



AGENDA **CITY COUNCIL MEETING**

October 21, 2021 | 7:00 PM

Council Chambers | Video Conference

City Hall | 665 Country Club Road, Lucas, Texas

Notice is hereby given that a meeting of the Lucas City Council will be held on Thursday, October 21, 2021, beginning at 7:00 pm at Lucas City Hall, 665 Country Club Road, Lucas, Texas 75002-7651 and by video conference, at which time the following agenda will be discussed. As authorized by Section 551.071 of the Texas Government Code, the City Council may convene into closed Executive Session for the purpose of seeking confidential legal advice from the City Attorney on any item on the agenda at any time during the meeting.

Pursuant to Texas Government Code Section 551.127, on a regular, non-emergency basis, members may attend and participate in a meeting remotely by video conference, when a quorum of the members and the presiding officer will be physically present at the location noted above on this agenda.

Effective September 1, 2021, residents are allowed to use the Zoom link below to participate in a City Council meeting; however, audio-only is no longer allowed, and full-video will be required when speaking to the City Council. To join the meeting, please click this URL:

<https://zoom.us/j/95534828374?pwd=ZkJ5cTZkVWNEEL3o0WFNCQXBjQ0RvZz09>

and enter your name and email address.

Join by phone: 1-346-248-7799

Webinar ID: 955 3482 8374

Passcode: 712285

If you would like to watch the meeting live, and not participate via Zoom, you may go to the City's live streaming link at <https://www.lucastexas.us/live-streaming-videos/>.

How to Provide Input at a Meeting:

Speak In Person: Request to Speak forms will be available at the meeting. Please fill out the form and give to the City Secretary prior to the start of the meeting. This form will also allow a place for comments.

Speak Remotely Via Zoom: If you would like to attend a meeting remotely and speak via Zoom, email the City Secretary at shenderson@lucastexas.us by 4:00 pm noting the item you wish to speak on and noting your attendance will be remote. Please note, any requests received after 4:00 pm will not be included at the meeting.

Submit Written Comments: If you are unable to attend a meeting and would like to submit written comments regarding a specific agenda item, email the City Secretary at shenderson@lucastexas.us by no later than 4:00 pm the day of the meeting. The email must contain the person's name, address, phone number, and the agenda item(s) for which comments will be made. Any requests received after 4:00 pm will not be included at the meeting.

Call to Order

- Roll Call
- Determination of Quorum
- Reminder to turn off or silence cell phones
- Pledge of Allegiance

Citizen Input

1. Citizen Input

Community Interest

Pursuant to Section 5510415 of the Texas Government Code, the City Council may report on the following items: 1) expression of thanks, congratulations or condolences; 2) information about holiday schedules; 3) recognition of individuals; 4) reminders about upcoming City Council events; 5) information about community events; and 6) announcements involving imminent threat to public health and safety.

2. Items of Community Interest

Consent Agenda

All items listed under the consent agenda are considered routine and are recommended to the City Council for a single vote approval. If discussion is desired, an item may be removed from the consent agenda for a separate vote.

3. Consent Agenda:

- A. Approval of the minutes of the October 7, 2021, City Council meeting. **(City Secretary Stacy Henderson)**

Regular Agenda

4. Introduction of new Lovejoy ISD Superintendent Katie Kordel. **(City Manager Joni Clarke)**
5. Receive a presentation by Birkhoff, Hendricks & Carter LLP regarding the hydraulic model of the City's existing water distribution system and discuss the 2020 Lucas Water Master Plan. **(City Council)**

Executive Agenda

6. Executive Session.

Pursuant to Section 551.074 of the Texas Government Code, the City Council will convene into Executive Session to discuss the evaluation for the City Secretary.

7. Reconvene from Executive Session and take any action necessary as a result of the Executive Session.
8. Adjournment.

Certification

I do hereby certify that the above notice was posted in accordance with the Texas Open Meetings Act on the bulletin board at Lucas City Hall, 665 Country Club Road, Lucas, TX 75002 and on the City's website at www.lucastexas.us on or before 5:00 p.m. on October 8, 2021.

Stacy Henderson, City Secretary

In compliance with the American with Disabilities Act, the City of Lucas will provide for reasonable accommodations for persons attending public meetings at City Hall. Requests for accommodations or interpretive services should be directed to City Secretary Stacy Henderson at 972.912.1211 or by email at shenderson@lucastexas.us at least 48 hours prior to the meeting.



City of Lucas

City Council Agenda Request

October 21, 2021

Item No. 01

Requester: Mayor Jim Olk

Agenda Item Request

Citizen Input

Background Information

NA

Attachments/Supporting Documentation

NA

Budget/Financial Impact

NA

Recommendation

NA

Motion

NA



City of Lucas
City Council Agenda Request
October 21, 2021

Item No. 02

Requester: Mayor Jim Olk

Agenda Item Request

Items of Community Interest

Background Information

NA

Attachments/Supporting Documentation

NA

Budget/Financial Impact

NA

Recommendation

NA

Motion

NA



City of Lucas

City Council Agenda Request

October 21, 2021

Requester: City Secretary Stacy Henderson

Agenda Item Request

Consent Agenda:

- A. Approval of the minutes of the October 7, 2021, City Council meeting.

Background Information

NA

Attachments/Supporting Documentation

1. Minutes of the October 7, 2021 City Council meeting.

Budget/Financial Impact

NA

Recommendation

City Staff recommends approval of the Consent Agenda.

Motion

I make a motion to approve/deny the Consent Agenda as presented.



MINUTES

CITY COUNCIL REGULAR MEETING

October 7, 2021 | 7:00 PM

Council Chambers | Video Conference

City Hall | 665 Country Club Road, Lucas, Texas

City Councilmembers Present:

Mayor Jim Olk
Mayor Pro Tem Kathleen Peele
Councilmember Tim Johnson
Councilmember Tim Baney
Councilmember David Keer
Councilmember Debbie Fisher
Councilmember Phil Lawrence (*left meeting at 8:10 pm*)

City Staff Present:

City Manager Joni Clarke
City Secretary Stacy Henderson
City Attorney Joe Gorfida
Development Services Director Joe Hilbourn
Public Works Director Scott Holden

The regular City Council meeting was called to order at 7:00 pm.

Citizen Input

1. Citizen Input

Sylvia Roy, 924 Brentwood Drive in Murphy, Texas, a resident of Murphy, Texas, discussed the wastewater treatment plant being proposed in the City of Murphy. Ms. Roy expressed her opposition to the proposed wastewater treatment facility in their community and asked that the City of Lucas join their efforts in opposing the wastewater treatment plant.

Carolyn Moebius, 1412 Parkview Lane in Murphy, Texas also a resident of Murphy, Texas, asked that the City get information out to the residents of Lucas so they can register their concerns about a wastewater treatment facility being proposed in Murphy and nearby the city limits of the City of Lucas.

Community Interest

2. Items of Community Interest

Mayor Olk discussed upcoming community events related to the farmers market, movie in the park, board/commission meet and greet, service tree award program nominations, Fire Department open house, breast cancer awareness month, recognizing Oncor for improved upgraded services to the grid system, and National Night Out neighborhood participants.

Consent Agenda

3. Consent Agenda:

- A. Approval of the minutes of the September 16, 2021, City Council meeting.

MOTION: A motion was made by Mayor Pro Tem Peele, seconded by Councilmember Johnson to approve the Consent Agenda as presented. The motion passed unanimously by a 7 to 0 vote.

Regular Agenda

- 4. Receive a presentation from Chris Meszler, BCC Engineering, on the status of the West Lucas Road Reconstruction Project from South Angel Parkway (F.M. 2551) to Country Club Road, and provide direction to the City Manager, if desired.**

Chris Meszler, with BCC Engineering gave an update regarding the West Lucas Road reconstruction project. He noted that coordination meetings had occurred with TxDOT and Collin County regarding intersection improvements, 60 percent plans were submitted on October 1, 2021, exhibits had been prepared for drainage easements needed, plans were being reviewed for existing utility conflicts, and final design plans are scheduled to be completed in February 2022 with the bidding process beginning in March 2022.

The City Council asked that BCC Engineering provide an update and exhibits as to where medians would be proposed on West Lucas Road for review and discussion.

The City Council discussed drainage along West Lucas Road and how standing water near the residential properties would be eliminated. Mr. Meszler discussed drainage designs proposed that would eliminate a large ditch along West Lucas Road and discharge water underneath the roadway from Walmart to alleviate drainage onto residential properties near Angel Parkway and the Walmart area.

There was no motion on this item, it was for discussion purposes only.

- 5. Consider approving Resolution R 2021-10-00520 establishing a comprehensive Economic Development Policy and Program for economic development activities for the City of Lucas as authorized by Section 380.001 of the Texas Local Government Code.**

The City Council discussed how the economic development agreement was prepared specifically related to interests for Lucas, and that the policy would be used on a case-by-case basis and did not require incentives to be completed if an application was submitted.

MOTION: A motion was made by Mayor Pro Tem Peele, seconded by Councilmember Lawrence to approve Resolution R 2021-10-00520 establishing a comprehensive Economic Development Policy and Program for economic development activities for the City of Lucas as authorized by Section 380.001 of the Texas Local Government Code. The motion passed unanimously by a 7 to 0 vote.

- 6. Consider an Economic Development Agreement between the City of Lucas and Dwarf Willow for 215 Southview Drive, being 10.262 acres in the James Anderson Survey, Abs A0017, Sheet 1, Tract 8.**

The City Council discussed amendments made by Mayor Olk to the lighting section clarifying glare to the property line, as well as zoning. The City Council also clarified location on the property of two-story and one-story buildings.

The following email was read into the record:

- Tonya and Chris Egger, 8 Carey Lane

Ron Lacock, property owner and applicant, discussed updates to the site plan related to location of the two-story buildings and the theme and materials associated with the development.

MOTION: A motion was made by Mayor Pro Tem Peele, seconded by Councilmember Baney to approve the Economic Development Agreement between the City of Lucas and Dwarf Willow for 215 Southview Drive, being 10.262 acres in the James Anderson Survey, Abs A0017, Sheet 1, Tract 8. The motion passed unanimously by a 7 to 0 vote.

- 7. Consider approving Resolution R 2021-10-00519 nominating up to five board candidates to the Collin Central Appraisal District Board of Directors with terms beginning January 1, 2022.**

MOTION: A motion was made by Mayor Olk, seconded by Councilmember Lawrence to approve Resolution R 2021-10-00519 nominating L. Wayne Mayo, Ken Maun, and Gary Rodenbaugh to the Collin Central Appraisal District Board of Directors with terms beginning January 1, 2022. The motion passed unanimously by a 7 to 0 vote.

- 8. Discuss the Texas Commission on Environmental Quality (TCEQ) application proposed for a wastewater treatment facility located 0.4 miles northwest of the intersection of North Murphy Road and Rolling Ridge Drive in Collin County, Texas near the cities of Murphy and Parker.**

Mayor Olk stated he was in favor of supporting neighboring communities regarding the impact the wastewater treatment facility could have on their city and Lucas.

City Attorney Joe Gorfida stated he would review the TCEQ application for the proposed wastewater treatment facility and determine what Lucas could do related to participation, if a Resolution in opposition was appropriate. The Council directed the City Manager to place this item on a future agenda once additional information was gathered.

There was no motion taken on this item, it was for discussion purposes only.

- 9. Consider setting a date and time for the Lucas City Council to receive the hydraulic modeling report and a presentation regarding the City of Lucas water distribution system prepared by Gary Hendricks, PE, RPLS, of Birkhoff, Hendricks & Carter, LLP.**

The City Council directed staff to place this item on the October 21, 2021 City Council agenda.

Executive Agenda

- 10. Pursuant to Section 551.071 (2) of the Texas Government Code, the City Council will convene into Executive Session to consult with the City Attorney regarding a letter dated September 10, 2021, from attorney Grant Figari representing the Seis Lago Community Services Association, Inc.**

The City Council convened into Executive Session at 7:58 pm.

11. Reconvene from Executive Session and take any action necessary as a result of the Executive Session.

The City Council reconvened from Executive Session at 8:11 pm. There was no action taken as a result of the Executive Session.

12. Adjournment.

MOTION: A motion was made by Councilmember Johnson seconded by Mayor Pro Tem Peele to adjourn the meeting at 8:12 pm. The motion passed unanimously by a 6 to 0 vote.

APPROVED:

ATTEST:

Mayor Jim Olk

City Secretary Stacy Henderson



City of Lucas

City Council Agenda Request

October 21, 2021

Requester: City Manager Joni Clarke

Agenda Item Request

Introduction of new Lovejoy ISD Superintendent Katie Kordel.

Background Information

NA

Attachments/Supporting Documentation

NA

Budget/Financial Impact

NA

Recommendation

NA

Motion

NA



City of Lucas

City Council Agenda Request

October 21, 2021

Requester: City Council

Agenda Item Request

Receive a presentation by Birkhoff, Hendricks & Carter LLP regarding the hydraulic model of the City's existing water distribution system and discuss the 2020 Lucas Water Master Plan.

Background Information

NA

Attachments/Supporting Documentation

1. Hydraulic Modeling Report

Budget/Financial Impact

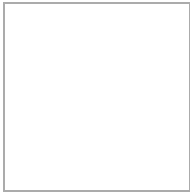
NA

Recommendation

NA

Motion

There is no motion for this item, it is for discussion purposes only.



BIRKHOFF, HENDRICKS & CARTER, L.L.P.
PROFESSIONAL ENGINEERS

11910 Greenville Ave., Suite 600 Dallas, Texas 75243 Phone (214) 361-7900 www.bhcllp.com

JOHN W. BIRKHOFF, P.E.
GARY C. HENDRICKS, P.E., R.P.L.S.
JOE R. CARTER, P.E.
MATT HICKEY, P.E.
ANDREW MATA, JR., P.E.

DEREK B. CHANEY, P.E., R.P.L.S.
CRAIG M. KERKHOFF, P.E.
JUSTIN R. IVY, P.E.
JULIAN T. LE, P.E.
COOPER E. REINBOLD, P.E.

September 22, 2021

Ms. Joni Clarke
City Manager
City of Lucas, Texas
665 Country Club Road
Lucas, TX 75002

Re: Existing System Hydraulic Modeling Report

Dear Ms. Clarke:

In accordance with the engineering services agreement with the City of Lucas dated November 4, 2020, Birkhoff, Hendricks & Carter, LLP (BHC) has prepared a fully functional hydraulic model of the City of Lucas existing water distribution system. Utilizing this model and water system data provided by the City, BHC has evaluated the water distribution immediate needs.

