	700	LF	$ 1	$ 700
25	Trench Safety for pipeline	700	LF	$ 2	$ 1,400
26	Construction Site Restoration and Seeding	1,167	SY	$ 3.58	$ 4,182
27	Pavement Repair	117	SY	$ 128	$ 14,976
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 4,000	$ 4,000
				Subtotal	$ 77,000
				Contingency (30%)	$ 23,000
				Construction	**$ 100,000**
				Design (15%)	**$ 15,000**
				ROW	**$ 32,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	15,000								
	Const	100,000								
	ROW	32,000								
	Total	147,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	15,000			15,000
ROW	32,000			32,000
Utilities				0
Const.	100,000			100,000
Materials				0
Total	147,000	0	0	147,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-27		
PROJECT TITLE:	Upsize 4" Line to 6" along Foreman Avenue	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Fixed low FF at Node 06514 (FF was 672 gpm, FF is now 1,512 gpm) by upsizing a line from 4" to 6" along Foreman Avenue. This segment is approximately 1,150 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	1,150	LF	$ 53	$ 60,950
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	3	EA	$ 1,087	$ 3,260
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	1,150	LF	$ 1	$ 1,150
25	Trench Safety for pipeline	1,150	LF	$ 2	$ 2,300
26	Construction Site Restoration and Seeding	1,917	SY	$ 3.58	$ 6,869
27	Pavement Repair	192	SY	$ 128	$ 24,576
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 7,000	$ 7,000
				Subtotal	$ 135,000
				Contingency (30%)	$ 41,000
				Construction	**$ 176,000**
				Design (15%)	**$ 26,000**
				ROW	**$ 52,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	26,000								
	Const	176,000								
	ROW	52,000								
	Total	254,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	26,000			26,000
ROW	52,000			52,000
Utilities				0
Const.	176,000			176,000
Materials				0
Total	254,000	0	0	254,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	8" Line along E Main St. Near Beacon Ave.	APAI PROJECT NUMBER	F-28
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Fixed low FF at Node 05797 (FF was 566 gpm, now = 1,805 gpm) & Node 05694 (FF was 683 gpm, now = 1,964 gpm) by connecting two dead end lines in the MDS with 8" pipe west of Morren Dr. Segment of 2" & 6" line was also upsized to 8". Segment is approximately 1,180 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,180	LF	$ 68	$ 79,650
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	3	EA	$ 1,452	$ 4,355
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	1,180	LF	$ 1	$ 1,180
25	Trench Safety for pipeline	1,180	LF	$ 2	$ 2,360
26	Construction Site Restoration and Seeding	1,967	SY	$ 3.58	$ 7,048
27	Pavement Repair	197	SY	$ 128	$ 25,216
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 8,000	$ 8,000
				Subtotal	$ 157,000
				Contingency (30%)	$ 47,000
				Construction	**$ 204,000**
				Design (15%)	**$ 31,000**
				ROW	**$ 53,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	31,000								
	Const	204,000								
	ROW	53,000								
	Total	288,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	31,000			31,000
ROW	53,000			53,000
Utilities				0
Const.	204,000			204,000
Materials				0
Total	288,000	0	0	288,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-29		
PROJECT TITLE:	Upsize 6" Line to 8" along Riverwalk Ct.	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

Upsize existing 6" line along River Walk Court to 8" line to address low FF at hydrant at end in culdesac. FF at Node 10209 increases from 1,081 to 2,111 gpm. Length of segment is approximately 825 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	825	LF	$ 68	$ 55,688
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	825	LF	$ 1	$ 825
25	Trench Safety for pipeline	825	LF	$ 2	$ 1,650
26	Construction Site Restoration and Seeding	1,375	SY	$ 3.58	$ 4,927
27	Pavement Repair	138	SY	$ 128	$ 17,664
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 6,000	$ 6,000
				Subtotal	$ 113,000
				Contingency (30%)	$ 34,000
				Construction	**$ 147,000**
				Design (15%)	**$ 22,000**
				ROW	**$ 37,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	22,000								
	Const	147,000								
	ROW	37,000								
	Total	206,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	22,000			22,000
ROW	37,000			37,000
Utilities				0
Const.	147,000			147,000
Materials				0
Total	206,000	0	0	206,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-30		
PROJECT TITLE:	Upsize 6" Line to 8" along Jean Marie Dr.	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Upsized 6" line to 8" along Jean Marie Dr. and to Alcott Middle School to increase FF at the following Nodes (09006 - from 780 to 2,042 gpm, 09007 - from 1,054 to 2,590 gpm, 09008 - from 1,206 to 2,405 gpm). The total length of 8" pipeline required is approximately 1,875 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,875	LF	$ 68	$ 126,563
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	4	EA	$ 1,452	$ 5,807
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	2	EA	$ 150	$ 300
24	Utility location	1,875	LF	$ 1	$ 1,875
25	Trench Safety for pipeline	1,875	LF	$ 2	$ 3,750
26	Construction Site Restoration and Seeding	3,125	SY	$ 3.58	$ 11,198
27	Pavement Repair	313	SY	$ 128	$ 40,064
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 12,000	$ 12,000
				Subtotal	$ 236,000
				Contingency (30%)	$ 71,000
				Construction	**$ 307,000**
				Design (15%)	**$ 46,000**
				ROW	**$ 84,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	46,000								
	Const	307,000								
	ROW	84,000								
	Total	437,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	46,000			46,000
ROW	84,000			84,000
Utilities				0
Const.	307,000			307,000
Materials				0
Total	437,000	0	0	437,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-31		
PROJECT TITLE:	Upsize 6" Line to 8" along McFarland St.	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Upsize 6" to 8" along McFarland Street to increase FF at hydrant. Node 10703 increases FF from 1,154 to 2,246 gpm. Length of segment is approximately 530 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	530	LF	$ 68	$ 35,775
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	530	LF	$ 1	$ 530
25	Trench Safety for pipeline	530	LF	$ 2	$ 1,060
26	Construction Site Restoration and Seeding	884	SY	$ 3.58	$ 3,168
27	Pavement Repair	89	SY	$ 128	$ 11,392
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 4,000	$ 4,000
				Subtotal	$ 77,000
				Contingency (30%)	$ 23,000
				Construction	**$ 100,000**
				Design (15%)	**$ 15,000**
				ROW	**$ 24,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	15,000								
	Const	100,000								
	ROW	24,000								
	Total	139,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	15,000			15,000
ROW	24,000			24,000
Utilities				0
Const.	100,000			100,000
Materials				0
Total	139,000	0	0	139,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Extend 6" line along Elm Avenue to W. Symmes St.	APAI PROJECT NUMBER	F-32
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Extend 6" line along Elm Avenue north until it ties into existing 8" on W. Symmes Street to increase FF and reduce water age. At Node 8925, flow increases from 987 to 2,990 gpm. Length of line segment is approximately 220 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	220	LF	$ 53	$ 11,660
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	220	LF	$ 1	$ 220
25	Trench Safety for pipeline	220	LF	$ 2	$ 440
26	Construction Site Restoration and Seeding	367	SY	$ 3.58	$ 1,315
27	Pavement Repair	37	SY	$ 128	$ 4,736
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 2,000	$ 2,000
				Subtotal	$ 40,000
				Contingency (30%)	$ 12,000
				Construction	**$ 52,000**
				Design (15%)	**$ 8,000**
				ROW	**$ 10,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	8,000								
	Const	52,000								
	ROW	10,000								
	Total	70,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	8,000			8,000
ROW	10,000			10,000
Utilities				0
Const.	52,000			52,000
Materials				0
Total	70,000	0	0	70,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 6" Line to 8" along Schulze Dr. and Creston Way	APAI PROJECT NUMBER	F-33
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

Upsize 6" line to 8" along Schulze Drive & Creston Way to address low FF. Node 8897 increased from 1,118 to 1,969 gpm (along Schulze Dr). Node 7529 increased from 1,190 to 2,269 gpm (along Creston Way). Total length of line segments is 1,425 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,425	LF	$ 68	$ 96,188
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	3	EA	$ 1,452	$ 4,355
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	3	EA	$ 5,164	$ 15,491
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	1,425	LF	$ 1	$ 1,425
25	Trench Safety for pipeline	1,425	LF	$ 2	$ 2,850
26	Construction Site Restoration and Seeding	2,375	SY	$ 3.58	$ 8,510
27	Pavement Repair	238	SY	$ 128	$ 30,464
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 9,000	$ 9,000
				Subtotal	$ 182,000
				Contingency (30%)	$ 55,000
				Construction	**$ 237,000**
				Design (15%)	**$ 36,000**
				ROW	**$ 64,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	36,000								
	Const	237,000								
	ROW	64,000								
	Total	337,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	36,000			36,000
ROW	64,000			64,000
Utilities				0
Const.	237,000			237,000
Materials				0
Total	337,000	0	0	337,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Connect Dead-End 6" Line in The Pines Apartments	APAI PROJECT NUMBER	F-34
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Connect dead-end 6" line to dead-end 8" line with 6" pipe within The Pines Apartments on E. Alameda Street and Andover Drive. Project is to address low FF at two hydrants toward end of 6" line. FF at Nodes 8191 & 8193 increases from about 1,043-1,160 gpm to range of 2,277-2,464 gpm respectively. Length of segment is approximately 450 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	450	LF	$ 53	$ 23,850
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	450	LF	$ 1	$ 450
25	Trench Safety for pipeline	450	LF	$ 2	$ 900
26	Construction Site Restoration and Seeding	750	SY	$ 3.58	$ 2,688
27	Pavement Repair	75	SY	$ 128	$ 9,600
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 3,000	$ 3,000
				Subtotal	$ 60,000
				Contingency (30%)	$ 18,000
				Construction	**$ 78,000**
				Design (15%)	**$ 12,000**
				ROW	**$ 20,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	12,000								
	Const	78,000								
	ROW	20,000								
	Total	110,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	12,000			12,000
ROW	20,000			20,000
Utilities				0
Const.	78,000			78,000
Materials				0
Total	110,000	0	0	110,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 4" Lines to 6" along Justin Dr., Bill Carrol Dr., and Cara Jo Dr.	APAI PROJECT NUMBER	F-35
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Upsize four 4" lines to 6" around Justin Dr., Bill Carrol Dr., & Cara Jo Dr. This improvement raises FF from 696-1,187 gpm to greater than 1,500 gpm at all four nodes. The total length of these lines is approximately 650 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	650	LF	$ 53	$ 34,450
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	650	LF	$ 1	$ 650
25	Trench Safety for pipeline	650	LF	$ 2	$ 1,300
26	Construction Site Restoration and Seeding	1,084	SY	$ 3.58	$ 3,884
27	Pavement Repair	109	SY	$ 128	$ 13,952
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 5,000	$ 5,000
				Subtotal	$ 85,000
				Contingency (30%)	$ 26,000
				Construction	**$ 111,000**
				Design (15%)	**$ 17,000**
				ROW	**$ 29,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	17,000								
	Const	111,000								
	ROW	29,000								
	Total	157,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	17,000			17,000
ROW	29,000			29,000
Utilities				0
Const.	111,000			111,000
Materials				0
Total	157,000	0	0	157,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 6" Lines to 8" along Brandon Cr., Sheffield Dr., Chamblee Dr., Surrey Dr., & Village Dr	APAI PROJECT NUMBER	F-36
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Upsize existing 6" lines along culdesacs to 8" lines to address low FF at hydrants. Streets to be upsized include Brandon Circle, Sheffield Drive, Chamblee Drive, Surrey Drive, & Village Drive. Low FF Nodes (8770, 8772, 8774, 8535, & 9351) increase from about 1,062-1,210 gpm to a range of 2,208-2,582 gpm. Length of segment is approximately 1,725 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,725	LF	$ 68	$ 116,438
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	4	EA	$ 1,452	$ 5,807
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	3	EA	$ 5,164	$ 15,491
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	2	EA	$ 150	$ 300
24	Utility location	1,725	LF	$ 1	$ 1,725
25	Trench Safety for pipeline	1,725	LF	$ 2	$ 3,450
26	Construction Site Restoration and Seeding	2,875	SY	$ 3.58	$ 10,302
27	Pavement Repair	288	SY	$ 128	$ 36,864
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 11,000	$ 11,000
				Subtotal	$ 226,000
				Contingency (30%)	$ 68,000
				Construction	**$ 294,000**
				Design (15%)	**$ 44,000**
				ROW	**$ 78,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	44,000								
	Const	294,000								
	ROW	78,000								
	Total	416,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	44,000			44,000
ROW	78,000			78,000
Utilities				0
Const.	294,000			294,000
Materials				0
Total	416,000	0	0	416,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-37		
PROJECT TITLE:	Upsize 6" Line to 8" along Columbia Cr., Atlanta Cr., Montgomery Cr., Raleigh Cr., and Mobile Cr	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Upsize 6" lines to 8" along five culdesac streets (Columbia Circle, Atlanta Circle, Montgomery Circle, Raleigh Circle, & Mobile Circle) to increase FF. FF at these nodes increases from a range of about 1,178-1,394 gpm to a range of 1,979-2,748 gpm. Length of pipeline segment is approximately 1,705 LF

