

Waste Water Treatment

History and options



Agenda

- History of the plant
- Background of current concerns
- Options for remediation
- Conclusion and recommendations

History of the plant

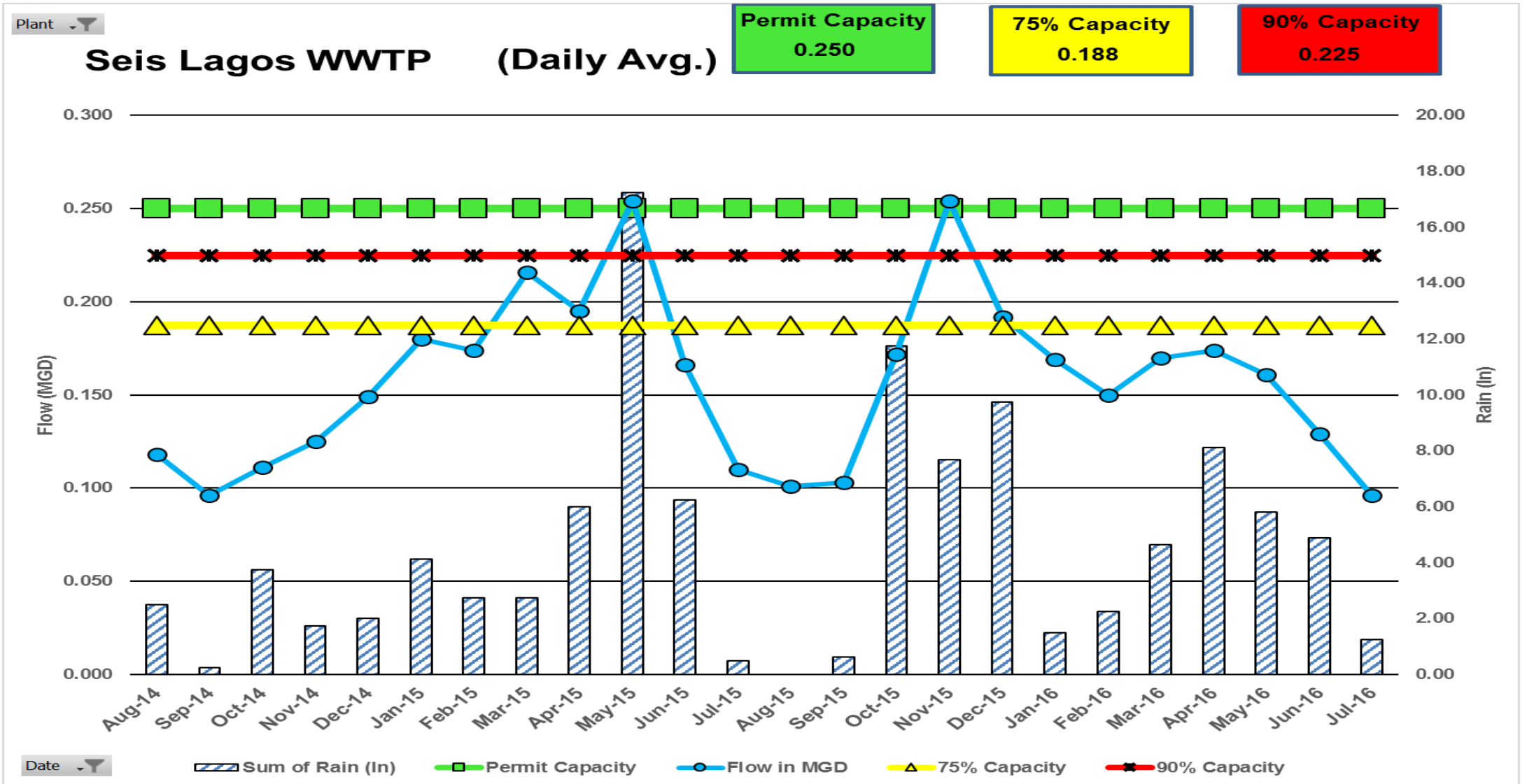
- Originally constructed in 1974
- Permitted for an average daily flow of 250,000 Gallons
 - With a maximum 2-hour peak of 720,000 gallons
 - Permit up for renewal in 2021
- Today we have 571 Active sewer connections
 - 676 total plumbed out connections
 - Stables and House on the hill are platted for an additional 153 connections should they ever be built out
- Total possible connections at full build out 829

