

GENERAL

The scope of services is for the development of a Water Master Plan Update for the City of Hutchins, Texas (Owner). This Water Master Plan Update generally includes population projections, hydraulic model updates, and planning evaluations needed provide the City with an updated capital improvement plan (CIP) for water facilities. Cost estimates, timelines, and additional justification for water infrastructure projects will be documented in the final report.

ASSUMPTIONS

In developing the scope of work and associated level of effort discussed in this proposal, Garver has made the assumptions outlined below.

- 1. Garver will update the Owner's existing water distribution system hydraulic model in Autodesk InfoWater Pro software. The existing hydraulic model is skeletonized, but the updated hydraulic model will be an "all pipes" hydraulic model.
- 2. Garver will conduct the following meetings over the course of the master plan update:
 - a. Virtual Project Kickoff Meeting
 - b. Site Visit (tour all water facilities owned and operated by City of Hutchins)
 - c. Virtual Population Projection and Water Demand Updates Meeting
 - d. Virtual Hydraulic Model Update Workshop
 - e. Virtual CIP Workshop
 - f. Decisions and comments made in the workshops will be included in the meeting minutes to be sent out electronically following each workshop.
- 3. The Owner has record drawings for all water facilities and operation and maintenance manuals for significant equipment (pumps, control valves, etc.).
- 4. The Owner or wholesale water provider has monthly customer billing data in a tabular format (.csv or Excel file) for at least the last ten years.

SCOPE OF WORK

The Water Master Plan Update is to be comprised of the following tasks, which are described in detail in the following sections:

- 1. Project Administration
- 2. Data Collection and Analysis
- 3. Population and Water Demand Projections
- 4. Hydraulic Model Update
- 5. CIP Development and Water Maser Plan Report



TASK 1 – PROJECT ADMINISTRATION

Garver will complete the following project administration tasks over the duration of the project:

- 1. Garver will attend one virtual kick-off meeting to discuss project objectives, internal and external team, lines of communication, and schedule.
- 2. Garver will prepare and provide monthly invoices and progress/status reports to support monthly billings.

TASK 2 – DATA COLLECTION AND ANALYSIS

Garver will coordinate with the Owner to obtain the necessary historical information for use in execution of this project. Garver will complete the following items related to this task.

- 1. Garver will prepare a memorandum to request the information required to develop the Water Distribution System Master Plan. The initial data request to the Owner will include but not be limited to:
 - a. Existing and future water service Areas
 - b. Water system record drawings (for all facilities and pipelines)
 - c. Pump curves
 - d. Annual and monthly wholesale water purchase records for the last ten (10) years
 - e. GIS data for parcels, zoning, and existing/future land use
- 2. Once data is received, Garver will review, identify data gaps, and propose assumptions for the master plan.
- 3. Garver will conduct a site visit with Owner's staff to review operation of the water distribution system facilities; it is assumed that one (1) Garver employee will tour all pumping, storage, and control valve facilities with City Staff. Photos, visual observations of condition, and installation year will be documented and compared against industry standard lifetimes (in years) for water system infrastructure.
- 4. Field Data Collection exercises will begin once an initial site visit is completed. Garver will develop a field data collection plan that documents preferred locations for pressure loggers and hydrant flow tests to be completed. These locations will be based on preliminary evaluations of system hydraulics and will be submitted to the Owner for review prior to mobilizing staff and equipment.
 - a. Pressure Logging: Garver will furnish and loan up to eight (8) hydrant pressure loggers for deployment by the Owner in the Owner's system for the purposes of collecting continuous pressure data for a period of up to seven (7) days. It is anticipated that the pressure logging will consist of one (1) set of unique logging locations. It is assumed that Garver staff will assist the Owner in deployment and collection of the loggers.
 - b. Hydrant Flow Tests: Garver will select up to eight (8) hydrant flow test locations and assist the Owner in directing operations and collecting data during the flow tests. It is anticipated that two (2) Garver staff will be present for one (1) day to support hydrant flow tests.
 - c. Pressure Logging and Hydrant Flow Testing Data Analysis: Garver will analyze the



data collected during the Pressure Logging and Hydrant Flow Tests for use in calibration of the hydraulic model.