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,705	LF	$ 68	$ 115,088
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	4	EA	$ 1,452	$ 5,807
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	3	EA	$ 5,164	$ 15,491
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	2	EA	$ 150	$ 300
24	Utility location	1,705	LF	$ 1	$ 1,705
25	Trench Safety for pipeline	1,705	LF	$ 2	$ 3,410
26	Construction Site Restoration and Seeding	2,842	SY	$ 3.58	$ 10,184
27	Pavement Repair	285	SY	$ 128	$ 36,480
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 30,000	$ 30,000
30	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
31	Erosion Control	1	LS	$ 9,000	$ 9,000
32	Mobilization and Insurance (5%)	1	LS	$ 14,000	$ 14,000
				Subtotal	$ 290,000
				Contingency (30%)	$ 87,000
				Construction	**$ 377,000**
				Design (15%)	**$ 57,000**
				ROW	**$ 77,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	57,000								
	Const	377,000								
	ROW	77,000								
	Total	511,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	57,000			57,000
ROW	77,000			77,000
Utilities				0
Const.	377,000			377,000
Materials				0
Total	511,000	0	0	511,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-38		
PROJECT TITLE:	Upsize 6" Line to 8" along Peppertree Ct.	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Upsize 6" line to 8" along Peppertree Court to address low FF. Node 10400 increased from 1,107 to 2,221 gpm. Line segment is approximately 680 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	680	LF	$ 68	$ 45,900
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	680	LF	$ 1	$ 680
25	Trench Safety for pipeline	680	LF	$ 2	$ 1,360
26	Construction Site Restoration and Seeding	1,134	SY	$ 3.58	$ 4,064
27	Pavement Repair	114	SY	$ 128	$ 14,592
28	Storm Water Pollution Prevention Plan		LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 6,000	$ 6,000
				Subtotal	$ 110,000
				Contingency (30%)	$ 33,000
				Construction	**$ 143,000**
				Design (15%)	**$ 21,000**
				ROW	**$ 31,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	21,000								
	Const	143,000								
	ROW	31,000								
	Total	195,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	21,000			21,000
ROW	31,000			31,000
Utilities				0
Const.	143,000			143,000
Materials				0
Total	195,000	0	0	195,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-39		
PROJECT TITLE:	Upsize 8" Line to 12" along Meadowood Blvd	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	High

DETAILED PROJECT DESCRIPTION:

Upsized 8" line to 12" along Meadowood Blvd & 6" line to 8" along Smalley & Dunham Drive to increase FF at hydrants in this neighborhood. FF at ten nodes increased from about 9,30-1,230 gpm to ~ 1,500 gpm. The length of the 8" line segment is approximately 1,000 LF. The length of the 12" segment is approximately 1,030 LF. This project would be paired with project P-4.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,000	LF	$ 68	$ 67,500
3	12-inch Pipe	1,030	LF	$ 84	$ 86,005
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	3	EA	$ 2,543	$ 7,628
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	2	EA	$ 5,000	$ 10,000
21	New Fire Hydrant Assembly	4	EA	$ 5,164	$ 20,655
22	Remove Existing Fire Hydrant Assembly	3	EA	$ 601	$ 1,802
23	Pipeline Markers	2	EA	$ 150	$ 300
24	Utility location	2,030	LF	$ 1	$ 2,030
25	Trench Safety for pipeline	2,030	LF	$ 2	$ 4,060
26	Construction Site Restoration and Seeding	3,384	SY	$ 3.58	$ 12,126
27	Pavement Repair	339	SY	$ 128	$ 43,392
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 14,000	$ 14,000
				Subtotal	$ 291,000
				Contingency (30%)	$ 87,000
				Construction	**$ 378,000**
				Design (15%)	**$ 57,000**
				ROW	**$ 91,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	57,000								
	Const	378,000								
	ROW	91,000								
	Total	526,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	57,000			57,000
ROW	91,000			91,000
Utilities				0
Const.	378,000			378,000
Materials				0
Total	526,000	0	0	526,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-40		
PROJECT TITLE:	Upsize 6" Line to 8" South of Briggs St.	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Upsize 6" line to 8" along dead-end line with hydrant south of Briggs Street to increase FF at Node 11265 from 1,241 to 1,616 gpm. Length of segment is approximately 410 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	410	LF	$ 68	$ 27,675
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	410	LF	$ 1	$ 410
25	Trench Safety for pipeline	410	LF	$ 2	$ 820
26	Construction Site Restoration and Seeding	684	SY	$ 3.58	$ 2,451
27	Pavement Repair	69	SY	$ 128	$ 8,832
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 4,000	$ 4,000
				Subtotal	$ 76,000
				Contingency (30%)	$ 23,000
				Construction	**$ 99,000**
				Design (15%)	**$ 15,000**
				ROW	**$ 18,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	15,000								
	Const	99,000								
	ROW	18,000								
	Total	132,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	15,000			15,000
ROW	18,000			18,000
Utilities				0
Const.	99,000			99,000
Materials				0
Total	132,000	0	0	132,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Connect 6" Dead-End Line to McGee Drive	APAI PROJECT NUMBER	F-41
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Connect 6" dead-end line to McGee Drive with a 6" line through commercial area (if possible). This will address low FF & high water age in this dead-end line. Node 11163 increases from 1,059 to 2,609 gpm. If extending a 6" line is not feasible (no City ROW), then upsize to 8" to also increase FF to ~2,242 gpm, however water age still an issue. Length of segment is approximately 600 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	600	LF	$ 53	$ 31,800
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	600	LF	$ 1	$ 600
25	Trench Safety for pipeline	600	LF	$ 2	$ 1,200
26	Construction Site Restoration and Seeding	1,000	SY	$ 3.58	$ 3,583
27	Pavement Repair	100	SY	$ 128	$ 12,800
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 4,000	$ 4,000
				Subtotal	$ 74,000
				Contingency (30%)	$ 22,000
				Construction	**$ 96,000**
				Design (15%)	**$ 14,000**
				ROW	**$ 27,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	14,000								
	Const	96,000								
	ROW	27,000								
	Total	137,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	14,000			14,000
ROW	27,000			27,000
Utilities				0
Const.	96,000			96,000
Materials				0
Total	137,000	0	0	137,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Complete 6" Loop along Brookside Drive	APAI PROJECT NUMBER	F-42
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Completed 6" loop along Brookside Drive to improve FF at Node 11219 from 888 to 1,933 gpm. The loop also reduces water age. The total length of this pipeline segment is approximately 200 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	200	LF	$ 53	$ 10,600
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	200	LF	$ 1	$ 200
25	Trench Safety for pipeline	200	LF	$ 2	$ 400
26	Construction Site Restoration and Seeding	334	SY	$ 3.58	$ 1,197
27	Pavement Repair	34	SY	$ 128	$ 4,352
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 3,000	$ 3,000
				Subtotal	$ 51,000
				Contingency (30%)	$ 15,000
				Construction	**$ 66,000**
				Design (15%)	**$ 10,000**
				ROW	**$ 9,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	10,000								
	Const	66,000								
	ROW	9,000								
	Total	85,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	10,000			10,000
ROW	9,000			9,000
Utilities				0
Const.	66,000			66,000
Materials				0
Total	85,000	0	0	85,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-43		
PROJECT TITLE:	Upsize 6" Line to 8" along Rolling Hills Street	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Upsize 6" lines to 8" along Rolling Hills Street to address low FF nodes (Node 12017 went from 1,116 to 1,964 gpm & Node 12019 went from 825 to 1,755 gpm). Length of segment is approximately 820 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	820	LF	$ 68	$ 55,350
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	820	LF	$ 1	$ 820
25	Trench Safety for pipeline	820	LF	$ 2	$ 1,640
26	Construction Site Restoration and Seeding	1,367	SY	$ 3.58	$ 4,898
27	Pavement Repair	137	SY	$ 128	$ 17,536
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 6,000	$ 6,000
				Subtotal	$ 123,000
				Contingency (30%)	$ 37,000
				Construction	**$ 160,000**
				Design (15%)	**$ 24,000**
				ROW	**$ 37,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	24,000								
	Const	160,000								
	ROW	37,000								
	Total	221,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	24,000			24,000
ROW	37,000			37,000
Utilities				0
Const.	160,000			160,000
Materials				0
Total	221,000	0	0	221,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-44		
PROJECT TITLE:	Upsize 6" Line to 8" along Whispering Pines Drive	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Upsize 6" line to 8" along Whispering Pines Drive to increase FF. Node 11973 increases from 1,147 to 2,015 gpm. Node 11975 increases from 1,105 to 1,621 gpm. Length of line segment is approximately 460 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	460	LF	$ 68	$ 31,050
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	460	LF	$ 1	$ 460
25	Trench Safety for pipeline	460	LF	$ 2	$ 920
26	Construction Site Restoration and Seeding	767	SY	$ 3.58	$ 2,748
27	Pavement Repair	77	SY	$ 128	$ 9,856
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 4,000	$ 4,000
				Subtotal	$ 70,000
				Contingency (30%)	$ 21,000
				Construction	**$ 91,000**
				Design (15%)	**$ 14,000**
				ROW	**$ 21,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	14,000								
	Const	91,000								
	ROW	21,000								
	Total	126,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	14,000			14,000
ROW	21,000			21,000
Utilities				0
Const.	91,000			91,000
Materials				0
Total	126,000	0	0	126,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-45		
PROJECT TITLE:	Upsize 6" Line to 8" along Holly Cir.	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

This project would upsize the 6" line along Holly Circle to an 8" line to increase FF to Node 14359. The length of this segment is approximately 50 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	50	LF	$ 68	$ 3,375
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	50	LF	$ 1	$ 50
25	Trench Safety for pipeline	50	LF	$ 2	$ 100
26	Construction Site Restoration and Seeding	84	SY	$ 3.58	$ 301
27	Pavement Repair	9	SY	$ 128	$ 1,152
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 2,000	$ 2,000
				Subtotal	$ 28,000
				Contingency (30%)	$ 8,000
				Construction	**$ 36,000**
				Design (15%)	**$ 5,000**
				ROW	**$ 2,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	5,000								
	Const	36,000								
	ROW	2,000								
	Total	43,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	5,000			5,000
ROW	2,000			2,000
Utilities				0
Const.	36,000			36,000
Materials				0
Total	43,000	0	0	43,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Extend 6" Line Along Twin Creek Village Apartments	APAI PROJECT NUMBER	F-46
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Fireflow	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Extend 6" line from dead-end hydrant at Twin Creek Village Apartments west to tie into 8" line at Creekside Drive. Project will increase FF at Node 11074 from 1,135 to 3,077 gpm and decrease water age at the dead-end node. Length of segment is approximately 360 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	360	LF	$ 53	$ 19,080
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	360	LF	$ 1	$ 360
25	Trench Safety for pipeline	360	LF	$ 2	$ 720
26	Construction Site Restoration and Seeding	600	SY	$ 3.58	$ 2,150
27	Pavement Repair	60	SY	$ 128	$ 7,680
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 3,000	$ 3,000
				Subtotal	$ 53,000
				Contingency (30%)	$ 16,000
				Construction	**$ 69,000**
				Design (15%)	**$ 10,000**
				ROW	**$ 16,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	10,000								
	Const	69,000								
	ROW	16,000								
	Total	95,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	10,000			10,000
ROW	16,000			16,000
Utilities				0
Const.	69,000			69,000
Materials				0
Total	95,000	0	0	95,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-47		
PROJECT TITLE:	Upsize 6" Lines to 8" along White Oak Cir., Oak Vista Cir., & Bois-de-arc Cir.	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

Upsized 6" lines to 8" along three culdesac streets (White Oak Circle, Oak Vista Circle, & Bois-de-arc Circle) to increase FF. FF increased from about 1,243 to 1,758 gpm on White Oak Circle. FF increased from 1,250 to 2,193 gpm on the other two streets. Length of segments is approximately 1,170 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	1,170	LF	$ 68	$ 78,975
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	3	EA	$ 1,452	$ 4,355
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	3	EA	$ 5,164	$ 15,491
22	Remove Existing Fire Hydrant Assembly	3	EA	$ 601	$ 1,802
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	1,170	LF	$ 1	$ 1,170
25	Trench Safety for pipeline	1,170	LF	$ 2	$ 2,340
26	Construction Site Restoration and Seeding	1,950	SY	$ 3.58	$ 6,988
27	Pavement Repair	195	SY	$ 128	$ 24,960
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 8,000	$ 8,000
				Subtotal	$ 156,000
				Contingency (30%)	$ 47,000
				Construction	**$ 203,000**
				Design (15%)	**$ 30,000**
				ROW	**$ 53,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	30,000								
	Const	203,000								
	ROW	53,000								
	Total	286,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	30,000			30,000
ROW	53,000			53,000
Utilities				0
Const.	203,000			203,000
Materials				0
Total	286,000	0	0	286,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	F-48		
PROJECT TITLE:	Loop 6" Line along Black Locust Ct & Black Locust Place	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Fireflow	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Very Low

DETAILED PROJECT DESCRIPTION:

Looped 6" line along Black Locust Court & Black Locust Place neighborhood & upsized a line from 6" to 8" to increase FF & reduce water age. (Node 15005 went from 810 to 1,852 gpm, Node 12510 went from 1,076 to 2,271 gpm). The 6" line is approximately 985 LF and the 8" line is approximately 1,055 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	985	LF	$ 53	$ 52,205
2	8-inch Pipe	1,055	LF	$ 68	$ 71,213
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	3	EA	$ 1,452	$ 4,355
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	3	EA	$ 5,164	$ 15,491
22	Remove Existing Fire Hydrant Assembly	3	EA	$ 601	$ 1,802
23	Pipeline Markers	2	EA	$ 150	$ 300
24	Utility location	2,040	LF	$ 1	$ 2,040
25	Trench Safety for pipeline	2,040	LF	$ 2	$ 4,080
26	Construction Site Restoration and Seeding	3,400	SY	$ 3.58	$ 12,183
27	Pavement Repair	340	SY	$ 128	$ 43,520
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 12,000	$ 12,000
				Subtotal	$ 245,000
				Contingency (30%)	$ 74,000
				Construction	**$ 319,000**
				Design (15%)	**$ 48,000**
				ROW	**$ 92,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	319,000								
	Const	48,000								
	ROW	92,000								
	Total	459,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	319,000			319,000
ROW	92,000			92,000
Utilities				0
Const.	48,000			48,000
Materials				0
Total	459,000	0	0	459,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Complete 12" Line Along 36th Ave. NE	APAI PROJECT NUMBER	H-1
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	High Headloss	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	High

DETAILED PROJECT DESCRIPTION:

Complete 12" line n/s up past Wells 2 and 5 along 36th Avenue NE. Velolcity in future model is ~ 2-3 ft/s, Unit HL is ~ 4.5 ft/1,000 ft, but peaks at 6.5 ft/1,000 ft. Length of line segment is approximately 4,080 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe	4,080	LF	$ 84	$ 340,680
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	9	EA	$ 2,543	$ 22,884
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	3	EA	$ 5,000	$ 15,000
21	New Fire Hydrant Assembly	7	EA	$ 5,164	$ 36,146
22	Remove Existing Fire Hydrant Assembly	5	EA	$ 601	$ 3,003
23	Pipeline Markers	4	EA	$ 150	$ 600
24	Utility location	4,080	LF	$ 1	$ 4,080
25	Trench Safety for pipeline	4,080	LF	$ 2	$ 8,160
26	Construction Site Restoration and Seeding	6,800	SY	$ 3.58	$ 24,367
27	Pavement Repair	680	SY	$ 128	$ 87,040
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 30,000	$ 30,000
30	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
31	Erosion Control	1	LS	$ 9,000	$ 9,000
32	Mobilization and Insurance (5%)	1	LS	$ 31,000	$ 31,000
				Subtotal	$ 644,000
				Contingency (30%)	$ 193,000
				Construction	**$ 837,000**
				Design (15%)	**$ 126,000**
				ROW	**$ 184,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	126,000								
	Const	837,000								
	ROW	184,000								
	Total	1,147,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	126,000			126,000
ROW	184,000			184,000
Utilities				0
Const.	837,000			837,000
Materials				0
Total	1,147,000	0	0	1,147,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 12" Line to 16" along Robinson from WTP to 36th Ave. NE	APAI PROJECT NUMBER	H-2
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	High Headloss	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Upsize 12" line to 16" leaving the MDS PS at the WTP and heading east along Robinson until tieing into existing 12" line at the corner of Robinson & 36th Avenue NE. Line upsized due to higher than desired unit HL (~ 8 ft/1,000) and high velocity (~ 6 ft/s). Length is approximately 2,730 LF

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe	2,730	LF	$ 138	$ 375,375
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	6	EA	$ 4,446	$ 26,676
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	2	EA	$ 5,000	$ 10,000
21	New Fire Hydrant Assembly	5	EA	$ 5,164	$ 25,818
22	Remove Existing Fire Hydrant Assembly	3	EA	$ 601	$ 1,802
23	Pipeline Markers	3	EA	$ 150	$ 450
24	Utility location	2,730	LF	$ 1	$ 2,730
25	Trench Safety for pipeline	2,730	LF	$ 2	$ 5,460
26	Construction Site Restoration and Seeding	4,550	SY	$ 3.58	$ 16,304
27	Pavement Repair	455	SY	$ 128	$ 58,240
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 30,000	$ 30,000
30	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
31	Erosion Control	1	LS	$ 9,000	$ 9,000
32	Mobilization and Insurance (5%)	1	LS	$ 31,000	$ 31,000
				Subtotal	$ 635,000
				Contingency (30%)	$ 191,000
				Construction	**$ 826,000**
				Design (15%)	**$ 124,000**
				ROW	**$ 123,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	124,000								
	Const	826,000								
	ROW	123,000								
	Total	1,073,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	124,000			124,000
ROW	123,000			123,000
Utilities				0
Const.	826,000			826,000
Materials				0
Total	1,073,000	0	0	1,073,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize 6" Line to 12" at Alameda St. and Vicksburg Ave.	APAI PROJECT NUMBER	H-3
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	High Headloss	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	High

DETAILED PROJECT DESCRIPTION:

Upsize existing 6" line to 12" that connects the 24" line on the north side of E. Alameda Street to the 8" on the southside of the street near Vicksburg Avenue. Upsizing recommended due to high unit HL (> 10 ft/1,000 ft). Length of line segment is approximately 105 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe	105	LF	$ 84	$ 8,768
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	2	EA	$ 2,543	$ 5,085
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	-	EA	$ 5,164	$ -
22	Remove Existing Fire Hydrant Assembly	-	EA	$ 601	$ -
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	105	LF	$ 1	$ 105
25	Trench Safety for pipeline	105	LF	$ 2	$ 210
26	Construction Site Restoration and Seeding	175	SY	$ 3.58	$ 627
27	Pavement Repair	18	SY	$ 128	$ 2,304
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 2,000	$ 2,000
				Subtotal	$ 31,000
				Contingency (30%)	$ 9,000
				Construction	**$ 40,000**
				Design (15%)	**$ 6,000**
				ROW	**$ 5,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	6,000								
	Const	40,000								
	ROW	5,000								
	Total	51,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	6,000			6,000
ROW	5,000			5,000
Utilities				0
Const.	40,000			40,000
Materials				0
Total	51,000	0	0	51,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Upsize Lines to Boyd Tower	APAI PROJECT NUMBER	H-4
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	High Headloss	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	High

DETAILED PROJECT DESCRIPTION:

Upsize lines feeding Boyd Tower upsize a 12" to a 16" and an 8" to a 12". Unit HL was between 8-15 ft/1,000 ft before upsizing. Length of new 12" and 16" line is approximately 300 LF and 800 LF, respectively.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe	300	LF	$ 84	$ 25,050
4	16-inch Pipe	800	LF	$ 138	$ 110,000
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	2	EA	$ 2,543	$ 5,085
16	16-inch Butterfly Valve with Valve Box	2	EA	$ 4,446	$ 8,892
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
22	Remove Existing Fire Hydrant Assembly	2	EA	$ 601	$ 1,201
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	1,100	LF	$ 1	$ 1,100
25	Trench Safety for pipeline	1,100	LF	$ 2	$ 2,200
26	Construction Site Restoration and Seeding	1,834	SY	$ 3.58	$ 6,572
27	Pavement Repair	184	SY	$ 128	$ 23,552
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 11,000	$ 11,000
				Subtotal	$ 228,000
				Contingency (30%)	$ 68,000
				Construction	**$ 296,000**
				Design (15%)	**$ 44,000**
				ROW	**$ 50,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	44,000								
	Const	296,000								
	ROW	50,000								
	Total	390,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	44,000			44,000
ROW	50,000			50,000
Utilities				0
Const.	296,000			296,000
Materials				0
Total	390,000	0	0	390,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	H-5		
PROJECT TITLE:	Upsize 6" Line to 8" along Chautauqua Ave.	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	High Headloss	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Bottleneck along Chautauqua Avenue: Upsize 6" line to 8" between McCall Drive and Lakewood Drive. (6" line is sandwhiched between two 8" lines.) Segment shows high unit HL > 7 ft/1,000 ft. Length of line segment is 400 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	400	LF	$ 68	$ 27,000
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	400	LF	$ 1	$ 400
25	Trench Safety for pipeline	400	LF	$ 2	$ 800
26	Construction Site Restoration and Seeding	667	SY	$ 3.58	$ 2,390
27	Pavement Repair	67	SY	$ 128	$ 8,576
28	Storm Water Pollution Prevention Plan		LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 4,000	$ 4,000
				Subtotal	$ 75,000
				Contingency (30%)	$ 23,000
				Construction	**$ 98,000**
				Design (15%)	**$ 15,000**
				ROW	**$ 18,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	15,000								
	Const	98,000								
	ROW	18,000								
	Total	131,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	15,000			15,000
ROW	18,000			18,000
Utilities				0
Const.	98,000			98,000
Materials				0
Total	131,000	0	0	131,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	WL Replacement: Classen/Flood: Hwy 9 to Indian Hills	APAI PROJECT NUMBER	M-1
PROJ. CATEGORY:	Water Line Maintenance Misc Projects	PROJECT TYPE:	Water System Improvt.
DEPARTMENT:	Utilities	PROJECT NUMBER:	WA
MANAGER:	Mark Daniels	ACCOUNT NUMBER:	031-9521-462
WARD(s):	4	BEGIN & END DATES:	7/1/22 to 6/30/26
PROJECT DRIVER:	Maintenance	LIFE EXPECTANCY:	50 Years
		PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Project will replace 24,100 LF 16" concrete waterlines with 16" PVC waterlines along Classen from Highway 9 to Lindsey, then along the James Garner/BNSF RR to W Daws Rd., then from W Daws Rd to Robinson, then along Flood to W. Rock Creek Rd. Project will also replace 12,000 LF 12" DIP waterlines with 12" PVC from Venture Dr. to Well #20 just north of Indian Hills Road.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe	11,400	LF	$ 84	$ 951,900
4	16-inch Pipe	23,500	LF	$ 138	$ 3,231,250
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing	600	LF	$ 371	$ 222,400
10	16-inch Bore and Casing	600	LF	$ 468	$ 280,800
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	24	EA	$ 2,543	$ 61,024
16	16-inch Butterfly Valve with Valve Box	49	EA	$ 4,446	$ 217,854
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	4	EA	$ 6,196	$ 24,784
20	Air Release Valve and Concrete Vault	19	EA	$ 5,000	$ 95,000
21	New Fire Hydrant Assembly	61	EA	$ 5,164	$ 314,984
22	Remove Existing Fire Hydrant Assembly	37	EA	$ 601	$ 22,225
23	Pipeline Markers	36	EA	$ 150	$ 5,400
24	Utility location	34,900	LF	$ 1	$ 34,900
25	Trench Safety for pipeline	34,900	LF	$ 2	$ 69,800
26	Construction Site Restoration and Seeding	60,167	SY	$ 3.58	$ 215,598
27	Pavement Repair	6,017	SY	$ 128	$ 770,176
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 30,000	$ 30,000
30	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
31	Erosion Control	1	LS	$ 9,000	$ 9,000
32	Mobilization and Insurance (5%)	1	LS	$ 330,000	$ 330,000
				Subtotal	$ 6,923,000
				Contingency (30%)	$ 2,077,000
				Construction	**$ 9,000,000**
				Design (15%)	**$ 1,350,000**
				ROW	**$ 1,625,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	1,350,000								
	Const	9,000,000								
	ROW	1,625,000								
	Total	11,975,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	1,350,000			1,350,000
ROW	1,625,000			1,625,000
Utilities				0
Const.	9,000,000			9,000,000
Materials				0
Total	11,975,000	0	0	11,975,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Water Dist. System Improvements - Segment G	APAI PROJECT NUMBER	M-2
PROJ. CATEGORY:	Water Distribution System	PROJECT TYPE:	Water System Improvt.
DEPARTMENT:	Utilities	PROJECT NUMBER:	WA
MANAGER:	Mark Daniels	ACCOUNT NUMBER:	031-9360-462
WARD(s):	8	BEGIN & END DATES:	7/1/17 to 6/30/18
PROJECT DRIVER:	Maintenance	LIFE EXPECTANCY:	50 Years
		PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Segment G includes 7,280 LF 12-inch waterline along Indian Hills Road and was identified as a Priority 2 line segment. It connects the Blue Lake Estates area to the 12-inch waterline just east of US-77/Flood Avenue.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe	7,180	LF	$ 84	$ 599,530
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing	100	LF	$ 371	$ 37,067
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	15	EA	$ 2,543	$ 38,140
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	2	EA	$ 5,000	$ 10,000
21	New Fire Hydrant Assembly	5	EA	$ 5,164	$ 25,818
22	Remove Existing Fire Hydrant Assembly	-	EA	$ 601	$ -
23	Pipeline Markers	7	EA	$ 150	$ 1,050
24	Utility location	7,180	LF	$ 1	$ 7,180
25	Trench Safety for pipeline	7,180	LF	$ 2	$ 14,360
26	Construction Site Restoration and Seeding	6,067	SY	$ 3.58	$ 21,740
27	Pavement Repair	607	SY	$ 128	$ 77,696
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 44,000	$ 44,000
				Subtotal	$ 905,000
				Contingency (30%)	$ 272,000
				Construction	**$ 1,177,000**
				Design (15%)	**$ 177,000**
				ROW	**$ 328,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	177,000								
	Const	1,177,000								
	ROW	328,000								
	Total	1,682,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	177,000			177,000
ROW	328,000			328,000
Utilities				0
Const.	1,177,000			1,177,000
Materials				0
Total	1,682,000	0	0	1,682,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	WL Replacement: Franklin: RR to 12th NW	APAI PROJECT NUMBER	M-3
PROJ. CATEGORY:	Water Line Maintenance Misc Projects	PROJECT TYPE:	Water System — Improvt.
DEPARTMENT:	Utilities	PROJECT NUMBER:	WA
MANAGER:	Mark Daniels	ACCOUNT NUMBER:	031-9521-462
WARD(s):	4	BEGIN & END DATES:	7/1/23 to 6/30/25
PROJECT DRIVER:	Maintenance	LIFE EXPECTANCY:	50 Years
		PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Upsize two segments along Franklin Road. The first segment is from the Railroad to Derby Drive and the second segment is the last 150 ft west from the intersection of W Franklin Rd and 12th Ave NW. These two segments of 8" DIP will be replaced with 12" PVC. A total of 2,170 LF will be replaced.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe	2,170	LF	$ 84	$ 181,195
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	5	EA	$ 2,543	$ 12,713
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	2	EA	$ 5,000	$ 10,000
21	New Fire Hydrant Assembly	3	EA	$ 5,164	$ 15,491
22	Remove Existing Fire Hydrant Assembly	3	EA	$ 601	$ 1,802
23	Pipeline Markers	2	EA	$ 150	$ 300
24	Utility location	2,170	LF	$ 1	$ 2,170
25	Trench Safety for pipeline	2,170	LF	$ 2	$ 4,340
26	Construction Site Restoration and Seeding	3,617	SY	$ 3.58	$ 12,961
27	Pavement Repair	362	SY	$ 128	$ 46,336
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 5,000	$ 5,000
32	Mobilization and Insurance (5%)	1	LS	$ 16,000	$ 16,000
				Subtotal	$ 325,000
				Contingency (30%)	$ 98,000
				Construction	**$ 423,000**
				Design (15%)	**$ 63,000**
				ROW	**$ 98,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	63,000								
	Const	423,000								
	ROW	98,000								
	Total	584,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	63,000			63,000
ROW	98,000			98,000
Utilities				0
Const.	423,000			423,000
Materials				0
Total	584,000	0	0	584,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

				APAI PROJECT NUMBER	M-4		
PROJECT TITLE:	Waterline Improvement: OKC Second Feed			PROJECT TYPE:	Water System		Improvt.
PROJ. CATEGORY:	Water Line Maintenance Misc Projects			PROJECT NUMBER:	WA		
DEPARTMENT:	Utilities			ACCOUNT NUMBER:	031-9521-462		
MANAGER:	Mark Daniels			BEGIN & END DATES:	7/1/21	to	6/30/23
WARD(s):	4			LIFE EXPECTANCY:	50 Years		
PROJECT DRIVER:	Maintenance			PREVIOUS CITY PROJECT:	Yes		
				PROJECT PRIORITY:	Low		

DETAILED PROJECT DESCRIPTION:

This project will install approximately 6 miles of 24-inch treated waterline from OKC to allow purchase of an additional 6 MGD of treated water from OKC. Connection point would likely be in NE Norman, possibly 12th NE or 24th NE and could act a potential blending point for non-potable groundwater and treated water. Costs taken from Table 3.7 of 2060 Strategic Water Supply Plan. 31,680 LF 24-inch at $335 per LF plus $563K for flow metering vault (2012 costs). Original costs have been updated to 2017 dollars.

