

TOWN HALL WORKSHOPS

July 27, 28

LAREDO
WATER
A 50 YEAR
MASTER PLAN



A project of the City of Laredo



In conjunction with



Lockwood, Andrews
& Newnam, Inc.
A LEO A DALY COMPANY





Welcome!

Introductions

- City Council in attendance
- Other Dignitaries
- City Management
- City Staff
- Consultant Teams

Housekeeping Items

- Facebook Live
- Laredowater.org
- Q&A - Please register at laredowater.org
- Monitoring chat and streams to incorporate questions & comments

Background

- Council action
- Previous Master Plans
- Secondary Water



Laredo City Council Members





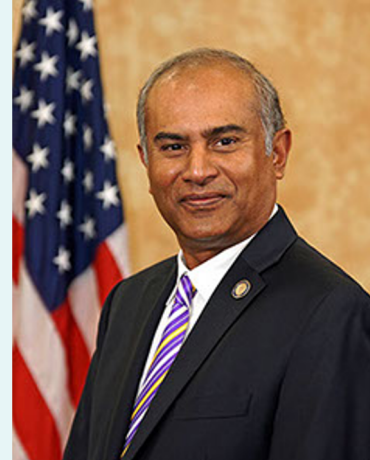
Laredo City Management



Robert Eads
ICMA Credentialed Manager
City Manager



Rosario C. Cabello
Deputy City
Manager



Riazul I. Mia, PE
Assistant City
Manager



Kristina Laurel Hale
Assistant City
Manager



Consultants

LAN Project Team

- J. Tom Ray, PE, D. WRE
- Charles Shumate, PE
- Lisa Lattu, PE, AICP
- Russ Ford, Senior Associate
- Thomas W. Mountz, PE, D.WRE, CFM



Lockwood, Andrews & Newnam, Inc.



Consultants

Ardurra Project Team

- Chris Canonico, PE
- Dan Leyendecker, PE
- Hector Pena, PE
- Ignacio Hinojosa, PE



Ardurra



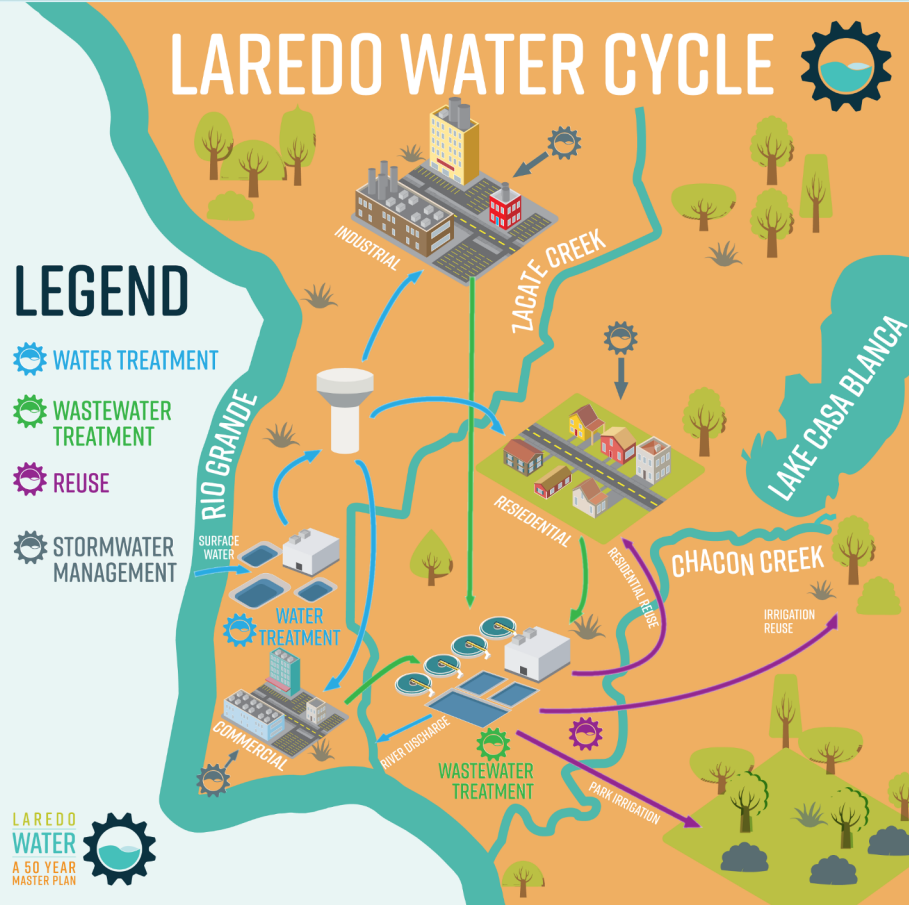
Water Master Plan

LAREDO WATER A 50 YEAR MASTER PLAN





Laredo Water Cycle





Integrated Water Master Plan

Major Components & IWMP
Hydraulic Modeling effort
Review of Progress to date



Charles Shumate, PE





What are the Master Plan Goals?

- ⚙️ Water & Wastewater Infrastructure for Laredo's Growth
- ⚙️ Coordinated Efforts with City Staff and Previous Work
- ⚙️ Prepare For Water Supply Vulnerabilities / Emergency Outages
- ⚙️ Understand Laredo's Financial Impacts & Financing Needs
- ⚙️ Work with the People to develop a Community Master Plan

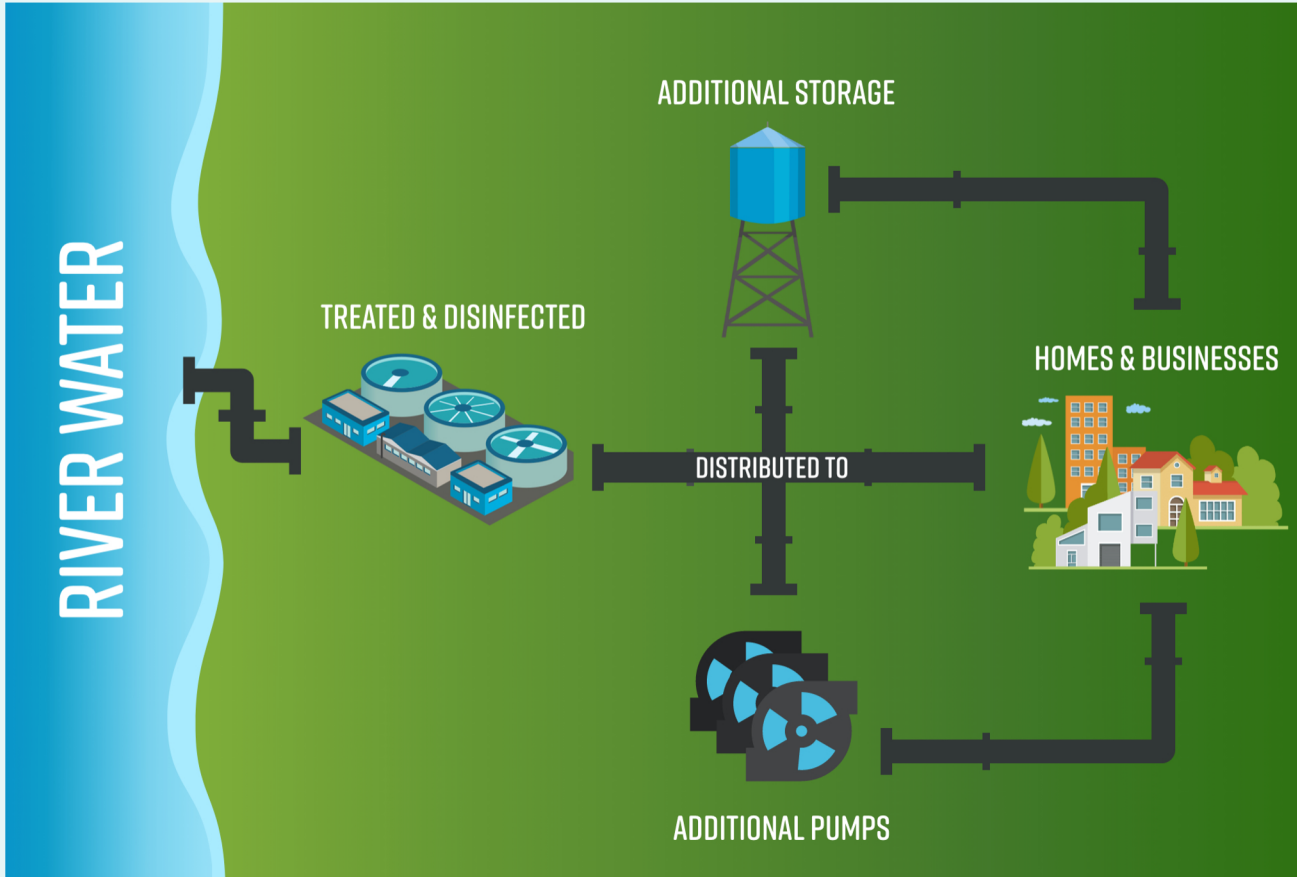
Water Background

- ☀️ Water system dates back to 1882
- ☀️ Most water is from the Rio Grande River
 - Well water is limited in quantity & quality
- Previous Water Master Plan 2011; Updated 2015
- ☀️ State of Texas Water Development Board plans for future population and water demand
- ☀️
 - Laredo is in Region M





Water Purification & Delivery





Existing Water System

~ Laredo Owns and Operates ~



Surface Water Treatment Plant

- ☀ Two Surface Water Treatment Plants
- ☀ Eight Booster Stations
- ☀ Nine Elevated Tanks
- ☀ Ten Service Areas
 - PRVs and Isolation Valves Control Water Flow / Direction



Elevated Storage Tanks

- ☀ More than 1,000 Miles of Water Pipe
 - from 2-inch water lines to 60-inch water transmission mains

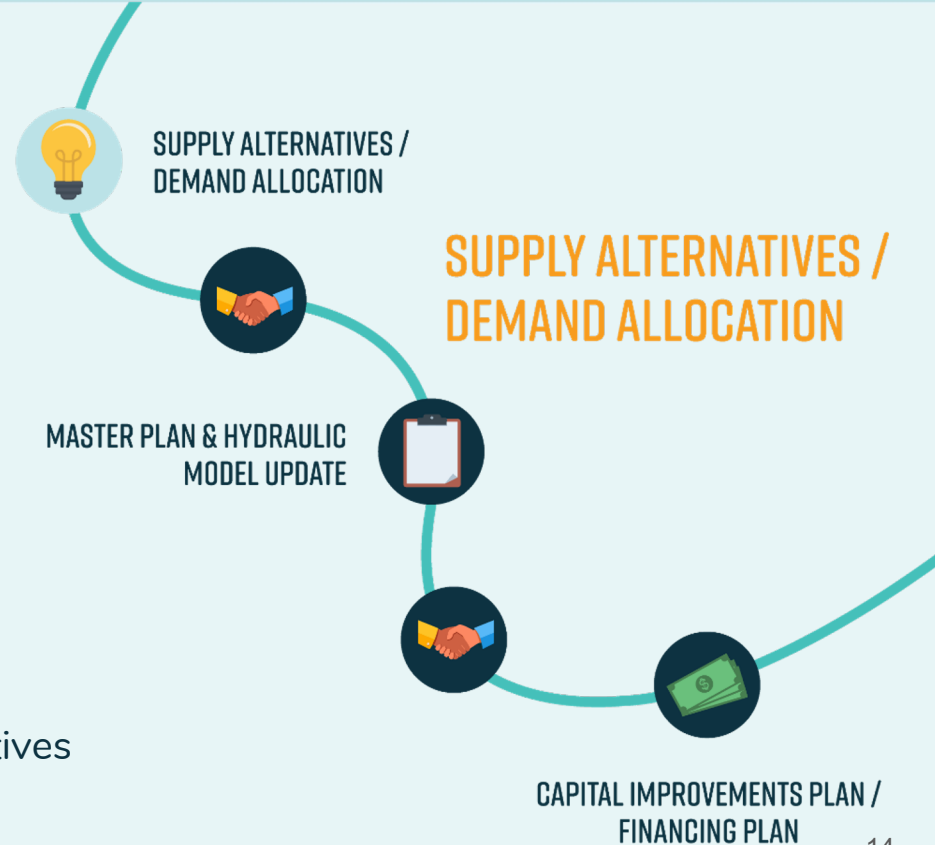


Ground Storage Tanks

Water or Hydraulic Modeling

A Computer Water Model

- Simulates the Above-ground & Below-ground parts of the Systems
- Evaluates System Disruptions
- Virtually Tests Improvements
 - Storage (where and how much)
 - Pumps (redirecting flow / improving pressure)
 - Water Lines / Connections (where, how big)
 - Operational Changes (timing and sequences)
- Helps Compare Costs and Benefits of Alternatives For Today and Prepare for the Future





Water Model

- ⚙️ Update the city's model
 - 2015 model updated to current conditions
 - New customers, tanks, pumps, pipes
- ⚙️ Verify the model (model results match actual system)
 - System flows, tank levels, and pressures
 - Pump controls
- ⚙️ Apply verified model to the system
 - S.Laredo, ability to fill storage, simplify and improve efficiency of operation
 - Future growth
- ⚙️ Identify efficient / affordable improvements

