

DRINKING WATER STATE REVOLVING FUND ENGINEERING REPORT

RAW WATER PUMP STATION IMPROVEMENTS MONTGOMERY COUNTY, NORTH CAROLINA



TWC PROJECT NO: 3288-K
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1.0 Executive Summary

Montgomery County owns and operates a Raw Water Pump Station (RWPS) and Water Treatment Plant (WTP) located near Lake Tillery in western Mt. Gilead that provides treated water to approximately 5,760 residential and commercial connections across six municipalities.

This report focuses on the 6 MGD RWPS that was constructed in 1982 and most of its components are original to the facility. Montgomery County recently commissioned an independent assessment of the RWPS which concluded that the raw water pumps and other infrastructure vital to the operation of the RWPS are nearing the end of their useful life. The County's Asset Management Plan has slated for the replacement of the aging components critical to the operation of RWPS for Fiscal Year 2020, including replacement of the raw water pumps (RWPs), motors, valves, related appurtenances, an emergency generator, SCADA improvements and general site improvements to the facility. Due to the catastrophic consequences associated with a failure of this infrastructure, Montgomery County applied for, and received, an intent to fund from the Division of Water Infrastructure (DWI) for RWPS Improvements.

This Preliminary Engineering Report (PER) evaluates four alternatives. The alternatives considered include: "Preferred Alternative – Alternative No. 1 – RWPS Improvements with 6 MGD Replacement Pumps", "Alternative No. 2 – RWPS Improvements with 4 MGD Replacement Pumps", "Alternative No. 3 – RWPS Improvements with 6 MGD Replacement Pumps and VFDs", and "Alternative No. 4 – No Action". The "No Action" alternative promotes the growing risk of mechanical failure within the RWPS and was consequently rejected. The remaining three alternatives met criteria to address the needs and concerns of the County. Alternative No. 2 was rejected based on the projected 20-year maximum daily flow of 3.791 MGD which is 95% of the 4 MGD pump capacity. Alternative No. 3 was rejected because the marginal improvement to efficiency provided by VFDs is outweighed by the annual O&M and replacement costs of the VFDs.

Alternative No. 1 was found to address the County's needs and concerns and was selected based upon the design flow and cost analysis included in this report. This "Preferred Alternative", proposes like-for-like replacement of facility's two 6 MGD horizontal split case centrifugal pumps and motors, including replacement of check valves, butterfly valves, piping and appurtenances, replacement of the existing 300kW emergency generator and automatic transfer switch (ATS), replacement and relocation of the Motor Control Center (MCC) and miscellaneous electrical improvements, modification of the SCADA system with relocation of the existing antennae, sump pump and float replacement, installation of a sodium permanganate system, landscape bank stabilization, and modification of an access hatch to improve safety at the facility.

Alternative No. 1 is intended to positively impact the environment by reducing the risk of catastrophic failure of the sole source of potable water to Montgomery County and the six municipalities it serves. All construction activity will take place on the RWPS property. Adequate construction practices and erosion control measures will be implemented during construction to minimize any temporary construction effects to the surrounding environment.

The total project cost of the preferred alternative is \$1,357,700. This project is funded by the Division of Water Infrastructure with a State Reserve Project Grant in the amount of \$157,650 and Drinking Water State Revolving Funds Loan in the amount of \$1,200,050 with \$521,200 eligible for principal forgiveness. The grant fee and loan closing cost of \$26,400 will be paid by local funds. This project will have no impact on user fees. This proposed funding is sufficient to improve the overall operation, reliability, safety and quality of the RWPS and help ensure continued service for its current and future customers for decades to come.

2.0 Existing Facilities and Project Planning

Montgomery County owns and operates a 6 million gallons per day (6 MGD) Raw Water Pump Station (RWPS) and Water Treatment Plant (WTP) located near Lake Tillery in western Mt. Gilead. The County owns and maintains a water distribution system which serves approximately 5,760 residential and commercial connections across six municipalities. These municipalities include the Towns of Biscoe, Candor, Mt. Gilead, Robbins, Star, and Troy. The RWPS is located just west of Mt. Gilead on Hydro Road on the shoreline of Lake Tillery.