TASK 3 – POPULATION AND WATER DEMAND PROJECTIONS

Garver will develop projections for population and water demand based on growth rates and land use planning information provided by the Owner. The projections will allow evaluation of capacity-based improvements for this project. Specifically, Garver will accomplish the following items:

- 1. Population Projections: Garver will develop service population and development projections for the water service area. These projections will be based on historical trends, available planning documents, and future land use maps provided by the Owner.
- 2. AMI Data Analysis: Garver will assess water meter demand data to develop representative diurnal demand patterns for each account type. Representative average and maximum day diurnal curves will be developed for each account type based on averaging of a subset of meter data from each account type. Garver will use AMI data from up to one hundred (100) meters for this analysis.
- 3. Unit Demand Coordination: Garver will coordinate with the Owner to determine per capita and/or per unit land area demand values used to project water usage over the planning horizon for each rate category and/or land area type.
- 4. Water Use Projections: Garver will project water demand over the planning horizon based on projected development and unit water usage values.
- 5. Population and Water Demand Meeting: Garver will conduct a virtual meeting to review draft Population and Water Demand Projections with Owner staff.

TASK 4 – HYDRAULIC MODEL UPDATES

Garver will update the hydraulic model. Specifically, Garver will accomplish the following items:

- 1. Model Network and Facility Updates: Garver will review and update the distribution system hydraulic model, so it accurately represents the current state of the system. The following components will be updated based on information provided by the Owner:
 - a. Pipe Network (all pipes)
 - b. Facilities (Pump Stations, Storage Tanks, Control Valves, Normally-Closed Valves)
- 2. Demand Alternatives Development: Garver will develop existing average day and maximum day demand alternatives using water meter data and representative diurnal demand curves. Demand allocation will use tools within the hydraulic modeling software. Garver will select the methodology that maximizes the number of junctions receiving demands to limit the presence of zero-demand junctions on dead-end lines.
- 3. SCADA Data Review: Garver will review historical SCADA data to identify typical pumping operations for development of model boundary conditions and to develop current pump



performance curves, where possible, based on available data. Garver will identify typical operations for average day and maximum day demand conditions. Garver will calibrate the distribution system hydraulic model using the hydrant pressure logger, and flow test.

- 4. Model Controls: Garver will create model controls based on the SCADA Data from the wholesale provider as well as detailed calibration using pressure loggers and hydrant flow tests.
- 5. Garver will complete hydraulic model evaluations for existing conditions. At each horizon, Garver will complete modeling for average day, and maximum day conditions using extended-period simulations (EPS), unless otherwise specified. Garver will complete steady-state fire flow evaluations for maximum day conditions. Garver will complete water age evaluations for average day and maximum month conditions. Garver will accomplish the following items:\
 - a. Level of Service Criteria: Garver will develop level of service criteria for the system based on Owner requirements and preferences, State regulations, and industry standards. Criteria will be developed related to system pressures (minimum, maximum, and variation), pipe velocities, pipe head loss gradients, storage levels and turnover, and fire flows.
 - b. Existing System Assessment: Garver will use the calibrated hydraulic model to assess the performance of the existing system and identify system deficiencies in meeting level of service criteria.
- 6. Garver will complete hydraulic model evaluations for up to two (2) future planning horizons. These evaluations will be used to develop and identify triggers/phasing for capital improvement projects. At each horizon, Garver will complete modeling for average day and maximum day conditions using extended-period simulations (EPS), unless otherwise specified. Garver will complete fire flow evaluations for maximum day conditions. Garver will complete water age evaluations for average day and maximum day conditions. Garver will accomplish the following items:
 - a. Existing System Improvements: Garver will identify improvements necessary to address deficiencies with the existing system for inclusion in the future model evaluations.
 - b. Future Planning Horizon Model Updates: Garver will create average day and maximum day demand alternatives for each of the two (2) future planning horizons. For each horizon, Garver will add skeletonized model and pipe infrastructure necessary for the evaluation.
 - c. Future Planning Horizon Evaluations and Project Phasing: Garver will complete hydraulic modeling at each planning horizon to develop phasing and/or triggers for improvements.
- 7. Hydraulic Model Update Virtual Workshop: Garver will conduct a virtual meeting to discuss the hydraulic model updates.