This letter report presents a summary of hydraulic model methodology, data provided by the City and used in the model, and the existing system immediate needs evaluation and recommendations.

EXISTING HYDRAULIC MODEL DEVELOPMENT AND RESOURCES

Existing System Pipe Network

The existing system hydraulic model pipe network was created from existing water system mapping provided by the city. Water pipe sizes, configuration and connectivity were applied the Collin County Parcel Map which form basis of the pipe network. Pipe lengths are determined from this network. Pipe friction factors were applied to the hydraulic model utilizing normal industry standards. The pipe network was originally intended to only include pipe sizes 8-inches and larger. However, once BHC started the modeling process, it became apparent that smaller pipes must be included to complete the pipe network. We believe all know water lines in the City's water distribution system are included in the hydraulic model.

They hydraulic system node elevations were determined from 2-foot contours secured by BHC from the North Central Texas Council of Governments DFW Map Service Center.

Existing System Pressure Planes

The City of Lucas existing water system is reported to operate using two separate and distinct pressure planes. The City referred to these pressure plans as the “High Pressure Zone” and “Low Pressure Zone”. For this hydraulic study, BHC refers to these pressure plans as:

792 Service Area (High Zone)

723 Service Area (Low Zone)

The City reported these zones were at one time “interconnected” with a series of pressure regulating valves, with the 792 Service Area providing water supply across the pressure boundary divide through these devices when system demands and pressures required. Through our review and several interviews with current City Staff, it was reported these pressure regulating valves are inoperable and that the two service areas are completely separated using a series of closed valves along the pressure boundary divide. The existing system hydraulic map that accompanies this report shows the now current service area (pressure) boundary divide as reported by the city and utilized by BHC in the existing system hydraulic model. The existing system hydraulic model is configured so that the 792 and 723 Service Areas operate separate and distinct.

Pump Station and Ground Storage Reservoirs

Pump Station locations and layout including ground storage tank capacities and levels, were determined from available record drawings of the McGarity Pump and new North Pump Station. Existing pump sizes and pump performance curves were obtained using submittal data for the North Pump Station; and name plate data from the pumps at the McGarity Pump Station. BHC performed field verification of the pump station configuration and pump data. The pump station hydraulic model schematics and information are detailed on the Existing System Hydraulic Map and summarized in Table 1 below:

Table 1 – Existing System Pump Station and Ground Storage Capacities

McGarity Pump Station (792 Service Area)		North Pump Station (723 Service Area)	
Pump Bulding One (old)		Pump Building One (old)	
Pump 1	1,100 gpm at 160 TDH	Pump 1	900 pgm at 200 TDH
Pump 2	1,100 pgm at 160 TDH	Pump 2	900 pgm at 200 TDH
		Pump 3	900 pgm at 200 TDH
Pump Building Two (newer)		Pump Building Two (new)	
Pump 1	750 gpm @ 190 TDH	Pump 1	900 pgm at 200 TDH
Pump 2	750 gpm @ 190 TDH	Pump 2	900 pgm at 200 TDH
Pump 3	750 gpm @ 190 TDH	Pump 3	900 pgm at 200 TDH
		Pump 4	900 pgm at 200 TDH
		Pump 5	900 pgm at 200 TDH
Ground Storage Reservoirs		Ground Storage Reservoirs	
GSR 1	200,000 gallons	GSR 1	500,000 gallons
GSR2	350,000 gallons	GSR2	750,000 gallons

Elevated Storage Tanks

The city was not able to provide any construction record data for either of the two existing elevated storage tanks in the system. To include these critical infrastructure elements in the hydraulic model, we relied on information obtained from a previous water system master plan report prepared by Freese and Nichols dated April 10, 2006. The existing system hydraulic model includes these two elevated tanks configured as shown in Table 2 below:

Table 2 – Existing System Elevated Storage Tanks

McGarity Elevated Tank (792 Service Area)		Winningkoff Elevated Tank (723 Service Area)	
Capacity	300,000 gallons	Capacity	300,000 gallons
High Water Level	792 MSL	High Water Level	723 MSL
Head Range	32.5 Feet	Head Range	32.0 Feet

Existing System Hydraulic Demands

To determine the existing system hydraulic demands for the maximum day, maximum hour and minimum hour conditions, and the development of a 72-hour diurnal demand curve for use in the model, the City of Lucas was expected to provide the following data for the months of January, July, and August 2019 (or 2020 if available):

- i. Hourly Pumping Records at both the McGarity and North Pump Station
- ii. Hourly Elevated Storage Tank Levels (McGarity and Winningkoff)
- iii. Hourly Ground Storage Tank Levels (McGarity and North Pump Station)
- iv. NTMWD Water Supply Meter Data (McGarity and North Pump Station)
- v. Wholesale customer meters and any unique water demand customers known within the distribution system
- vi. Water customer monthly retail billing records

Due to reported SCADA system problems, the city was not able to provide any of the data listed above, other than item vi. monthly retail billing records. Therefore, to develop the existing water system hydraulic model demands, BHC used the monthly billing data and developed unit demands as outlined in Tables 3 through 7 below. These demands are utilized in the existing system hydraulic model.

Again, because the City was not able to provide the necessary data for a complete existing system demand evaluation, the 72-hour diurnal demand curve developed by BHC for the City of Parker was utilized for the existing system hydraulic model as shown in Figure 1.

Table 3 – City of Lucas Monthly Water Billing Record Summary

3a-Lucas Monthly Billing Records Summary

Month and Year	Residential (GAL)	Commercial (GAL)	Total Consumption (GAL)	Residential (MG)	Commercial (MG)	Total Consumption (MG)
July 2018	71,485,300	3,209,600	74,694,900	71.49	3.21	74.69
August 2018	82,320,000	4,283,000	86,603,000	82.32	4.28	86.60
January 2019	20,667,400	1,525,600	22,193,000	20.67	1.53	22.19
July 2019	44,223,900	1,820,800	46,044,700	44.22	1.82	46.04
August 2019	91,004,000	4,331,800	95,335,800	91.00	4.33	95.34

Note: Assumes raw data
 is per 100 gallons

3b-Max Day per Capita

Month and Year	Monthly Residential (GAL)	Average Day Residential (GAL)	Max Day Residential Demands (GAL)*	Estimated 2019 Population	Max Day per Capita Rate (gpcd)
July 2018	71,485,300	2,305,977	5,764,944	8,067	715
August 2018	82,320,000	2,655,484	6,638,710	8,067	823
July 2019	44,223,900	1,426,577	3,566,444	8,067	442
August 2019	91,004,000	2,935,613	7,339,032	8,067	910

*Used Max Daily Demand Factor of 2.5

3c -Avg Day per Capita

Month and Year	Monthly Residential (GAL)	Average Day Residential (GAL)	Estimated 2019 Population	Avg Day per Capita Rate (gpcd)
January 2019	20,667,400	666,690	8,067	83

3d-Population Calculation

# of Residential Meters (2019)	Meter to Population Factor	Estimated Population
2569	3.14	8,067

Table 4 – Existing System Unit Demands

CITY OF LUCAS EXISTING DEMAND RATES

Land Use	Residential		Non-Residential		Peak Factor
	Max Day Per Capita g.p.c.d.	Max Hour Per Capita g.p.c.d.	Max Day Per Acre g.p.a.d.	Max Hour Per Acre g.p.a.d.	
Single Family Residential - Rural	495	891			1.80
Single Family Residential - Estate	495	891			
Single Family Residential - Low Density	495	891			
Single Family Residential - High Density	495	891			
Estate Development District	495	891			
Manufactured Housing	495	891			
Commercial			1,500	2,700	
Village Center			1,500	2,700	
Public/Semi-Public			1,500	2,700	
Park/Open Space			0	0	

Table 5 – Water Distribution Existing System Model Demands

**CITY OF LUCAS
 2020 WATER DISTRIBUTION SYSTEM SUMMARY**

Land Use	Residential			Non-Residential			Total Demand	
	Population	Max Day Demand (MGD)	Max Hour Demand (MGD)	Area (Ac)	Max Day Demand (MGD)	Max Hour Demand (MGD)	Max Day Demand (MGD)	Max Hour Demand (MGD)
Single Family Residential - Rural	5,268	2.608	4.694				2.608	4.694
Single Family Residential - Estate	1,317	0.652	1.173				0.652	1.173
Single Family Residential - Low Density	1,372	0.679	1.222				0.679	1.222
Single Family Residential - High Density	0	0.000	0.000				0.000	0.000
Estate Development District	60	0.030	0.053				0.030	0.053
Manufactured Housing	50	0.025	0.045				0.025	0.045
Residential Totals	8,067						3.993	7.188
Commercial				164.94	0.247	0.445	0.247	0.445
Village Center				11.16	0.017	0.030	0.017	0.030
Public/Semi-Public				27.95	0.042	0.075	0.042	0.075
Park/Open Space				403.73	0.000	0.000	0.000	0.000
Non-Residential Totals				607.78			0.306	0.551
Totals							4.299	7.739

Min Hour Demand (MGD): 2.322

Table 6 – 723 Service Area Existing System Model Demands

**CITY OF LUCAS
 2020 723 SERVICE AREA SUMMARY**

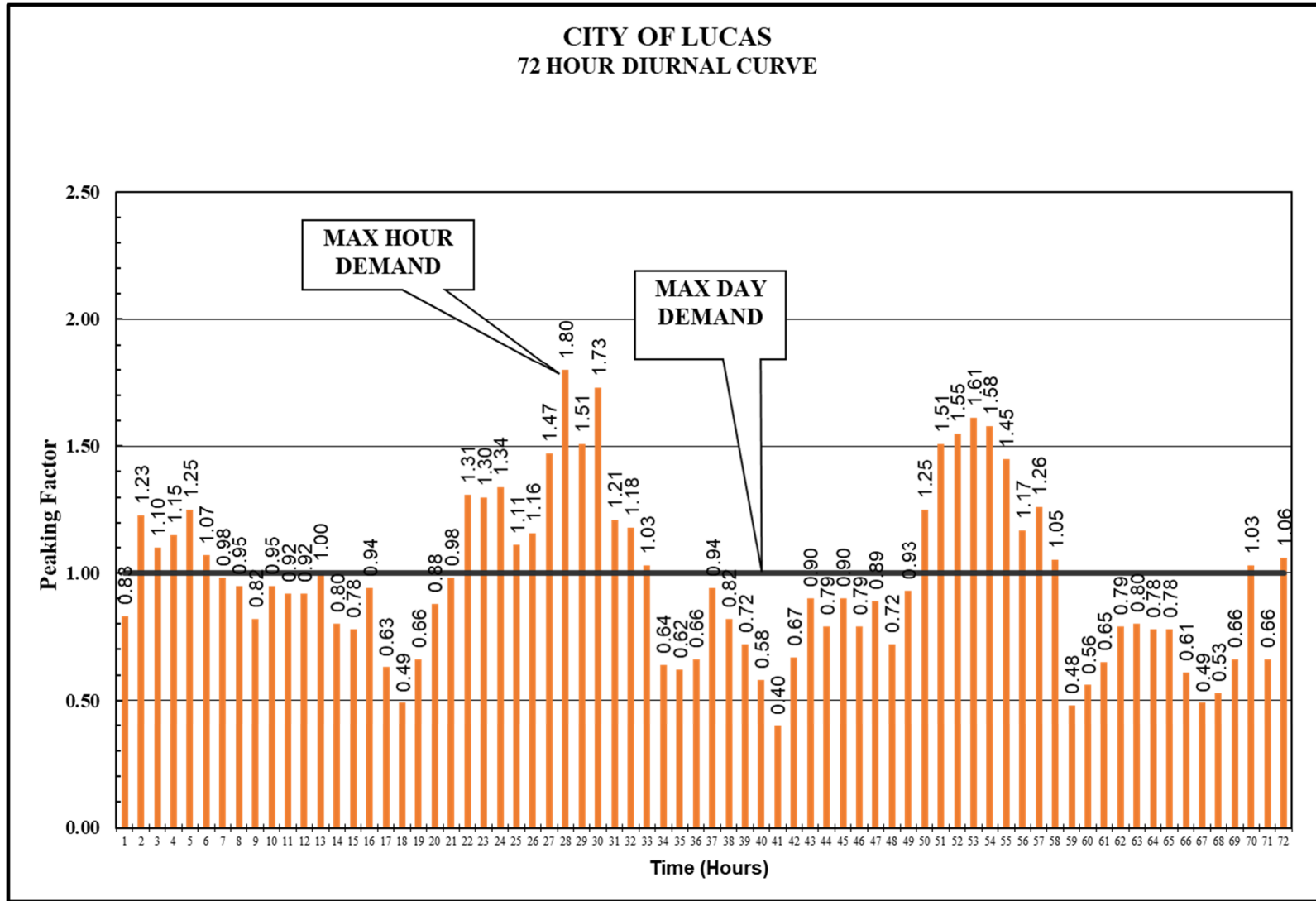
Land Use	Residential			Non-Residential			Total Demand	
	Population	Max Day Demand (MGD)	Max Hour Demand (MGD)	Area (Ac)	Max Day Demand (MGD)	Max Hour Demand (MGD)	Max Day Demand (MGD)	Max Hour Demand (MGD)
Single Family Residential - Rural	3,972	1.966	3.539				1.966	3.539
Single Family Residential - Estate	563	0.279	0.502				0.279	0.502
Single Family Residential - Low Density	771	0.382	0.687				0.382	0.687
Single Family Residential - High Density	-	0.000	0.000				0.000	0.000
Estate Development District	-	0.000	0.000				0.000	0.000
Manufactured Housing	50	0.025	0.045				0.025	0.045
Commercial				32.21	0.048	0.087	0.048	0.087
Village Center				0.00	0.000	0.000	0.000	0.000
Public/Semi-Public				10.94	0.016	0.030	0.016	0.030
Park/Open Space				403.73	0.000	0.000	0.000	0.000
Totals	5,356	2.651	4.772	446.89	0.065	0.117	2.716	4.889

Table 7 -792 Service Area Existing System Model Demands

**CITY OF LUCAS
 2020 792 SERVICE AREA SUMMARY**

Land Use	Residential			Non-Residential			Total Demand	
	Population	Max Day Demand (MGD)	Max Hour Demand (MGD)	Area (Ac)	Max Day Demand (MGD)	Max Hour Demand (MGD)	Max Day Demand (MGD)	Max Hour Demand (MGD)
Single Family Residential - Rural	1,296.00	0.642	1.155				0.642	1.155
Single Family Residential - Estate	754.00	0.373	0.672				0.373	0.672
Single Family Residential - Low Density	601.00	0.297	0.535				0.297	0.535
Single Family Residential - High Density	-	0.000	0.000				0.000	0.000
Estate Development District	60.00	0.030	0.053				0.030	0.053
Manufactured Housing	-	0.000	0.000				0.000	0.000
Commercial				132.73	0.199	0.358	0.199	0.358
Village Center				11.16	0.017	0.030	0.017	0.030
Public/Semi-Public				17.00	0.026	0.046	0.026	0.046
Park/Open Space				0.00	0.000	0.000	0.000	0.000
Totals	2,711	1.342	2.416	160.89	0.241	0.434	1.583	2.850

Figure 1 – 72 Hour Diurnal Curve



EXISTING SYSTEM HYDRAULIC EVALUATION

1) Low and High Pressure Areas

As described above, the existing water distribution system is believed to be operated in two separate and distinct pressure boundary service areas. The “High Zone” service area has an established high-water level in the existing McGarity Elevated tank of 792 MSL. The “Low Zone” service area has an established high-water level in the existing Winningkoff Elevated Tank of 723 MSL. The high-water level in the elevated tanks establish the operating pressures within each service area.