1. POPULATION & DEMAND PROJECTIONS

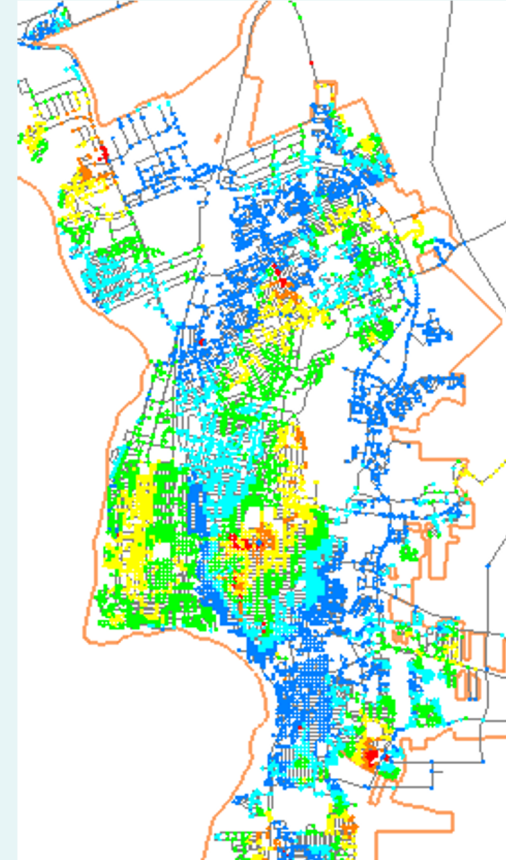
2. HYDRAULIC MODEL DEVELOPMENT/ UPDATE

3. SYSTEM EVALUATION

4. CIP DEVELOPMENT & PRIORITIZATION

Model Report

- ⚙ Document the Model Development
- ⚙ Identify System Needs
 - Water Capacity
 - Water Pressure
- ⚙ Propose Capital Improvements
 - Short Term
 - Long Term
- ⚙ Develop Conceptual or Planning Costs
 - Dynamic / Updateable





Future Water System

Major Projects:

- ⚙️ “Outer Loop” Water Transmission Pipeline
 - first segments to bring water from El Pico Water Treatment Plant

- ⚙️ Water Plant Improvements
 - to maintain higher pressures as water first enters the system

- ⚙️ Pump Station Improvements
 - pressure and storage / flow control of the water system across Laredo



Integrated Water Master Plan

Population & Water Demands

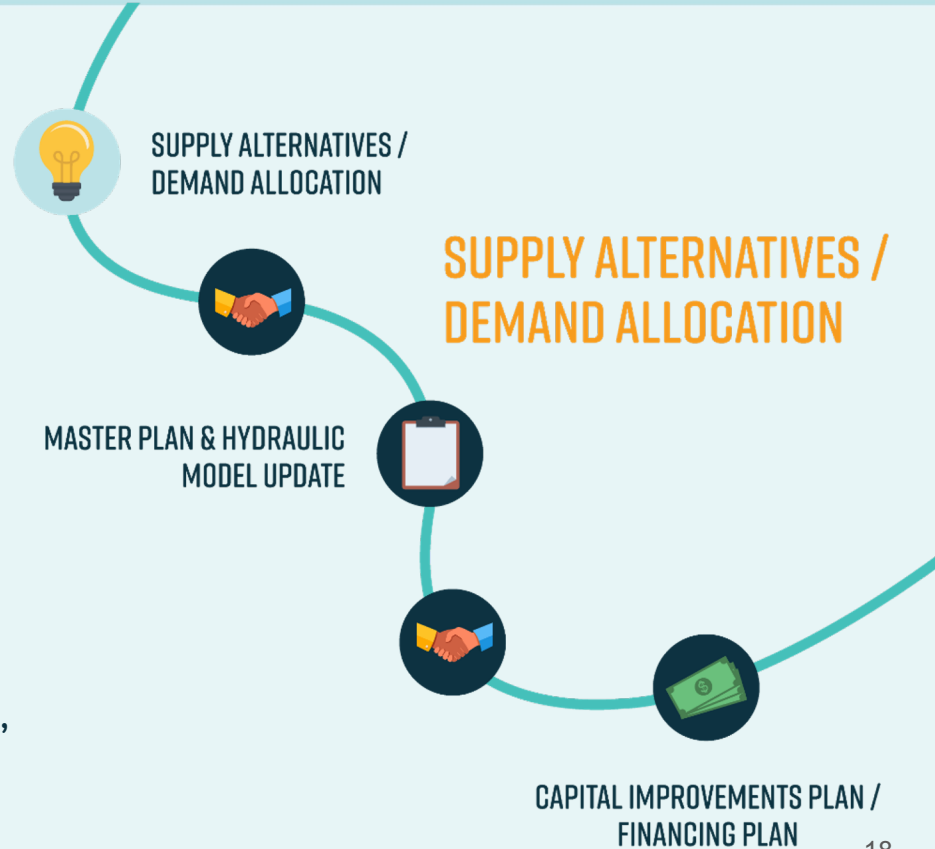
Water Supply Alternatives



J. Tom Ray, PE,
D. WRE



Thomas W. Mountz, PE,
D.WRE, CFM



Water Supply Demand & Alternatives

Preparing for Future Demands & Possible Emergency Outages

- ⚙️ Region M - Water Supply Plan
- ⚙️ Existing Water Supply & Sources
- ⚙️ Projected Water Demands
 - Setting Supplemental Supply Goal
 - Setting Emergency Supply Goal
- ⚙️ Identify & Evaluate Alternatives to meet Supply Goals





Water Supply Functions Considered

Emergency Water Supply

- Supply needed for emergencies caused by interruption of Laredo's water supply source (Rio Grande River diversion)

Supplemental Supply

- Supply needed to meet future water demands resulting from Laredo's growth and water system expansion in the future



Alternative Water Sources

Supply Goals:

Prepare For Future Water
Demands (>2040)



Supplemental Water Supply =
22,000 Acre-feet/year
20 MGD

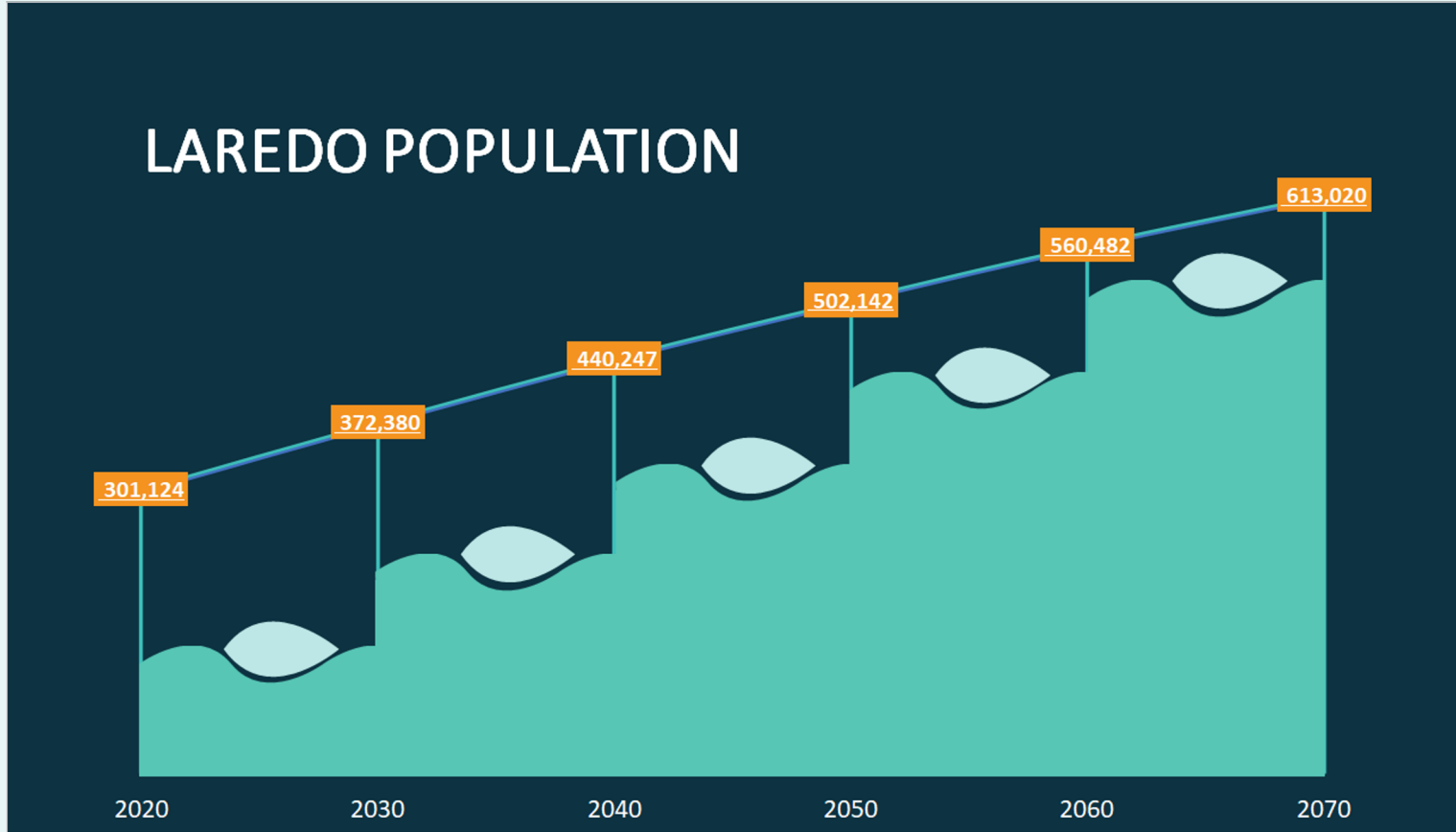
Prepare For Water Supply
Vulnerabilities / Emergency
Outages



Emergency Water Supply =
37,500 Acre-feet/year
33.5 MGD



Laredo's Population Projection



Laredo's Current Water Supply

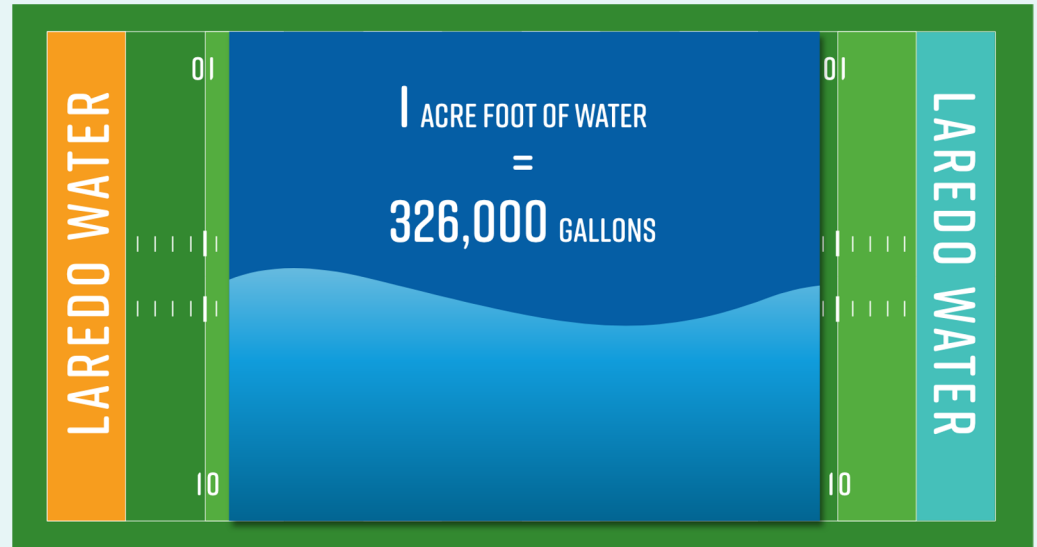
Laredo has prepared for future water demands:

Current Supply = 61,825 Acre-feet/year

(should meet demands through the year 2040)

Laredo is preparing for both future growth

(beyond 2040) & emergency outages.

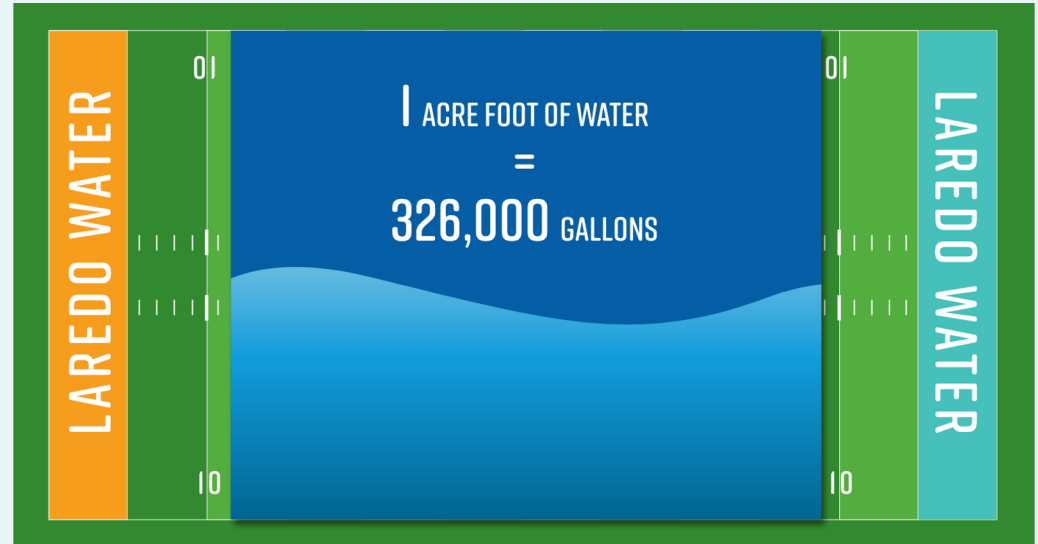


2021 Regional Water Plan

Water Demand Projections for 2020 - 2070

- 2020: 42,028 acre-feet
- 2030: 50,530 acre-feet
- 2040: 58,812 acre-feet
- 2050: 66,591 acre-feet
- 2060: 74,190 acre-feet
- 2070: 81,096 acre-feet