Background of current concerns

- In 2012 and again in 2016 studies were done to assess the current operational status of the plant
- The overriding concern was that as we approached buildout the plant would not have enough capacity to support our needs
- The Texas Commission on Environmental Quality (TCEQ) requires that once a plant reaches 75% of its capacity, planning for upgrade must be underway and that plan must be in active construction at the point the plant reaches 90% utilization.

Background of current concerns

- The 2016 study indicated average daily flows of 126,000 and 176,000 GPD in 2014 and 2015 respectively representing 50.4% and 70.4% of capacity respectively.
- The 2016 study also looked at multiple options for remediating the situation, primary the joining of a regional WWTP project
- See next slide



Background of current concerns

- This data presented an alarming picture indicating that we were rapidly approaching our plant's capacity and seeming to require us to immediately begin planning for a capacity upgrade
- The 39% year over year increase was alarming
- The future projections included in the report indicated that we would exceed our plant capacity between 2020 and 2025. These projections were based on a population of 3 persons per connection and approximately 110GPD per person

Background of current concerns

- As mentioned due to the alarming increase in flow rates we undertook two actions
- First, a series of smoke tests and repairs to minimize the amount of rainwater ingress into the sewer system
- Second, a committee of the board was formed to begin detailed investigation of the remediation options discussed in the 2016 study. This committee was comprised of Brett Faucett and Brian Holmes

Remediation options



Option 1 – Join Muddy Creek Regional WWTP

- The June 2016 study was an initial “quick look” at the prospect of adding our flows to the Muddy Creek WWTP
- It did include a “Cost Opinion” that we will refer to as the 6/16 cost
 - See next slide

Option 1 – Join Muddy Creek Regional WWTP

Item Description	Bid Price	% Allocation	Share of Cost
Main Lift Station	\$292,000	34.29%	\$100,127
Gravity & Forcemain from WNE Lift Station to City of Wylie system	\$880,000	34.29%	\$301,752
Oversize Inspiration Sect 1, 2 & 3	\$173,000	100%	\$173,000
Easement cost estimate	\$75,000	34.29%	\$25,718
Share of City of Wylie system rehabilitation	\$825,000	34.29%	\$282,893
Engineering Cost	\$60,000	34.29%	\$20,574
SLUD connection from WWTP to Inspiration	\$552,500	100%	\$552,500
Contingency	\$250,000	34.29%	\$85,725
Total cost to SLUD			\$1,543,288

Option 1 – Join Muddy Creek Regional WWTP

- The initial estimates of cost appeared to be far lower than the option of expanding our current plant and gave us other benefits such as reduction of flood risk from the Lago Grande Dam failing and reduction of smell in the neighborhood
- Based on our interest in this solution a detailed study was completed in November of 2016 detailing the solution and providing more accurate estimates
- This study also included a “Cost Opinion” which we will refer to as the 11/16 cost
 - See next slide