TASK 5 – CIP DEVELOPMENT AND WATER MASTER PLAN REPORT

Garver will develop a Capital Improvement Plan (CIP) to support multiple goals, including addressing system deficiencies, providing capacity for system growth and expansion, improving system operability and reliability, and renewing and replacing infrastructure that has reached the end of its effective useful life. Specifically, Garver will complete the following items:

- 1. Garver will finalize development of the capital improvement projects to address existing deficiencies and serve future growth, including new pump stations, storage tanks, and pipes 8-inches or larger, as required.
- 2. Cost Estimates: Garver will develop conceptual costs for each CIP project. Each of these conceptual cost estimates will be a Class 4 estimate as defined by the Association for the Advancement of Cost Engineering (AACE), which is consistent with cost estimates developed for studies and feasibility. The expected accuracy range for the estimates is -30% to +50% of the estimated values.
- 3. Project Triggers: Garver will identify triggers for each project. Condition-based triggers will be based on specific years, while capacity-based triggers will be based on capacity-related information, such as number of connections, system flows, etc., as applicable.
- 4. CIP Development: Garver will develop the CIP based on identified funding levels provided by the Owner and project phasing identified through the hydraulic modeling and/or condition assessments. Development of a dynamic CIP tool using a digital platform will be considered Extra Work.
- 5. Garver will create up to 5 individual project detail sheets for major capital improvements with project description, map, justification, unintended consequences, special considerations, potential alternatives, additional professional services, schedule and triggers, and costs.
- 6. CIP Workshop: Garver will conduct a virtual CIP Workshop to review the CIP with the Owner and identify adjustments to the CIP.
- 7. Garver will document the results of all the evaluations in a final report. Specifically, Garver will complete the following items:
 - a. Draft Water Master Plan Report: Garver will develop a Water Master Plan Report that consists of an Executive Summary, an Introduction, and a section or appendix for each major task. Garver will submit the Draft Water Master Plan Report for review by the Owner.
 - b. Final Water Master Plan Report: Garver will incorporate Owner comments and prepare a Final Water Master Plan Report. Garver will submit this report to the Owner in electronic format.



PROJECT MEETINGS AND WORKSHOPS

The following will be submitted to the Owner, or others as indicated, by Garver:

- A. Virtual Project Kickoff Meeting
- B. Site Visit (tour all water facilities owned and operated by City of Hutchins)
- C. Field work for pressure logging and hydrant flow tests
- D. Virtual Population Projection and Water Demand Updates Meeting
- E. Virtual Hydraulic Model Update Workshop
- F. Virtual CIP Workshop

PROJECT DELIVERABLES

The following will be submitted to the Owner, or others as indicated, by Garver:

- A. Digital (PDF) submittals of meeting minutes and workshop presentations
- B. Updated Hydraulic Model File
- C. Draft and Final Water Master Plan Report in digital (PDF) format
- D. Electronic files as requested

EXTRA WORK

The following items are not included under this agreement but will be considered as extra work:

- A. Survey
- B. Geotechnical Services
- C. Design services of any kind
- D. Computational fluid dynamics (CFD) modeling
- E. Water Quality modeling
- F. Water loss modeling
- G. Transient analysis and surge mitigation
- H. Pump testing at system pump facilities
- I. Process sampling and/or laboratory testing
- J. Electrical Power Usage Analysis or Profiling
- K. Rework for the Owner's convenience or due to changed conditions after previous alternate direction and/or approval.
- L. Submittals or deliverables in addition to those listed herein.
- M. Construction materials testing.
- N. Environmental Handling and Documentation, including wetlands identification or mitigation plans or other work related to environmentally or historically (culturally) significant items.
- O. Coordination with FEMA and preparation/submittal of a CLOMR and/or LOMR.
- P. Services after construction, such as warranty follow-up, operations support, etc.