The raw water supply for the County starts at the headwaters of the Yadkin-Pee Dee River Basin located near Blowing Rock where it travels south and east across the state for 203 miles before reaching the WTP's raw water intake located near the dam at Lake Tillery. Once at Lake Tillery, the raw water station pumps water to the WTP located on Hydro Road, west of Mt. Gilead. After the water is treated, it is stored in a clearwell onsite until pumped into the distribution system. The distribution system includes a network of ten (10) storage tanks, five major booster pumping stations, and over 365 miles of pipes ranging in size from 2 inches to 24 inches.

2.1 RWPS Condition

2.1.1 General RWPS Condition

Table 2.1.1. General RWPS Condition			
<i>Provide a brief description of the RWPS condition as discussed in Section 3.3.2.1 of the guidance.</i>			
<p>The RWPS was constructed in 1982 (>35 years ago). Many of the components are original to the facility and reaching the end of their useful life. The raw water pumps, sump pump, motor control center, electrical supply and most appurtenances are all original. The two Aurora Split Case Centrifugal Pumps have a life expectancy of 40 years and have been rewound twice. Given the importance of the RWPS as the sole source of raw water to its service population of over 24,000 users, the consequences of failure are considered catastrophic. Record drawings of the existing RWPS facility are included in Appendix 3.</p> <p>As seen in the table below, the average flows for the past two years has slightly increased. To date, there have been no issues meeting demands with regard to the sizing and capacity of the RWPS.</p>			
<i>Provide the average daily flows for the past two years and the current flow.</i>			
Schematic layout Reference:	Appendix 3	Supporting information Appendix Reference:	Appendix 3 Appendix 4

Table 2.1.1. General RWPS Condition			
Year	ADF (MGD)	Year	ADF (MGD)
2014	2.24	2016	2.54
2015	2.43	2017	2.57
2018 Current Average Day Demand(MGD):		2.793	
Current Capacity (MGD):		6.000	
Percentage of Capacity Currently Utilized:		46.55%	
<i>Provide information related to any NOVs the RWPS may have received or any special orders that may be in place.</i>			
NOVs		Special Orders	
Does the RWPS have any NOVs? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A (new construction only)		Does the RWPS have any Special Orders or pending SOCs? <input type="checkbox"/> Yes, Special Order is finalized <input type="checkbox"/> Yes, Special Order is pending <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A (new construction only)	
<i>If yes, then describe and provide supporting information in an appendix of the ER/EID.</i>		<i>If yes, then describe and provide supporting information in an appendix of the ER/EID.</i>	
Appendix Reference: N/A		Appendix Reference: N/A	
Does the RWPS currently have problems meeting SDWA primary and secondary standards?		<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
If Yes, complete Table 2.1.2; If No, proceed to Table 2.1.3			

2.1.2 Historical Water Demand

The following table details the historical water demands for the WTP. The figures found below were obtained from the daily water production reports provided by Montgomery County. The peak hourly demand is calculated as 2.5 times the average daily demand.

Table 2.1.2. Historical Water Demand Data				
<i>Provide historical flows in accordance with Section 3.3.2.2 of the guidance.</i>				
Historical Flow Appendix Reference:				Appendix 4
	Year	Annual Average Demand (MGD)	Maximum Daily Demand (MGD)	Peak hourly Demand (including Fire flow) (MGD)
1	2017	2.67	3.54	6.68
2	2018	2.80	3.76	7.00
Q2-yr:		2.74	3.65	6.84
<i>Provide additional discussion of flow variations in accordance with Section 3.3.2.2 of the guidance.</i>				
The above data was compiled from daily water production reports provided by Montgomery County.				

Table 2.1.2. Historical Water Demand Data

The current design capacity of the WTP is 6.0 MGD. The design flows for the components that need replacement/rehabilitation were sized to handle the permitted flow. There have been no issues regarding the sizing and capacities of these components and a like-for-like capacity replacement would be sufficient to satisfy both this design flow and the current/projected demands. However, with consideration of the available storage in the system to handle any peak hourly flows and fire flow demands, the design flow for all replacements and rehabilitation components will be based on maximum daily demand.

2.1.3 Specific Equipment to be Replaced or Rehabilitated Description

The following tables provide information on the specific equipment to be replaced or rehabilitated. The sizing of all current equipment is sufficient to handle the current design flows and no increase in capacity is required for any equipment identified.