Option 1 – Join Muddy Creek Regional WWTP

Table 4.1 – Cost Opinion to Connect SLUD to WNESUD

Item Description	Estimated Price	Percent Allocation	SLUD Share of Cost
WNESUD Main Lift Station	\$292,000	34.29%	\$100,127
Gravity and Force Main from WNESUD Lift Station to City of Wylie System	\$880,000	34.29%	\$301,752
Oversize Inspiration Sect 1, 2 & 3	\$173,000	100%	\$173,000
Easement Cost Estimate	\$75,000	34.29%	\$25,718
12" Gravity West	\$1,085,000	34.29%	\$372,047
Open Channel Flow Measurement Flume	\$250,000	34.29%	\$85,725
Engineering Cost	\$60,000	34.29%	\$20,574
SLUD Force Main connection from WWTP to Inspiration	\$552,500	100%	\$552,500
Magmeter for Force Main Flow Metering	\$40,000	100%	\$40,000
Contingency	\$500,000	34.29%	\$171,450
475 LF 16" Upgrade	\$100,000	34.29%	\$34,290
New Lift Station Pumps	\$150,000	34.29%	\$51,435
Total Estimated Cost to SLUD			\$1,928,617

Option 1 – Join Muddy Creek Regional WWTP

- This new more accurate cost estimate represented roughly a \$400k increase from the 6/16 number driven by these factors:
 - Increase of \$90k to the main connection line from Inspiration to Wylie's system
 - The addition of \$85k for a measurement flume
 - Doubling of the contingency to \$171k
 - The addition of \$40k for a magmeter to measure SLUD's flow
 - The addition of \$34k for a short section of Wylie's pipe that would need to be enlarged
 - And the addition of \$51k for new lift Station pumps

Option 1 – Join Muddy Creek Regional WWTP

- This option still appeared to be the best path forward and so for the previous 2 years the Board has been pursuing this option
 - Memorandum of understanding with Huffines
 - Statement was made that we needed two things to fully commit, a confirmed cost estimate and a commitment that we would be a part of the regional solution
 - Agreements between WNESUD and Wylie obtained late 2017
 - WNESUD would pay a 20% rate premium to Wylie
 - Finalization of contract between WNESUD and SLUD Feb 2018
 - We would pay a 20% rate premium to WNESUD (44% rate premium on Wylie rates)
 - Engineers engaged to design connection line March 2018
 - \$3.5M Bond agreement in place with NTMWD September 2018

Option 1 – Join Muddy Creek Regional WWTP

- While the enabling agreements were being finalized we attempted to complete negotiations and agreements with Huffines (Inspiration developer) to lock down our total cost for the portions of their system which we would pay 34.29% of. We also engaged our engineers to put together a firm price for the portions we would pay 100% for.
- On 5-22-2018 a new Cost sheet was provided with many of the projects now complete. We will refer to this as the 5/18 cost
 - See next slide

Option 1 – Join Muddy Creek Regional WWTP

Item Description	Construction & Engineering/Inspection	% Allocation	Share of Cost
Master Lift Station - (completed project)	\$318,360	34.29%	\$109,166
Gravity & Forcemain from Master Lift Station to FM 1378 (Country Club) - (completed project)	\$1,048,379	34.29%	\$359,489
Oversize Inspiration Sect 1, 2 & 3 - (completed projects)	\$173,000	100%	\$173,000
Easement costs - (completed)	\$124,212	34.29%	\$42,592
12" Gravity West to City of Wylie System - (As-Bid)	\$1,089,718	34.29%	\$373,664
Open Channel Flow Measurement Flume or Mag Meter - (estimated)	\$100,000	34.29%	\$34,290
General Engineering Cost (Wylie Agreements) - (completed)	\$7,396	34.29%	\$2,536
SLUD Force Main connection from WWTP to Inspiration - (estimated)	\$552,500 *	100.00%	\$552,500
Magmeter for SLUD Force Main - (estimated)	\$100,000 *	100.00%	\$100,000
Contingency - (proposed)	\$200,000	34.29%	\$68,580
475 16" Upgrade - (not needed)	\$0	34.29%	\$0
Master Lift Station Pump Upgrade - (in-progress)	\$69,265	34.29%	\$23,751
Total Estimated Cost to SLUD			\$1,839,568