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
031-9521-462.62-01	Design	2,342,000							1,171,000	1,171,000
031-9521-462.60-01	ROW	2,028,000							1,014,000	1,014,000
031-9521-462.67-01	Utilities	0								0
031-9521-462.61-01	Const	11,707,000								11,707,000
031-9521-462.63-01	Matls	0								
	Total	16,077,000	0	0	0	0	0	0	2,185,000	13,892,000

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	2,342,000			2,342,000
ROW	0			0
Utilities				0
Const.	2,028,000			2,028,000
Materials				0
Total	4,370,000	0	0	4,370,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

				APAI PROJECT NUMBER	M-5		
PROJECT TITLE:	WL Replacement: Flood: Rock Creek to Venture			PROJECT TYPE:	Water System		Improvt.
PROJ. CATEGORY:	Water Distribution System			PROJECT NUMBER:	WA		
DEPARTMENT:	Utilities			ACCOUNT NUMBER:	031-9360-462		
MANAGER:	Charlie Thomas			BEGIN & END DATES:	7/1/18	to	6/30/21
WARD(s):	6	8		LIFE EXPECTANCY:	50 Years		
PROJECT DRIVER:	Maintenance			PREVIOUS CITY PROJECT:	Yes		
				PROJECT PRIORITY:	High		

DETAILED PROJECT DESCRIPTION:

Project will replace ductile iron pipe (DIP) water lines along North Flood Avenue from Rock Creek Road across Tecumseh to Venture Drive. DIP is rupturing causing extensive damage to driveways, streets, and yards. The DIP is not compatible with the corrosive clay soils. Project will replace approximately 6,600 feet of 16-inch and 3,400 feet of 12-inch DIP with 6,600 feet of 16-inch and 3,400 feet of 12-inch C900 PVC pipe.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe	3,100	LF	$ 84	$ 258,850
4	16-inch Pipe	6,300	LF	$ 138	$ 866,250
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing	300	LF	$ 371	$ 111,200
10	16-inch Bore and Casing	100	LF	$ 468	$ 46,800
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	7	EA	$ 2,543	$ 17,799
16	16-inch Butterfly Valve with Valve Box	13	EA	$ 4,446	$ 57,798
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	5	EA	$ 5,000	$ 25,000
21	New Fire Hydrant Assembly	17	EA	$ 5,164	$ 87,782
22	Remove Existing Fire Hydrant Assembly	10	EA	$ 601	$ 6,007
23	Pipeline Markers	10	EA	$ 150	$ 1,500
24	Utility location	9,400	LF	$ 1	$ 9,400
25	Trench Safety for pipeline	9,400	LF	$ 2	$ 18,800
26	Construction Site Restoration and Seeding	16,334	SY	$ 3.58	$ 58,530
27	Pavement Repair	1,634	SY	$ 128	$ 209,152
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 30,000	$ 30,000
30	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
31	Erosion Control	1	LS	$ 9,000	$ 9,000
32	Mobilization and Insurance (5%)	1	LS	$ 93,000	$ 93,000
				Subtotal	$ 1,949,000
				Contingency (30%)	$ 585,000
				Construction	**$ 2,534,000**
				Design (15%)	**$ 380,000**
				ROW	**$ 441,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	380,000								
	Const	2,534,000								
	ROW	441,000								
	Total	3,355,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	380,000			380,000
ROW	441,000			441,000
Utilities				0
Const.	2,534,000			2,534,000
Materials				0
Total	3,355,000	0	0	3,355,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Water Line Replacement: Hall Park, Phase 2	APAI PROJECT NUMBER	M-6
PROJ. CATEGORY:	Water Distribution System	PROJECT TYPE:	Water System Maint.
DEPARTMENT:	Utilities	PROJECT NUMBER:	WA
MANAGER:	Charlie Thomas	ACCOUNT NUMBER:	031-
WARD(s):	5	BEGIN & END DATES:	7/1/19 to 6/30/21
PROJECT DRIVER:	Maintenance	LIFE EXPECTANCY:	50 Years
		PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Project will replace ductile iron pipe (DIP) water lines in the Double Tree area of the Hall Park subdivision along Oak Forest, Timbercrest, Five Oaks, Wood Hollow, Timberwood and Burning Tree. The DIP is not compatible with the corrosive clay soils and is rupturing causing extensive damage to driveways, streets, and yards. Project of this scope exceeds ability of Water Line Maintenance Division to perform on an annual basis. Approximately 4,000 feet of 4" and 6" DIP will be replaced with 6" C900 PVC pipe.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	4,600	LF	$ 53	$ 243,800
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	10	EA	$ 1,087	$ 10,867
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	3	EA	$ 5,000	$ 15,000
21	New Fire Hydrant Assembly	8	EA	$ 5,164	$ 41,309
22	Remove Existing Fire Hydrant Assembly	5	EA	$ 601	$ 3,003
23	Pipeline Markers	5	EA	$ 150	$ 750
24	Utility location	4,600	LF	$ 1	$ 4,600
25	Trench Safety for pipeline	4,600	LF	$ 2	$ 9,200
26	Construction Site Restoration and Seeding	7,667	SY	$ 3.58	$ 27,473
27	Pavement Repair	767	SY	$ 128	$ 98,176
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 24,000	$ 24,000
				Subtotal	$ 496,000
				Contingency (30%)	$ 149,000
				Construction	**$ 645,000**
				Design (15%)	**$ 97,000**
				ROW	**$ -**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	97,000								
	Const	645,000								
	ROW	0								
	Total	742,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	97,000			97,000
ROW	0			0
Utilities				0
Const.	645,000			645,000
Materials				0
Total	742,000	0	0	742,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Robinson Waterline: 24th Ave. NE to 24th Ave. NW	APAI PROJECT NUMBER	M-7
PROJ. CATEGORY:	Water Line Maintenance Misc Projects	PROJECT TYPE:	Water System Improvt.
DEPARTMENT:	Utilities	PROJECT NUMBER:	WA
MANAGER:	Mark Daniels	ACCOUNT NUMBER:	031-9521-462
WARD(s):	4	BEGIN & END DATES:	7/1/20 to 6/30/24
PROJECT DRIVER:	Maintenance	LIFE EXPECTANCY:	50 Years
		PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	High

DETAILED PROJECT DESCRIPTION:

Replace 21,850 LF of 16" line on Robinson Rd from 24th Ave NE to 24th Ave NW to a 30" line. (Recently replaced segment of 16" waterline under railroad from westside of Flood Avenue to eastside of Stubbeman Avenue not included in revised project limits.)

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe	21,360	LF	$ 230	$ 4,912,800
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing	490	LF	$ 1,194	$ 585,060
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	44	EA	$ 12,595	$ 554,180
19	Blowoff Valves	3	EA	$ 6,196	$ 18,588
20	Air Release Valve and Concrete Vault	11	EA	$ 5,000	$ 55,000
21	New Fire Hydrant Assembly	20	EA	$ 5,164	$ 103,273
22	Remove Existing Fire Hydrant Assembly	20	EA	$ 601	$ 12,013
23	Pipeline Markers	22	EA	$ 150	$ 3,300
24	Utility location	21,360	LF	$ 1	$ 21,360
25	Trench Safety for pipeline	21,360	LF	$ 2	$ 42,720
26	Construction Site Restoration and Seeding	36,417	SY	$ 3.58	$ 130,494
27	Pavement Repair	1,821	SY	$ 128	$ 233,088
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 30,000	$ 30,000
30	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
31	Erosion Control	1	LS	$ 9,000	$ 9,000
32	Mobilization and Insurance (5%)	1	LS	$ 338,000	$ 338,000
				Subtotal	$ 7,085,000
				Contingency (30%)	$ 2,126,000
				Construction	**$ 9,211,000**
				Design (15%)	**$ 1,382,000**
				ROW	**$ 983,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	1,382,000								
	Const	9,211,000								
	ROW	983,000								
	Total	11,576,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	1,382,000			1,382,000
ROW	983,000			983,000
Utilities				0
Const.	9,211,000			9,211,000
Materials				0
Total	11,576,000	0	0	11,576,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Waterline Replacement: Interstate Drive	APAI PROJECT NUMBER	M-8
PROJ. CATEGORY:	Water Distribution system	PROJECT TYPE:	Water System Maint.
DEPARTMENT:	Utilities	PROJECT NUMBER:	WA
MANAGER:	Charlie Thomas	ACCOUNT NUMBER:	031-XXXX-462
WARD(s):		BEGIN & END DATES:	7/1/17 to 6/30/19
PROJECT DRIVER:	Maintenance	LIFE EXPECTANCY:	50 Years
		PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	High

DETAILED PROJECT DESCRIPTION:

Project will replace ductile iron pipe (DIP) water lines along North Interstate Drive from near Copperfield Drive and Northwest Blvd. south to approximately River Oaks Drive. It will also include Copperfield Drive and an extension west into Springbrook Addition. The DIP water lines are not compatible with the clay soils and lines are rupturing, causing damage to parking, driveways and streets, and service disruptions to commercial entities in the area. Existing 6 " and 8" lines will be replaced with an 8" pipeline. No additional hydraulic capacity is needed, although this project did help increase FF at Node 6352 from 1,010 to 1,560 gpm. Length of pipe segment is approximately 5,680 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	5,680	LF	$ 68	$ 383,400
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	12	EA	$ 1,452	$ 17,420
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	3	EA	$ 5,000	$ 15,000
21	New Fire Hydrant Assembly	10	EA	$ 5,164	$ 51,637
22	Remove Existing Fire Hydrant Assembly	6	EA	$ 601	$ 3,604
23	Pipeline Markers	6	EA	$ 150	$ 900
24	Utility location	5,680	LF	$ 1	$ 5,680
25	Trench Safety for pipeline	5,680	LF	$ 2	$ 11,360
26	Construction Site Restoration and Seeding	9,467	SY	$ 3.58	$ 33,923
27	Pavement Repair	947	SY	$ 128	$ 121,216
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 30,000	$ 30,000
30	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
31	Erosion Control	1	LS	$ 9,000	$ 9,000
32	Mobilization and Insurance (5%)	1	LS	$ 37,000	$ 37,000
				Subtotal	$ 762,000
				Contingency (30%)	$ 229,000
				Construction	**$ 991,000**
				Design (15%)	**$ 149,000**
				ROW	**-**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	149,000								
	Const	991,000								
	ROW	-								
	Total	1,140,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	149,000			149,000
ROW	-			#VALUE!
Utilities				0
Const.	991,000			991,000
Materials				0
Total	1,140,000	0	0	#VALUE!
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	WL Replacement: W. Main: Berry to Interstate Drive	APAI PROJECT NUMBER	M-9
PROJ. CATEGORY:	Water Line Maintenance Misc Projects	PROJECT TYPE:	Water System Improvt.
DEPARTMENT:	Utilities	PROJECT NUMBER:	WA
MANAGER:	Mark Daniels	ACCOUNT NUMBER:	031-9521-462
WARD(s):	4	BEGIN & END DATES:	7/1/24 to 6/30/26
PROJECT DRIVER:	Maintenance	LIFE EXPECTANCY:	50 Years
		PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Replace 4,860 LF of pipe of various diameters on north side of Main St. with 8" PVC. Replace 6,830 LF of pipe of various diameters on the south side of Main St. with 12" PVC. The replacement project is bounded between Berry Rd. and N. Interstate drive. Project is required due to pipe age/condition concerns.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	4,860	LF	$ 68	$ 328,050
3	12-inch Pipe	6,830	LF	$ 84	$ 570,305
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing	310	LF	$ 296	$ 91,760
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	11	EA	$ 1,452	$ 15,968
15	12-inch Gate Valve with Valve Box	14	EA	$ 2,543	$ 35,597
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	2	EA	$ 6,196	$ 12,392
20	Air Release Valve and Concrete Vault	6	EA	$ 5,000	$ 30,000
21	New Fire Hydrant Assembly	10	EA	$ 5,164	$ 51,637
22	Remove Existing Fire Hydrant Assembly	12	EA	$ 601	$ 7,208
23	Pipeline Markers	12	EA	$ 150	$ 1,800
24	Utility location	11,690	LF	$ 1	$ 11,690
25	Trench Safety for pipeline	11,690	LF	$ 2	$ 23,380
26	Construction Site Restoration and Seeding	20,000	SY	$ 3.58	$ 71,667
27	Pavement Repair	2,000	SY	$ 128	$ 256,000
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 30,000	$ 30,000
30	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
31	Erosion Control	1	LS	$ 9,000	$ 9,000
32	Mobilization and Insurance (5%)	1	LS	$ 80,000	$ 80,000
				Subtotal	$ 1,662,000
				Contingency (30%)	$ 499,000
				Construction	**$ 2,161,000**
				Design (15%)	**$ 324,000**
				ROW	**$ 540,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	324,000								
	Const	2,161,000								
	ROW	540,000								
	Total	3,025,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	324,000			324,000
ROW	540,000			540,000
Utilities				0
Const.	2,161,000			2,161,000
Materials				0
Total	3,025,000	0	0	3,025,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Waterline Replacement: Flood Avenue	APAI PROJECT NUMBER	M-10
PROJ. CATEGORY:	Water Distribution System	PROJECT TYPE:	Water System Improvt.
DEPARTMENT:	Utilities	PROJECT NUMBER:	WA0306
MANAGER:	Mark Daniels	ACCOUNT NUMBER:	031-9521-462
WARD(s):	4	BEGIN & END DATES:	7/1/18 to 6/30/21
PROJECT DRIVER:	Maintenance	LIFE EXPECTANCY:	50 Years
		PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

This project will replace 6,130 feet of 6-inch waterline with 8-inch waterline along Flood Street, generally between Robinson and Boyd Street. The 6" water line is cast iron greater than 50 years old and has a number of leaks and repairs. Eleven waterlines crossing Flood will also be replaced with 8-inch by open trench construction .