- a) Existing Service Area Pressure Evaluation (See **Exhibits A and B** attached hereto)

792 Service Area

Based on BHC understanding of the pump operation sequencing at the McGarity Pump Station, we found no particular instance of either high pressure (over 90 psi) or low pressure (under 40 psi) throughout the 72-hour extended period simulation within the 792 Service Area.

723 Service Area

Based on BHC understanding of the pump operation sequencing at the new North Pump Station (we took the old pump station out of service in the hydraulic model), we noted several instances of both high pressure (over 90 psi) and low pressure (under 40 psi) throughout the 72-hour extended period simulation within the 723 Service Area. The low-pressure areas are represented by the red contour lines (40 psi and less) on Exhibit A. The high-pressure areas are represented by the red contour lines (90 psi and over) on Exhibit B.

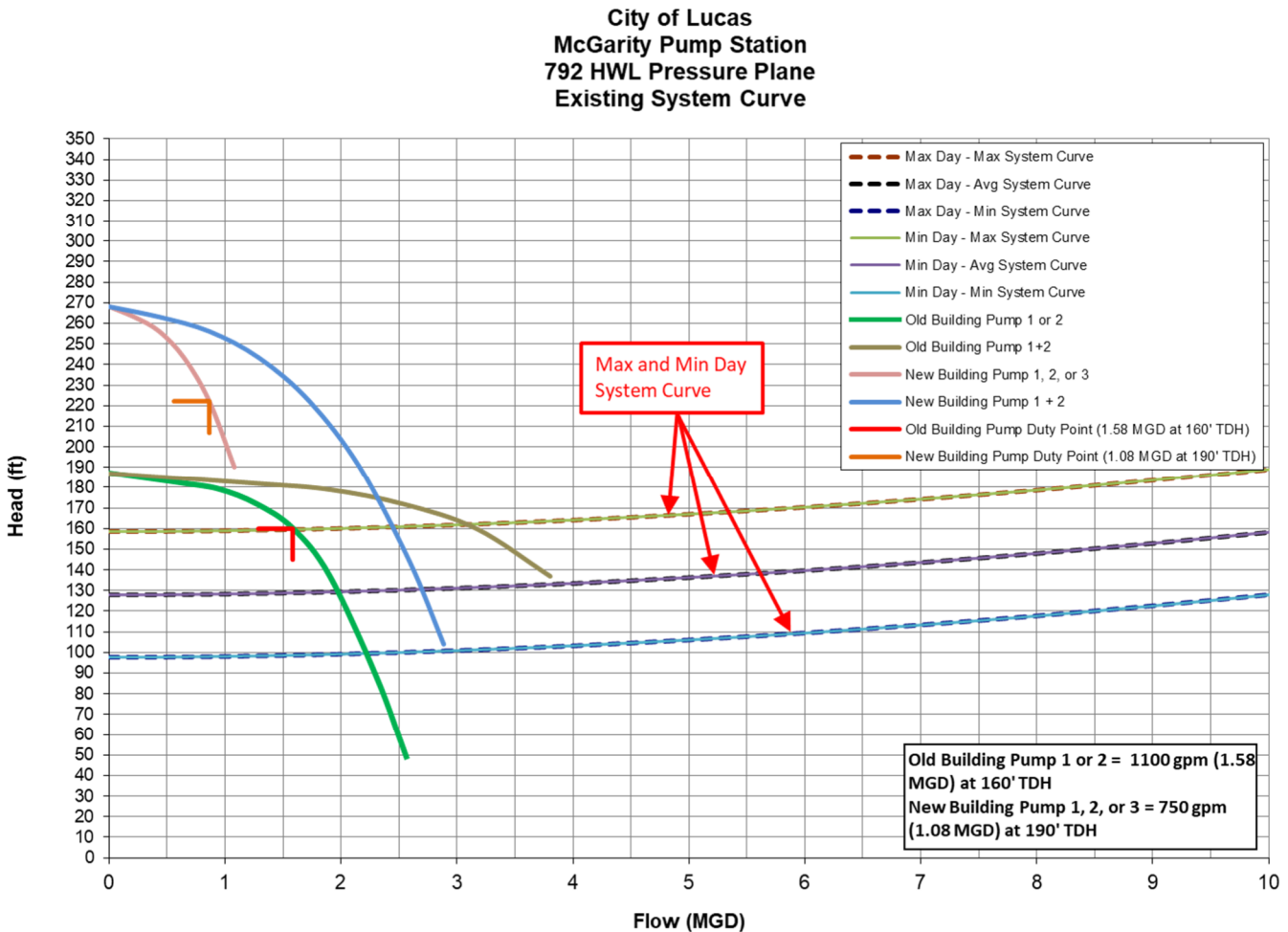
2) Pump Station System Curves and Pump Performance Curves

Though not a specific scope item for evaluation (and not something we expected to find), during our existing system hydraulic model runs, we continued to get a warning at both the McGarity and North Pump Stations that the pumps are “operating out of range”. This means the pump performance curves input into the model are not crossing the hydraulic system curve without being “extended” beyond their normal and designed operating point.

To illustrate the situation, using the existing system hydraulic model, we created a system curve for both the McGarity and North Pump Station, and imposed the existing pump performance curves. **Figure 2**

shows the McGarity Pump Station (792 Service Area) pump and system curves, and **Figure 3** shows the North Pump Station (723 Service Area) pump and system curves.

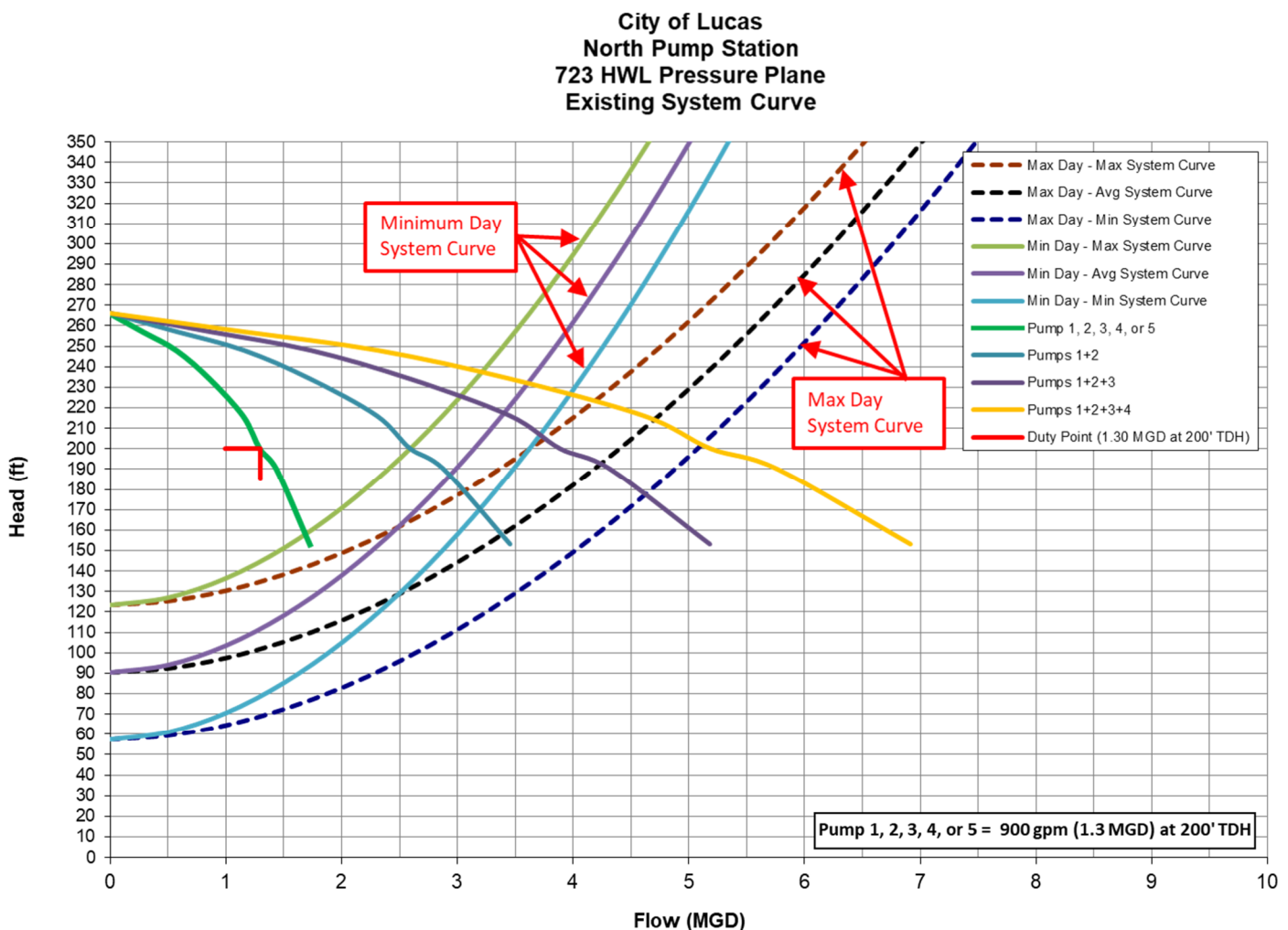
Figure 2 – McGarity Pump Station Existing System Curve



The solid color green line either Pump 1 or Pump 2 on the “Old Pump Building”. The red angle mark is the point of desirable operation for the pump(s). Notice the green pump curve crosses the system curve(s) at or near the most efficient operating point. This seems consistent with the City’s operators reports that they prefer to use the pumps in the old pump building.

The light brown line represents the pumps in the new pump building. Notice the pump curve does not cross the system curve. This indicates these pumps, when running alone (if that ever occurs) are running “off the curve” or “to far right” on the curve. This condition, if it is occurring, can be the cause of the pumps operating inefficiently, can cause the pumps to cavitate and wear out the impeller quickly, and can cause the motors to pull more amps than designed to do.

Figure 3 – North Pump Station Existing System Curve



The situation is more pronounced at the North Pump Station. Notice the solid green line is barely touching the system curve during the highest head condition (Minimum Hour Demand, EST nearly full). Based on this evaluation, the pumps are most likely not operating at or near its point of best efficiency. As the water

distribution system expands and grows (especially in the 723 Service Area), this problem may become more noticeable.

We recommend the City operating staff keep a close watch on the pumps and motors at both pump stations and look for any signs of cavitation or unusually high amp draws.

IMMEDIATE NEEDS RECOMMENDATION

1) Texas Commission on Environmental Quality (TCEQ) Requirements

The TCEQ Chapter 290 Rules and Regulations for Public Water System provides for minimum capacities for water supply, pumping capacity, and total storage capacity (ground storage and elevated storage). These TCEQ requirements are the minimum capacities required for public water systems. These minimums are designed to provide a safe drinking water system. They generally do not consider robust landscape irrigation nor fire flow demands necessary to meet the needs of adequate fire protection. requirements. For that reason, in this hydraulic evaluation, BHC utilizes actual system demands as experienced by the City of Lucas and has provided capacity recommendations that meet the needs of the City’s actual patterns of use during a severe test of the system; and provide for strong and reliable fire flow capabilities during extreme system demands.

Tables 8a and 8b below summarizes the City of Lucas existing system capacities in both the 792 and 723 Service Area, provides a comparison to the TCEQ minimum system requirements and BHC’s recommendations for water supply and pumping, elevated storage and ground storage capacities.

Table 8a – Existing System Pumping Recommendations

Service Area	Population Served	Estimated Number of Connections	TCEQ Min. Pumping (0.6-gpm/Conn.)	BHC Pumping Recommendation	Total Existing Pumping
723 Service Area	5,356	1,706	1.47 MGD	3.41 MGD	5.20 MGD
792 Service Area	2,711	863	0.75 MGD	1.94 MGD	3.74 MGD
System Totals	8,067	2569	2.22 MGD	5.35 MGD	8.94 MGD

Table 8b – Existing System Storage Recommendations

Service Area	Population Served	Estimated Number of Connections	TCEQ Min. Volume Elev. Storage	BHC Elevated Storage Recommendation	Total Existing Elev. Storage	BHC Ground Storage Recommendation	Total Existing Ground Storage
723 Service Area	5,356	1,706	0.34 MGD	0.68 MG	0.30 MG	0.85 MG	1.25 MG
792 Service Area	2,711	863	0.17 MGD	0.39 MG	0.30 MG	0.50 MG	0.55 MG
System Totals	8,067	2569	0.51 MGD	1.07 MG	0.60 MG	1.35 MG	1.80 MG

2) System Pressures, Service Area Divide, and Elevated Storage Tank Recommendations

a) Phase 1 Existing System Improvements Recommendation

i) Elevated Storage Tank Recommendation

As indicated in Table 8a and 8b, while the 723 Service Area has adequate pumping and ground storage capacities, based on our estimate of service connections in the 723 Service Area, additional elevated storage is recommended. Along with input from City Staff, BHC evaluated several potential elevated storage sites and ran numerous hydraulic model scenarios to determine the best suited site *hydraulically*. On this basis we recommend a new 0.5 MG elevated storage tank located on the currently owned City of Lucas 0.89-acre, Tract 22 in the Jas Lovejoy Survey Abstract 538 (CAD Parcel ID 1214545). The recommended site is shown on the Existing System Hydraulic Model Map accompanying this report.