Option 1 – Join Muddy Creek Regional WWTP

- This latest cost sheet included many changes;
 - Final cost increase of \$9k for the master lift station
 - Final cost increase of \$58k for section one of the connection to Wylie
 - Final cost increase of \$17k for easements Huffines acquired
 - An increase of \$1500 due to the bid being accepted for section two of the connection to Wylie
 - A reduction of \$50k for the master measurement flume
 - A reduction of \$18k for general engineering costs
 - An increase of \$60k to the estimate for the SLUD meter cost
 - A reduction of \$103k in the contingency
 - A removal of \$34k for the short section of Wylie pipe that did NOT need to be expanded
 - Finally a reduction of \$28k to the Master Lift Station pump upgrade
- Total change was to decrease the cost by \$89k but in a very confusing way
- Huffines also included a threat that if the charges were not agreed to and payments begun by a certain date they would assess interest “and other” charges not included here

Option 1 – Join Muddy Creek Regional WWTP

- We met with Huffines, WNESUD, & NTMWD with the intention of working out the remaining issues and entering an actual contract with Huffines.
- We expressed our intentions to join the regional solution and that we (as had been stated many times before) needed two things
 - A binding commitment to allow us to join the regional system
 - An accurate cost estimate of what it would cost our district to join
- We expressed our concerns that Huffines had not to date provided us with a clear ‘final’ price and had not issued the easements to us for the connection to their system.
- Huffines at this time indicated (for the first time) that they would be charging us for the easements through their property.
- We also asked that in future cost estimates they remove the charges for our connection and meter since we would be paying 100% for those and would contract them directly

Option 1 – Join Muddy Creek Regional WWTP

- On September 4th 2018 a “final” cost sheet was provided by Huffines totaling \$1,373,316.11 now referred to as the 9/18 cost (see next slide)
- Notable changes:
 - The previously completed Master lift station project mysteriously increased \$16.5k
 - The previously completed Gravity/Forcemain line decreased \$500
 - The now completed Master lift station pump upgrade increased \$1350
 - The previously completed oversizing of Inspiration lines decreased by \$14.7k
 - Added \$99.3k in new costs for easements to connect to their pipe
 - Added \$216.7k in ‘interest’ fees that had never been discussed nor agreed to.
 - At our request removed the amounts for the SLUD meter and SLUD connection to their system as we were 100% responsible for that section and also to remove the contingency fee since most of the projects were now completed

Option 1 – Join Muddy Creek Regional WWTP

Wylie NE Special Utility District

Item Description	Construction	Engineering Inspection Easement	Interest (thru 8/29/19) Rounded	% Allocation	Share of Cost
Master Lift Station - (completed project)	\$308,562.50	\$26,360.03	\$48,851.94	34.29%	\$131,596.27
Off-Site Easement costs - (completed)		\$124,212.47	\$12,078.51	34.29%	\$46,734.18
Gravity & Forcemain from Master Lift Station to FM 1378 (Country Club) - (completed project)	\$953,642.12	\$95,258.39	\$121,219.68	34.29%	\$401,234.21
General Engineering Cost (Wylie Agreements) - (completed)		\$7,396.32	\$868.44	34.29%	\$2,833.99
Master Lift Station Pump Upgrade - (completed)	\$63,476.81	\$7,135.70	\$1,298.71	34.29%	\$24,658.36
12" Gravity West to City of Wylie System - (As-Bid)	\$978,333.75	\$115,175.00	\$2,472.45	34.29%	\$375,811.95
Open Channel Flow Measurement Flume or Mag Meter - (estimated) (City of Wylie)	\$100,000.00	\$0	\$0	34.29%	\$34,290.00
Contingency (Gravity West & Flow Measurement) - (proposed)	\$200,000.00	\$0	\$0	34.29%	\$68,580.00
Oversize Inspiration Sect 1, 2 & 3 - (completed projects)	\$140,843.60	\$17,463.90	\$29,909.66	100.00%	\$188,217.16
Easement Acquisition Thru Inspiration	\$99,360.00	\$0	\$0	100.00%	\$99,360.00
Total Estimated Cost to SLUD					\$1,373,316.11