Extra Work will be as directed by the Owner in writing for an addition fee as agreed upon by the Owner and Garver.



SCHEDULE

The following schedule milestones are anticipated for this project. Note that the schedule provides anticipated time periods for providing information, reviewing submittals, and scheduling meetings and workshops. Additional time required for these elements of the project will likely result in changes to milestone dates, which will be captured in the detailed project schedule maintained throughout the duration of the project.

Phase Description	Calendar Days
Virtual Kickoff Meeting	15 days from NTP
Site Visit and Field Data Collection	60 days from NTP
Population and Water Demand Projections Virtual Meeting	120 days from NTP
Hydraulic Model Update Workshop	180 days from NTP
CIP Workshop	240 days from NTP
Draft Water Master Plan Report	270 days from NTP
Final Water Master Plan Report	30 days from receipt of Owner comments

Exhibit B

City of Hutchins, TX Water Master Plan

FEE SUMMARY

Basic Services Section	Estimated Fees			
TASK 1 - Project Administration	\$	6,181.00		
TASK 2 - Data Collection and Analysis	\$	32,540.00		
TASK 3 - Population and Water Demand	\$	23,858.00		
TASK 4 - Hydraulic Model Update	\$	54,608.00		
TASK 5 - CIP Development and Water Master Plan Report	\$	69,226.00		
Subtotal for Basic Services Section	\$	186,413.00		

Total All Services

\$ 186,413.00

Exhibit B

City of Hutchins, TX

Water Master Plan

	Project Manager	Hydraulic Team Leader	Hydraulic Modeling Lead	Hydraulic Modeling Project Engineer	GIS Coordinator				
WORK TASK DESCRIPTION	E-5	E-5	E-4	E-1	ES-2	GARVER LABOR	GARVER ODC	GARVER TOTAL	TOTAL
Basic Services Section									
1 TASK 1 - Project Administration						\$0		02	\$0
1. Kickoff Meeting	2		4	4		\$2,094	\$100	\$2 204	\$2 204
	£			2		\$298	 	\$298	\$298
3 Monthly Billing/Progress Reports	12					\$3,396		\$3,396	\$3,396
	12					\$0		\$0	\$0
						\$0 \$0		\$0	\$0
						\$0		\$0	\$0
Quality Control Review		1				\$283		\$283	\$283
						\$0		\$0	\$0
Subtotal - TASK 1 - Project Administration	14	1	4	6	0	\$6,071	\$100	\$6,181	\$6,181
2. TASK 2 - Data Collection and Analysis						\$0		\$0	\$0
1. Data Reguest Memo				1		\$149		\$149	\$149
2. Data Analysis			4	32		\$5,700		\$5,700	\$5,700
3. Site Visit (tour of water facilities)	8					\$2,264	\$100	\$2,374	\$2,374
4. Field Data Collection (pressure loggers and hydrant flow tests)	15		30	84		\$23,751		\$23,751	\$23,751
						\$0		\$0	\$0
						\$0		\$0	\$0
						\$0		\$0	\$0
						\$0		\$0	\$0
Quality Control Review		2				\$566		\$566	\$566
						\$0		\$0	\$0
Subtotal - TASK 2 - Data Collection and Analysis	23	2	34	117	0	\$32,430	\$100	\$32,540	\$32,540
3. TASK 3 - Population and Water Demand Projections						\$0		\$0	\$0
1. Population Projections	1		2	16		\$3,133		\$3,133	\$3,133
2. AMI Data Analysis	1		12	40		\$9,039		\$9,039	\$9,039
3. Unit Demand Coordination	1		2	16		\$3,133		\$3,133	\$3,133
4. Water Use Projections	1		4	16		\$3,599		\$3,599	\$3,599
5. Virtual Meeting	2		4	8		\$2,690		\$2,690	\$2,690
						\$0		\$0	\$0
						\$0		\$0	\$0
						\$0		\$0	\$0
Quality Control Review		8				\$2,264		\$2,264	\$2,264
						\$0		\$0	\$0
Subtotal - TASK 3 - Population and Water Demand Projections	6	8	24	96	0	\$23,858	\$0	\$23,858	\$23,858
4. TASK 4 - Hydraulic Model Update						\$0		\$0	\$0
1. Model Network and Facility Updates	4		4	16	20	\$7,448		\$7,448	\$7,448
2. Demand Development			4	16		\$3,316		\$3,316	\$3,316
3. SCADA Data Review and validation			4	8		\$2,124		\$2,124	\$2,124
4. Model Controls			2	8		\$1,658		\$1,658	\$1,658
5. Model evaluation for existing conditions	2		2	4		\$1,628		\$1,628	\$1,628
Level of Service Criteria			2	4		\$1,062		\$1,062	\$1,062
Existing System Assessment			8	40	20	\$10,824		\$10,824	\$10,824
6. Model evaluations for two (2) future planning horizons						\$0		\$0	\$0
Existing System Improvements	2		2	4		\$1,628		\$1,628	\$1,628
Future Planning Horizon Model Updates	2		8	40	20	\$11,390		\$11,390	\$11,390
Future Planning Horizon Evaluations and Project Phasing	2		8	16		\$4,814		\$4,814	\$4,814