While this site provides the best hydraulic solution and can be implemented with minimum immediate changes to the distribution system and pressure boundary divide, two (2) other sites along Stinson Road, south of West Lucas Road were considered and will function adequately in the 723 Service Area. These sites are shown as the 1st and 2nd alternate tank sites on the Existing System Hydraulic Map.

ii) Water Distribution System Improvements

To help “balance” the operation of the recommended 0.5 MG elevated tank with the smaller capacity 0.3 MG Winningkoff elevated tank in this Phase 1 improvements, we recommend the City consider closing the 12-inch water line connection at Estates Parkway to the 12” water line in Country Club Road (Model Pipe P2121) and the 12” water line connection in W. Blondy

Jhune Road to the 12” water line in Country Club Rod (Model Pipe P2117), and creating a new water line loop (proposed pipe P2240).

Phase I system improvements are more specifically shown on **Exhibit C - Phase I Improvements** expected to reduce or eliminate the regions of low and high pressures currently experienced in the 723 Service Area. **Exhibit D – Phase I Improvements Low Pressure Areas and Exhibit E – Phase I Improvements High Pressure Areas** graphically show the anticipated results of these improvements.

Our opinion of probable construction cost for these Phase I system improvements recommendations is in the range of **\$4.0 million**. Our itemized opinion of cost is included in the Appendix to this letter report.

b) Phase 2 Existing System Improvements Recommendation

i) 792/723 Service Area Boundary Adjustment

While the Phase I improvements address the immediate needs of the existing water distribution system and provide some relief to high- and low-pressure areas, they do not adequately address all the high pressure areas and the new 723 Service Area elevated storage tank is not “balanced” with the existing elevated tank.

The proposed Phase 2 System Improvements mitigate this situation by adjusting the 792/723 Service Area Boundary Line. The recommended boundary line adjustment and associated water distribution system improvements are shown on Exhibit F -Phase 2 Improvements. The cyan color line is the current Service Area Boundary Line, and the magenta-colored dashed line is the recommended Service Area Boundary location.

The hydraulic model results with these recommended improvements provide a more consistent and stable pressure gradient across the 723 Service Area throughout the 72-hour extended period simulation and improve the balance between the existing 0.30 MG Winningkoff elevated tank and the proposed 0.5 MG elevated tank.

Our opinion of probable construction cost for the recommended Phase 2 improvements is in the range of **\$6.5 million**. Our itemized opinion of cost is included in the Appendix to this letter report.

SUPPLEMENTAL LONG-TERM RECOMMENDATIONS

Our scope of services on this project was to construct an existing system hydraulic model, evaluate the existing system and provide “immediate needs” recommendations. We believe our computer hydraulic model, this report and accompanying existing system hydraulic map accomplished the task. While working through this task, and as we discovered more about your water distribution system, we note other “Supplemental Recommendations” below:

Supplemental Recommendation No. 1

Our scope of services does not include development of a “Water System Master Plan”. While the City of Lucas may be at or near its expected build-out condition, a Water System Master Plan is still an important and valuable tool in for planning for future water supply needs and addressing the needs of future developments as they are considered or occur.

Supplemental Recommendation No. 2

During our site visit to the North Pump Station and subsequent discussions with City Staff, we pointed out the need to make sure the North Texas Municipal Water District (NTMWD) is aware of the City’s water supply needs and specifically what long-term supply needs are required at each pump station. We were told that the NTMWD “restricts” the flow to the North Pump Station and is a better position to deliver more water to the McGarity Pump Station.

This statement, if true, is counter-intuitive to the apparent previous planning efforts for the system. The McGarity Pump Station serves a much smaller service area (792) than the North Pump Station; it is appropriately smaller than the North Pump Station, and it has less ground storage capacity than the North Pump Station. The City recently expanded (significantly) the capacity of the North Pump Station apparently to meet the needs of anticipated growth in the 792 Service Area.

If not already in progress, we recommend the City coordinate with the NTMWD and discuss your long-term water supply needs and plans for delivery at each of the two pump stations. If the NTMWD will not

(or cannot) deliver the required water supply to the North Pump Station, then another look at the long-term needs of the City's Water Distribution System is in order.

We trust the hydraulic model of the City's existing water distribution system; the accompanying existing system hydraulic model map and this letter report meets your expectations and fulfills our obligations under the terms of our professional services agreement. We are available to discuss this project further at your convenience.



Sincerely,

Gary C. Hendricks, P.E., R.P.L.S.

Attachments/Accompaniments

- 2020 Existing Water Distribution System Hydraulic Model Map (Full Scale)
- Exhibit A – Existing System Low Pressure Area Contour Map
- Exhibit B – Existing System High Pressure Area Contour Map
- Exhibit C – Phase 1 Recommended System Improvements
- Exhibit D – Phase 1 Low Pressure Area Contour Map
- Exhibit E– Phase 1 High Pressure Area Contour Map
- Exhibit F- Phase 2 Recommended System Improvements
- Exhibit G – Phase 2 Low Pressure Area Contour Map
- Exhibit H -Phase 2 High Pressure Area Contour Map
- Exhibit I – 2020 Water Distribution System
Existing System Hydraulic Model Map (Separate Document)

Appendix

- Phase 1 and Phase 2 Itemized Opinion of Probable Cost

City of Lucas

Existing System Hydraulic Model Report

Existing Water Distribution System Hydraulic Map

EXHIBITS A – I

Exhibit A – Existing System Low Pressure Area Contour Map

Exhibit B – Existing System High Pressure Area Contour Map

Exhibit C – Phase 1 Recommended System Improvements

Exhibit D – Phase 1 Low Pressure Area Contour Map

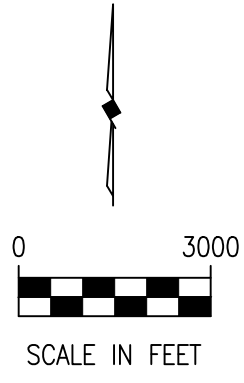
Exhibit E – Phase 1 High Pressure Area Contour Map

Exhibit F - Phase 2 Recommended System Improvements

Exhibit G – Phase 2 Low Pressure Area Contour Map

Exhibit H - Phase 2 High Pressure Area Contour Map

Exhibit I – 2020 Water Distribution System Existing System
Hydraulic Model Map (Separate Document)

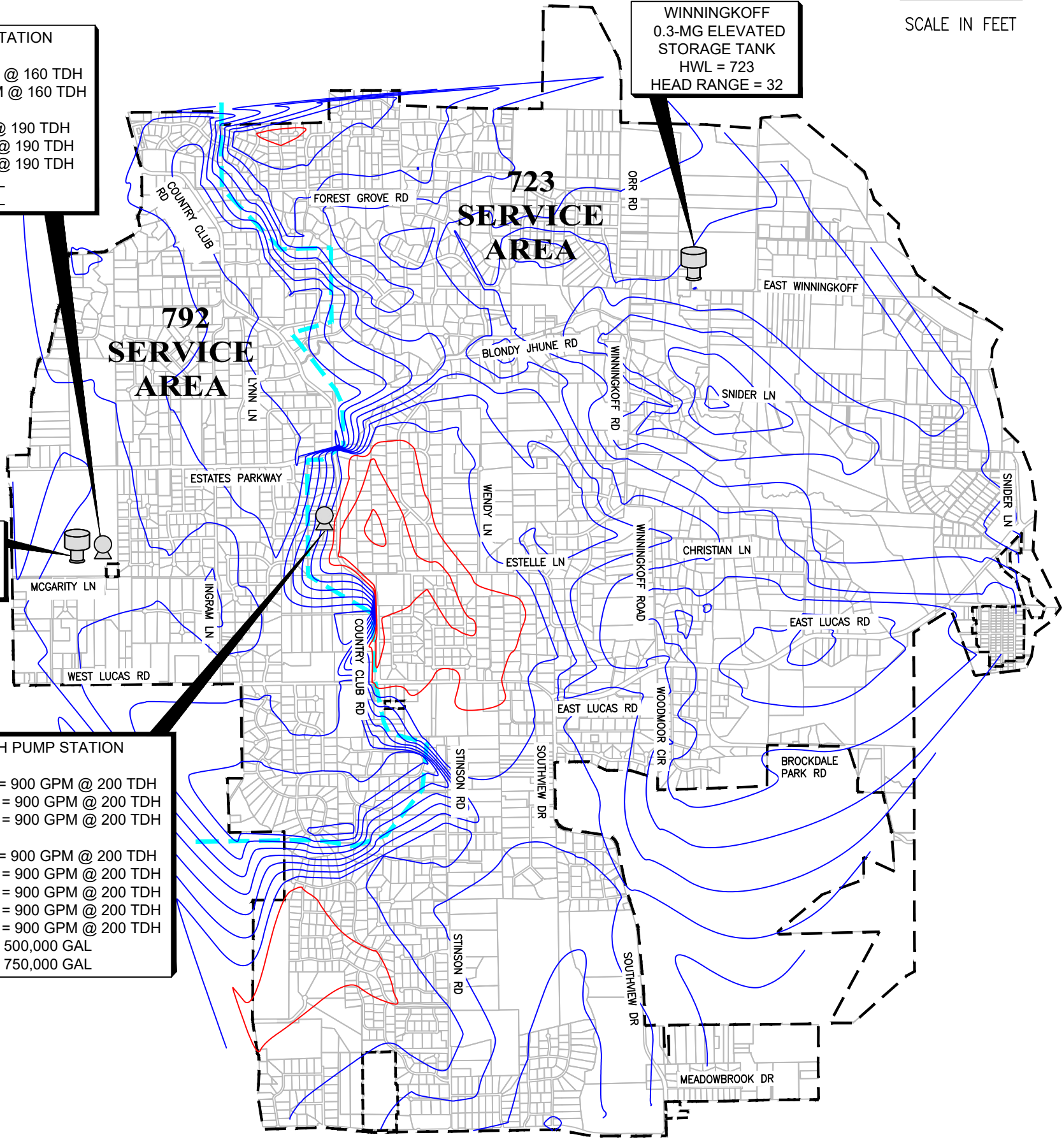


MCGARITY PUMP STATION
BUILDING 1:
 PUMP NO.1 = 1,100 GPM @ 160 TDH
 PUMP NO. 2 = 1,100 GPM @ 160 TDH
BUILDING 2:
 PUMP NO.1 = 750 GPM @ 190 TDH
 PUMP NO. 2 = 750 GPM @ 190 TDH
 PUMP NO. 3 = 750 GPM @ 190 TDH
 GSR NO. 1 = 200,000 GAL
 GSR NO. 2 = 350,000 GAL

WINNINGKOFF
 0.3-MG ELEVATED
 STORAGE TANK
 HWL = 723
 HEAD RANGE = 32

MCGARITY 0.3-MG
 ELEVATED STORAGE TANK
 HWL = 792
 HEAD RANGE = 32.5

NORTH PUMP STATION
BUILDING 1:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
BUILDING 2:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
 PUMP NO. 4 = 900 GPM @ 200 TDH
 PUMP NO. 5 = 900 GPM @ 200 TDH
 GSR NO. 1 = 500,000 GAL
 GSR NO. 2 = 750,000 GAL



LEGEND
 - - LUCAS CITY LIMITS
 - - SERVICE AREA BOUNDARY
 - - LESS THAN OR EQUAL TO 40 PSI
 - - GREATER THAN 40 PSI

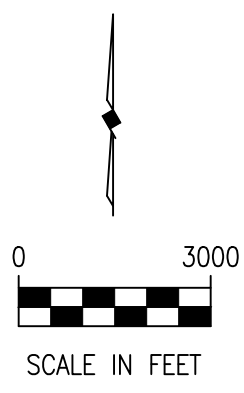
EXHIBIT A

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
 PROFESSIONAL ENGINEERS
 TBPE Firm No. 526; TBPLS Firm No. 10031800
 Dallas, Texas