Laredo Current Water Supply =





Current Water Supply vs Projected Water Demand





Water Demand vs Supply

LAREDO	2020	2030	2040	2050	2060	2070
WUG Demand	42,028	50,530	58,812	66,591	74,190	81,096
Webb County Irrigation – Contract Demand	1,657	1,656	1,656	1,655	1,655	1,655
Webb County Manufacturing – Contract Demand	100	100	100	100	100	100
Webb County Mining – Contract Demand	66	66	66	66	66	66
WWP Demand	43,851	52,352	60,634	68,412	76,011	82,917
WWP Supplies	61,827	61,826	61,826	61,825	61,825	61,825
WWP Need/Surplus	17,976	9,474	1,192	-6,587	-14,186	-21,092



Alternative Water Sources

Prepare For Water Supply

- Vulnerabilities /
- Emergency Outages



Lake Casa Blanca



Groundwater

- Local (Webb County)
- Imported (further places)
- Brackish (needs additional treatment)



Reuse/Reclaimed Water



Aquifer Storage & Recovery (ASR)



Additional Water Rights (Rio Grande River)

Lake Casa Blanca

Status:

- ⚙ Evaluations & Records research completed
- ⚙ Technical memo being prepared

Potential Use:

- ⚙ Direct Emergency Supply use very limited
- ⚙ Limited indirect reuse storage for additional water supply

Background:

- ⚙ Dam and Lake constructed by Webb County in the 1950s with uncontrolled spillway
- ⚙ TCEQ Dam Permit Records: 1680 acres surface area, 20,000 acre-feet storage volume, 36 feet max depth

Findings:

- ⚙ Latest 2007 Dam Rehab H&H Field Study showed: 1650 acres surface area, +/- 11,000 acre-feet vol., +/- 27 feet max depth

Conclusion/Recommendations:

- ⚙ Limited volume potential in reservoir vs. daily need or emergency need
- ⚙ Significant evaporation reduces storage capacity (+/- 5000 ac-ft)
- ⚙ Restoration of capacity by dredging is cost prohibitive







Webb County Groundwater


 **Status:** Initial evaluation complete, LAN reviewing draft; opinion of cost prepared


 **Locations:** Webb County


 **Northern Webb County Wells**
adjacent to Dimmit County approximately 40 miles from the Laredo system connection requiring approximately 47 miles of conveyance pipeline


 **Northwestern Webb County Wells**
Water quantity and quality being investigated; results expected next month

 **Potential Use:**
Supplemental supply, up to 25,000 AF/Yr (22.3 MGD)
Emergency supply, up to 33,750 AF/Yr (33.5 MGD)

 **Potential Use:**
Supply potential to be determined

 **Findings:**
Would meet the long-term future supply need (Suppl. Goal)

 **Findings:**
Test well information expected next month and provide estimated 243 days at the Emergency Goal level.

 **Recommendations:**
Additional investigations, including well tests, needed to verify preliminary findings



Brackish Groundwater

Status:

- ⚙️ Evaluation complete, based on TWDB available information; draft report being reviewed by LAN

Background:

- ⚙️ TWDB has identified potential brackish production zones in Webb County. More study is needed to assess potential production. *(Laredo's Santa Isabel Groundwater Reverse Osmosis plant draws from this brackish water zone.)*

Findings:

- ⚙️ Distance varies - Carrizo, Queen City & Sparta locations in and near Laredo
 - Cost Estimates also vary, depends on well depth & location
 - Water Quality - slightly saline (1,000 – 3,000 mg/l TDS) to moderate saline (3,000 – 10,000 mg/l)
 - Treatment – requires advanced (demineralization) and blending
- ⚙️ Closest proximity has limited quantity and poor quality *(likely requiring advance treatment and/or blending)* and is not sufficient supply to meet either Emergency or Supplement water supply goals.



Aquifer Storage & Recovery

Status:

- ⚙️ Evaluation complete; draft report being reviewed by LAN

Background:

- ⚙️ In 1996, with TWDB grant, had CH2MHill investigate ASR feasibility to help manage water needs during peak and drought conditions.
- ⚙️ Based on CH2MHill report:
 - Investigated shallow aquifer within the city limits
 - Slow injection & recovery rates resulting in low production
 - Water quality of this local aquifer could result in well plugging
 - Additional studies needed to assess ASR potential
 - No recommendations in current Region M plan

Findings:

- ⚙️ Based on prior studies, ASR supply is not expected to meet either Supplement or Emergency water supply goals



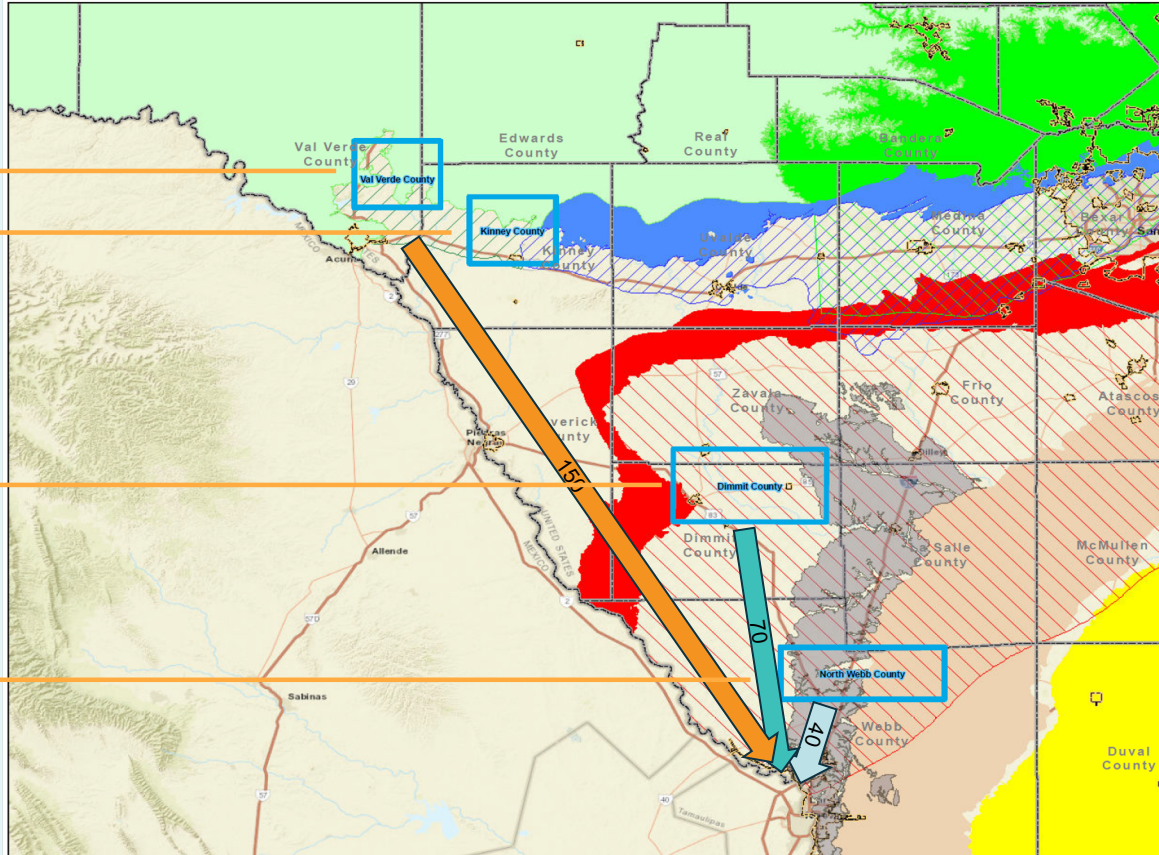
“Imported” Groundwater Supply

Val Verde County

Kinney County

Dimmit County

Webb County





“Imported ” Groundwater Supply

	Dimmit County Well Fields	Kinney County Project	Val Verde County Project
Supply quantity	40 MGD, fresh groundwater	22 MGD fresh groundwater	40 – 90 MGD fresh groundwater
Distance	70 miles	150 miles	150 miles
Quality	300 mg/l TDS	230 -390 mg/l TDS	~300 mg/l TDS
Treatment	None (blending only)	None (blending only)	None (blending only)



South Laredo WWTP Indirect Potable Reuse

Status:

- ☀ Identified and recently updated in the Region M Regional Water Plan

Background:

- ☀ This indirect reuse project will pump treated effluent from the South Laredo WWTP to the Laredo Jefferson WTP for additional treatment.
- ☀ Phased project:
 - Phase 1 – 3,360 AF/Yr (3 MGD) – 2040
 - Phase 2 – 6,720 AF/Yr (6 MGD) – 2060

Findings:

- ☀ Cost effective, excellent planning ahead
- ☀ Limited supply and long-term future use
- ☀ Will not meet Supplemental or Emergency goals



Other Surface Water (Rio Grande)

Status:

- ⚙️ Kirk Kennedy is preparing a draft report for LAN review

Background:

- ⚙️ The water rights system for the Rio Grande is unique. The Rio Grande River water rights are fully appropriated; the Rio Grande Watermaster oversees the use of water rights, diversions.

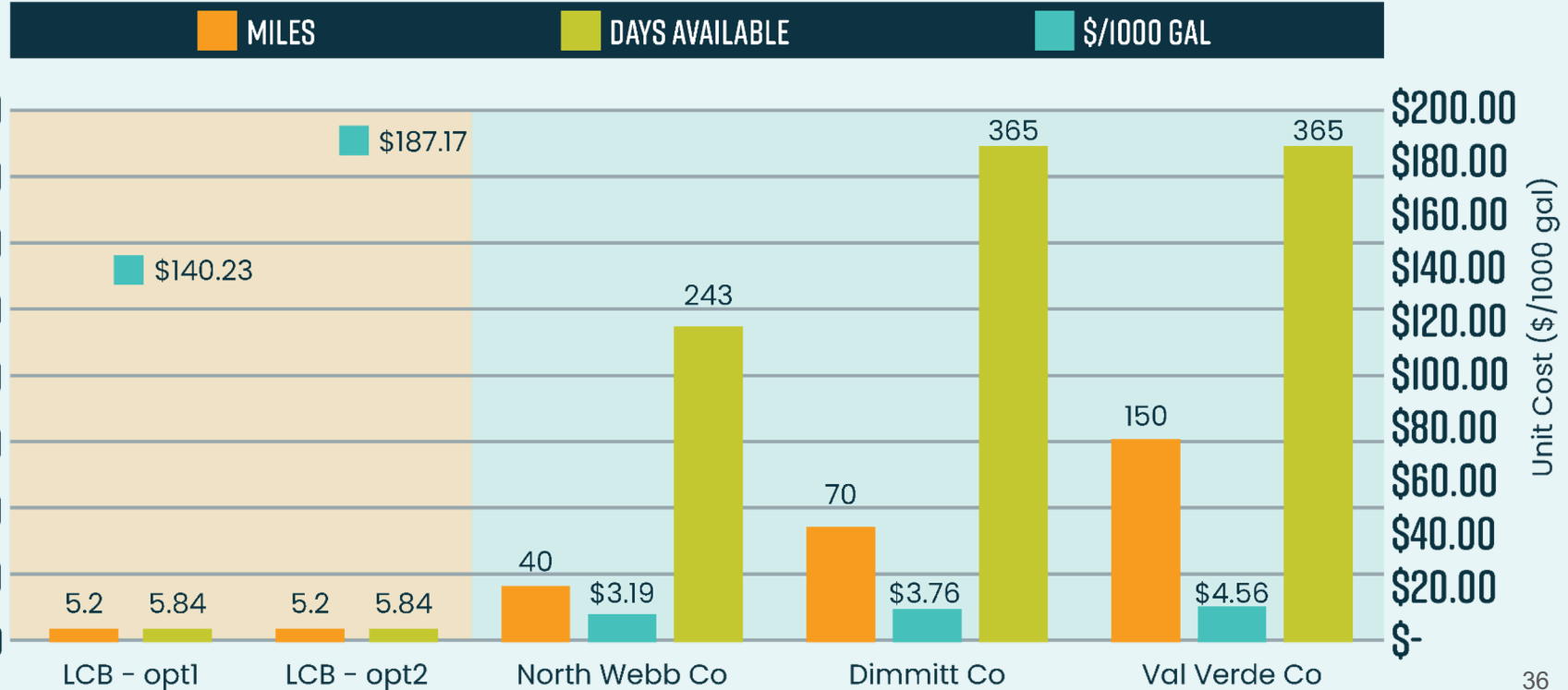
Findings:

- ⚙️ Based on initial discussions, additional surface water development in the Rio Grande basin is expected to be very limited although it is acquisition of existing water rights is permitted.