Table 2.1.3. Specific Equipment to be Replaced or Rehabilitated Description

Raw Water Pumps #1 and #2					
Picture Reference:	Appendix 3	Diagram Reference:	Appendix 3	Additional Information Reference:	Appendix 3.a
Condition		Age		Size	
<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A		36+ Years		4,200 GPM (6 MGD)	
Is this like for like replacement/no capacity increase required?				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Additional Information					
Provide any additional information that may be helpful in describing the equipment discussed above. Create additional tables for individual project components to be replaced or rehabilitated.					
<p>The raw water pumps (RWP) #1 and #2 are 4,200 GPM (6 MGD) horizontal split case centrifugal pumps. Originally installed in 1982, the pumps have already been rebuilt once and have an estimated five years of remaining life. An asset assessment conducted by <i>Underwood Pump</i> rated the probability of failure of these pumps as 50%. The pumps exhibit vibrations up to 10% over the allowable range. It is questionable whether the pump packing leakage is still within spec with some grease leakage was also detected. While the maintenance records for the raw water pumps are incomplete, the pumps have some history of failures. Given the importance of the RWPS as the sole source of raw water for its considerable service population, the consequences of failure are considered catastrophic. The Asset Assessment identified casing gasket leakage and fastener corrosion on RWP #1 & #2. RWP #1 & #2 clamps on packing gland swing bolts need replacement due to corrosion. RWP #1 & #2 base and foundation corrosion & degradation. Corrosion on RWP #2 inboard end lower casing half area beneath packing. Some casing gasket extrusion on both RWP #1 and #2. Corrosion on RWP #1 & #2 inboard/outboard end bearing clamps & outside of bearing cartridges.</p>					

Based on future water demand projections, a like-for-like replacement of the raw water pumps would be more than adequate for the 20-year planning period. An alternative including the downsizing of the raw water pumps from 6 MGD to 4 MGD is investigated below considering the tradeoffs between capacity and efficiency.

Raw Water Pump Motors #1 and #2					
Picture Reference:	Appendix 3	Diagram Reference:	Appendix 3	Additional Information Reference:	Appendix 3.a
Condition		Age		Size	
<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A		36+ Years		125 HP	
Is this like for like replacement/no capacity increase required?				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Additional Information					
Provide any additional information that may be helpful in describing the equipment discussed above. Create additional tables for individual project components to be replaced or rehabilitated.					
<p>The RWP Motors #1 and #2 are 125 HP, 1,185 RPM Frame 445T motors manufactured by US Electrical Motors. Originally installed in 1982, the motors have been rewound twice and have less than 25% remaining life. An asset assessment conducted by <i>Underwood Pump</i> rated the probability of failure of these motors as 50%. The bearings have more than 20,000 hours of usage and generally run very hot with moderate vibrations and noise. The motors also show evidence of grease leakage associated with age and wear. The base and foundation have signs of corrosion & degradation, the coupling guard bolt is missing, and voids are developing in the grout.</p> <p>Based on a like-for-like replacement of the raw water pumps, a similar like-for-like replacement of the motors is sufficient for the 20-year planning period. One of the alternatives below considers the addition of variable frequency drives (VFDs) to 6 MGD pumps and motors to maximize energy efficiency and productivity.</p>					
Emergency Generator					
Picture Reference:	Appendix 3	Diagram Reference:	Appendix 3	Additional Information Reference:	Appendix 3.a
Condition		Age		Size	
<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A		18+ Years		300 kW	
Is this like for like replacement/no capacity increase required?				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
Additional Information					
Provide any additional information that may be helpful in describing the equipment discussed above. Create additional tables for individual project components to be replaced or rehabilitated.					
<p>The emergency generator is a model 300ROZD, 300 kW. The emergency generator is in generally fair condition; however, the electrical access panel is rusted. The generator has an estimated remaining life of six years. Based on a like-for-like replacement of the raw water pumps and motors, a similar like-for-like replacement of the emergency generator is sufficient for the 20-year planning period.</p>					