**EXISTING WATER DISTRIBUTION SYSTEM
 BASED ON EXISTING MAXIMUM DAY DEMANDS
 LOW PRESSURE AREAS**

JUNE 2021

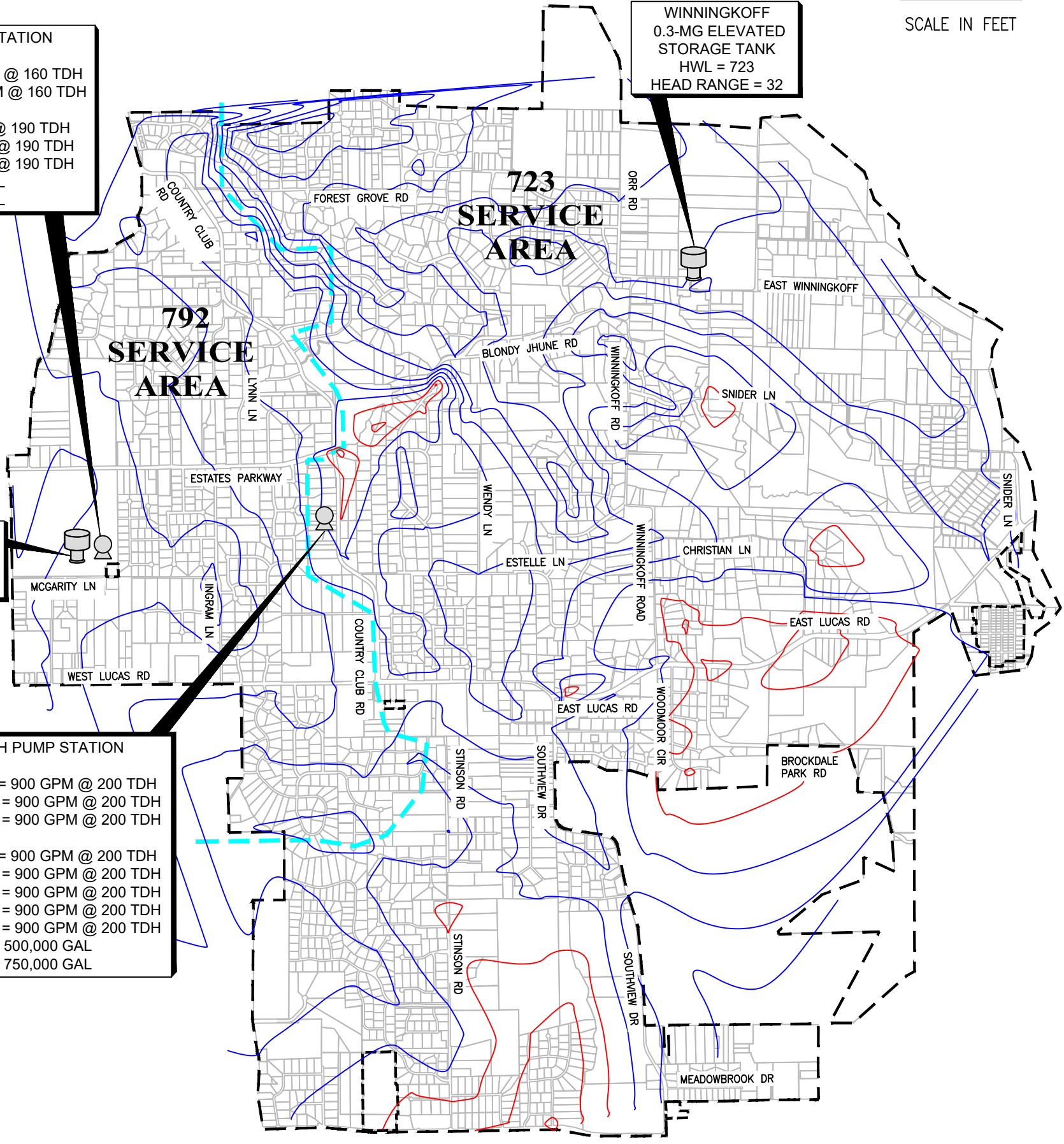


MCGARITY PUMP STATION
BUILDING 1:
 PUMP NO.1 = 1,100 GPM @ 160 TDH
 PUMP NO. 2 = 1,100 GPM @ 160 TDH
BUILDING 2:
 PUMP NO.1 = 750 GPM @ 190 TDH
 PUMP NO. 2 = 750 GPM @ 190 TDH
 PUMP NO. 3 = 750 GPM @ 190 TDH
 GSR NO. 1 = 200,000 GAL
 GSR NO. 2 = 350,000 GAL

WINNINGKOFF
 0.3-MG ELEVATED
 STORAGE TANK
 HWL = 723
 HEAD RANGE = 32

MCGARITY 0.3-MG
ELEVATED STORAGE TANK
 HWL = 792
 HEAD RANGE = 32.5

NORTH PUMP STATION
BUILDING 1:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
BUILDING 2:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
 PUMP NO. 4 = 900 GPM @ 200 TDH
 PUMP NO. 5 = 900 GPM @ 200 TDH
 GSR NO. 1 = 500,000 GAL
 GSR NO. 2 = 750,000 GAL



LEGEND
 - - LUCAS CITY LIMITS
 - - SERVICE AREA BOUNDARY
 - - GREATER THAN OR EQUAL TO 90 PSI
 - - LESS THAN 90 PSI

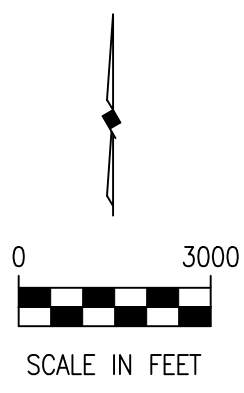
BIRKHOFF, HENDRICKS & CARTER, L.L.P.
 PROFESSIONAL ENGINEERS
 TBPE Firm No. 526; TBPLS Firm No. 10031800
 Dallas, Texas

EXHIBIT B



**EXISTING WATER DISTRIBUTION SYSTEM
 BASED ON EXISTING MAXIMUM DAY DEMANDS
 HIGH PRESSURE AREAS**

JUNE 2021

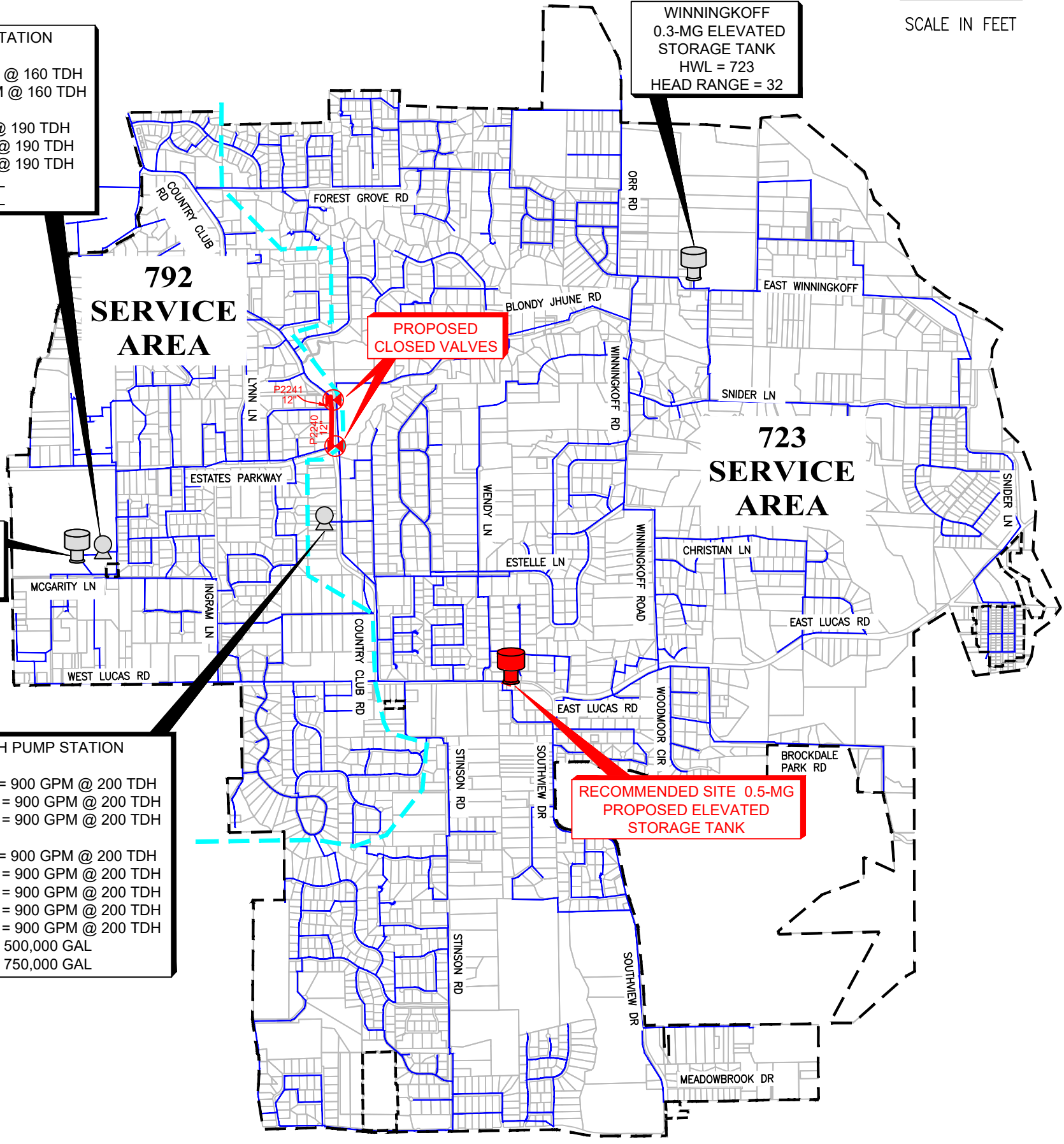


MCGARITY PUMP STATION
BUILDING 1:
 PUMP NO.1 = 1,100 GPM @ 160 TDH
 PUMP NO. 2 = 1,100 GPM @ 160 TDH
BUILDING 2:
 PUMP NO.1 = 750 GPM @ 190 TDH
 PUMP NO. 2 = 750 GPM @ 190 TDH
 PUMP NO. 3 = 750 GPM @ 190 TDH
 GSR NO. 1 = 200,000 GAL
 GSR NO. 2 = 350,000 GAL

WINNINGKOFF
 0.3-MG ELEVATED
 STORAGE TANK
 HWL = 723
 HEAD RANGE = 32

MCGARITY 0.3-MG
 ELEVATED STORAGE TANK
 HWL = 792
 HEAD RANGE = 32.5

NORTH PUMP STATION
BUILDING 1:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
BUILDING 2:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
 PUMP NO. 4 = 900 GPM @ 200 TDH
 PUMP NO. 5 = 900 GPM @ 200 TDH
 GSR NO. 1 = 500,000 GAL
 GSR NO. 2 = 750,000 GAL



LEGEND
 - - LUCAS CITY LIMITS
 — EXISTING WATER LINE
 — PROPOSED WATER LINE
 ⊗ PROPOSED CLOSED VALVE

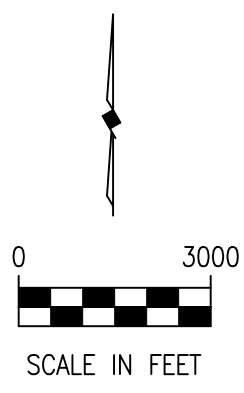
BIRKHOFF, HENDRICKS & CARTER, L.L.P.
 PROFESSIONAL ENGINEERS
 TBPE Firm No. 526; TBPLS Firm No. 10031800
 Dallas, Texas

EXHIBIT C



**PHASE 1 IMPROVEMENTS
 PROPOSED 0.5 MG ELEVATED STORAGE TANK AND
 PARALLEL 12-INCH WATER LINE**

JUNE 2021



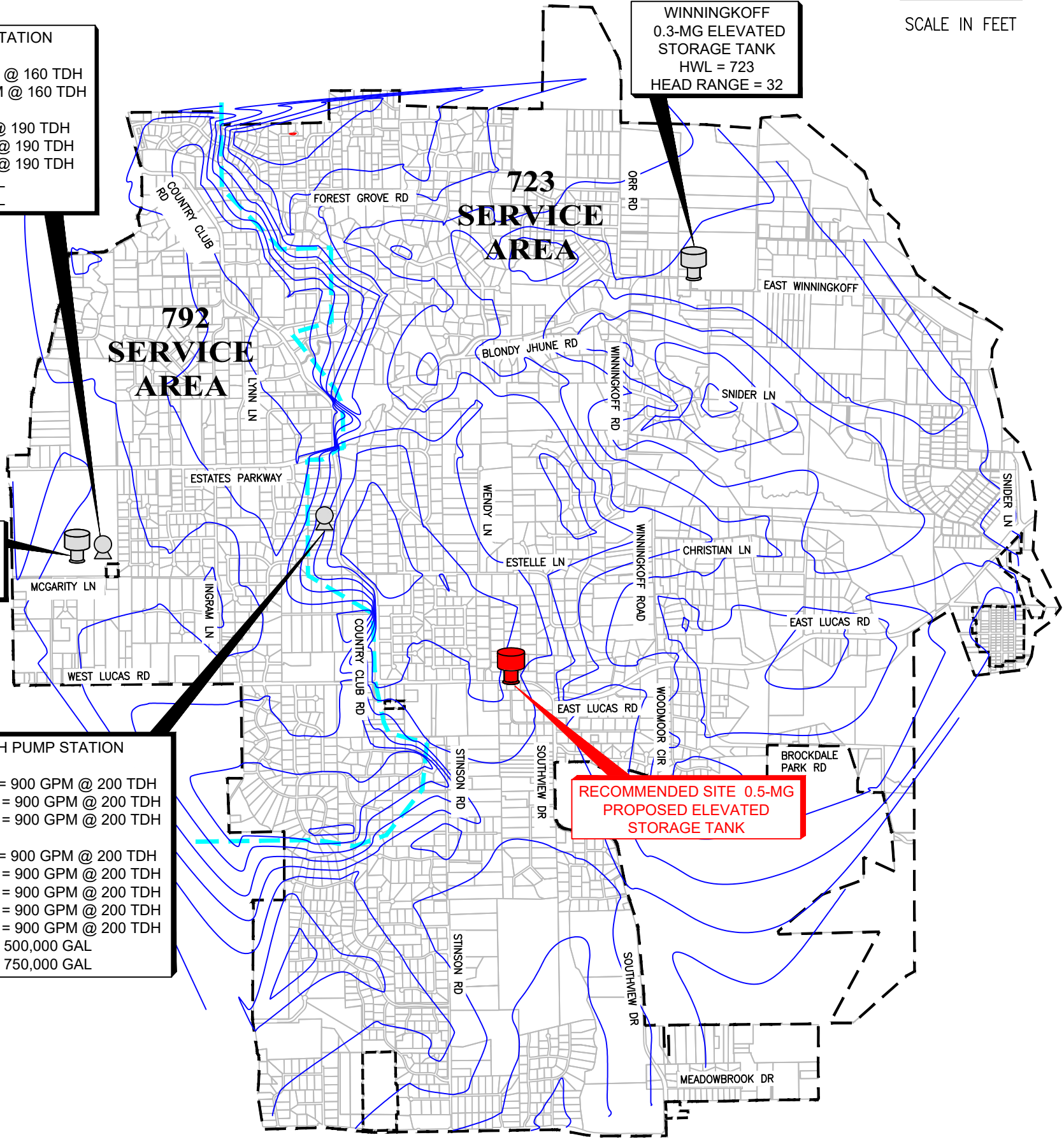
MCGARITY PUMP STATION
BUILDING 1:
 PUMP NO.1 = 1,100 GPM @ 160 TDH
 PUMP NO. 2 = 1,100 GPM @ 160 TDH
BUILDING 2:
 PUMP NO.1 = 750 GPM @ 190 TDH
 PUMP NO. 2 = 750 GPM @ 190 TDH
 PUMP NO. 3 = 750 GPM @ 190 TDH
 GSR NO. 1 = 200,000 GAL
 GSR NO. 2 = 350,000 GAL