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	6,130	LF	$ 68	$ 413,775
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	13	EA	$ 1,452	$ 18,872
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	4	EA	$ 5,000	$ 20,000
21	New Fire Hydrant Assembly	11	EA	$ 5,164	$ 56,800
22	Remove Existing Fire Hydrant Assembly	7	EA	$ 601	$ 4,205
23	Pipeline Markers	6	EA	$ 150	$ 900
24	Utility location	6,130	LF	$ 1	$ 6,130
25	Trench Safety for pipeline	6,130	LF	$ 2	$ 12,260
26	Construction Site Restoration and Seeding	10,217	SY	$ 3.58	$ 36,611
27	Pavement Repair	1,022	SY	$ 128	$ 130,816
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 30,000	$ 30,000
30	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
31	Erosion Control	1	LS	$ 9,000	$ 9,000
32	Mobilization and Insurance (5%)	1	LS	$ 40,000	$ 40,000
				Subtotal	$ 822,000
				Contingency (30%)	$ 247,000
				Construction	**$ 1,069,000**
				Design (15%)	**$ 160,000**
				ROW	**$ 276,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	160,000								
	Const	1,069,000								
	ROW	276,000								
	Total	1,505,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	160,000			160,000
ROW	276,000			276,000
Utilities				0
Const.	1,069,000			1,069,000
Materials				0
Total	1,505,000	0	0	1,505,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Water Line Replacement: Gray St. & Tonhawa St.	APAI PROJECT NUMBER	M-11
PROJ. CATEGORY:	Water Distribution System	PROJECT TYPE:	Water System Maint.
DEPARTMENT:	Utilities	PROJECT NUMBER:	
MANAGER:	Charlie Thomas	ACCOUNT NUMBER:	031-9360-462
WARD(s):		BEGIN & END DATES:	7/1/16 to 6/30/18
PROJECT DRIVER:	Maintenance	LIFE EXPECTANCY:	50 Years
		PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	High

DETAILED PROJECT DESCRIPTION:

Project will replace ductile iron pipe (DIP) water lines along Gray Street from Porter crossing BNSF RR and James Garner Avenue to University Blvd. DIP is rupturing causing extensive damage to driveways, streets, and yards. The DIP is not compatible with the corrosive clay soils. Project will add approximately 430 LF of 6", 4000 ft of 8", and 1,800 ft of 12" C900 PVC pipe.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	430	LF	$ 53	$ 22,790
2	8-inch Pipe	4,000	LF	$ 68	$ 270,000
3	12-inch Pipe	1,700	LF	$ 84	$ 141,950
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing	100	LF	$ 371	$ 37,067
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	8	EA	$ 1,452	$ 11,613
15	12-inch Gate Valve with Valve Box	4	EA	$ 2,543	$ 10,171
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	4	EA	$ 5,000	$ 20,000
21	New Fire Hydrant Assembly	4	EA	$ 5,164	$ 20,655
22	Remove Existing Fire Hydrant Assembly	-	EA	$ 601	$ -
23	Pipeline Markers	6	EA	$ 150	$ 900
24	Utility location	6,130	LF	$ 1	$ 6,130
25	Trench Safety for pipeline	6,130	LF	$ 2	$ 12,260
26	Construction Site Restoration and Seeding	5,192.00	SY	$ 3.58	$ 18,605
27	Pavement Repair	200	SY	$ 128	$ 25,600
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 15,000	$ 15,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 32,000	$ 32,000
				Subtotal	$ 670,000
				Contingency (30%)	$ 201,000
				Construction	**$ 871,000**
				Design (15%)	**$ 131,000**
				ROW	**$ -**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	131,000								
	Const	871,000								
	ROW	0								
	Total	1,002,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	131,000			131,000
ROW	0			0
Utilities				0
Const.	871,000			871,000
Materials				0
Total	1,002,000	0	0	1,002,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

				APAI PROJECT NUMBER	M-12		
PROJECT TITLE:	Water Line Replacement: West of Campus			PROJECT TYPE:	Water System		Maint.
PROJ. CATEGORY:	Water Distribution System			PROJECT NUMBER:			
DEPARTMENT:	Utilities			ACCOUNT NUMBER:	031-9360-462		
MANAGER:	Charlie Thomas			BEGIN & END DATES:	7/1/17	to	6/30/19
WARD(s):	4	7		LIFE EXPECTANCY:	50 Years		
PROJECT DRIVER:	Maintenance			PREVIOUS CITY PROJECT:	Yes		
				PROJECT PRIORITY:	High		

DETAILED PROJECT DESCRIPTION:

Project will replace ductile iron pipe (DIP) water lines in an area west of OU bounded by Brooks to the north, Flood to the west, Lindsey to the south, and Elm to the east. DIP is rupturing causing extensive damage to driveways, streets, and yards. The DIP is not compatible with the corrosive clay soils. Project will replace approximately 9,700 feet of 6" and 8" DIP with C900 PVC pipe.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	8,150	LF	$ 53	$ 431,950
2	8-inch Pipe	1,550	LF	$ 68	$ 104,625
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	17	EA	$ 1,087	$ 18,473
14	8-inch Gate Valve with Valve Box	4	EA	$ 1,452	$ 5,807
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	5	EA	$ 5,000	$ 25,000
21	New Fire Hydrant Assembly	17	EA	$ 5,164	$ 87,782
22	Remove Existing Fire Hydrant Assembly	10	EA	$ 601	$ 6,007
23	Pipeline Markers	10	EA	$ 150	$ 1,500
24	Utility location	9,700	LF	$ 1	$ 9,700
25	Trench Safety for pipeline	9,700	LF	$ 2	$ 19,400
26	Construction Site Restoration and Seeding	16,167	SY	$ 3.58	$ 57,932
27	Pavement Repair	1,617	SY	$ 128	$ 206,976
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 30,000	$ 30,000
30	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
31	Erosion Control	1	LS	$ 9,000	$ 9,000
32	Mobilization and Insurance (5%)	1	LS	$ 53,000	$ 53,000
				Subtotal	$ 1,109,000
				Contingency (30%)	$ 333,000
				Construction	**$ 1,442,000**
				Design (15%)	**$ 216,000**
				ROW	**$ -**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	216,000								
	Const	1,442,000								
	ROW	0								
	Total	1,658,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	216,000			216,000
ROW	0			0
Utilities				0
Const.	1,442,000			1,442,000
Materials				0
Total	1,658,000	0	0	1,658,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 7/18/17

ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Alameda Waterline Replacement: S. Poncha Ave. to 24th Ave. NE	APAI PROJECT NUMBER	M-13
PROJ. CATEGORY:	Water Line Maintenance Misc Projects	PROJECT TYPE:	Water System — Improvt.
DEPARTMENT:	Utilities	PROJECT NUMBER:	WA
MANAGER:	Mark Daniels	ACCOUNT NUMBER:	031-9521-462
WARD(s):	4	BEGIN & END DATES:	7/1/17 to 6/30/24
PROJECT DRIVER:	Maintenance	LIFE EXPECTANCY:	50 Years
		PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	High

DETAILED PROJECT DESCRIPTION:

Replace 8,700 LF of 24" with 24" PVC pipeline along Alameda St. from 24th Ave NE to S. Ponca Ave.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe	8,500	LF	$ 166	$ 1,408,167
6	30-inch Pipe		LF	$ 230	$ -
7	36-inch Pipe		LF	$ 300	$ -
8	6-inch Bore and Casing		LF	$ 246	$ -
9	8-inch Bore and Casing		LF	$ 296	$ -
10	12-inch Bore and Casing		LF	$ 371	$ -
11	16-inch Bore and Casing		LF	$ 468	$ -
12	24-inch Bore and Casing	200	LF	$ 628	$ 125,600
13	30-inch Bore and Casing		LF	$ 1,194	$ -
14	36-inch Bore and Casing		LF	$ 1,719	$ -
15	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
16	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
17	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
18	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
19	24-inch Butteryfly Valve with Valve Box	18	EA	$ 8,086	$ 145,548
20	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
21	36-inch Butterfly Valve with Valve Box	-	EA	$ 18,137	$ -
22	Blowoff Valves	1	EA	$ 6,196	$ 6,196
23	Air Release Valve and Concrete Vault	5	EA	$ 5,000	$ 25,000
24	New Fire Hydrant Assembly	15	EA	$ 5,164	$ 77,455
25	Remove Existing Fire Hydrant Assembly	9	EA	$ 601	$ 5,406
26	Pipeline Markers	9	EA	$ 150	$ 1,350
27	Utility location	8,500	LF	$ 1	$ 8,500
28	Trench Safety for pipeline	8,500	LF	$ 2	$ 17,000
29	Construction Site Restoration and Seeding	14,500	SY	$ 3.58	$ 51,958
30	Pavement Repair	1,450	SY	$ 128	$ 185,600
31	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
32	Mitigation	1	LS	$ 30,000	$ 30,000
33	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
34	Erosion Control	1	LS	$ 9,000	$ 9,000
35	Mobilization and Insurance (5%)	1	LS	$ 107,000	$ 107,000
				Subtotal	$ 2,240,000
				Contingency (30%)	$ 672,000
				Construction	**$ 2,912,000**
				Design (15%)	**$ 437,000**
				ROW	**$ 392,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	437,000								
	Const	2,912,000								
	ROW	392,000								
	Total	3,741,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

	Purpose	Fnd 31	Fed. Aid		Total
	Design	437,000			437,000
	ROW	392,000			392,000
	Utilities				0
	Const.	2,912,000			2,912,000
	Materials				0
	Total	3,741,000	0	0	3,741,000
	Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

	Bldg Maint		
	IT		
	Pub Wks		
	Utilities		
	Parks		
	Other		

Last Update 10/4/17

CITY OF NORMAN

PROJECT TITLE:	24th Ave NE Waterline Replacement: Alameda St. to Robinson St.	APAI PROJECT NUMBER	M-14
PROJ. CATEGORY:	Water Line Maintenance Misc Projects	PROJECT TYPE:	Water System Improvt.
DEPARTMENT:	Utilities	PROJECT NUMBER:	WA
MANAGER:	Mark Daniels	ACCOUNT NUMBER:	031-9521-462
WARD(s):	4	BEGIN & END DATES:	7/1/17 to 6/30/24
PROJECT DRIVER:	Maintenance	LIFE EXPECTANCY:	50 Years
		PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Replace 5,200 LF of 30" with 36" pipeline along 24th Ave NE from Robinson St. to Alameda St.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	36-inch Pipe	5,000	LF	$ 300	$ 1,500,000
8	6-inch Bore and Casing		LF	$ 246	$ -
9	8-inch Bore and Casing		LF	$ 296	$ -
10	12-inch Bore and Casing		LF	$ 371	$ -
11	16-inch Bore and Casing		LF	$ 468	$ -
12	24-inch Bore and Casing		LF	$ 628	$ -
13	30-inch Bore and Casing		LF	$ 1,194	$ -
14	36-inch Bore and Casing	200	LF	$ 1,719	$ 343,872
15	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
16	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
17	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
18	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
19	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
20	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
21	36-inch Butterfly Valve with Valve Box	11	EA	$ 18,137	$ 199,505
22	Blowoff Valves	1	EA	$ 6,196	$ 6,196
23	Air Release Valve and Concrete Vault	3	EA	$ 5,000	$ 15,000
24	New Fire Hydrant Assembly	9	EA	$ 5,164	$ 46,473
25	Remove Existing Fire Hydrant Assembly	6	EA	$ 601	$ 3,604
26	Pipeline Markers	5	EA	$ 150	$ 750
27	Utility location	5,000	LF	$ 1	$ 5,000
28	Trench Safety for pipeline	5,000	LF	$ 2	$ 10,000
29	Construction Site Restoration and Seeding	8,667	SY	$ 3.58	$ 31,057
30	Pavement Repair	867	SY	$ 128	$ 110,976
31	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
32	Mitigation	1	LS	$ 30,000	$ 30,000
33	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
34	Erosion Control	1	LS	$ 9,000	$ 9,000
35	Mobilization and Insurance (5%)	1	LS	$ 118,000	$ 118,000
				Subtotal	$ 2,465,000
				Contingency (30%)	$ 740,000
				Construction	**$ 3,205,000**
				Design (15%)	**$ 481,000**
				ROW	**$ 234,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	481,000								
	Const	3,205,000								
	ROW	234,000								
	Total	3,920,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

	Purpose	Fnd 31	Fed. Aid		Total
	Design	481,000			481,000
	ROW	234,000			234,000
	Utilities				0
	Const.	3,205,000			3,205,000
	Materials				0
	Total	3,920,000	0	0	3,920,000
	Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

	Bldg Maint		
	IT		
	Pub Wks		
	Utilities		
	Parks		
	Other		

Last Update 10/4/17

CITY OF NORMAN

PROJECT TITLE:	Robinson Waterline Replacement: WTP to 24th Ave NE	APAI PROJECT NUMBER	M-15
PROJ. CATEGORY:	Water Line Maintenance Misc Projects	PROJECT TYPE:	Water System Improvt.
DEPARTMENT:	Utilities	PROJECT NUMBER:	WA
MANAGER:	Mark Daniels	ACCOUNT NUMBER:	031-9521-462
WARD(s):	4	BEGIN & END DATES:	7/1/17 to 6/30/24
PROJECT DRIVER:	Maintenance	LIFE EXPECTANCY:	50 Years
		PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	High

DETAILED PROJECT DESCRIPTION:

This project would replace 2,600 LF of 30" pipe in the low pressure system with 42" pipe along Robinson St. from the WTP to 24th Ave NE.