Option 1 – Join Muddy Creek Regional WWTP

- After receiving this latest cost estimate and the associated red flags we saw, we made one final offer to Huffines that we would agree to a flat cost of \$1M as the total cost for our portion inclusive of all construction, easement, engineering, and interest costs.
- Huffines responded with yet another Cost estimate totaling \$1.191M which is now the 10/18 costs
 - See following slide
 - A few of the construction costs changed
 - New Engineering fees for the Inspiration easements appeared
 - Several of the interest charges changed, some up substantially others down substantially
 - Huffines did remove the acquisition costs for the easements and contingency but added new engineering costs for those and also threatened to re-instate the acquisition costs if we did not approve by 10/16/18

Option 1 – Join Muddy Creek Regional WWTP

Item Description	Construction	Engineering Inspection Easements	Interest (thru 10/01/18)	% Allocation	Share of Cost
Master Lift Station (COMPLETED)	\$308,562.50	\$26,360.03	\$31,400.60	34.29%	\$125,612.20
Easement Acquisitions - MLS to Country Club (COMPLETED)	\$0	\$124,212.47	\$7,651.37	34.29%	\$45,216.11
Gravity & Forcemain - MLS to Country Club (COMPLETED)	\$953,642.12	\$95,258.39	\$78,671.92	34.29%	\$386,644.59
General Engineering Cost (COMPLETED)	\$0	\$7,396.32	\$0	34.29%	\$2,536.20
Master Lift Station Pump Upgrade (COMPLETED)	\$63,476.81	\$7,135.70	\$0	34.29%	\$24,213.03
Gravity from Country Club to Wylie System (UNDER CONSTRUCTION; BID+CO1+CO2)	\$975,848.75	\$115,175.00	\$0	34.29%	\$374,112.04
Open Channel Flow Flume or Mag Meter (ESTIMATE)	\$75,000.00	\$0	\$0	34.29%	\$25,717.50
Contingency (REDUCED TO \$0 PER SLUD)	\$0	\$0	\$0	34.29%	\$0.00
Oversize Inspiration Sect 1, 2 & 3 (COMPLETED)	\$140,843.60	\$17,463.90	\$19,132.68	100.00%	\$177,440.18
*Easement Acquisition thru Inspiration (SUBJECT TO CHANGE AFTER 10/16/18)	\$0.00	\$29,808	\$0	100.00%	\$29,808.00
Total Estimated Cost to SLUD					\$1,191,299.84

NOTE: This ESTIMATE includes items which are subject to change; during the course of construction and engineering.

Estimate does not include any improvements to be constructed by Seis Lagos, and does not include a contingency (Per SLUD)

*Easement Cost temporarily reduced; if not approve by SLUD by 10/16/18, easements may not be granted.

Option 1 – Join Muddy Creek Regional WWTP

- As we had asked Huffines to remove the portion of the estimate that we would be 100% responsible for we directed our engineers to complete the pre-work necessary to create an up-to-date accurate estimate on the cost for the line to connect our plant to Inspirations system
- This cost estimate came in at \$2,002,194.61 nearly 4 times what the original estimate was
 - Total project costs:
 - SLUD Forcemain to Inspiration - \$2,002,194.61
 - SLUD MagMeter flow measurement - \$100,000
 - Huffines Charges - \$1,191,299.84
 - Total - \$3,293,494.45

Option 1 – Join Muddy Creek Regional WWTP

- Projected Costs

	main lift station	gravity forcemain	over size inspir.	non huffines easement	Wylie system conn.	engineering cost	slud connection	contingency	WNE meter	SLUD meter	wylie pipe upgrade	lift station pumps	Huffines easement cost	total slud cost
6/16 cost	100,127	301,752	173,000	25,718	282,893	20,574	552,500	85,725						1,542,289
11/16 cost	100,127	301,752	173,000	25,718	372,047	20,574	552,500	171,450	85,725	40,000	34,290	51,435		1,928,618
5/18 cost	109,166	359,489	173,000	42,592	373,664	2,536	552,500	68,580	34,290	100,000	0	23,751		1,839,568
9/18 cost	131,596	401,234	188,217	46,734	375,812	2,833	552,500	68,580	34,290	100,000	0	24,658	99,360	2,025,814
10/18 cost	125,612	386,644	177,440	45,216	374,112	2,536	552,500	0	25,718	100,000	0	24,213	29,808	1,843,799
Actual Cost	125,612	386,644	177,440	45,216	374,112	2,536	2,002,491	0	25,718	100,000	0	24,213	29,808	3,293,790