WINNINGKOFF
 0.3-MG ELEVATED
 STORAGE TANK
 HWL = 723
 HEAD RANGE = 32

MCGARITY 0.3-MG
ELEVATED STORAGE TANK
 HWL = 792
 HEAD RANGE = 32.5

NORTH PUMP STATION
BUILDING 1:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
BUILDING 2:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
 PUMP NO. 4 = 900 GPM @ 200 TDH
 PUMP NO. 5 = 900 GPM @ 200 TDH
 GSR NO. 1 = 500,000 GAL
 GSR NO. 2 = 750,000 GAL

RECOMMENDED SITE 0.5-MG
PROPOSED ELEVATED
STORAGE TANK



LEGEND
 - - LUCAS CITY LIMITS
 - - SERVICE AREA BOUNDARY
 - - LESS THAN OR EQUAL TO 40 PSI
 - - GREATER THAN 40 PSI

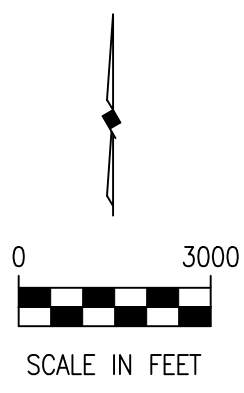
BIRKHOFF, HENDRICKS & CARTER, L.L.P.
 PROFESSIONAL ENGINEERS
 TBPE Firm No. 526; TBPLS Firm No. 10031800
 Dallas, Texas

EXHIBIT D

PHASE 1 IMPROVEMENTS
LOW PRESSURE AREAS

JUNE 2021





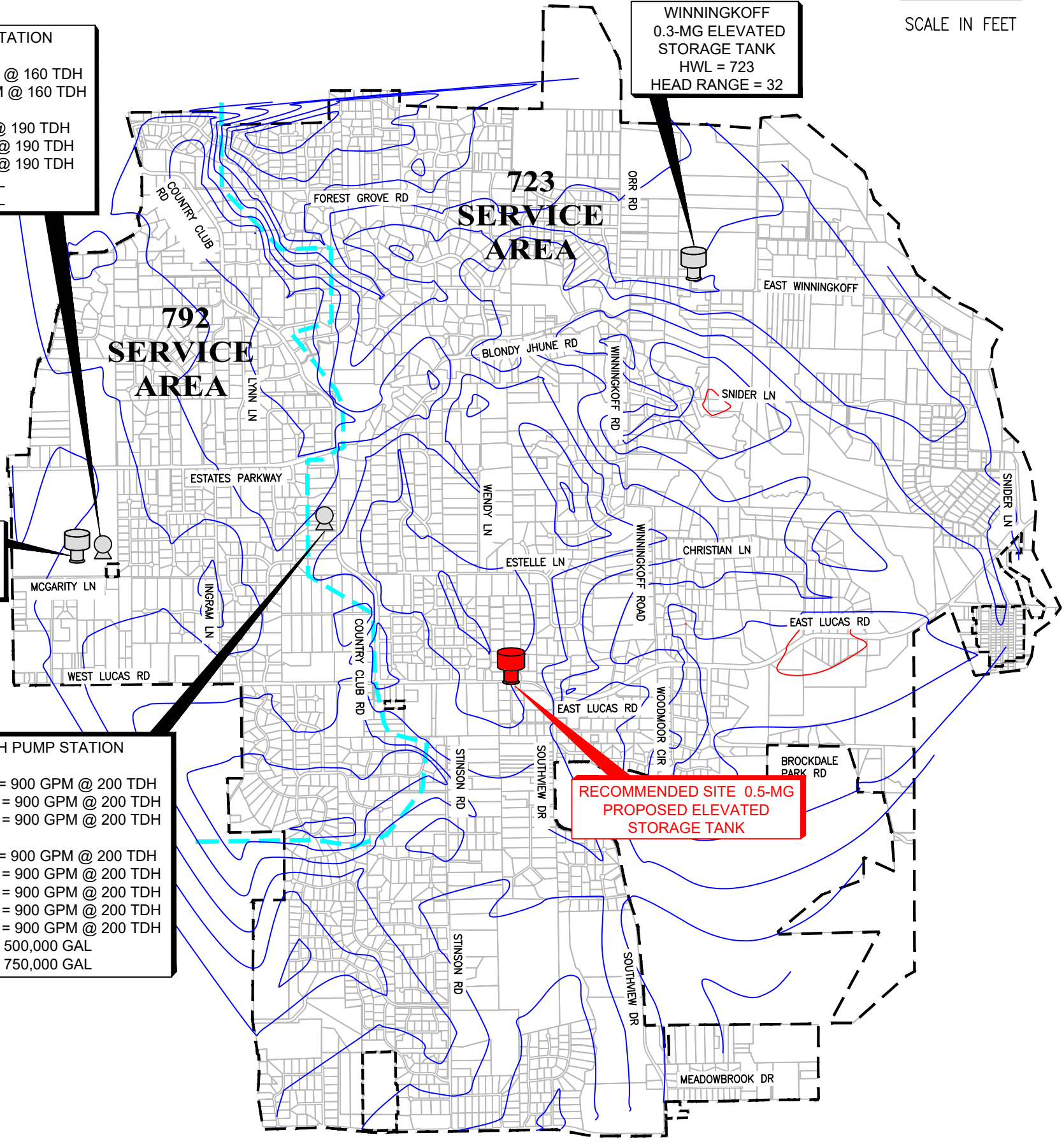
MCGARITY PUMP STATION
BUILDING 1:
 PUMP NO.1 = 1,100 GPM @ 160 TDH
 PUMP NO. 2 = 1,100 GPM @ 160 TDH
BUILDING 2:
 PUMP NO.1 = 750 GPM @ 190 TDH
 PUMP NO. 2 = 750 GPM @ 190 TDH
 PUMP NO. 3 = 750 GPM @ 190 TDH
 GSR NO. 1 = 200,000 GAL
 GSR NO. 2 = 350,000 GAL

WINNINGKOFF
 0.3-MG ELEVATED
 STORAGE TANK
 HWL = 723
 HEAD RANGE = 32

MCGARITY 0.3-MG
 ELEVATED STORAGE TANK
 HWL = 792
 HEAD RANGE = 32.5

NORTH PUMP STATION
BUILDING 1:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
BUILDING 2:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
 PUMP NO. 4 = 900 GPM @ 200 TDH
 PUMP NO. 5 = 900 GPM @ 200 TDH
 GSR NO. 1 = 500,000 GAL
 GSR NO. 2 = 750,000 GAL

RECOMMENDED SITE 0.5-MG
 PROPOSED ELEVATED
 STORAGE TANK



LEGEND
 - - LUCAS CITY LIMITS
 - - SERVICE AREA BOUNDARY
 - - GREATER THAN OR EQUAL TO 90 PSI
 - - LESS THAN 90 PSI

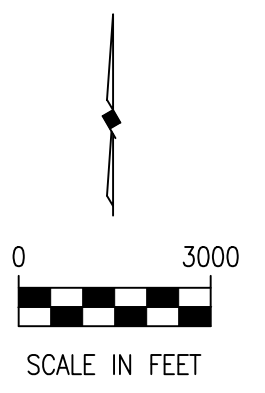
BIRKHOFF, HENDRICKS & CARTER, L.L.P.
 PROFESSIONAL ENGINEERS
 TBPE Firm No. 526; TBPLS Firm No. 10031800
 Dallas, Texas

EXHIBIT E

**PHASE 1 IMPROVEMENTS
 HIGH PRESSURE AREAS**

JUNE 2021





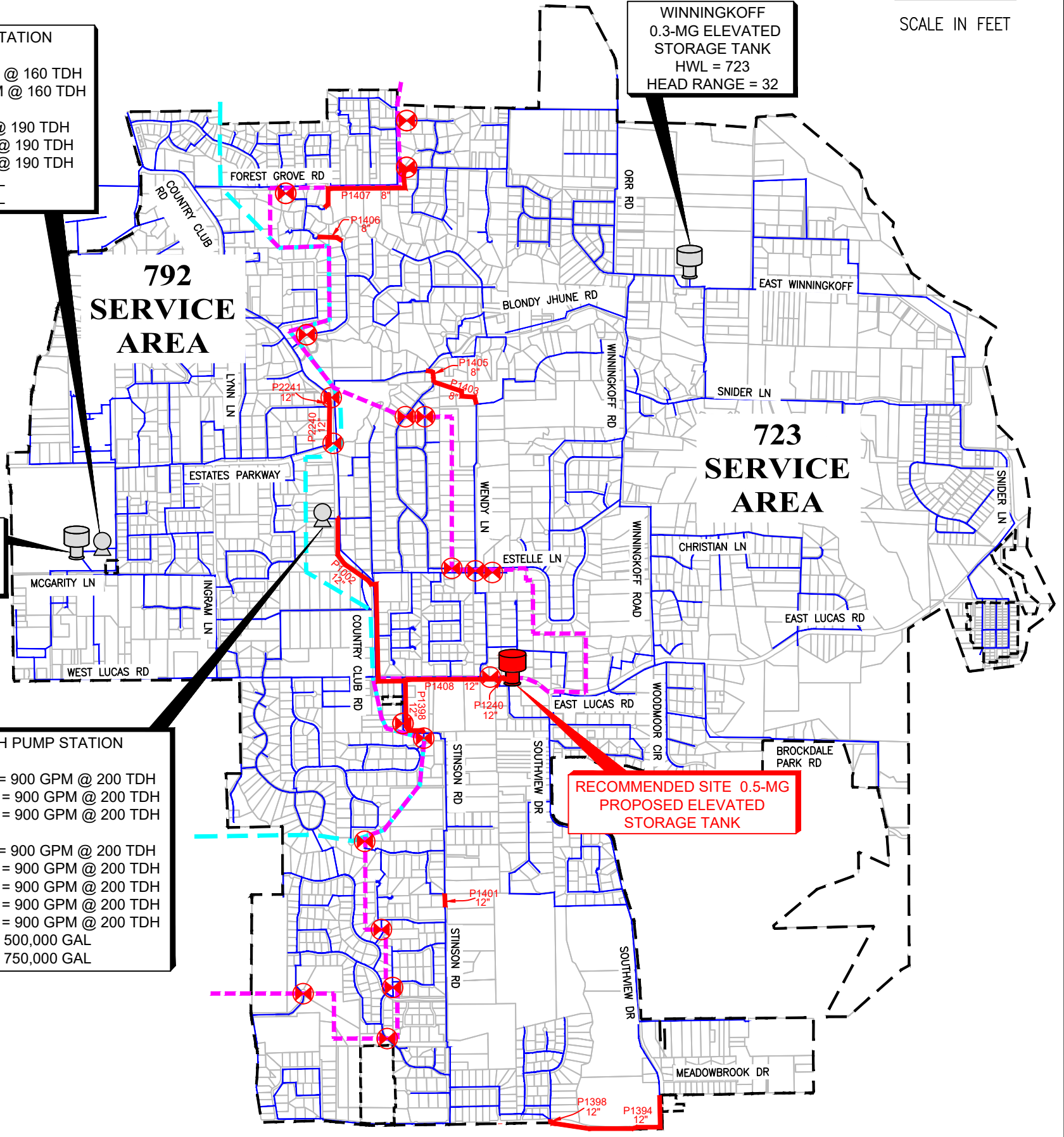
MCGARITY PUMP STATION
BUILDING 1:
 PUMP NO.1 = 1,100 GPM @ 160 TDH
 PUMP NO. 2 = 1,100 GPM @ 160 TDH
BUILDING 2:
 PUMP NO.1 = 750 GPM @ 190 TDH
 PUMP NO. 2 = 750 GPM @ 190 TDH
 PUMP NO. 3 = 750 GPM @ 190 TDH
 GSR NO. 1 = 200,000 GAL
 GSR NO. 2 = 350,000 GAL

WINNINGKOFF
 0.3-MG ELEVATED
 STORAGE TANK
 HWL = 723
 HEAD RANGE = 32

MCGARITY 0.3-MG
 ELEVATED STORAGE TANK
 HWL = 792
 HEAD RANGE = 32.5

NORTH PUMP STATION
BUILDING 1:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
BUILDING 2:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
 PUMP NO. 4 = 900 GPM @ 200 TDH
 PUMP NO. 5 = 900 GPM @ 200 TDH
 GSR NO. 1 = 500,000 GAL
 GSR NO. 2 = 750,000 GAL

RECOMMENDED SITE 0.5-MG
 PROPOSED ELEVATED
 STORAGE TANK



LEGEND
 - - LUCAS CITY LIMITS
 — EXISTING WATER LINE
 — PROPOSED WATER LINE
 ⊗ PROPOSED CLOSED VALVE

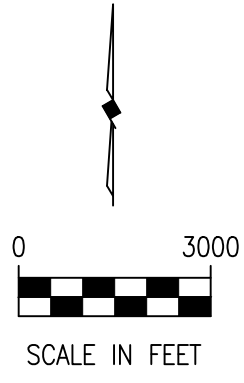
BIRKHOFF, HENDRICKS & CARTER, L.L.P.
 PROFESSIONAL ENGINEERS
 TBPE Firm No. 526; TBPLS Firm No. 10031800
 Dallas, Texas