Additionally, this project would upsize a short section of the 16" pipeline in the high pressure plane running north/south at the intersection of 24th Ave NE and Robinson St. This segment connects the two 24" high pressure plane lines running east/west along Robinson St. The City is widening this intersection, so the 16" will need to be relocated further east. Though the water model indicates that a 16" inch diameter pipe is large enough, the City would like to upsize this segment to a 24" diameter so that there won't be a bottleneck through this segment in the future. The length of this segment is approximately 80 LF

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe	80	LF	$ 166	$ 13,253
6	30-inch Pipe		LF	$ 230	$ -
7	36-inch Pipe		LF	$ 300	$ -
8	42-inch Pipe	2,200	LF	$ 350	$ 770,000
9	6-inch Bore and Casing		LF	$ 246	$ -
10	8-inch Bore and Casing		LF	$ 296	$ -
11	12-inch Bore and Casing		LF	$ 371	$ -
12	16-inch Bore and Casing		LF	$ 468	$ -
13	24-inch Bore and Casing		LF	$ 628	$ -
14	30-inch Bore and Casing		LF	$ 1,194	$ -
15	36-inch Bore and Casing		LF	$ 1,719	$ -
16	42-inch Bore and Casing	400	LF	$ 2,340	$ 936,096
17	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
18	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
19	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
20	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
21	24-inch Butteryfly Valve with Valve Box	2	EA	$ 8,086	$ 16,172
22	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
23	36-inch Butterfly Valve with Valve Box	-	EA	$ 18,137	$ -
24	42-inch Butterfly Valve with Valve Box	6	EA	$ 24,686	$ 148,117
25	Blowoff Valves	1	EA	$ 6,196	$ 6,196
26	Air Release Valve and Concrete Vault	2	EA	$ 5,000	$ 10,000
27	New Fire Hydrant Assembly	4	EA	$ 5,164	$ 20,655
28	Remove Existing Fire Hydrant Assembly	3	EA	$ 601	$ 1,802
29	Pipeline Markers	2	EA	$ 150	$ 300
30	Utility location	80	LF	$ 1	$ 80
31	Trench Safety for pipeline	80	LF	$ 2	$ 160
32	Construction Site Restoration and Seeding	3,800	SY	$ 3.58	$ 13,617
33	Pavement Repair	380	SY	$ 128	$ 48,640
34	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
35	Mitigation	1	LS	$ 30,000	$ 30,000
36	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
37	Erosion Control	1	LS	$ 9,000	$ 9,000
38	Mobilization and Insurance (5%)	1	LS	$104,000	$ 104,000
				Subtotal	$ 2,164,000
				Contingency (30%)	$ 649,000
				Construction	**$ 2,813,000**
				Design (15%)	**$ 422,000**
				ROW	**$ 103,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	422,000								
	Const	2,813,000								
	ROW	103,000								
	Total	3,338,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

	Purpose	Fnd 31	Fed. Aid		Total
	Design	422,000			422,000
	ROW	103,000			103,000
	Utilities				0
	Const.	2,813,000			2,813,000
	Materials				0
	Total	3,338,000	0	0	3,338,000
	Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

	Bldg Maint		
	IT		
	Pub Wks		
	Utilities		
	Parks		
	Other		

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	M-16		
PROJECT TITLE:	Robinson PZ Waterline Replacement: WTP to 24th Ave NE	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Maintenance	PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

This project would replace the 24" water line south of Robinson St. between the WTP and 24th Ave NE that services the high pressure zone for maintenance reasons. After replacement, this segment would be converted to the low pressure system as a redundant line to the existing low pressure line south of Robinson St. (see project M-15). In order to repurpose this segment for the low pressure system, two valves would need to be exercised.This segment has a length of approximately 2,590 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe	2,590	LF	$ 166	$ 429,077
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	6	EA	$ 8,086	$ 48,516
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	2	EA	$ 5,000	$ 10,000
21	New Fire Hydrant Assembly	5	EA	$ 5,164	$ 25,818
22	Remove Existing Fire Hydrant Assembly	3	EA	$ 601	$ 1,802
23	Pipeline Markers	3	EA	$ 150	$ 450
24	Utility location	2,590	LF	$ 1	$ 2,590
25	Trench Safety for pipeline	2,590	LF	$ 2	$ 5,180
26	Construction Site Restoration and Seeding	4,317	SY	$ 3.58	$ 15,469
27	Pavement Repair	432	SY	$ 128	$ 55,296
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 30,000	$ 30,000
30	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
31	Erosion Control	1	LS	$ 9,000	$ 9,000
32	Mobilization and Insurance (5%)	1	LS	$ 34,000	$ 34,000
				Subtotal	$ 709,000
				Contingency (30%)	$ 213,000
				Construction	**$ 922,000**
				Design (15%)	**$ 138,000**
				ROW	**$ 117,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	138,000								
	Const	922,000								
	ROW	117,000								
	Total	1,177,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	138,000			138,000
ROW	117,000			117,000
Utilities				0
Const.	922,000			922,000
Materials				0
Total	1,177,000	0	0	1,177,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

					APAI PROJECT NUMBER	M-17				
PROJECT TITLE:	Replace Upper Pressure Zone Pumps				PROJECT TYPE:					
PROJ. CATEGORY:					PROJECT NUMBER:					
DEPARTMENT:					ACCOUNT NUMBER:					
MANAGER:					BEGIN & END DATES:					
WARD(s):					LIFE EXPECTANCY:					
PROJECT DRIVER:	Maintenance				PREVIOUS CITY PROJECT:	Yes				
					PROJECT PRIORITY:	High				

DETAILED PROJECT DESCRIPTION:

This project would replace the upper pressure zone pumps. A cost estimate has not been prepared since the pumps have already been selected by the City.

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design									
	Const									
	ROW									
	Total	0	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	0			0
ROW	0			0
Utilities				0
Const.	0			0
Materials				0
Total	0	0	0	0
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Extend Upper PZ to Hollister Trail and Palomino Way	APAI PROJECT NUMBER	P-1
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Pressure	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	High

DETAILED PROJECT DESCRIPTION:

This project would extend the upper PZ to include homes along Hollister Trail, Palomino Way, Pomelo Circle, and Santa Rosa Court to increase water pressure. The neighborhood can be disconnected from the 24" water line along E Tecumseh Rd. An 425 LF 8" line will be constructed to connect the corner of Queenston Avenue to Pomelo Circle and provide the feed from the HPP.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	425	LF	$ 68	$ 28,688
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	2	EA	$ 1,452	$ 2,903
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
22	Remove Existing Fire Hydrant Assembly	-	EA	$ 601	$ -
23	Pipeline Markers	2	EA	$ 150	$ 300
24	Utility location	425	LF	$ 1	$ 425
25	Trench Safety for pipeline	425	LF	$ 2	$ 850
26	Construction Site Restoration and Seeding	709	SY	$ 3.58	$ 2,541
27	Pavement Repair	71	SY	$ 128	$ 9,088
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 4,000	$ 4,000
				Subtotal	$ 82,000
				Contingency (30%)	$ 25,000
				Construction	**$ 107,000**
				Design (15%)	**$ 16,000**
				ROW	**$ 19,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	16,000								
	Const	107,000								
	ROW	19,000								
	Total	142,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	16,000			16,000
ROW	19,000			19,000
Utilities				0
Const.	107,000			107,000
Materials				0
Total	142,000	0	0	142,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	P-2		
PROJECT TITLE:	Add 5th 250 HP Pump to MDS PS	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Pressure	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

This project would add a 5th identical pump to the MDS PS. We need all 4 pumps on to fill Brookhaven Tower and meet future max day demands. Pump will be 250 HP

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	Pump	1	LS	$ 115,000	$ 115,000
2	Pump Installation (10%)	1	LS	$ 12,000	$ 12,000
3	Electrical (30%)	1	LS	$ 38,000	$ 38,000
4	Mobilization and Insurance (5%)	1	LS	$ 9,000	$ 9,000
				Subtotal	$ 174,000
				Contingency (30%)	$ 52,000
				Construction	**$ 226,000**
				Design (15%)	**$ 34,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	34,000								
	Const	226,000								
	ROW	0								
	Total	260,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	34,000			34,000
ROW	0			0
Utilities				0
Const.	226,000			226,000
Materials				0
Total	260,000	0	0	260,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	P-3		
PROJECT TITLE:	Expand Upper PZ to Include Crest Place	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	Low Pressure	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

This project would extend the Upper Pressure Zone to include Crest Place by opening three closed valves along this road that isolate the Upper Pressure Zone from the Lower Pressure Zone. Additionally, a single valve on the west side of the interesection of Morren Drive with Crest Place must be closed. This change improves low pressures and low FF along this Crest Place. Since this project only requires labor to open and close valves, a cost estimate was not prepared.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	-	EA	$ 5,164	$ -
22	Remove Existing Fire Hydrant Assembly	-	EA	$ 601	$ -
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	-	LF	$ 1	$ -
25	Trench Safety for pipeline	-	LF	$ 2	$ -
26	Construction Site Restoration and Seeding	-	SY	$ 3.58	$ -
27	Pavement Repair	-	SY	$ 128	$ -
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	-	LS	$ 30,000	$ -
30	Traffic Control Plan and Implementation	-	LS	$ 26,000	$ -
31	Erosion Control	-	LS	$ 9,000	$ -
32	Mobilization and Insurance (5%)	-	LS	$ -	$ -
				Subtotal	$ -
				Contingency (30%)	$ -
				Construction	**$ -**
				Design (15%)	**$ -**
				ROW	**$ -**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	0								
	Const	0								
	ROW	0								
	Total	0	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	0			0
ROW	0			0
Utilities				0
Const.	0			0
Materials				0
Total	0	0	0	0
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

					APAI PROJECT NUMBER	P-4				
PROJECT TITLE:	Include Meadowood Blvd in HPP				PROJECT TYPE:					
PROJ. CATEGORY:					PROJECT NUMBER:					
DEPARTMENT:					ACCOUNT NUMBER:					
MANAGER:					BEGIN & END DATES:					
WARD(s):					LIFE EXPECTANCY:					
PROJECT DRIVER:	Low Pressure				PREVIOUS CITY PROJECT:	No				
					PROJECT PRIORITY:	High				

DETAILED PROJECT DESCRIPTION:

Move the neighborhood along Meadowood Blvd to the HPP to address low pressures (nodes in this neighborhood were near 35 psi). Open two existing valves along 8" lines and close new 12" valve on Meadowood Blvd. This project would be pair with project F-39

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design									
	Const									
	ROW									
	Total	0	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	0			0
ROW	0			0
Utilities				0
Const.	0			0
Materials				0
Total	0	0	0	0
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Future Elevated Storage Tank in MDS	APAI PROJECT NUMBER	P-5
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	Low Pressure	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	Yes
		PROJECT PRIORITY:	High

DETAILED PROJECT DESCRIPTION:

This project would add a new 1.0 million gallon elevated storage tank in the Main Distribution System in the southeast corner of the City. The elevated storage tank would be connected to the MDS with a new 24" pipeline approximately 800 ft long.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe	800	LF	$ 166	$ 132,533
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	2	EA	$ 6,266	$ 12,532
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	1.0 MG Elevated Storage Tank	1	EA	$ 2,027,692	$ 2,027,692
20	Blowoff Valves	1	EA	$ 6,196	$ 6,196
21	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
22	New Fire Hydrant Assembly	2	EA	$ 5,164	$ 10,327
23	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
24	Pipeline Markers	1	EA	$ 150	$ 150
25	Utility location	800	LF	$ 1	$ 800
26	Trench Safety for pipeline	800	LF	$ 2	$ 1,600
27	Construction Site Restoration and Seeding	1,334	SY	$ 3.58	$ 4,780
28	Pavement Repair	134	SY	$ 128	$ 17,152
29	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
30	Mitigation	1	LS	$ 30,000	$ 30,000
31	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
32	Erosion Control	1	LS	$ 9,000	$ 9,000
33	Mobilization and Insurance (5%)	1	LS	$ 115,000	$ 115,000
				Subtotal	$ 2,409,000
				Contingency (30%)	$ 723,000
				Construction	**$ 3,132,000**
				Design (15%)	**$ 470,000**
				ROW	**$ 36,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	470,000								
	Const	3,132,000								
	ROW	36,000								
	Total	3,638,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	470,000			470,000
ROW	36,000			36,000
Utilities				0
Const.	3,132,000			3,132,000
Materials				0
Total	3,638,000	0	0	3,638,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	W-1		
PROJECT TITLE:	Complete 6" loop along Teton Oval culdesac	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	High Water Age	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Complete 6" loop along culdesac of Teton Oval to increase low FF at Node 12774 from 1238 to 2213 gpm. Length of pipeline segment is 120 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	120	LF	$ 53	$ 6,360
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	120	LF	$ 1	$ 120
25	Trench Safety for pipeline	120	LF	$ 2	$ 240
26	Construction Site Restoration and Seeding	200	SY	$ 3.58	$ 717
27	Pavement Repair	20	SY	$ 128	$ 2,560
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 2,000	$ 2,000
				Subtotal	$ 32,000
				Contingency (30%)	$ 10,000
				Construction	**$ 42,000**
				Design (15%)	**$ 6,000**
				ROW	**$ 5,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	6,000								
	Const	42,000								
	ROW	5,000								
	Total	53,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	6,000			6,000
ROW	5,000			5,000
Utilities				0
Const.	42,000			42,000
Materials				0
Total	53,000	0	0	53,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

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ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	W-2		
PROJECT TITLE:	New 12" pipe on Nantucket Blvd	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	High Water Age	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Medium

DETAILED PROJECT DESCRIPTION:

Extend 12" pipe (ID = 27146.12786.F) from existing dead end line to 24" along Tecumseh. Requested by Mark. Will help FF and reduce water age in the area. New 12" line is approximately 240 LF