Option 1 – Join Muddy Creek Regional WWTP

- Projected Costs

year	project cost	sewer taps	flow rate	treatment charges	total bill
1	\$346,836	571	124,444	\$557,449	\$81.36
2	\$346,836	600	130,666	\$567,980	\$78.95
3	\$346,836	630	137,200	\$579,037	\$76.65
4	\$346,836	661	144,059	\$590,647	\$74.46
5	\$346,836	694	151,262	\$602,837	\$72.38
6	\$346,836	729	158,826	\$628,994	\$71.93
7	\$346,836	765	166,767	\$643,102	\$70.04
8	\$346,836	803	175,105	\$657,915	\$68.24
9 -to- 30	\$346,836	829	182,000	\$686,426	\$69.00
31 on	\$0	829	182,000	\$441,946	\$44.43

Option 1 – Join Muddy Creek Regional WWTP

- At this point we had a number of serious concerns
 - We had five different capital cost estimates, each of which seemed to be inconsistent with the previous and had numbers that should be finalized changing from revision to revision.
 - We were unhappy with the “customer of a customer” relationship we had with the Muddy Creek WWTP
 - The portion of the connection line that we were 100% responsible for was nearly 4 times higher than projected
- We directed our engineers to explore cost estimates for expansion of the existing plant and to review our current flow rates and projections to determine how much of an expansion would be needed

Status of the plant in 2018

- The engineers discovered nearly immediately that the entire premise we had been working on was flawed.
- The actual average flow over the past 9 months was 124,444 GPD, less than half of our capacity and we are more than 50% built out
 - We expect our efforts at preventing rainwater ingress was far more successful than originally believed

		PPC	GPP	usage
	taps	3	73	%
active	571	1713	125049	50.02%
inactive	105	315	22995	9.20%
planned	153	459	33507	13.40%
total	829	2487	181551	72.62%

Status of the plant in 2018

- This led us to 4 additional options
 2. Build a connection to WNESUD's line bypassing Inspiration
 3. Build a connection directly to Wylie's line bypassing both Inspiration and WNESUD
 4. Upgrade and refurbish the existing plant but do not expand capacity
 5. Expand the current plant to a capacity of 400,000 GPD

Option 2 – Build a connection to WNESUD

- Based on a very preliminary aerial survey this connection would incur a capital cost of \$3-4M and would still subject us to the 1.44% uplift to the rate
- Due to the much higher cost this option was not pursued further

Option 3 – Build a connection to Wylie

- Based on a very preliminary aerial survey this connection would incur a capital cost of \$6-7M and would subject us to 1.20% uplift to the rate
- This option, while it may be feasible in the future, is not truly viable at this time. The connection point for Wylie's system is still a fair distance away and would require major construction and acquisition of easements (possibly eminent domain) both inside and outside the district. The Capital cost is also wildly variable as any number of factors could drastically increase that cost
- Again based on the projected cost estimates as well as the need to pursue a new agreement with the city of Wylie this option was not pursued

Option 4 – Upgrade and refurbish existing plant

- Current plant is 44 years old. Some components may need to be updated and/or upgraded.
- In order to renew our permit upgrades may need to be made to the plant including
 - Adding phosphorous removal
 - Complying with other new regulations
 - Addressing high peak flows
 - Modification of effluent requirements