Preliminary Supply Goals - Unit Costs

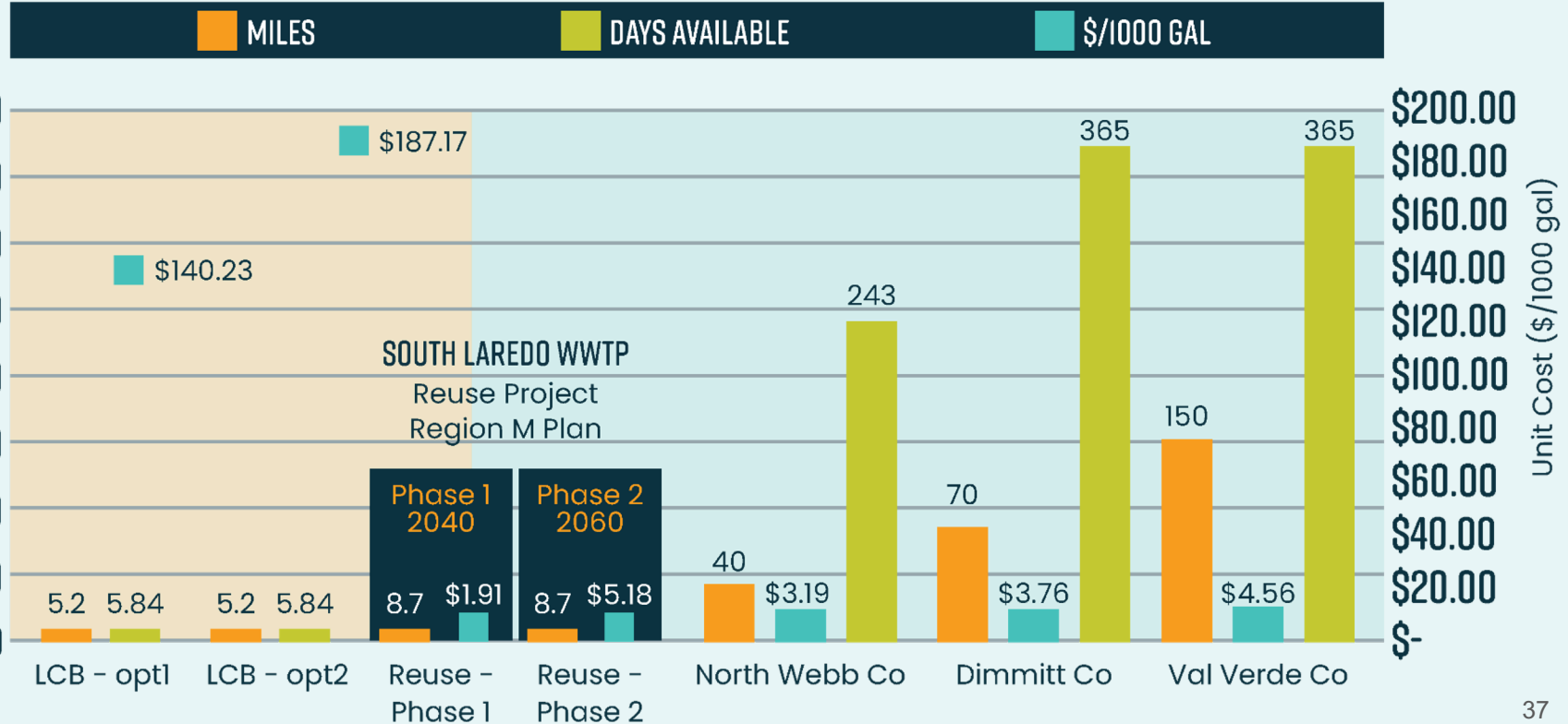
Current Cost of production per 1000 Gallons = \$1.90 (approximately)





Preliminary Supply Goals - Unit Costs

Current Cost of production per 1000 Gallons = \$1.90 (approximately)





Other Evaluation Factors

EVALUATION CRITERIA	Weighting Factor (0-5)	Primary Set - Water Supply Alternatives							Secondary Alternatives				
		Lake Casa Blanca - no dredge	Lake Casa Blanca - dredge	South Laredo Reuse - Ph 1	South Laredo Reuse - Ph 2	North Webb Co GW	Dimmit Co GW	Val Verde Co GW	Add'n Rio Grande WR	Other Rio Grande/ Falcon Reservoir	Laredo Weir w/ WS option	Brackish GW	Aquifer Storage & Recovery
1) Water Supply									1	5	2	1	2
a Days Available	5	0	0	0	0	5	5	5	NA				
b Phasing Options Available	1	1	1	1	1	1	1	1					
c Year Potentially Available	4	5	4	0	0	3	3	4	NA				
2) Cost of Supply (unit cost)													
a Capital Cost	5	2.0	4.6	4.8	4.8	2.8	0.8	0.0				-	-
b Life Cycle Cost	5	1.0	4.6	4.9	4.7	2.8	0.8	0.0				-	-
c Affordability	5	2.0	1.0	5.0	4.9	4.9	4.9	4.9	-	-	-	-	-
3) Supply Reliability									5	5	2	2	1
a Potential interruption/curtailment	3	1.5	1.5	2.5	2	2.2	2.3	2.5					
b Accessibility (conveyance distance)	5	4.8	4.8	4.7	4.7	3.7	2.7	0.0					
c Water quality (treatment req'd)	3	2	2	1	0	2	2	2					
4) Environmental Concerns	3	2	1	3	2	3	4	5	4	4	4	4	4
5) Water Rights Issues and Constraints	2	2	3	1	1	2	2.5	3	4	4	5	2	1
6) Property Acquisition Anticipated	3	2.9	2.9	2.8	2.8	2.2	1.6	0.0	5	1	0	4	4
7) Contract Requirements	3	0	1	0	0	1	2	3	1	1	0	5	5
8) Public Acceptability	5	3	3	3	2	2	2	1	5	1	1	2	2
TOTAL SCORE		29.2	34.5	33.8	29.9	37.5	34.6	31.4	25	21	14	20	19

Next Steps

Prioritizing 20 Years of CIP Projects

- *Cost and timing for projects based on need and financing*

Laredo Specific Financial Forecasts and Models

- *Loans / Grants and Other Funding & Cost Sharing*
- *Continue & Update Rate Study and Financial Plans (Willdan)*



Lisa Lattu



Capital Improvement Plan

Path from the Existing System to the Future System

- ⚙️ Reviewing & Updating Previously Planned Projects
- ⚙️ Evaluating New or Alternative Projects
- ⚙️ Looking at Future Growth & Needs
- ⚙️ Reviewing Costs and Timing for All Projects



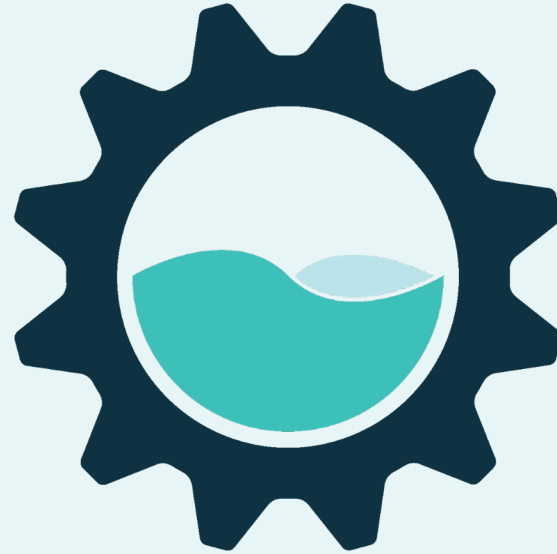
Planned Water Capital Improvements

- ⚙ El Pico Water Treatment Plant
 - Repairs and Reliability Improvements
- ⚙ Lyon St. Booster Station
 - Ground Storage Tank Demolition & Replacement
- ⚙ Downtown Waterline Replacements
- ⚙ “Outer Loop” Water Pipeline to bring water into the City
- ⚙ Improvements at Cuatro Vientos, Northwest Elevated Storage Tank (La Bota), East Corridor, Del Mar, Airport Areas






Wastewater Master Plan

LAREDO
WATER
A 50 YEAR
MASTER PLAN





Integrated Wastewater Master Plan

-  IWWMP Overview
-  Review of Progress to Date
-  WW System Overview






Hector Pena, PE



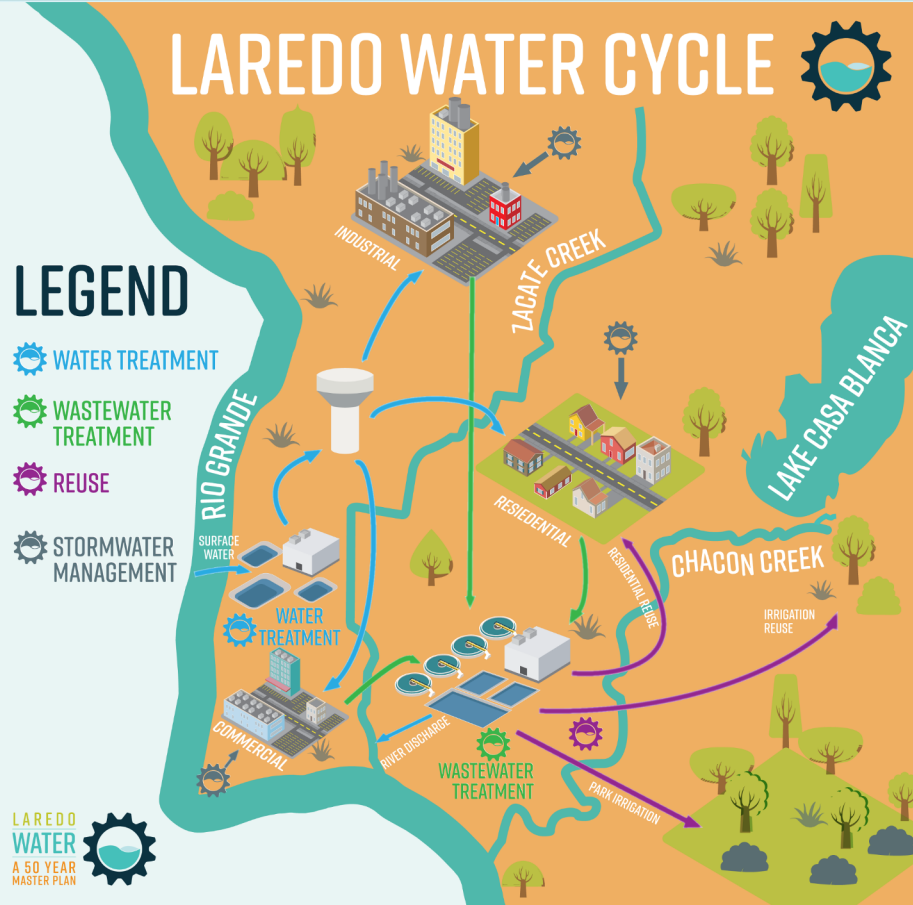
Integrated Wastewater Master Plan

Objectives

-  Evaluate capacity of the existing wastewater system under current and future projected growth scenarios.
-  Develop sustainable infrastructure for long-term growth.
-  Provide a roadmap for resilient, long-term water treatment.