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe	240	LF	$ 84	$ 20,040
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	2	EA	$ 2,543	$ 5,085
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	-	EA	$ 6,196	$ -
20	Air Release Valve and Concrete Vault	-	EA	$ 5,000	$ -
21	New Fire Hydrant Assembly	-	EA	$ 5,164	$ -
22	Remove Existing Fire Hydrant Assembly	-	EA	$ 601	$ -
23	Pipeline Markers	-	EA	$ 150	$ -
24	Utility location	240	LF	$ 1	$ 240
25	Trench Safety for pipeline	240	LF	$ 2	$ 480
26	Construction Site Restoration and Seeding	400	SY	$ 3.58	$ 1,433
27	Pavement Repair	40	SY	$ 128	$ 5,120
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 3,000	$ 3,000
				Subtotal	$ 47,000
				Contingency (30%)	$ 14,000
				Construction	**$ 61,000**
				Design (15%)	**$ 9,000**
				ROW	**$ 11,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	9,000								
	Const	61,000								
	ROW	11,000								
	Total	81,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	9,000			9,000
ROW	11,000			11,000
Utilities				0
Const.	61,000			61,000
Materials				0
Total	81,000	0	0	81,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

APAI PROJECT NUMBER	W-3		
PROJECT TITLE:	Upsize 6" Line to 8" along Shrill St.	PROJECT TYPE:	
PROJ. CATEGORY:		PROJECT NUMBER:	
DEPARTMENT:		ACCOUNT NUMBER:	
MANAGER:		BEGIN & END DATES:	
WARD(s):		LIFE EXPECTANCY:	
PROJECT DRIVER:	High Water Age	PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Upsize 6" to 8" lines in residential neighborhood off N. Porter Avenue and Sandpiper Lane. Make 8" connection to Medical Arts Drive to loop and reduce water age, but also increase FF at four culdesac nodes. Nodes increased from a range of 887-994 gpm to 1275-3122 gpm. Also, upsized small segment of 6" pipe that was between 12" lines along N. Porter Avenue. The total length of 8" and 12" pipes are approximately 2,890 LF and 25 LF, respectively.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe	2,890	LF	$ 68	$ 195,075
3	12-inch Pipe	25	LF	$ 84	$ 2,088
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	6	EA	$ 1,452	$ 8,710
15	12-inch Gate Valve with Valve Box	2	EA	$ 2,543	$ 5,085
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	5	EA	$ 5,164	$ 25,818
22	Remove Existing Fire Hydrant Assembly	3	EA	$ 601	$ 1,802
23	Pipeline Markers	3	EA	$ 150	$ 450
24	Utility location	2,915	LF	$ 1	$ 2,915
25	Trench Safety for pipeline	2,915	LF	$ 2	$ 5,830
26	Construction Site Restoration and Seeding	4,859	SY	$ 3.58	$ 17,411
27	Pavement Repair	486	SY	$ 128	$ 62,208
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 18,000	$ 18,000
				Subtotal	$ 369,000
				Contingency (30%)	$ 111,000
				Construction	**$ 480,000**
				Design (15%)	**$ 72,000**
				ROW	**$ 131,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	72,000								
	Const	480,000								
	ROW	131,000								
	Total	683,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	72,000			72,000
ROW	131,000			131,000
Utilities				0
Const.	480,000			480,000
Materials				0
Total	683,000	0	0	683,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

PROJECT TITLE:	Connect 6" Lines at NW corner of 24th Avenue NW and W. Main Street	APAI PROJECT NUMBER	W-4
PROJ. CATEGORY:		PROJECT TYPE:	
DEPARTMENT:		PROJECT NUMBER:	
MANAGER:		ACCOUNT NUMBER:	
WARD(s):		BEGIN & END DATES:	
PROJECT DRIVER:	High Water Age	LIFE EXPECTANCY:	
		PREVIOUS CITY PROJECT:	No
		PROJECT PRIORITY:	Low

DETAILED PROJECT DESCRIPTION:

Connect two dead-end 6" lines in commercial area at the NW corner of 24th Avenue NW and W. Main Street to improve FF and reduce water age. (FF at Node 6763 increases from 1010 to 1880 gpm, FF at Node 7999 increases from 1094 to 1882 gpm.). Length of line segment is approximately 540 LF.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe	540	LF	$ 53	$ 28,620
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe		LF	$ 166	$ -
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing		LF	$ 628	$ -
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	2	EA	$ 1,087	$ 2,173
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	-	EA	$ 8,086	$ -
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	1	EA	$ 5,000	$ 5,000
21	New Fire Hydrant Assembly	1	EA	$ 5,164	$ 5,164
22	Remove Existing Fire Hydrant Assembly	1	EA	$ 601	$ 601
23	Pipeline Markers	1	EA	$ 150	$ 150
24	Utility location	540	LF	$ 1	$ 540
25	Trench Safety for pipeline	540	LF	$ 2	$ 1,080
26	Construction Site Restoration and Seeding	900	SY	$ 3.58	$ 3,225
27	Pavement Repair	90	SY	$ 128	$ 11,520
28	Storm Water Pollution Prevention Plan	-	LS	$ 10,000	$ -
29	Mitigation	1	LS	$ 5,000	$ 5,000
30	Traffic Control Plan and Implementation	1	LS	$ 5,000	$ 5,000
31	Erosion Control	1	LS	$ 2,000	$ 2,000
32	Mobilization and Insurance (5%)	1	LS	$ 4,000	$ 4,000
				Subtotal	$ 80,000
				Contingency (30%)	$ 24,000
				Construction	**$ 104,000**
				Design (15%)	**$ 16,000**
				ROW	**$ 24,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	16,000								
	Const	104,000								
	ROW	24,000								
	Total	144,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	16,000			16,000
ROW	24,000			24,000
Utilities				0
Const.	104,000			104,000
Materials				0
Total	144,000	0	0	144,000
Reimbursable Account?				

THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

CITY OF NORMAN

				APAI PROJECT NUMBER	W-5		
PROJECT TITLE:	Water Line Segment D (Phase 4)			PROJECT TYPE:	Water System		Improvt.
PROJ. CATEGORY:	Water Distribution System			PROJECT NUMBER:	WA0239		
DEPARTMENT:	Utilities			ACCOUNT NUMBER:	031-9360-462		
MANAGER:	Chris Mattingly			BEGIN & END DATES:	7/1/16	to	6/30/19
WARD(s):	2	7		LIFE EXPECTANCY:	50 Years		
PROJECT DRIVER:	High Water Age			PREVIOUS CITY PROJECT:	Yes		
				PROJECT PRIORITY:	Highest		

DETAILED PROJECT DESCRIPTION:

As part of the development of the Water System Computer Model, Segment D was identified as a project to enhance the water distribution systems ability to transfer water across the City of Norman. This project was to complete the southern loop around Norman and included 19,000 LF 24-inch along Highway 9 between 12th Avenue SE and 24th Avenue SW then north to Briggs Street.
Segment D was broken into several components. Phase 1 extended the 24" WL from 12th Avenue SE east along SH 9 to Jenkins. Phase 2 extended 5,600 LF 24" WL along the south side of Lindsey between Berry and 24th SW to Briggs. Phase 3 extended 2,500 LF 24" from Berry to Chautauqua. The remaining section (Phase 4) will include about 8,500 LF along Timberdale east from Chautauqua to Jenkins and south to Highway 9.

Item No.	Description	Quantity	Unit	Unit Price	Extended Amount
1	6-inch Pipe		LF	$ 53	$ -
2	8-inch Pipe		LF	$ 68	$ -
3	12-inch Pipe		LF	$ 84	$ -
4	16-inch Pipe		LF	$ 138	$ -
5	24-inch Pipe	8,000	LF	$ 166	$ 1,325,333
6	30-inch Pipe		LF	$ 230	$ -
7	6-inch Bore and Casing		LF	$ 246	$ -
8	8-inch Bore and Casing		LF	$ 296	$ -
9	12-inch Bore and Casing		LF	$ 371	$ -
10	16-inch Bore and Casing		LF	$ 468	$ -
11	24-inch Bore and Casing	500	LF	$ 628	$ 314,000
12	30-inch Bore and Casing		LF	$ 1,194	$ -
13	6-inch Gate Valve with Valve Box	-	EA	$ 1,087	$ -
14	8-inch Gate Valve with Valve Box	-	EA	$ 1,452	$ -
15	12-inch Gate Valve with Valve Box	-	EA	$ 2,543	$ -
16	16-inch Butterfly Valve with Valve Box	-	EA	$ 4,446	$ -
17	24-inch Butteryfly Valve with Valve Box	17	EA	$ 8,086	$ 137,462
18	30-inch Butterfly Valve with Valve Box	-	EA	$ 12,595	$ -
19	Blowoff Valves	1	EA	$ 6,196	$ 6,196
20	Air Release Valve and Concrete Vault	5	EA	$ 5,000	$ 25,000
21	New Fire Hydrant Assembly	15	EA	$ 5,164	$ 77,455
22	Remove Existing Fire Hydrant Assembly	9	EA	$ 601	$ 5,406
23	Pipeline Markers	9	EA	$ 150	$ 1,350
24	Utility location	8,000	LF	$ 1	$ 8,000
25	Trench Safety for pipeline	8,000	LF	$ 2	$ 16,000
26	Construction Site Restoration and Seeding	14,167	SY	$ 3.58	$ 50,765
27	Pavement Repair	1,417	SY	$ 128	$ 181,376
28	Storm Water Pollution Prevention Plan	1	LS	$ 10,000	$ 10,000
29	Mitigation	1	LS	$ 30,000	$ 30,000
30	Traffic Control Plan and Implementation	1	LS	$ 26,000	$ 26,000
31	Erosion Control	1	LS	$ 9,000	$ 9,000
32	Mobilization and Insurance (5%)	1	LS	$ 112,000	$ 112,000
				Subtotal	$ 2,335,000
				Contingency (30%)	$ 701,000
				Construction	**$ 3,036,000**
				Design (15%)	**$ 455,000**
				ROW	**$ 383,000**

EXPENDITURE SCHEDULE through CITY Accounts by FY

Account Number	Cost Element	TOTAL ALL FISCAL YRS	Actual Prior Years	Budget FYE 2017	Proposed FYE 2018	FYE 2019	FYE 2020	FYE 2021	FYE 2022	Beyond 5 Years
	Design	455,000								
	Const	3,036,000								
	ROW	383,000								
	Total	3,874,000	0	0	0	0	0	0	0	0

OPERATING IMPACT:

STATUS & COMMENTS:

TOTAL PROJECT BUDGET BY FUND SOURCE AND PURPOSE:

Purpose	Fnd 31	Fed. Aid		Total
Design	455,000			455,000
ROW	383,000			383,000
Utilities				0
Const.	3,036,000			3,036,000
Materials				0
Total	3,874,000	0	0	3,874,000
Reimbursable Account?				

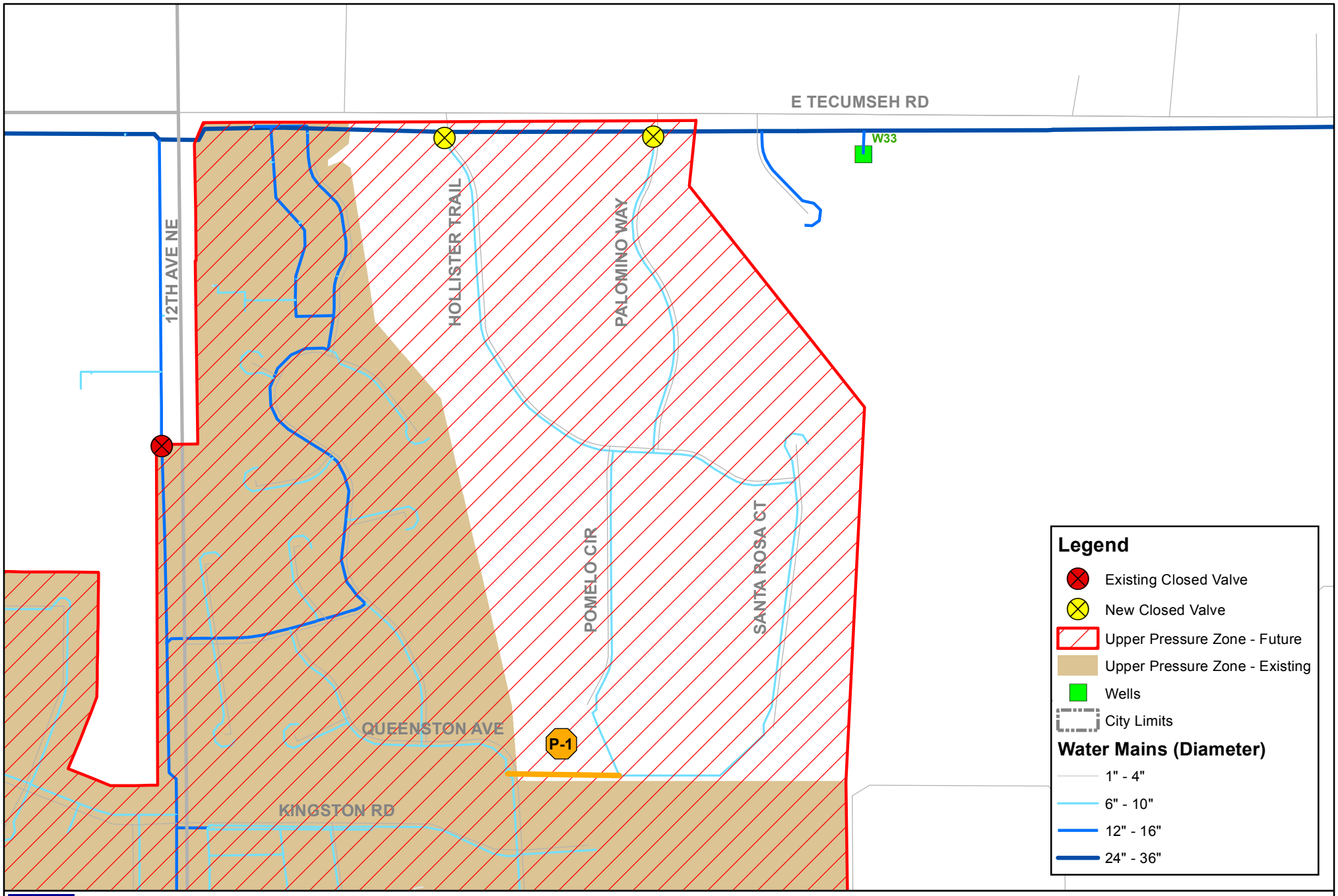
THIS PROJECT NEEDS ASSISTANCE FROM:

Bldg Maint	
IT	
Pub Wks	
Utilities	
Parks	
Other	

Last Update 10/4/17

ANNUAL BUDGET

Appendix J – Recommended Changes to Upper Pressure Zone Boundary



NORMAN UTILITIES AUTHORITY
Water Distribution Model Update

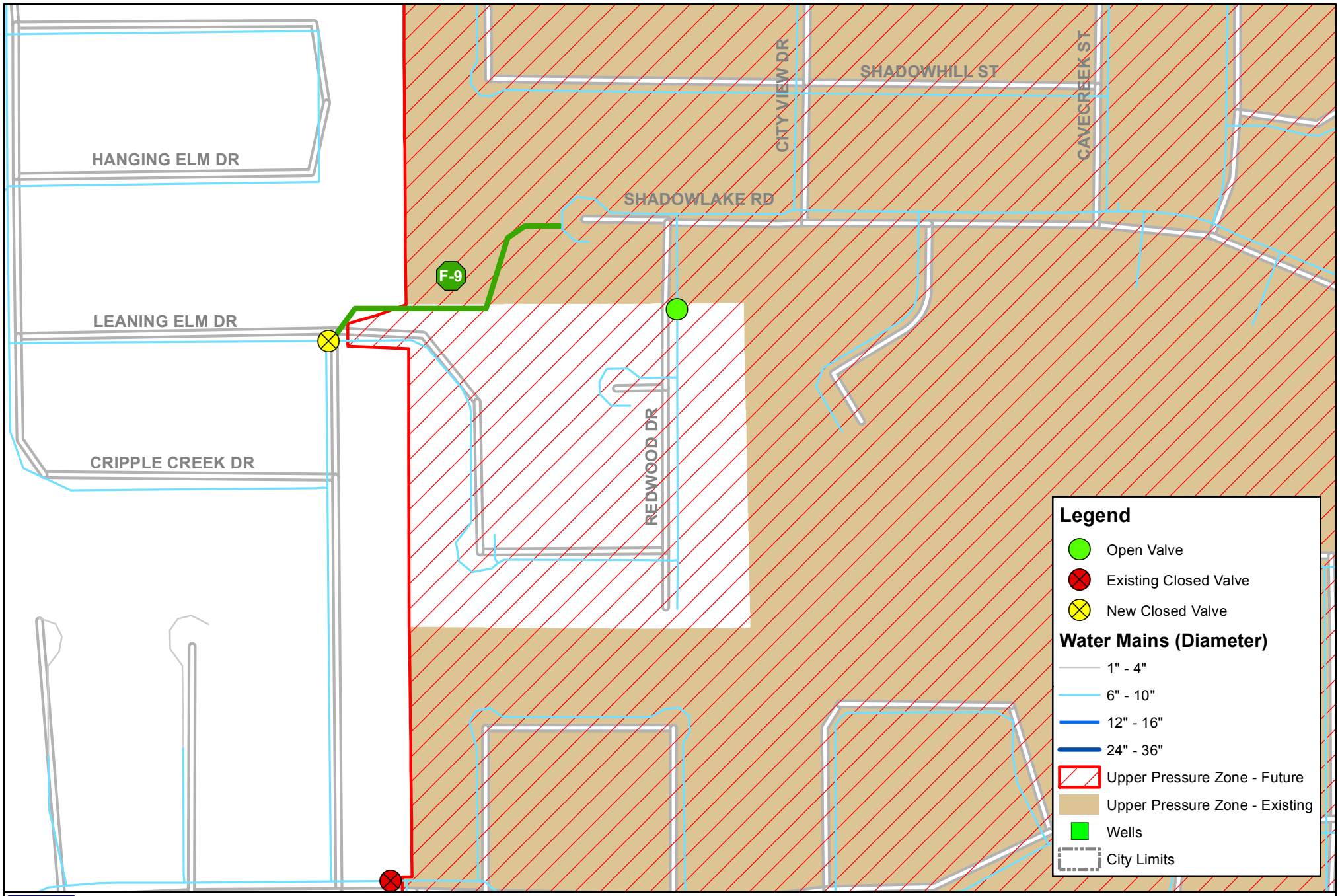
Upper Pressure Zone Boundary Changes - Area 1/4

N
W E
S

0 250 500 Feet

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS
414 NW 4th Street, Suite 150
Oklahoma City, OK 73102

Document Path: F:\projects\1115\004-01\2-0 Wrk Prod\2-9 GIS\MXD\Report\AppendixI_1.mxd



NORMAN UTILITIES AUTHORITY
Water Distribution Model Update

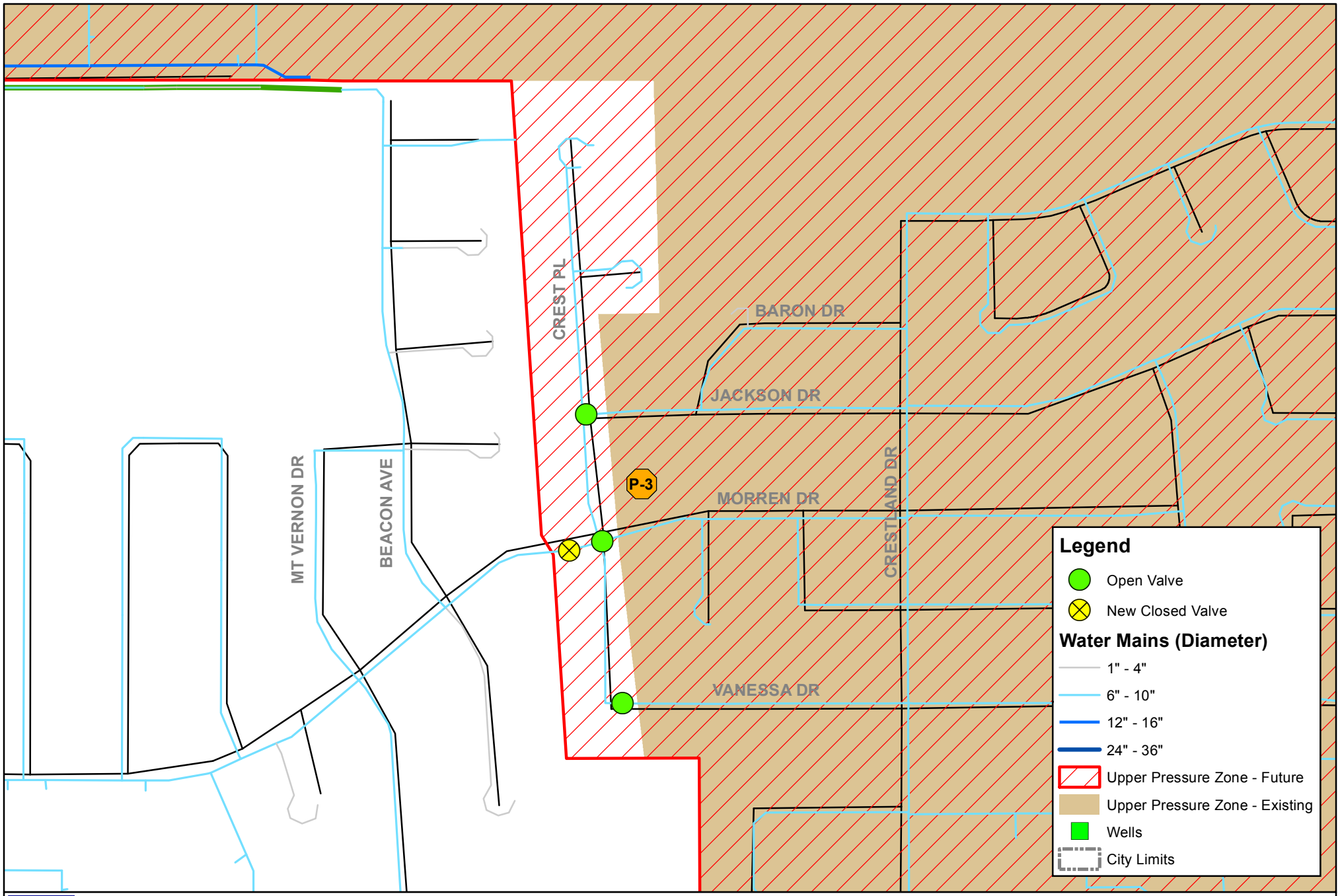
Upper Pressure Zone Boundary Changes - Area 2/4

N
W E
S

0 250 500 Feet

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS
414 NW 4th Street, Suite 150
Oklahoma City, OK 73102

Document Path: F:\projects\1115\004-01\2-0 Wrk Prod\2-9 GIS\MXD\Report\AppendixI_2.mxd



NORMAN UTILITIES AUTHORITY
Water Distribution Model Update

Upper Pressure Zone Boundary Changes - Area 3/4

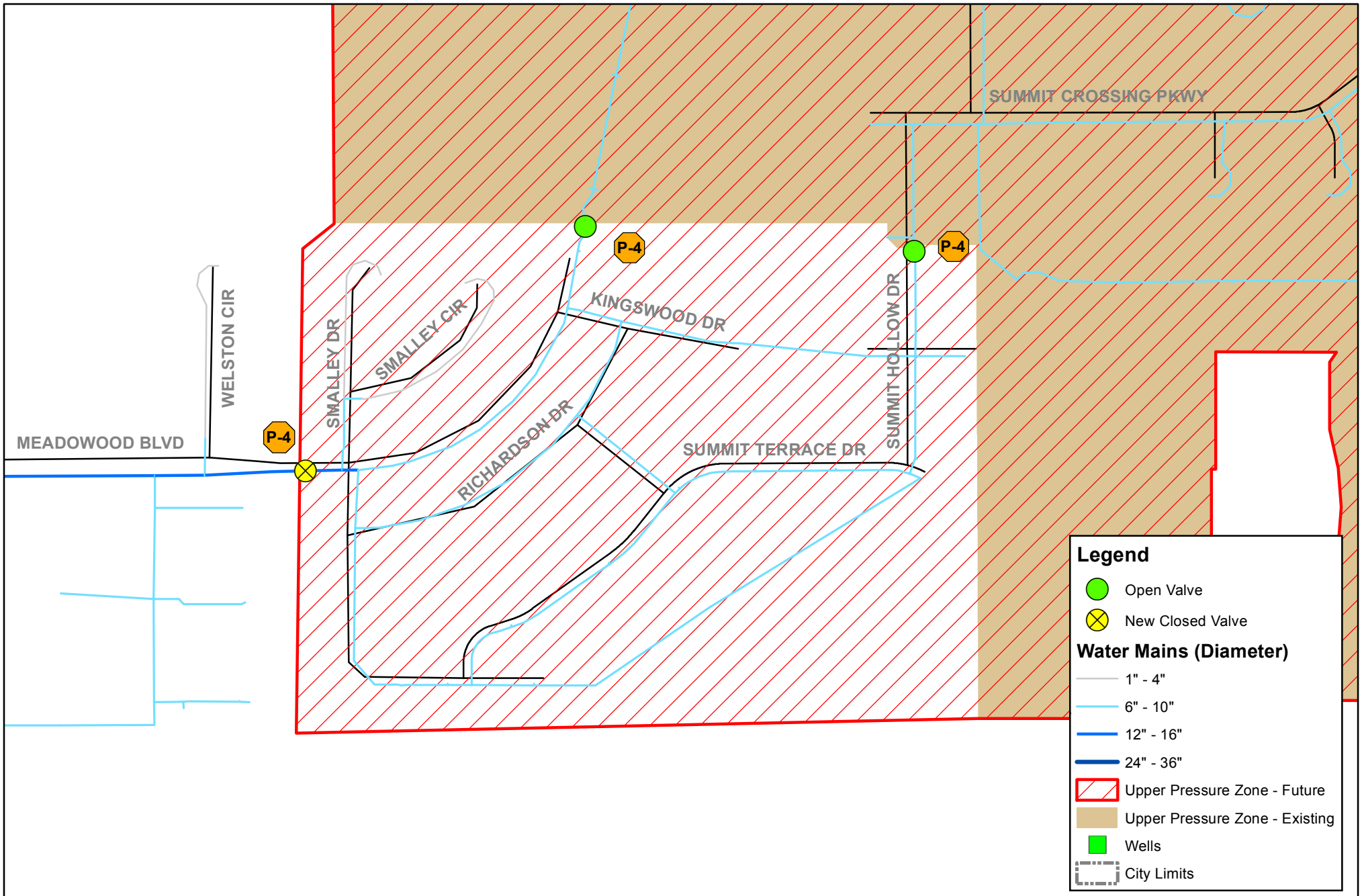
N
W E
S

0 250 500 Feet

ALAN PLUMMER ASSOCIATES, INC.
ENVIRONMENTAL ENGINEERS AND SCIENTISTS
414 NW 4th Street, Suite 150
Oklahoma City, OK 73102

Appendix J-3

Document Path: F:\projects\1115\004-01\2-0 Wrk Prod\2-9 GIS\MXD\Report\AppendixI_3.mxd



NORMAN UTILITIES AUTHORITY
Water Distribution Model Update

Upper Pressure Zone Boundary Changes - Area 4/4

N
W E
S

0 250 500 Feet

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ENVIRONMENTAL ENGINEERS AND SCIENTISTS
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Oklahoma City, OK 73102

Document Path: F:\projects\1115\004-01\2-0 Wrk Prod\2-9 GIS\MXD\Report\AppendixI_4.mxd