Option 4 – Upgrade and refurbish existing plant

- A cost analysis of necessary and “good idea” modifications was created
 - Total cost \$1,489,100
 - This includes \$250,000 in contingencies
 - Also includes the following optional but recommended improvements
 - Sludge dewatering process addition - \$250,000
 - Aeration Basin and liner to deal with peak flows - \$100,000
 - Chemical Phosphorous removal feed system - \$75,000
- As we have been planning for these costs we currently have ~\$1,000,000 in a capital reserve fund that would pay for the majority of this work allowing us to keep sewer rates at a similarly low rate as they are now

Option 4 – Upgrade and refurbish existing plant

year	project cost	sewer taps	flow rate	treatment charges	total bill
1	\$52,656	571	124,444	\$250,000	\$44.17
2	\$52,656	600	130,666	\$262,500	\$43.80
3	\$52,656	630	137,200	\$275,625	\$43.46
4	\$52,656	661	144,059	\$289,406	\$43.12
5	\$52,656	694	151,262	\$303,877	\$42.81
6	\$52,656	729	158,826	\$319,070	\$42.51
7	\$52,656	765	166,767	\$335,024	\$42.22
8	\$52,656	803	175,105	\$351,775	\$41.95
9 -to- 30	\$52,656	829	182,000	\$365,626	\$42.05
31 on	\$0	829	182,000	\$365,626	\$36.75

Option 5 – Expand plant capacity

- The original plant design included plans for a future expansion and certain components were oversized anticipating that expansion.
 - New regulations may affect this plan
 - Specific risk is the required setback from occupied property which the current plan does not meet and we currently hold a variance for.
- Current estimated cost is \$3,559,250 which includes a large contingency allowance (40%) due to the unknown factors that may come into play.
- For purposes of comparison we have increased that variable and used a number of \$4M

Option 5 – Expand plant capacity

year	project cost	sewer taps	flow rate	treatment charges	total bill
1	\$421,236	571	124,444	\$250,000	\$97.96
2	\$421,236	600	130,666	\$262,500	\$95.03
3	\$421,236	630	137,200	\$275,625	\$92.25
4	\$421,236	661	144,059	\$289,406	\$89.59
5	\$421,236	694	151,262	\$303,877	\$87.06
6	\$421,236	729	158,826	\$319,070	\$84.65
7	\$421,236	765	166,767	\$335,024	\$82.36
8	\$421,236	803	175,105	\$351,775	\$80.18
9 -to- 30	\$421,236	829	182,000	\$365,626	\$79.10
31 on	\$0	829	182,000	\$365,626	\$36.75

Option 5 – Expand plant capacity

- Based on current flow analysis we do not feel that capacity expansion is necessary at least for the near future.
- Additionally the high project cost along with many unknowns make it less than ideal
- Since we would be responsible for obtaining the bond directly we are unlikely to receive as favorable credit terms as we were through NTMWD resulting in initially higher sewer rates but lower rates once the bond is repaid.

Conclusions and Committee Recommendations



Conclusions

- Based on our current understanding of the actual flows we are experiencing the committee feels that expansion of the plant is not necessary.
- While connecting to the regional plant is attractive for many reasons the drastically increased cost over original assessments and the fact that our plant is capable of handling our projected load to buildout makes this option simply not feasible financially.
- The proposed upgrades to the existing plant should make it more efficient, easier to permit, and prepare it for operation into the foreseeable future

Conclusions

Expected 2021 rates

Option	capital cost		Rate uplift	total	per house/month
Regional connection through Huffines	3,322,306.48	50.2689655	44%	235248	83.78008347
Regional connection down 1378	3,064,600.00	46.3689655	44%	235248	79.88008347
Regional connection direct to Wylie	6,500,000.00	98.3482759	20%	196040	126.2742075
Existing plant refurb	1,080,250.00	11.3931034	0	250000	47.00563906
Existing plant expand	4,000,000.00	45.3913793	0	250000	81.00391492

Recommendations

- After consideration and exploration of all options the committee recommends that the SLUD board of directors adopt Option 4 to refurbish and modernize our current plant and not to join the regional solution at this time.