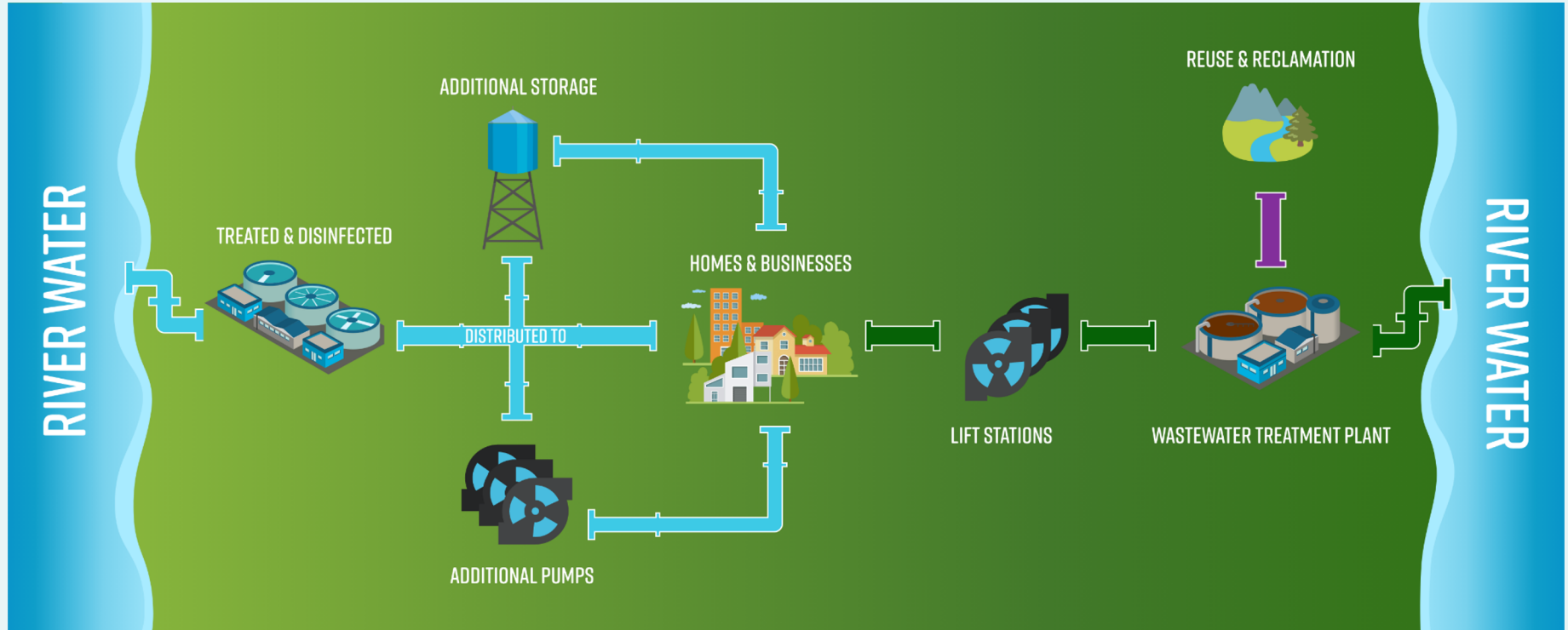


Laredo Water Cycle








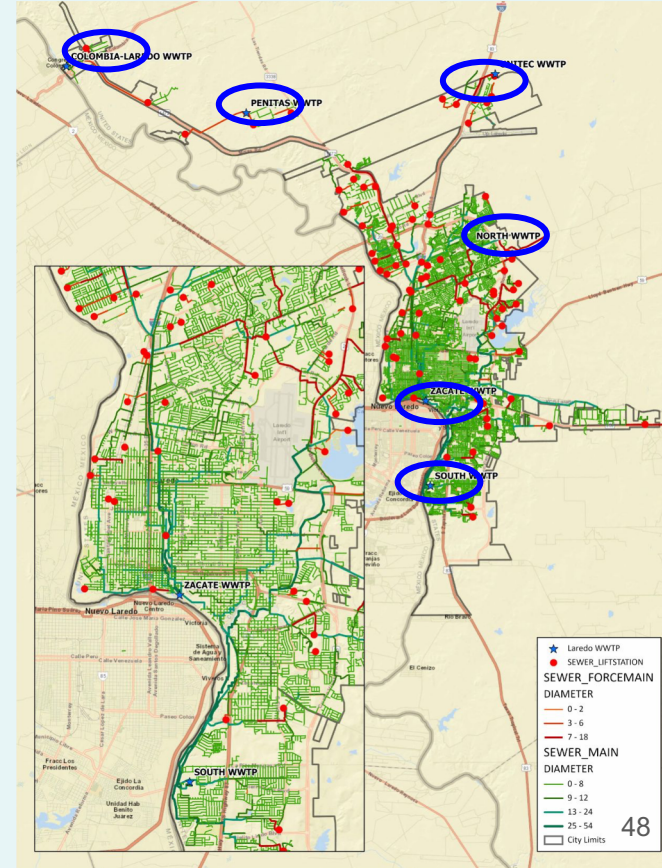
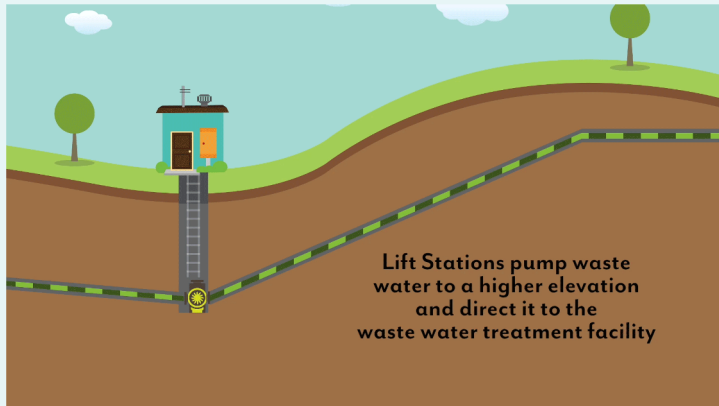


Wastewater Treatment Process



Wastewater System Overview

-  900 Miles of Sewer Lines (Laredo to Kansas City, Missouri)
-  71 Lift Stations
-  13,000 Manholes
-  6 Wastewater Treatment Plants
-  35.3 MGD Design Capacity/19 MGD Average Daily Flow





Collection System Baseline

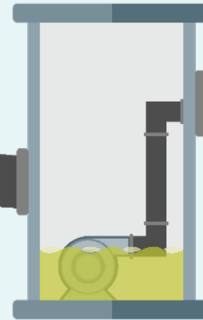
From Customer to Treatment Facility



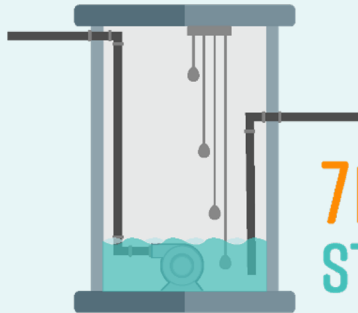
900 MILES
OF SEWER LINES



829 MILES OF GRAVITY MAINS



59 MILES OF FORCE MAINS

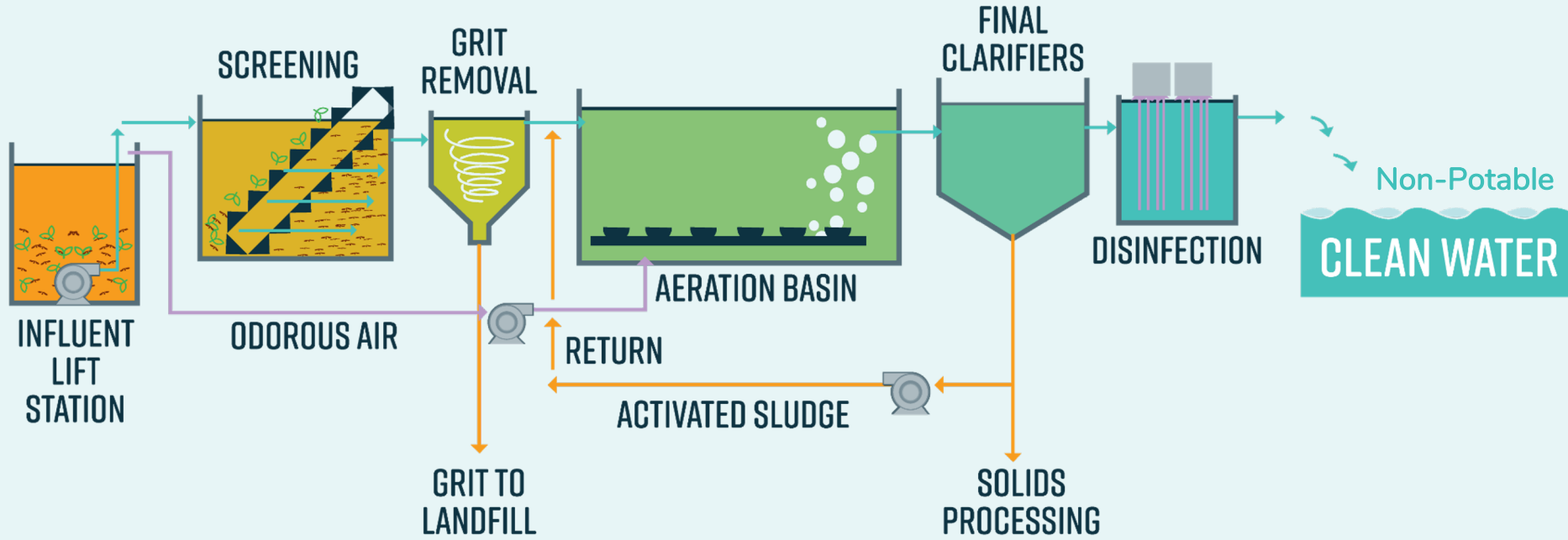


71 LIFT
STATIONS



13,000
MANHOLES

WW Treatment Flow Diagram



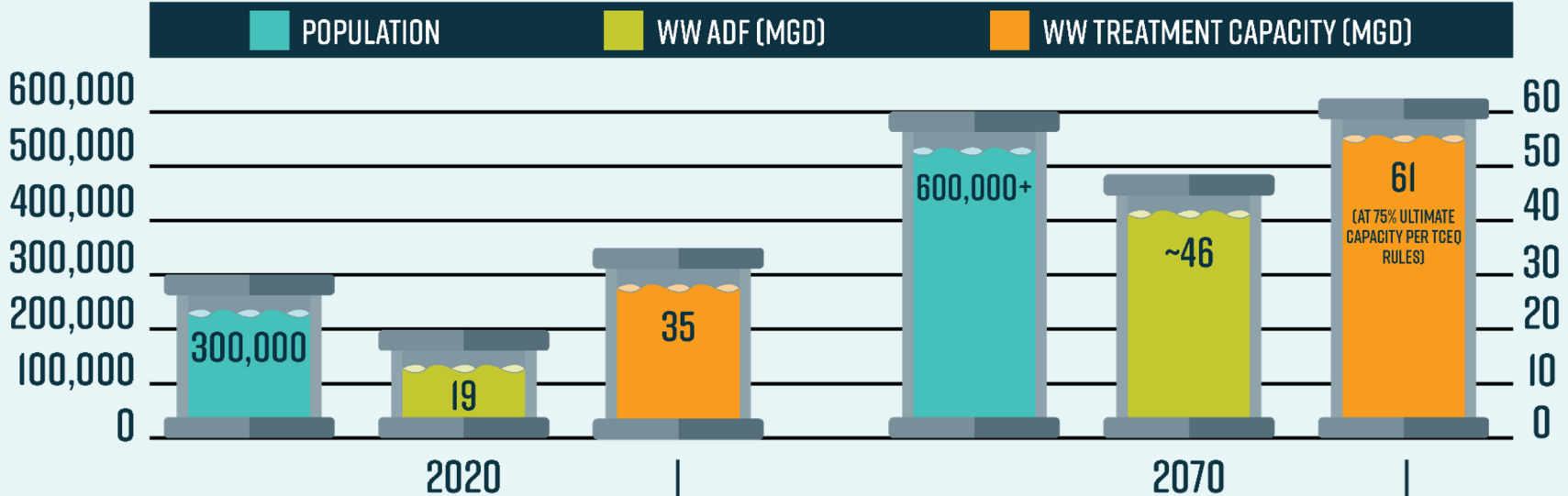


Wastewater Treatment Plants





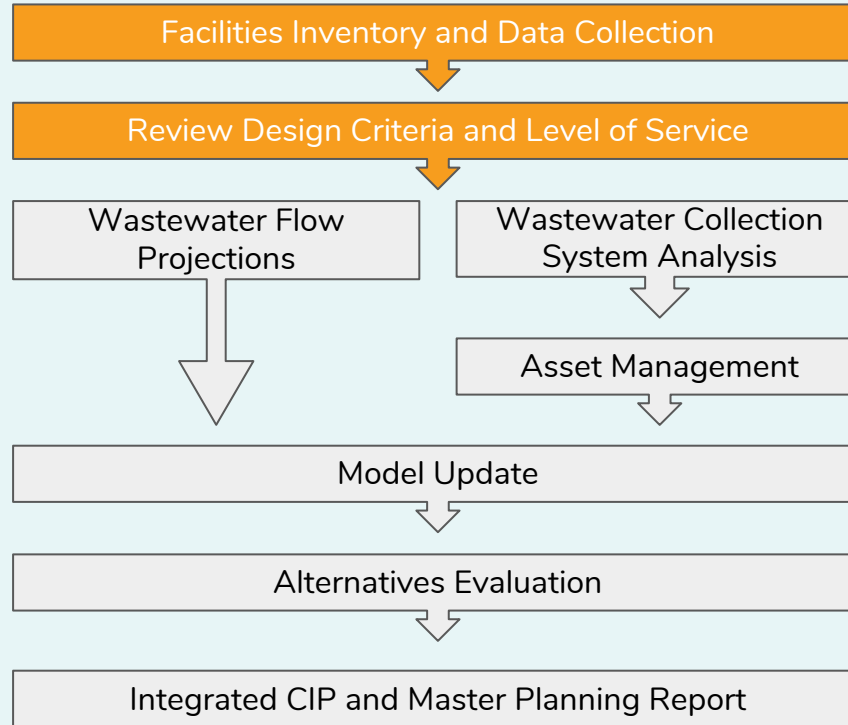
50 Year Projection MGD



26 MGD increase at \$8 - 10/gal is \$208M - 260M(2020\$) in treatment capacity alone.



Wastewater Master Plan Process

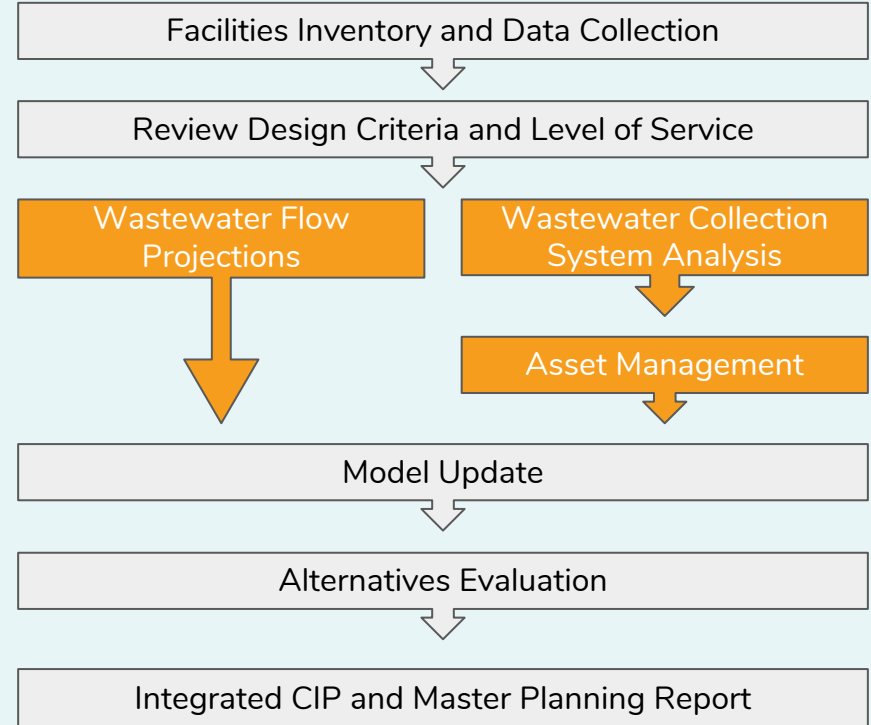


Integrated Wastewater Master Plan

Flow Determination

Wastewater Collection System Analysis & Asset Management

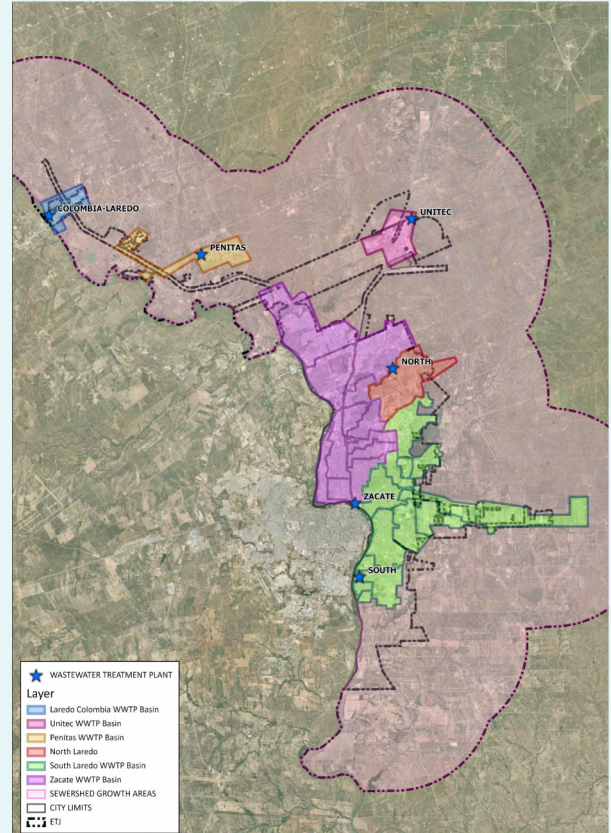
Existing Capital Improvement Plan



Ignacio Hinojosa, PE

Flow Determination

- Set a baseline condition/existing flow conditions (2020)
- Project flows for five planning horizons
2030, 2040, 2050, 2060 and 2070
- Use flow projections to develop 50 year plan:
 - Alternatives/Scenarios
 - Capital Improvement Plan