EXHIBIT F

**PHASE 2 IMPROVEMENTS
 PROPOSED SERVICE AREA ADJUSTMENT
 AND WATER LINES**

JUNE 2021





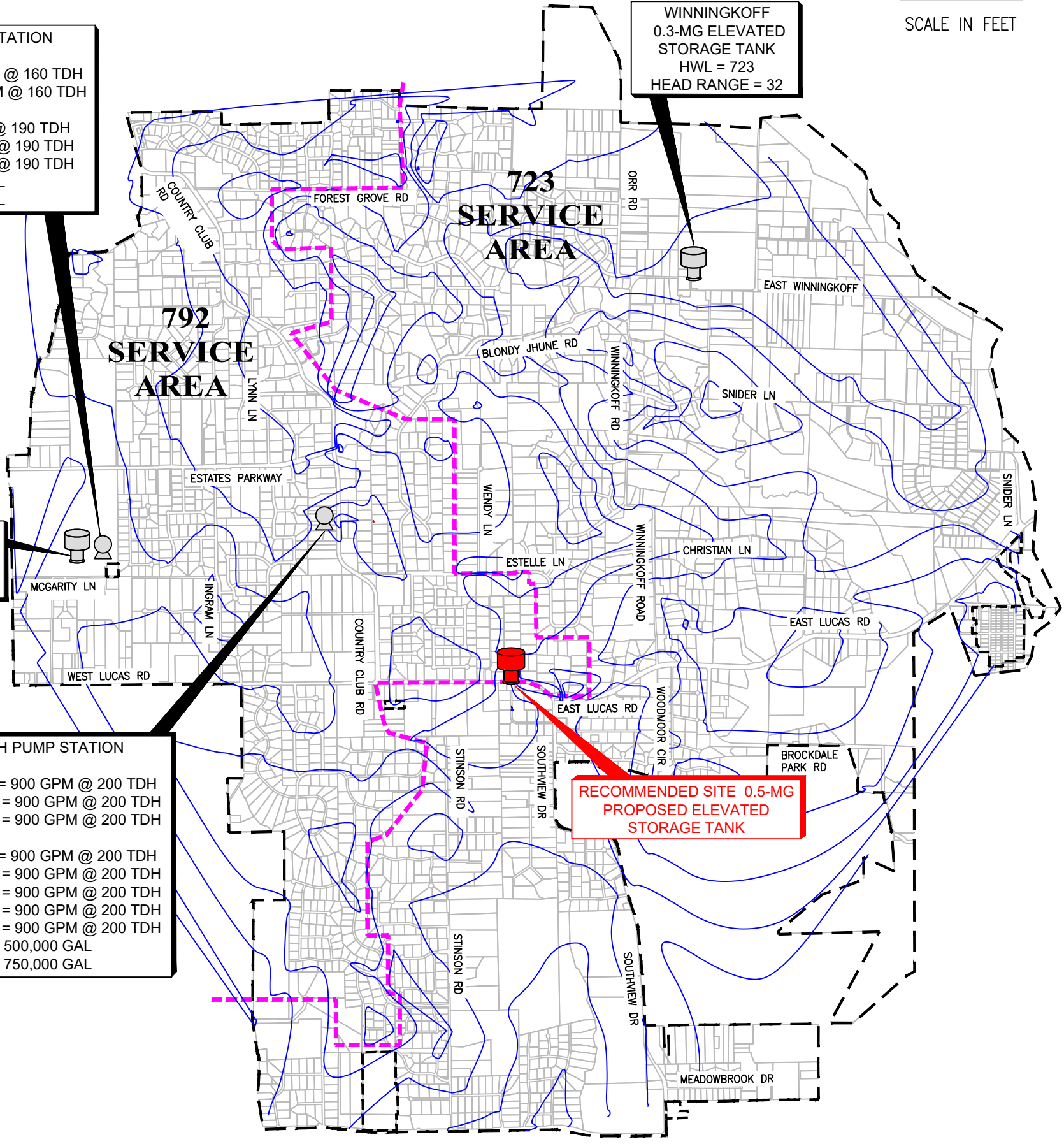
MCGARITY PUMP STATION
BUILDING 1:
 PUMP NO.1 = 1,100 GPM @ 160 TDH
 PUMP NO. 2 = 1,100 GPM @ 160 TDH
BUILDING 2:
 PUMP NO.1 = 750 GPM @ 190 TDH
 PUMP NO. 2 = 750 GPM @ 190 TDH
 PUMP NO. 3 = 750 GPM @ 190 TDH
 GSR NO. 1 = 200,000 GAL
 GSR NO. 2 = 350,000 GAL

WINNINGKOFF
 0.3-MG ELEVATED
 STORAGE TANK
 HWL = 723
 HEAD RANGE = 32

MCGARITY 0.3-MG
 ELEVATED STORAGE TANK
 HWL = 792
 HEAD RANGE = 32.5

NORTH PUMP STATION
BUILDING 1:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
BUILDING 2:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
 PUMP NO. 4 = 900 GPM @ 200 TDH
 PUMP NO. 5 = 900 GPM @ 200 TDH
 GSR NO. 1 = 500,000 GAL
 GSR NO. 2 = 750,000 GAL

RECOMMENDED SITE 0.5-MG
 PROPOSED ELEVATED
 STORAGE TANK



LEGEND
 - - LUCAS CITY LIMITS
 --- PROPOSED SERVICE AREA BOUNDARY
 --- LESS THAN OR EQUAL TO 40 PSI
 --- GREATER THAN 40 PSI

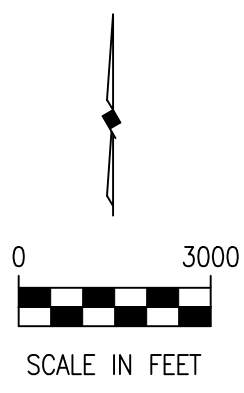
BIRKHOFF, HENDRICKS & CARTER, L.L.P.
 PROFESSIONAL ENGINEERS
 TBPE Firm No. 526; TBPLS Firm No. 10031800
 Dallas, Texas

EXHIBIT G

**PHASE 2 IMPROVEMENTS
 LOW PRESSURE AREAS**

JUNE 2021





MCGARITY PUMP STATION
BUILDING 1:
 PUMP NO.1 = 1,100 GPM @ 160 TDH
 PUMP NO. 2 = 1,100 GPM @ 160 TDH
BUILDING 2:
 PUMP NO.1 = 750 GPM @ 190 TDH
 PUMP NO. 2 = 750 GPM @ 190 TDH
 PUMP NO. 3 = 750 GPM @ 190 TDH
 GSR NO. 1 = 200,000 GAL
 GSR NO. 2 = 350,000 GAL

WINNINGKOFF
 0.3-MG ELEVATED
 STORAGE TANK
 HWL = 723
 HEAD RANGE = 32

MCGARITY 0.3-MG
ELEVATED STORAGE TANK
 HWL = 792
 HEAD RANGE = 32.5

NORTH PUMP STATION
BUILDING 1:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
BUILDING 2:
 PUMP NO.1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
 PUMP NO. 4 = 900 GPM @ 200 TDH
 PUMP NO. 5 = 900 GPM @ 200 TDH
 GSR NO. 1 = 500,000 GAL
 GSR NO. 2 = 750,000 GAL

RECOMMENDED SITE 0.5-MG
PROPOSED ELEVATED
STORAGE TANK

LEGEND
 - - LUCAS CITY LIMITS
 --- PROPOSED SERVICE AREA BOUNDARY
 --- GREATER THAN OR EQUAL TO 90 PSI
 --- LESS THAN 90 PSI

BIRKHOFF, HENDRICKS & CARTER, L.L.P.
 PROFESSIONAL ENGINEERS
 TBPE Firm No. 526; TBPLS Firm No. 10031800
 Dallas, Texas

EXHIBIT H

PHASE 2 IMPROVEMENTS
HIGH PRESSURE AREAS

JUNE 2021



City of Lucas
Existing System Hydraulic Model Report

APPENDIX

Phase 1 and Phase 2 Itemized Opinion of Cost

Client: City of Lucas

Date: 9/21/2021

Project: 2020 Existing Water Model Evaluation

Phase 1 - CIP (Proposed 0.5 MG Composite EST & Parallel 12-Inch Water Line)

By: GCH & JTL

ENGINEER'S OPINION OF CONSTRUCTION COST

Item No.	Description	Quantity	Unit	Price	Amount
1	Mobilization, Site Preparation, Bonds & Insurance	1	L.S.	\$ 100,000.00	\$ 100,000.00
2	Construct 0.5-MG Composite Elevated Steel Water Storage Tank (Reinforced Concrete Column & 0.5-MG Welded Steel Tank) in accordance with AWWA Standard D107-10 including all Instrumentation, Controls, Tank Piping, Containment System for Exterior Blasting and Painting (including Painted Logo), Dehumidification System & appurtenances	1	L.S.	\$1,500,000.00	\$ 1,500,000.00
3	Tank Mixing System	1	L.S.	\$ 150,000.00	\$ 150,000.00
4	Tank & Site Electrical Components	1	L.S.	\$ 150,000.00	\$ 150,000.00
5	Connect EST Instrumentation to SCADA System	1	L.S.	\$ 25,000.00	\$ 25,000.00
6	Tank Logos	3	Ea	\$ 5,000.00	\$ 15,000.00
7	12-Inch Waterline	100	L.F.	\$ 200.00	\$ 20,000.00
8	Connect to Existing Water Line	1	L.S.	\$ 2,000.00	\$ 2,000.00
9	8-Inch Thick Reinforced Concrete Driveway	250	S.Y.	\$ 90.00	\$ 22,500.00
10	4-Inch Thick Reinforced Concrete Sidewalks	150	S.Y.	\$ 55.00	\$ 8,250.00
11	Earthwork & Site Grading	1	L.S.	\$ 40,000.00	\$ 40,000.00
12	Drainage Infrastructure	1	L.S.	\$ 50,000.00	\$ 50,000.00
13	8-Foot Security Fence & Gate	1	L.S.	\$ 80,000.00	\$ 80,000.00
14	Site Security & Logo Lighting	1	L.S.	\$ 100,000.00	\$ 100,000.00
15	Site Turf & Landscape Features	1	L.S.	\$ 75,000.00	\$ 75,000.00
16	Site Irrigation System	1	L.S.	\$ 25,000.00	\$ 25,000.00
17	Stormwater Pollution Prevention Plan & Erosion Control	1	L.S.	\$ 5,000.00	\$ 5,000.00
	Subtotal:				\$ 2,367,750.00
	Contingencies and Miscellaneous Items	20.0%			\$ 473,600.00
	Proposed 2.0 MG Elevated Storage Tank Total:				\$ 2,841,350.00

Client: City of Lucas

Date: 9/21/2021

Project: 2020 Existing Water Model Evaluation

Phase 1 - CIP (Proposed 0.5 MG Composite EST & Parallel 12-Inch Water Line)

By: GCH & JTL

ENGINEER'S OPINION OF CONSTRUCTION COST

Item No.	Description	Quantity	Unit	Price	Amount
Prop. 24-inch Water Transmission Main, 18-inch, 16-inch, and 12-inch Water Lines					
18	Furnish & Install 12-inch Water Line	1,100	L.F.	\$ 200.00	\$ 220,000.00
19	Trench Safety Plan and Implementation	1,100	L.F.	\$ 5.00	\$ 5,500.00
20	Erosion Control Plan and Implementation	1	L.S.	\$ 5,000.00	\$ 5,000.00
21	Surface Restoration (Pavement, Sod, or Hydromulch)	3,000	S.Y	\$ 15.00	\$ 45,000.00
22	Traffic Control Plan and Implementation	1	L.S.	\$ 5,000.00	\$ 5,000.00
	Subtotal:				\$ 280,500.00
	Contingencies and Miscellaneous Items	20.0%			\$ 56,100.00
	Proposed Water Line Total:				\$ 336,600.00
	Construction Total:				\$ 3,177,950.00
	Professional Fees including: Engineering, Surveying, Bidding, Construction Admin., Easement Doc Preparation; Geotechnical Evaluations	15%			\$476,693
	Land Rights Acquisition (1 Acre parcel)	1.0	Acre	\$ 100,000.00	\$100,000
	Land Rights Acquisition (20-ft Permanent Easement):	0.51	Ac.	\$ 30,000.00	\$ 15,151.52
	Materials Testing & Quality Control	2.5%			\$ 79,400.00
	Specialized Inspection Services	2.0%			\$ 63,600.00
	Project Total:				\$ 3,912,794.02
				USE:	\$ 4,000,000.00

Client: City of Lucas

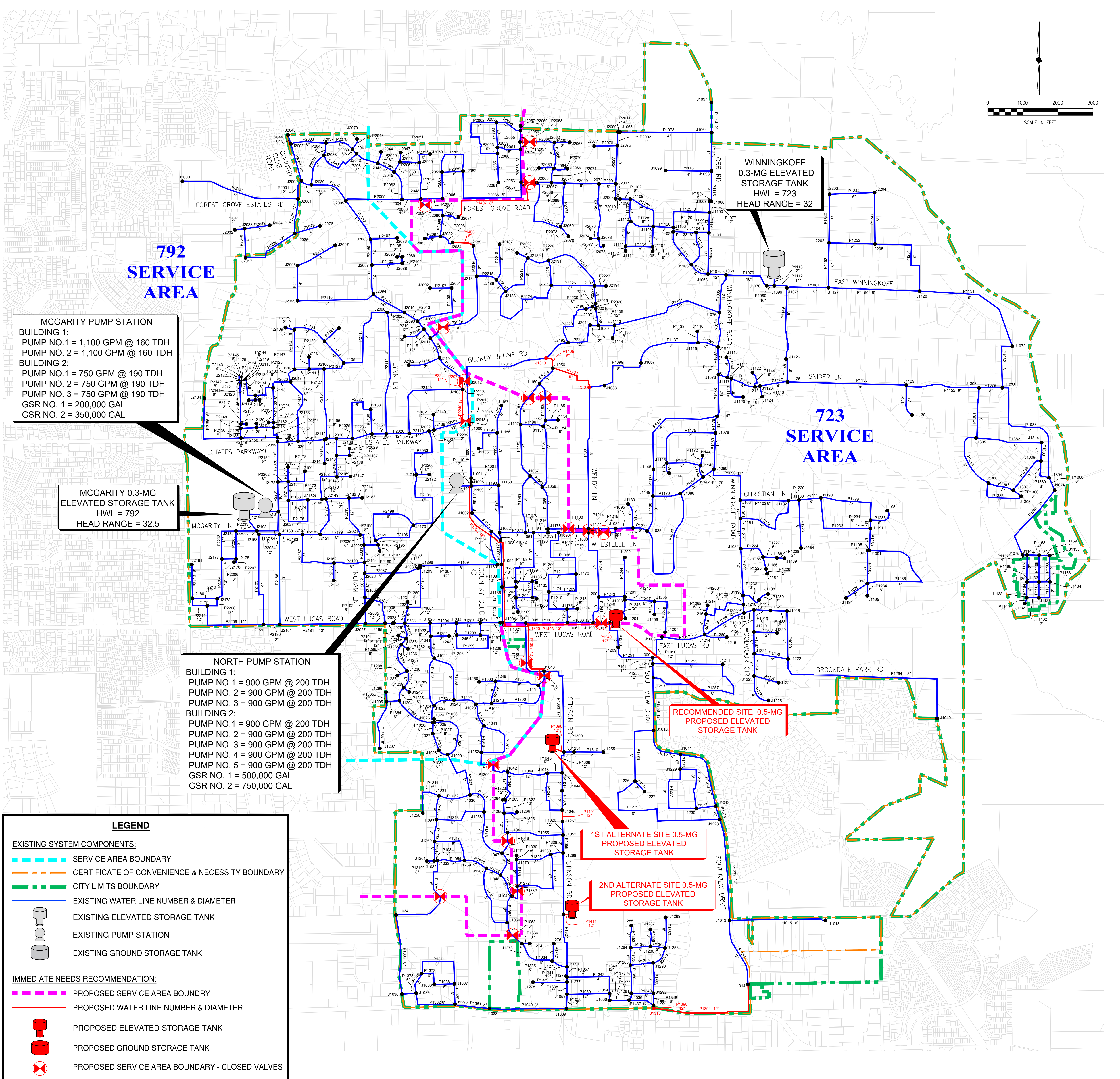
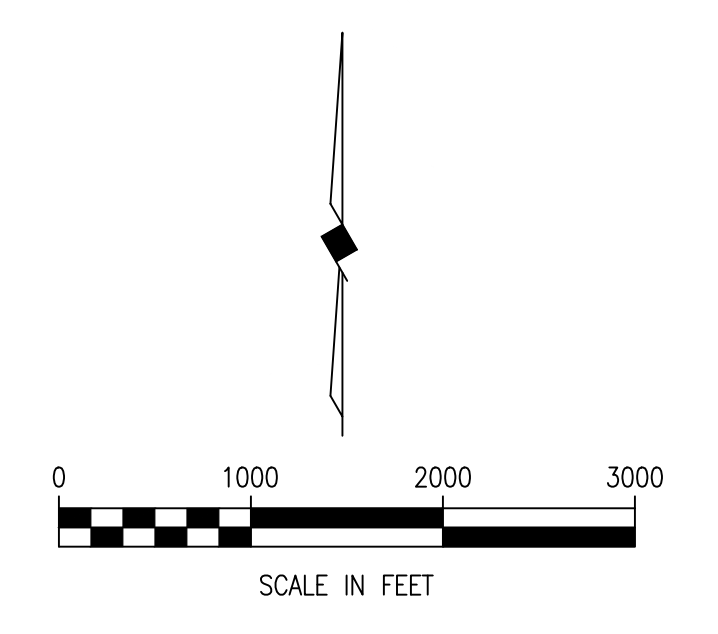
Date: 9/21/2021