Motor Control Center/Switchgear				
Picture Reference:	Appendix 3	Diagram Reference:	Appendix 3	Additional Information Reference: Appendix 3
Condition		Age	Size	
<input type="checkbox"/> Good <input checked="" type="checkbox"/> Fair <input type="checkbox"/> Poor <input type="checkbox"/> N/A		36+ Years	N/A	
Is this like for like replacement/no capacity increase required?				<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Additional Information				
<i>Provide any additional information that may be helpful in describing the equipment discussed above. Create additional tables for individual project components to be replaced or rehabilitated.</i>				
<p>The Motor Control Center (MCC) was originally installed in 1982 and is nearing its recommended useful life. The consequence of the MCC failing would be considered catastrophic as it runs the pumps/motors.</p> <p>Based on a like-for-like replacement of the raw water pumps and motors, a similar like-for-like replacement of the MCC is sufficient for the 20-year planning period.</p>				

2.2 Current Population

The population data presented was obtained from the US Census and Local Water Supply Plans (LWSP) for each respective system within the WTP service area. The table also provides a breakdown of the County’s distribution system service area, as well as the six (6) municipalities which the WTP serves for the estimated population served in 2010.

2.2.1 Current Population Data

Table 2.2.1 Current Population Data																												
<i>Provide historical census information in accordance with Section 3.3.3 of the guidance</i>																												
Supporting document Appendix Reference: Appendix 4																												
<i>Census Year</i>	<i>Population in the Service Area</i>																											
2000	18,300																											
2010	22,948																											
<i>If service area includes more than one municipality, discuss how breakdown of population data in accordance with Section 3.3.2.2 of the guidance.</i>																												
<p>The Montgomery County WTP service area includes the County’s own customers and those within each of the municipalities that purchase water from the County. The breakdown of each system’s service population for 2010 (US Census) and 2017 (LWSPs) is as follows:</p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th style="text-align: center;">2010</th> <th style="text-align: center;">2017</th> </tr> </thead> <tbody> <tr> <td>Montgomery County :</td> <td style="text-align: center;">12,754</td> <td style="text-align: center;">14,473</td> </tr> <tr> <td> Town of Biscoe :</td> <td style="text-align: center;">1,700</td> <td style="text-align: center;">1,749</td> </tr> <tr> <td> Town of Candor :</td> <td style="text-align: center;">840</td> <td style="text-align: center;">843</td> </tr> <tr> <td> Town of Mt. Gilead :</td> <td style="text-align: center;">1,181</td> <td style="text-align: center;">1,200</td> </tr> <tr> <td> Town of Robbins :</td> <td style="text-align: center;">1,097</td> <td style="text-align: center;">1,107</td> </tr> <tr> <td> Town of Star :</td> <td style="text-align: center;">876</td> <td style="text-align: center;">875</td> </tr> <tr> <td> Town of Troy :</td> <td style="text-align: center;">4,500</td> <td style="text-align: center;">4,300</td> </tr> <tr> <td>WTP Service Area :</td> <td style="text-align: center;">22,948</td> <td style="text-align: center;">24,547</td> </tr> </tbody> </table>			2010	2017	Montgomery County :	12,754	14,473	Town of Biscoe :	1,700	1,749	Town of Candor :	840	843	Town of Mt. Gilead :	1,181	1,200	Town of Robbins :	1,097	1,107	Town of Star :	876	875	Town of Troy :	4,500	4,300	WTP Service Area :	22,948	24,547
	2010	2017																										
Montgomery County :	12,754	14,473																										
Town of Biscoe :	1,700	1,749																										
Town of Candor :	840	843																										
Town of Mt. Gilead :	1,181	1,200																										
Town of Robbins :	1,097	1,107																										
Town of Star :	876	875																										
Town of Troy :	4,500	4,300																										
WTP Service Area :	22,948	24,547																										
<p>A summary of the data obtained can be found in Appendix 4. The 2017 LWSP data provides the basis for projecting population and flow demands through the planning period. A summary of each system’s LWSP is included in Appendix 4.</p>																												

2.3 Water Demand

The water demands presented below are the current demands for the Montgomery County water system. The year analyzed in Table 2.3.1 is 2017 to ensure actual data for the annual averages is represented. Additional data is also presented detailing the WTP service area demands and is compiled from the LWSP of each water system within the WTP service area. For a detailed breakdown of the demands for each system, see table “2017 Demands by User Type” found in Appendix 4.