	Project Manager	Hydraulic Team Leader	Hydraulic Modeling Lead	Hydraulic Modeling Project Engineer	GIS Coordinator				
WORK TASK DESCRIPTION	E-5	E-5	E-4	E-1	ES-2	GARVER LABOR	GARVER ODC	GARVER TOTAL	TOTAL
7. Hydraulic Model Update Virtual Workshop	4		8	8		\$4,188		\$4,188	\$4,188
						\$0		\$0	\$0
						\$0		\$0	\$0
Quality Control Review		16				\$4,528		\$4,528	\$4,528
						\$0		\$0	\$0
						\$0		\$0	\$0
Subtotal - TASK 4 - Hydraulic Model Update	16	16	52	164	60	\$54,608	\$0	\$54,608	\$54,608
5. TASK 5 - CIP Development and Water Master Plan Report						\$0		\$0	\$0
1. Finalize Projects	2		8	40		\$8,390		\$8,390	\$8,390
2. Cost Estimates	4		8	16		\$5,380		\$5,380	\$5,380
3. Project Triggers	2		4	8		\$2,690		\$2,690	\$2,690
4. CIP Development			16	40		\$9,688		\$9,688	\$9,688
5. Project detail sheets	2		12	24	8	\$8,138		\$8,138	\$8,138
6. Workshop	2		8	16		\$4,814	\$100	\$4,924	\$4,924
7. Final Report						\$0		\$0	\$0
Draft Master Plan Report			40	80		\$21,240		\$21,240	\$21,240
Final Master Plan Report			8	16		\$4,248		\$4,248	\$4,248
						\$0		\$0	\$0
Quality Control Review		16				\$4,528		\$4,528	\$4,528
						\$0		\$0	\$0
Subtotal - TASK 5 - CIP Development and Water Master Plan Report	12	16	104	240	8	\$69,116	\$100	\$69,226	\$69,226
Subtotal - Basic Services Section	71	43	218	623	68	\$186,083	\$300	\$186,413	\$186,413
Project Totals (Hours)	71	43	218	623	68	\$186,083	\$300	\$186,413	\$186,413