Project: 2020 Existing Water Model Evaluation
Phase 2 CIP (Proposed Service Area Adjustment & Water Line Improvements)

By: GCH & JTL

ENGINEER'S OPINION OF PROBABLE PROJECT COST

Item No.	Description	Quantity	Unit	Price	Amount
1	Furnish & Install 12-inch Water Line	13,200	L.F.	\$ 200.00	\$ 2,640,000.00
2	Furnish & Install 8-inch Water Line	5,500	L.F.	\$ 180.00	\$ 990,000.00
3	Trench Safety Plan and Implementation	18,700	L.F.	\$ 5.00	\$ 93,500.00
4	Erosion Control Plan and Implementation	1	L.S.	\$ 30,000.00	\$ 30,000.00
5	Surface Restoration (Pavement, Sod, or Hydromulch)	42,000	S.Y	\$ 15.00	\$ 630,000.00
6	Traffic Control Plan and Implementation	1	L.S.	\$ 30,000.00	\$ 30,000.00
	Construction Subtotal:				\$ 4,413,500.00
	Contingencies and Miscellaneous Items:	20%			\$ 882,700.00
	Subtotal:				\$ 5,296,200.00
	Land Rights Acquisition (20-ft Permanent Easement):	8.59	Ac.	\$ 30,000.00	\$ 257,575.76
	Professional Fees including: Engineering, Surveying, Bidding, Construction Admin., Easement Doc Preparation; Geotechnical Evaluations	15%			\$ 794,430.00
	Quality Control & Construction Materials Testing:	2.5%			\$ 132,405.00
	Project Total:				\$ 6,480,610.76
	Project Budget:			USE:	\$ 6,500,000.00



MCGARITY PUMP STATION
 BUILDING 1:
 PUMP NO. 1 = 1,100 GPM @ 160 TDH
 PUMP NO. 2 = 1,100 GPM @ 160 TDH
 BUILDING 2:
 PUMP NO. 1 = 750 GPM @ 190 TDH
 PUMP NO. 2 = 750 GPM @ 190 TDH
 PUMP NO. 3 = 750 GPM @ 190 TDH
 GSR NO. 1 = 200,000 GAL
 GSR NO. 2 = 350,000 GAL

MCGARITY 0.3-MG ELEVATED STORAGE TANK
 HWL = 792
 HEAD RANGE = 32.5

NORTH PUMP STATION
 BUILDING 1:
 PUMP NO. 1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
 BUILDING 2:
 PUMP NO. 1 = 900 GPM @ 200 TDH
 PUMP NO. 2 = 900 GPM @ 200 TDH
 PUMP NO. 3 = 900 GPM @ 200 TDH
 PUMP NO. 4 = 900 GPM @ 200 TDH
 PUMP NO. 5 = 900 GPM @ 200 TDH
 GSR NO. 1 = 500,000 GAL
 GSR NO. 2 = 750,000 GAL

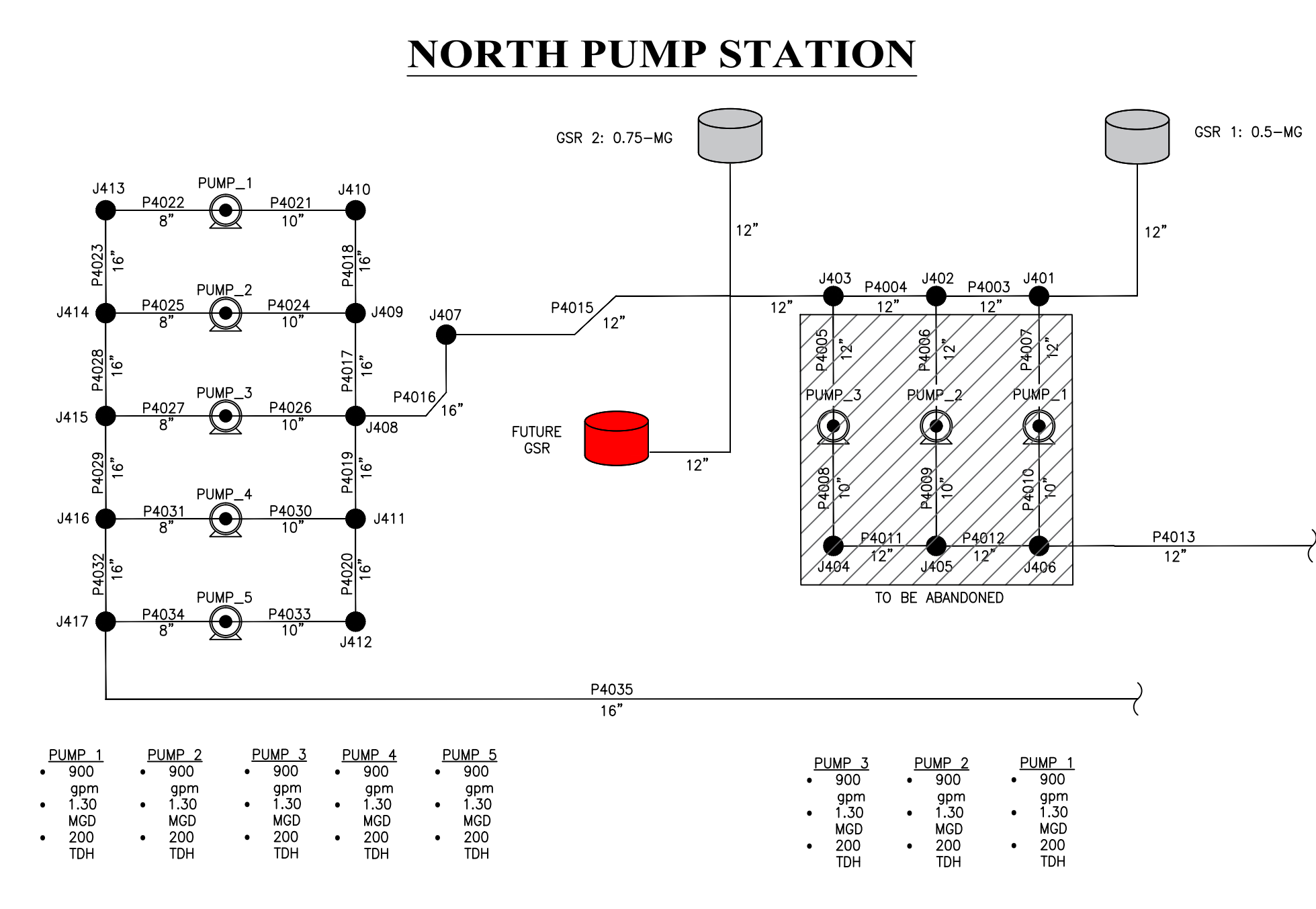
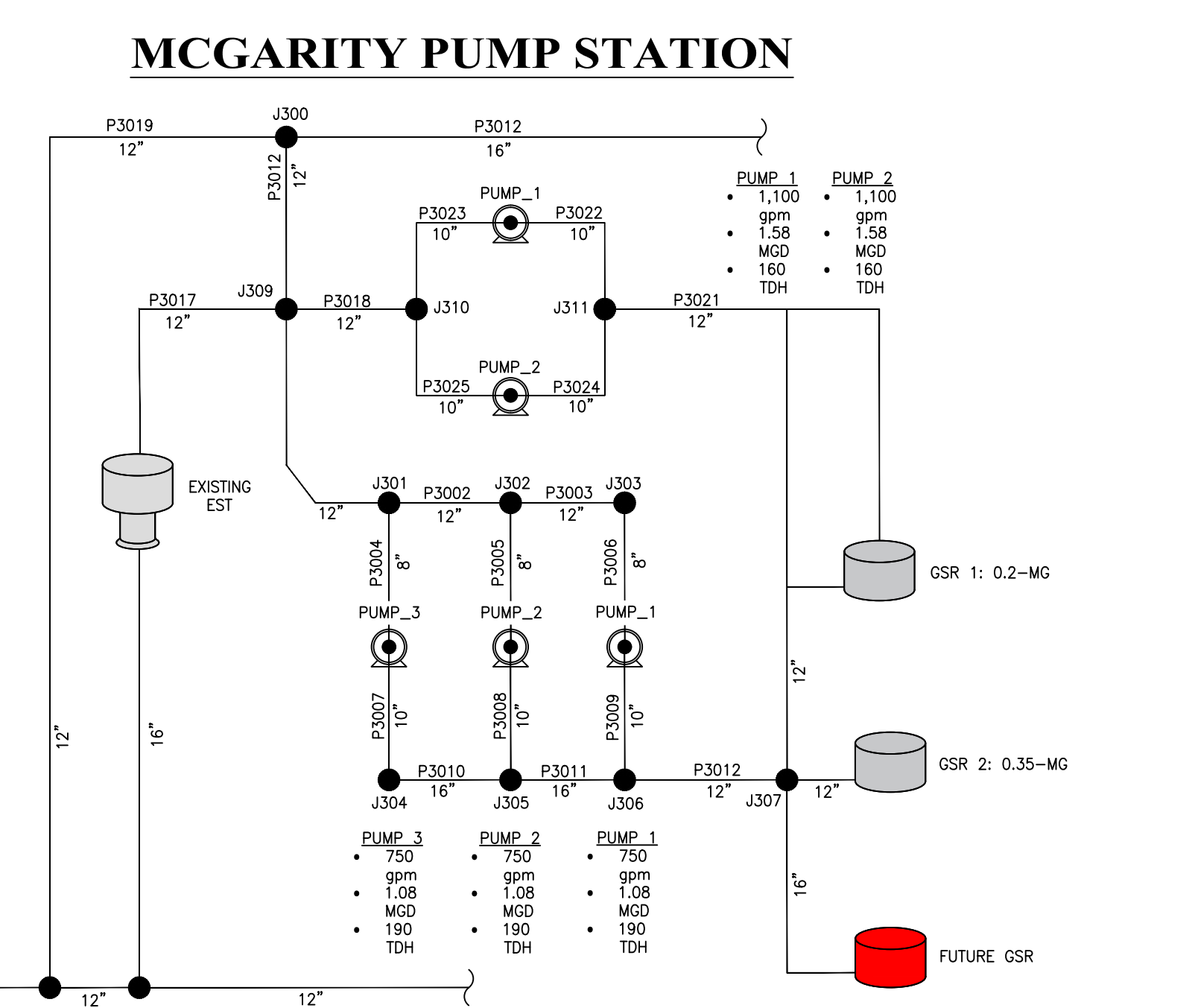
LEGEND

EXISTING SYSTEM COMPONENTS:

- SERVICE AREA BOUNDARY
- CERTIFICATE OF CONVENIENCE & NECESSITY BOUNDARY
- CITY LIMITS BOUNDARY
- EXISTING WATER LINE NUMBER & DIAMETER
- EXISTING ELEVATED STORAGE TANK
- EXISTING PUMP STATION
- EXISTING GROUND STORAGE TANK

IMMEDIATE NEEDS RECOMMENDATION:

- PROPOSED SERVICE AREA BOUNDARY
- PROPOSED WATER LINE NUMBER & DIAMETER
- PROPOSED ELEVATED STORAGE TANK
- PROPOSED GROUND STORAGE TANK
- PROPOSED SERVICE AREA BOUNDARY - CLOSED VALVES



**2020 WATER DISTRIBUTION SYSTEM
 EXISTING SYSTEM HYDRAULIC MODEL
 MAP AND IMMEDIATE NEEDS
 RECOMMENDATIONS**



City of Lucas City Council Agenda Request October 21, 2021

Requestor: Mayor Jim Olk

Agenda Item Request

Executive Session.

Pursuant to Section 551.074 of the Texas Government Code, the City Council will convene into Executive Session to discuss the evaluation for the City Secretary.

Background Information

NA

Attachments/Supporting Documentation

NA

Budget/Financial Impact

NA

Recommendation

NA

Motion

NA



City of Lucas City Council Agenda Request October 21, 2021

Item No. 07

Requester: Mayor Jim Olk

Agenda Item Request

Reconvene from Executive Session and take any action necessary as a result of the Executive Session.

Background Information

NA

Attachments/Supporting Documentation

NA

Budget/Financial Impact

NA

Recommendation

NA

Motion

NA