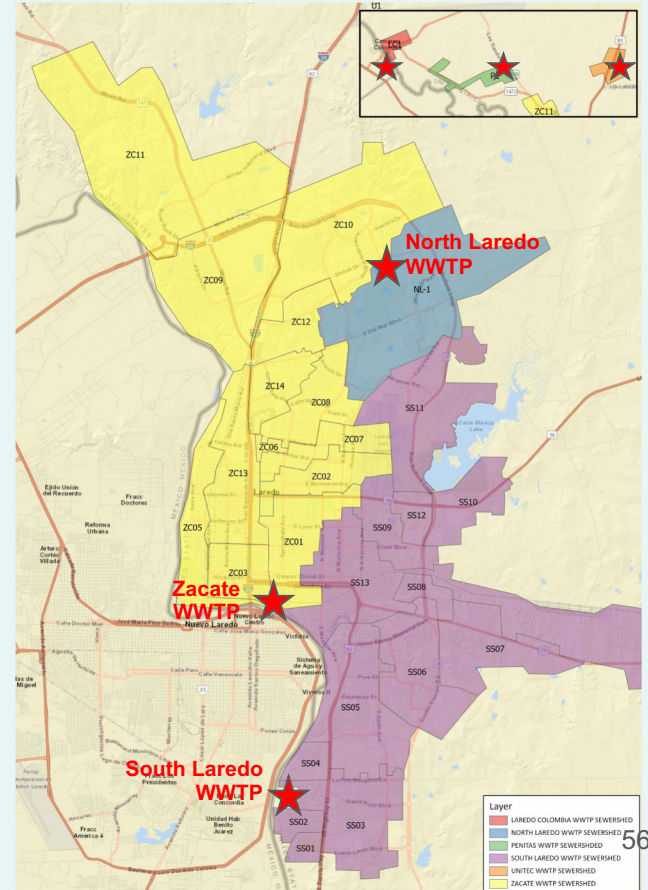
Existing Flow Estimation

Identified Existing Sewersheds and Subbasins

Average Daily Dry Weather Flow (no rain)

- Entire city
- By sewershed basin
- Per capita

Gallon Per Capita Per Day (GPCD) calculated for three main service areas



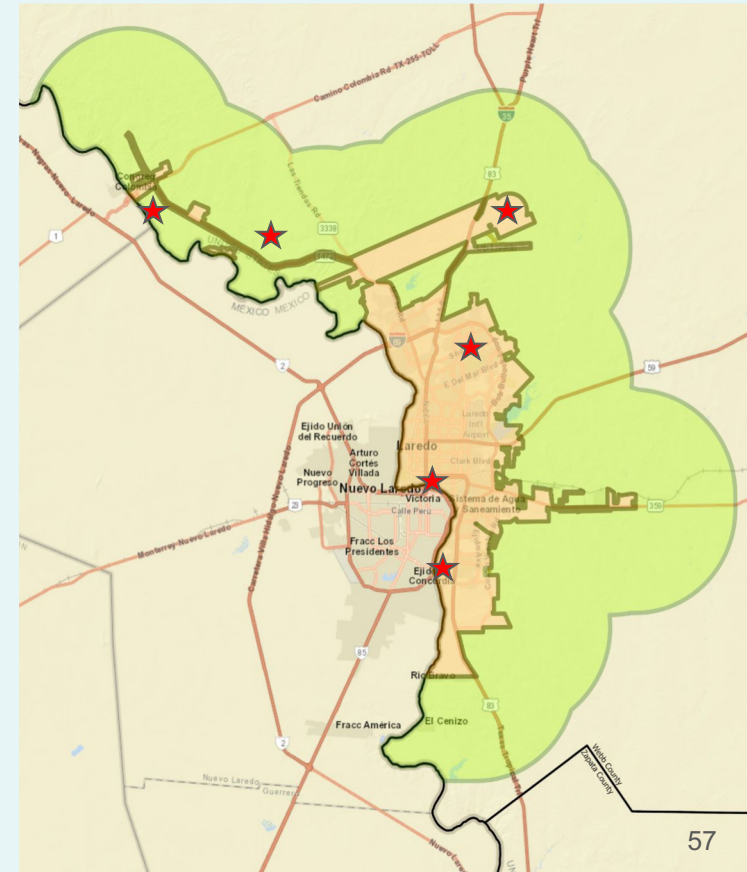
Flow Projections (Future)

Considerations

- Land Use Layers within City Limits and towards Extraterritorial Jurisdiction (ETJ)
- Region M Population Projections, Metropolitan Transportation Plan (MTP), Major Infrastructure Projects, etc.




Results

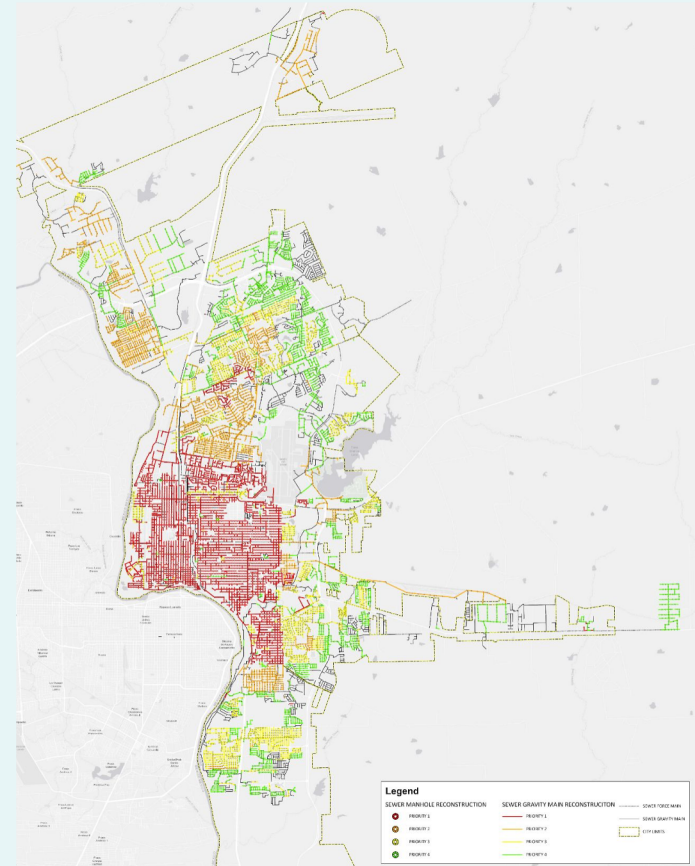
- Alternatives/Scenarios for Ultimate Build out (50 Year Plan)
- Capital Improvement Plan (CIP) for Near-Term, Intermediate, Long Term and Ultimate Build Out





WW Collection System & Asset Mgmt

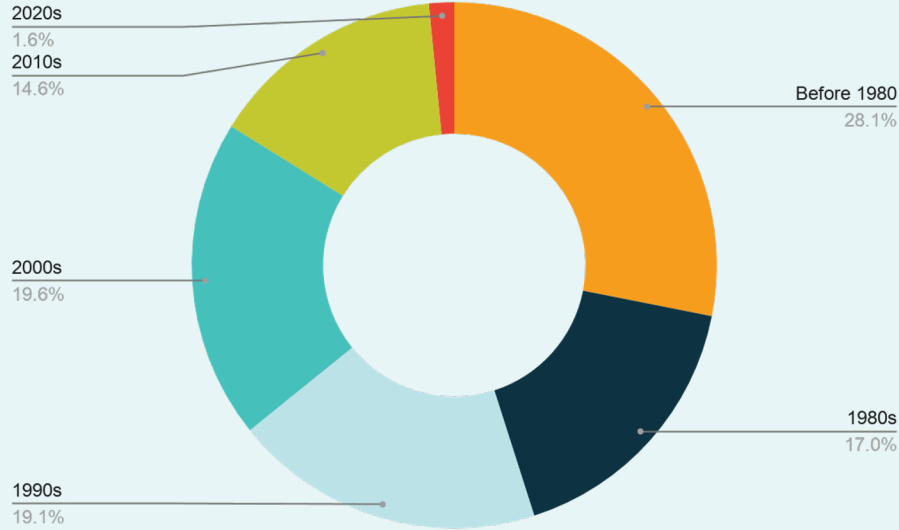
-  Summary of current assets and life expectancy
-  Develop Renewal Cost for the current assets
-  Use these costs to develop a long-term CIP



WW Collection System Analysis

Gravity Sewer Mains (6" to 24")

Installation Era



45% of the System was
Installed in the 80's or
Before

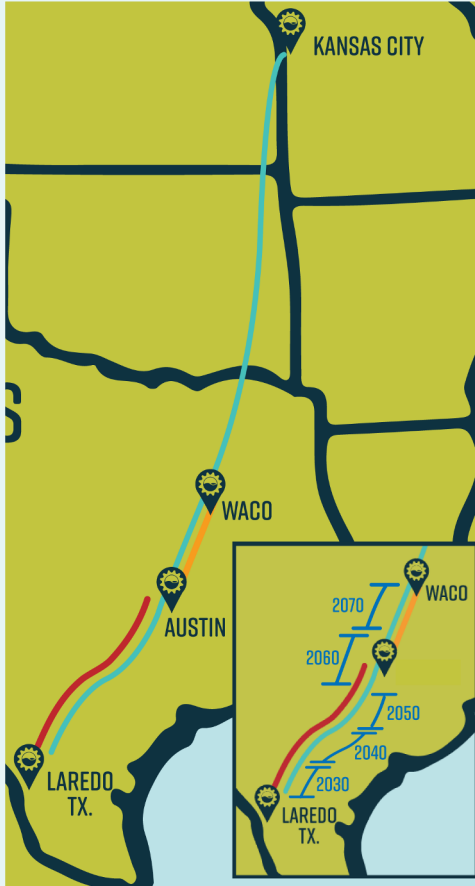
Material Type



Pipe Material has a
Significant Impact on Life-
Cycle Costs

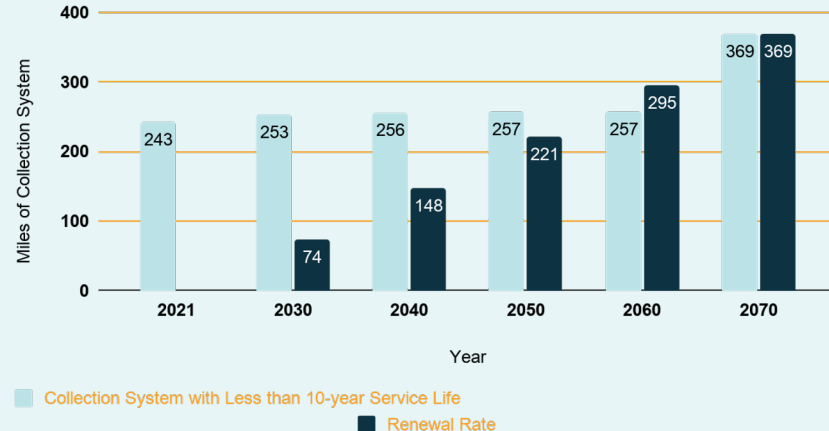


Asset Management



- Today 30% of the Collection System has 10-years or less of remaining service life.
- Without accounting for future growth, an annual Renewal of 1% is required to maintain a system no less than 10-year service life expectancy.

Collection System with Less than 10-year Service Life and Renewal Rate





WW Collection System Maintenance

Work Orders (WO): Odor Complaints, Sewer Pipe Breaks, Sewer Backups, Pump Failures at Lift Stations, etc.