2.3.1 Current Water Demand

Table 2.3.1 Current Water Demand	
<i>Provide historical census information in accordance with Section 3.3.4 of the guidance.</i>	
Supporting document Appendix Reference:	Appendix 4
Montgomery County	
	<i>Average Daily Demand (MGD)</i>
<i>Residential Demand :</i>	0.466
<i>Commercial Demand :</i>	0.282
<i>Industrial Demand :</i>	0.000
<i>Unaccounted-For :</i>	0.463
<i>Bulk Sales¹ :</i>	1.206
Total Current Demand (2017) :	2.417
<i>Discuss the methodology for estimating/calculating the flow breakdown and comment whether this use pattern will continue in accordance with Section 3.3.2.2 of the guidance.</i>	
<p>With reference to Montgomery County’s Water Daily Production records (Appendix 4), the maximum daily demand, as the average the two highest consecutive days of record of water treated, was found to be 3.761 MGD and occurred in September 2018.</p> <p>The breakdown of demands by user type was obtained from the 2017 LWSP for Montgomery County and can be found in Appendix 4. Future projections of these demands are expected to trend as a function of population. These projections are based on gpcd by user type and are discussed further in Tables 2.3.2 and 2.3.3.</p> <p>Notes: ¹ – Bulk sales account for the remaining demand of the service area. In order to further project the estimated flows for these water systems, an evaluation of historical population and flow demand by user type is required. The service area population for each of these systems is presented in Table 2.2.1. The flow demands by user type for these systems is shown in the table below:</p>	

	Residential (MGD)	Commercial (MGD)	Industrial (MGD)	Institutional (MGD)	Unaccounted (MGD)	Total (MGD)
Montgomery County :	0.466	0.282	0.000	0.000	0.463	1.211
Town of Biscoe :	0.160	0.060	0.090	0.010	0.020	0.340
Town of Candor :	0.039	0.013	0.057	0.003	0.011	0.123
Town of Mt. Gilead :	0.072	0.000	0.000	0.000	0.036	0.108
Town of Robbins :	0.093	0.014	0.005	0.008	0.027	0.147
Town of Star :	0.020	0.011	0.05	0.013	0.010	0.059
Town of Troy :	0.260	0.044	0.060	0.010	0.055	0.429
WTP Service Area :	1.110	0.424	0.217	0.044	0.622	2.417

2.3.2 Population and Flow Projections

The following table provides the breakdown of the projected population through the 20-year planning period for the Montgomery County WTP service area beginning in 2018. Additionally, a breakdown of each water system within the service area is provided as further information. **Appendix 4** contains the detailed analysis of each system with regards to population and flow projections.

<i>Project Service Area Population and residential demands for the next 20 years in accordance with Section 3.4.1 of the guidance.</i>		
Supporting document Appendix Reference:		Appendix 4
<i>Year</i>	<i>Service area Population (Projected)</i>	<i>Future Residential Demand</i>
<i>Current Year (2018)</i>	24,936	1.137
<i>Year 5</i>	26,099	1.197
<i>Year 10</i>	27,062	1.239
<i>Year 15</i>	28,009	1.280
<i>Year 20</i>	28,944	1.321
<i>State Assumptions and discuss methodology used for population projections. Provide percentage growth per year and justify that using U.S. Census data or data from state Data center (SDC). If alternate population growth rate is used, you must compare it with SDC projections and justify the alternate growth rate.</i>		
The methodology to determine the future residential demands included breaking out each respective system by population and user type demand for the County and six municipalities. The population projections for each system were based on the 2017 LWSP planning projections. The population for each unique year of the planning period was then calculated by interpolating linearly between the known planning projections (10-year increments) using the least squares method. The population for the WTP service for each year was found by simply adding each system’s population together. The corresponding residential demand was then calculated using the projected population and a fixed per capita day multiplier. The gallons per capita day for each system was based on the 2017 average daily residential demand and the 2017 water system population as reported in each system’s respective		

Table 2.3.2 Population and Flow Projections

LWSP. A detailed evaluation for each year in the planning period can found in **Appendix 4**.