Weekly Average

	2019	2020
Work Orders	30	23

2 Hrs/WO*
→

Time Spent

53 Hours/Week

Monthly Average

	2019	2020
Work Orders	155	99

→

255 Hours/Month

Annual Totals

	2019	2020
Work Orders	1703	1192

→

2,900 Hours/Year



Existing Wastewater CIP

Wastewater
Treatment



Collection System



Total Investment





CIP Example Projects





Treatment







Collection

Recently Completed:

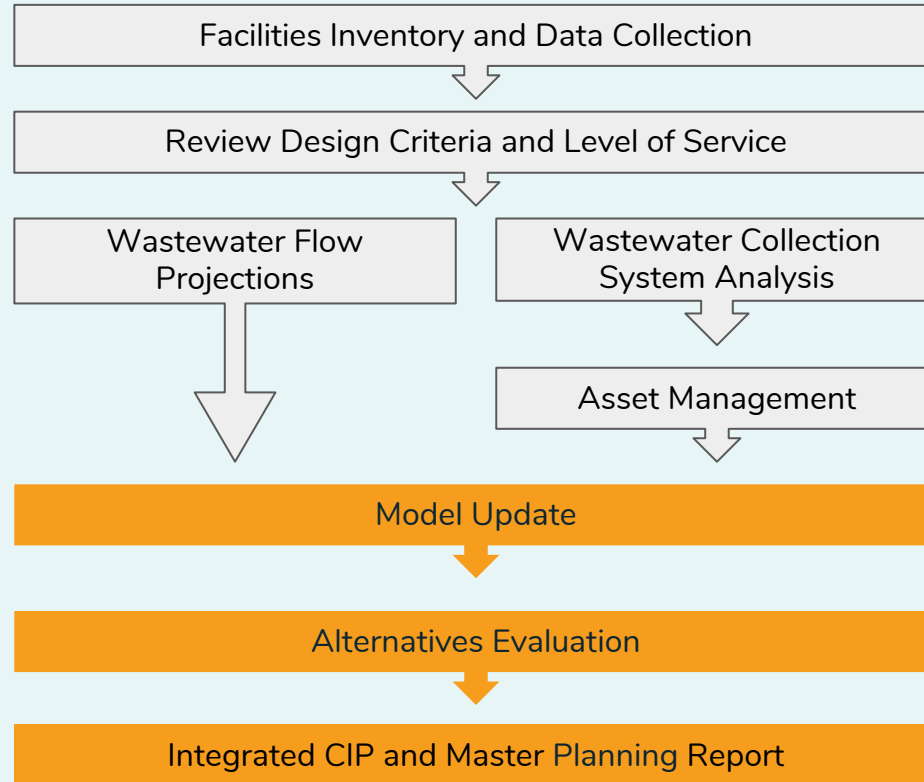
Project Name	Total Cost
South Laredo WWTP 12 to 18 MGD Expansion (2020) 	\$ 21.5 M
Unitec WWTP Improvements (2019) 	\$ 1.9 M

In Construction:

Project Name	Total Cost
Eastern Chacon Interceptor 	\$ 4 M
Zacate Line Rehab (Canal St. to Zacate Creek) 	\$ 2 M
Flores St Improvements 	\$ 1.2 M
Unitec Phase I Expansion (0.18 to 0.36 MGD) 	\$ 3.9 M



Next Steps



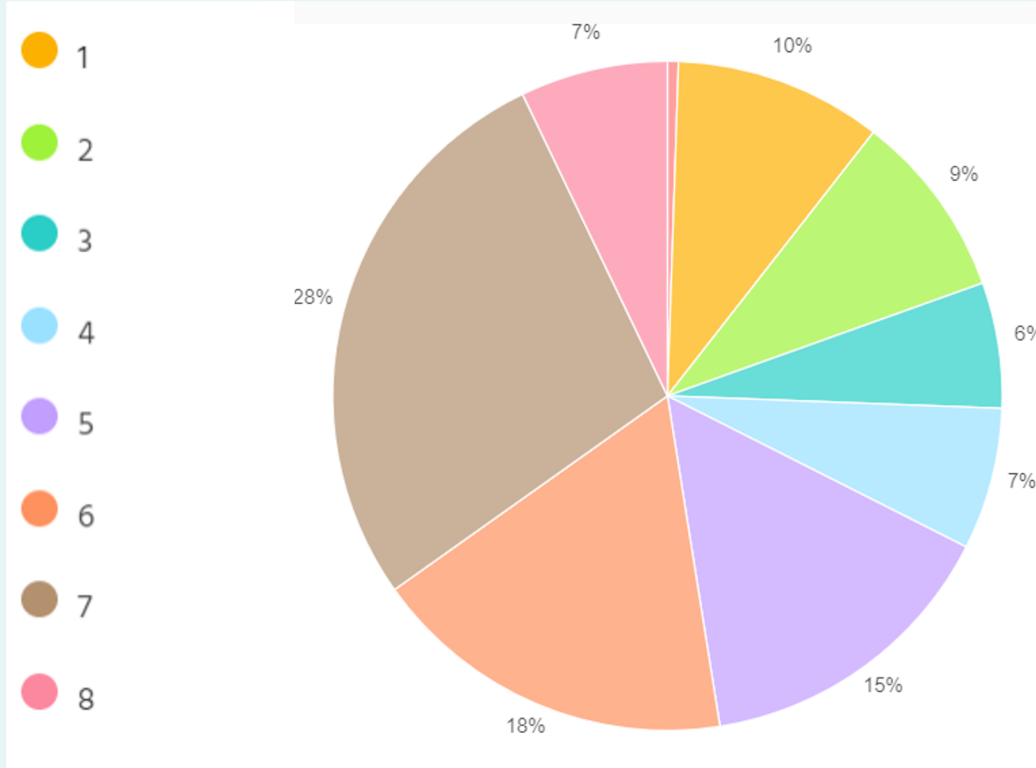


Questions?

If you have any questions,
we'll gladly answer them now.



What City Council District Do You Live In?



District 7 - 28%

District 6 - 18%

District 5 - 15%

District 1 - 10%

District 2 - 9%

District 8 - 7%

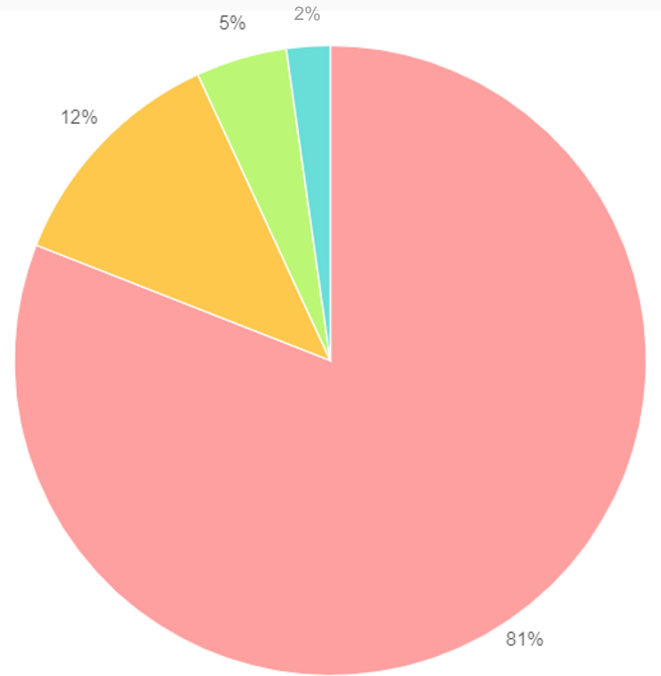
District 4 - 7%

District 3 - 6%



What Type Of Residence Do You Live In?

- House
- Apartment
- Mobile Home
- Townhome/ Condominium



House - 81%

Apartment - 12%

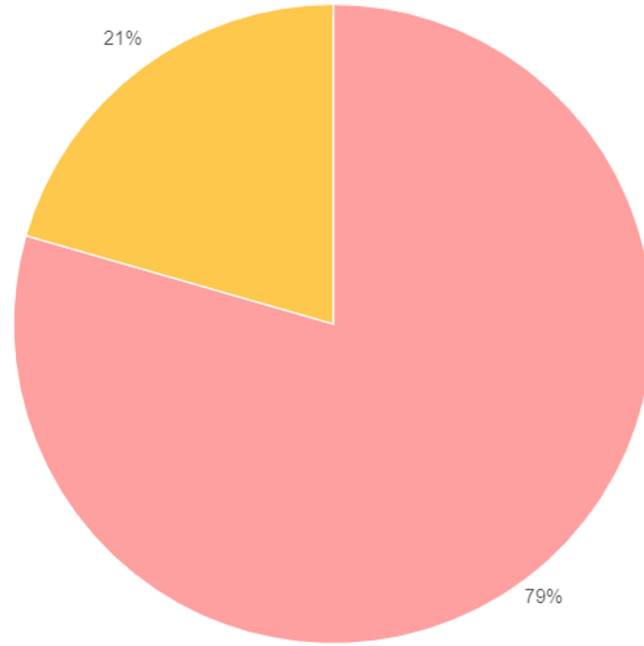
Mobile Home - 5%

Townhome/Condominium - 2%



Do You Own Or Rent?

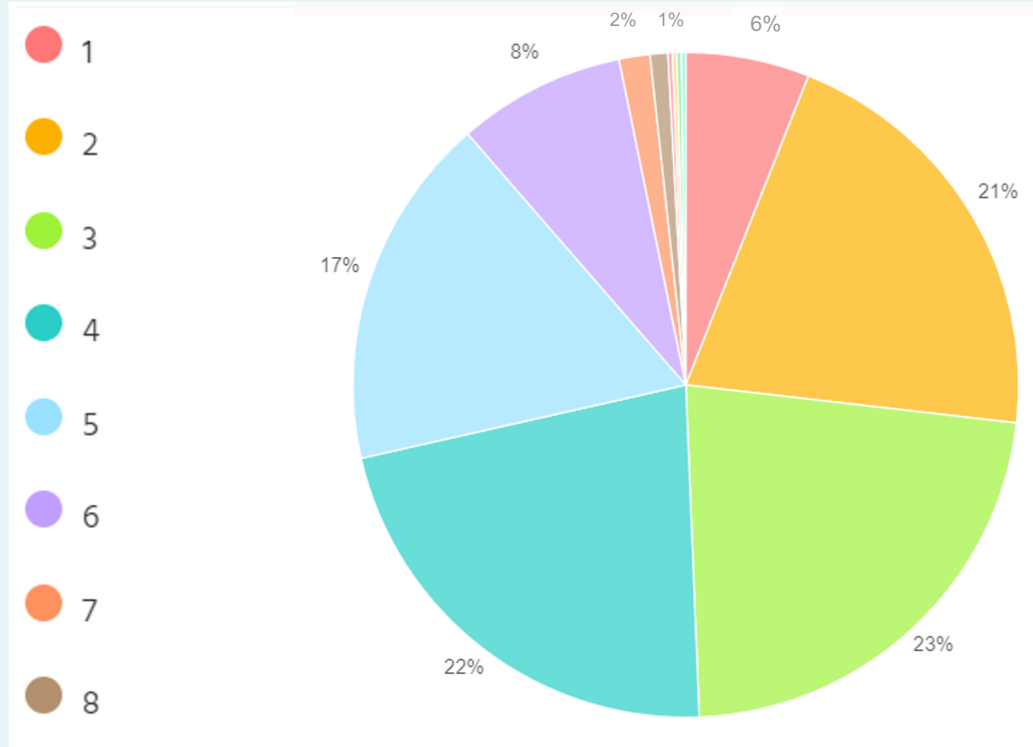
- Own
- Rent



Own - 79%

Rent - 21%

How Many People Live In The Household?



3 people - 23%

4 people - 22%

2 people - 21%

5 people - 17%

6 people - 8%

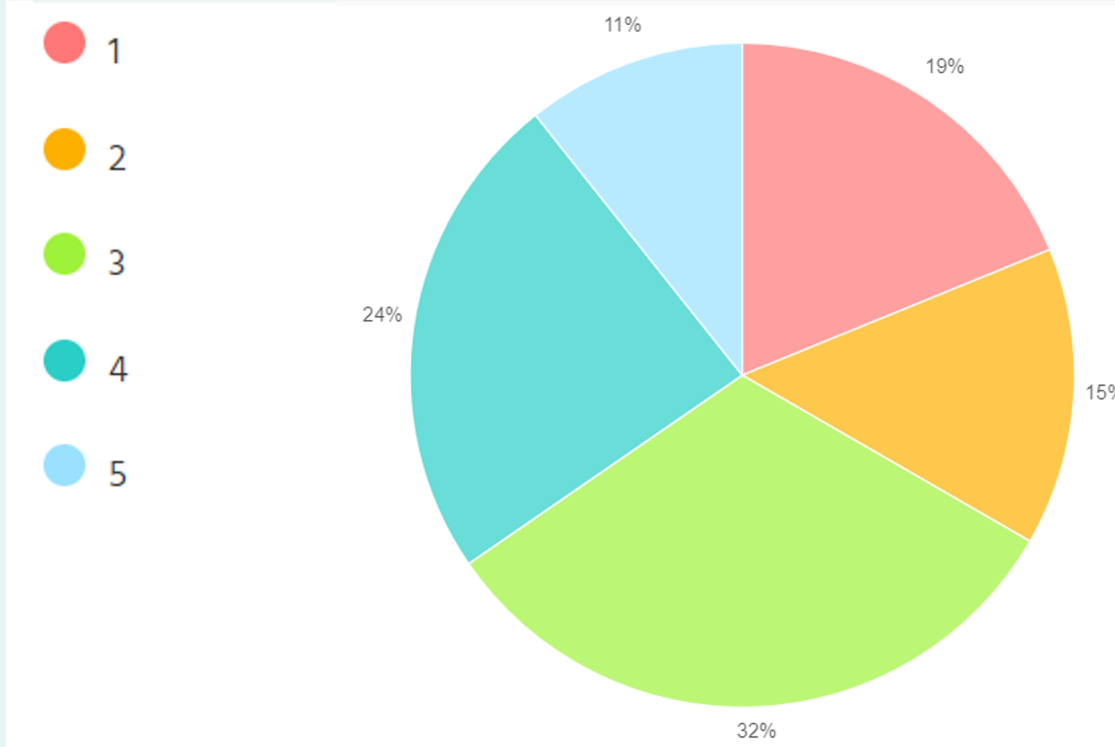
1 person - 6%

7 people - 2%

8 people - 1%



The City Responded To The Boil Water Notice Adequately



Strongly Disagree (1) - 19%

Disagree (2) - 15%

Neutral (3) - 32%

Agree (4) - 24%

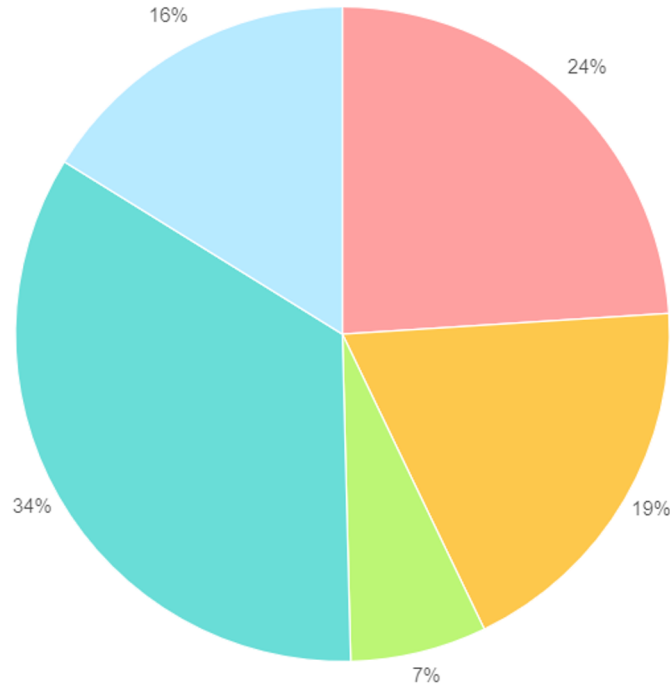
Strongly Agree (5) - 11%

**results shown are in reference to the 2019 Boil Water Notice*



How Long After The Boil Water Notice Did It Take Before You Stopped Boiling The Water And Resumed Drinking Tap Water?

- 1 week
- 1 month
- 6 months
- I have not returned to drinking municipal water
- I installed a water filtration system



I have not returned to drinking municipal water - 34%

1 week - 24%

1 month - 19%

I installed a water filtration system - 16%

6 months - 7%

*results shown are in reference to the 2019 Boil Water Notice



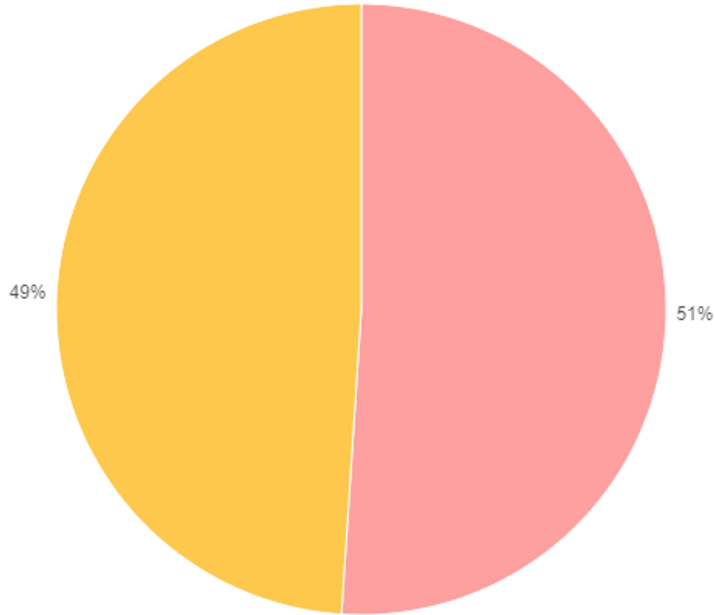
Ratings Regarding Water Quality

	★	★★	★★★	★★★★	★★★★★
Taste	20%	13%	26%	25%	13%
Color	10%	13%	24%	28%	23%
Clarity	10%	14%	28%	24%	22%
Smell	20%	17%	26%	17%	19%
Safety	21%	13%	25%	19%	19%
Overall Quality	16%	15%	27%	21%	19%



Have You Experienced Water Pressure Fluctuation?

- Yes
- No



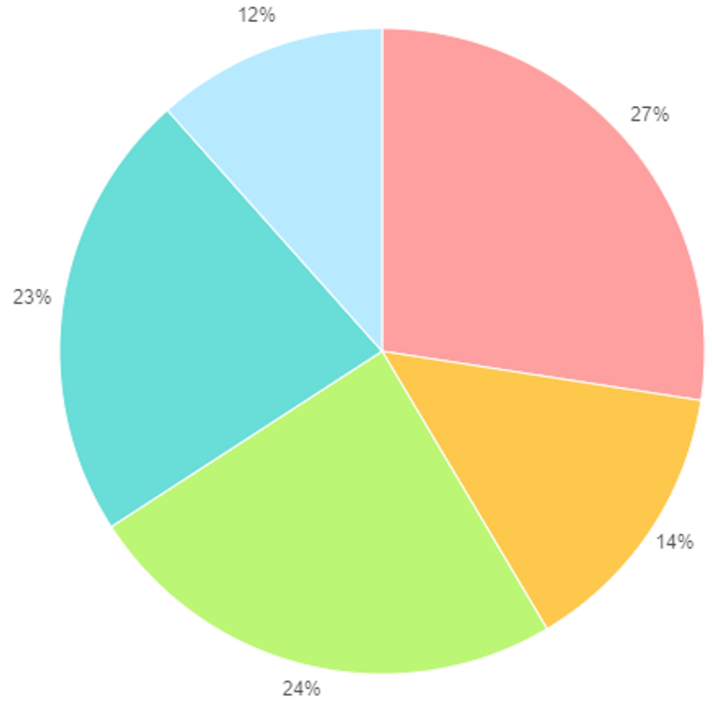
Yes - 51%

No - 49%



Roughly What Period Of The Day Does It Fluctuate?

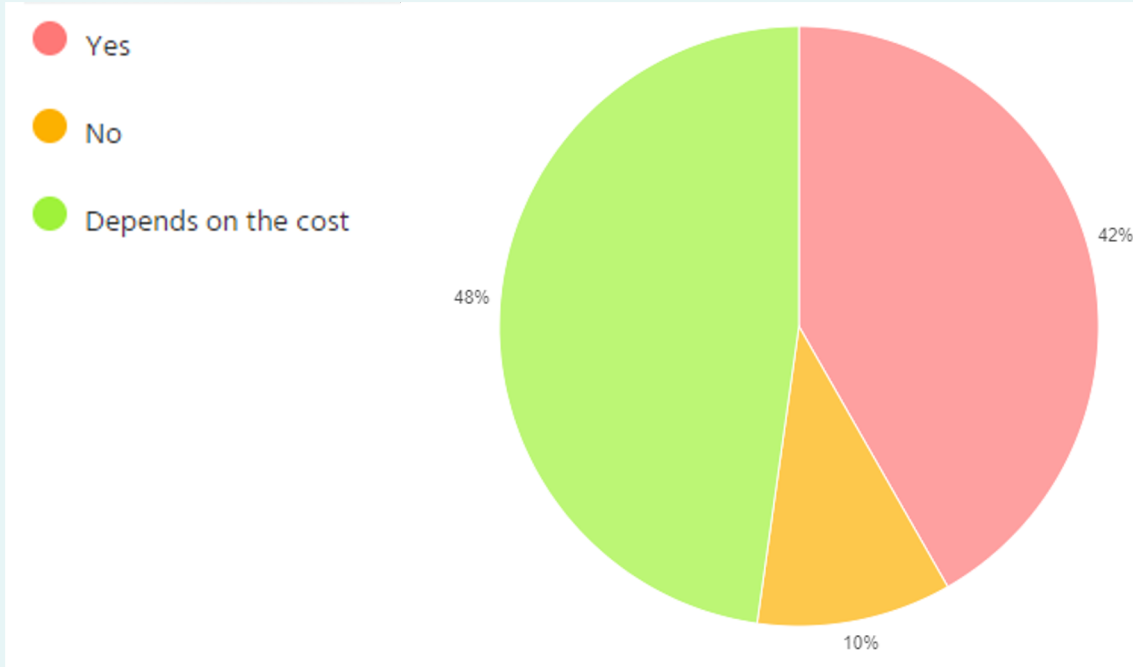
- Morning
- Early afternoon
- Late afternoon
- Early evening
- Late at night



- Morning - 27%
- Late Afternoon - 24%
- Early Evening - 23%
- Early Afternoon - 14%
- Late at Night - 12%



Do You Think The City Should Invest In A Secondary Water Source, Even Though It May Raise Water Rates?



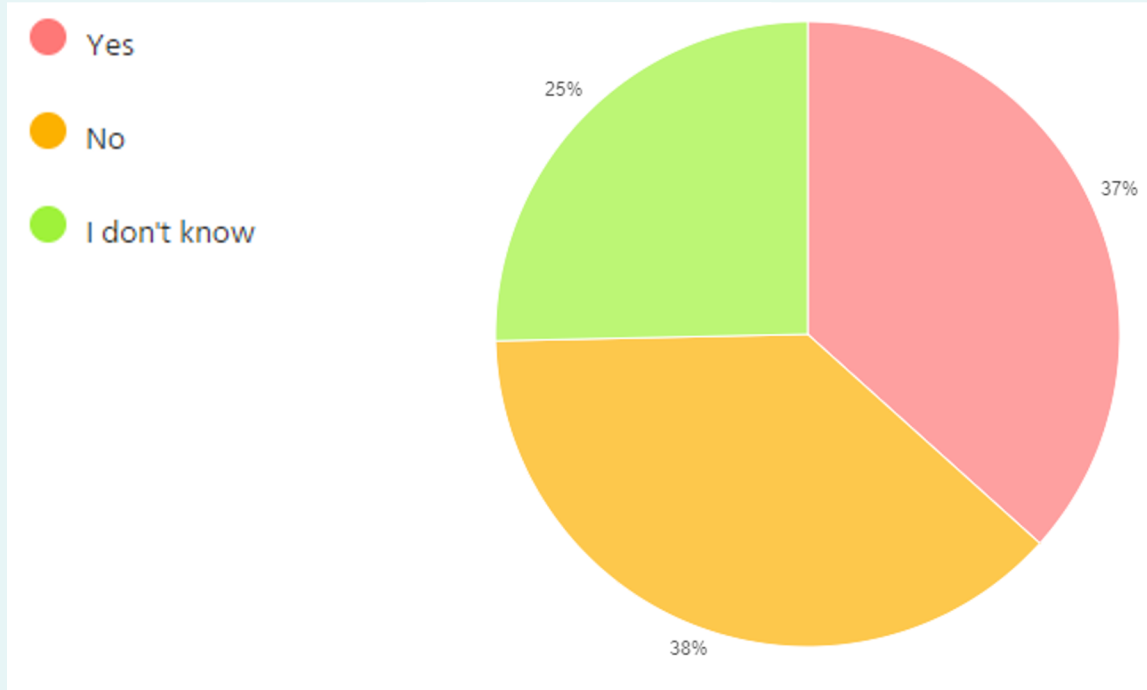
Depends on the cost - 48%

Yes - 42%

No - 10%



Do You Believe That You Are Getting A Good Value For Your Current Water And Wastewater Rates?



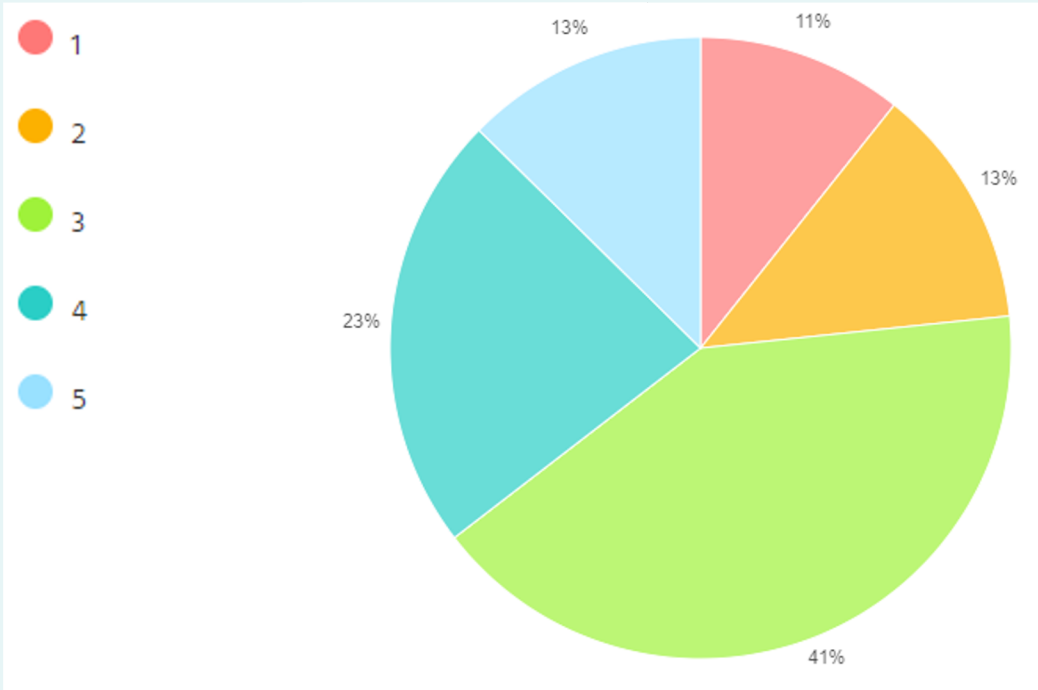
No - 38%

Yes - 37%

I Don't Know - 25%



How Satisfied Are You With The Current Billings Process?



Very Unsatisfied (1) - 11%

Unsatisfied (2) - 13%

Neutral (3) - 41%

Satisfied (4) - 23%

Very Satisfied (5) - 13%



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Surveys & Drawings

Deadlines for surveys and drawings extended.

Visit www.laredowater.org to participate in our survey.

- Completion of the survey automatically enters you in a drawing to win one of ten 4k UHD Smart TV's

THANK YOU!

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A project of the City of Laredo



In conjunction with



Lockwood, Andrews
& Newnam, Inc.
A LEO A DALY COMPANY