The following is a breakdown of each water system’s future residential demand in MGD:

	Population	County	Biscoe	Candor	Mt. Gilead	Robbins	Star	Troy	Total
Current Year (2018) :	24,936	0.480	0.171	0.039	0.073	0.094	0.020	0.260	1.137
Year 5 :	26,099	0.504	0.199	0.039	0.076	0.097	0.020	0.262	1.197
Year 10 :	27,062	0.528	0.209	0.039	0.077	0.100	0.021	0.265	1.239
Year 15 :	28,009	0.551	0.221	0.039	0.079	0.102	0.021	0.266	1.280
Year 20 :	28,944	0.575	0.234	0.039	0.081	0.104	0.021	0.266	1.321

2.3.3 Water Demand Projections

Table 2.3.3 Design Flow Analysis

Project Service Area Population and residential demands for the next 20 years in accordance with Section 3.4.1 of the guidance.

Supporting document Appendix Reference:		Appendix 4
Year	Design Flow(Year 20)	% change from the current Flow
Residential Flow	0.575	23.4%
Commercial Flow	0.348	23.4%
Industrial	0.000	0.0%
Unaccounted-For	0.387	-16.3%
Bulk Sales	1.429	18.5%
Total	2.739	14.8%

If design demand is based on a flow other than Year 20 flows, you must provide a justification.

A breakdown of each water system and explanation of how the bulk sale flows are calculated can be found in the worksheets in **Appendix 4**.

The scope of this project is for the rehabilitation/replacement of the raw water pump station. The consideration for the 20-year demand is applicable for the estimated total present worth of annual O&M through the life of the project. The sizing of associated pumps is based on the consideration of an expected operating range. This range was determined based on the estimated 20-year average daily design flow, the contractually obligated flow volume to the purchasing systems, and a maximum daily design flow.

The estimated 20-year average daily design flow is presented above – 2.739 MGD. The contractually obligated flow volumes to the purchasing systems are as follow: Town of Biscoe 0.900 MGD; Town of Candor 0.170 MGD, Town of Mt. Gilead 0.200 MGD; Town of Robbins 0.250 MGD; Town of Troy 0.600 MGD; Town of Star 0.113 MGD. The total maximum daily bulk sale flow considered is the sum of these contracts (2.233 MGD). The estimated bulk sale flow at the end of the design period is 1.429 MGD, or

Table 2.3.3 Design Flow Analysis

64% of the maximum obligated daily flow.

With the maximum obligated flow (2.233 MGD) and the Montgomery County projected 20-year demand (1.31 MGD), the total average demand in 20 years is **3.543 MGD**.

An alternate method is similarly used to determine the maximum daily flow using Montgomery County's *Water Daily Production* averages for 2018 (Appendix 4) whereby a peaking factor is determined. Using this source, the 2018 maximum daily flow (3.799 MGD) is divided by the average daily flow (2.793 MGD) to arrive at a peaking factor of 1.36. The projected 20-year maximum daily flow from Table 2.3.3 (2.739 MGD) is then multiplied by the peaking factor (1.36), providing a station demand of **3.725 MGD**.

The conclusion of the Design Flow Analysis is that a 4 MGD pump replacement could be considered as a project alternative in addition to like-for-like replacement, i.e., a 6 MGD pump replacement.



3.0 Purpose and Need

3.1 Need for the Project

The need for this project is precipitated by the aging infrastructure at the RWPS. The RWPS is vital to normal operation of the WTP and requires rehabilitation or replacement for continued service. A RWPS rehabilitation project has been prioritized in the Montgomery County Capital Improvements Plan and is considered to be one of the most critical needs in the system for maintaining the public health and safety, and continuity of service.

Table 3.1 Need for the Project		
Project is driven by (check all that Apply):		
Public Health <input checked="" type="checkbox"/>	Aging Infrastructure <input checked="" type="checkbox"/>	System Management Issues <input type="checkbox"/>
Does the project accommodate Future Growth?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No
If “Yes”, the Total Project cost associated with growth (capacity increase) should not be more than 30% of total project cost.		
<i>Provide a detailed statement of purpose and need of the project based on the above listed, or any other important factors.</i>		
Supporting Appendix Reference:	Appendix 3	
<p>The Raw Water Pump Station (RWPS) was constructed in 1982 along with the County Water Treatment Facility. Montgomery County recently completed an Asset Management Plan (AMP) which identified that the pumps were nearing the end of their useful life. The County was aware that the pumps would soon need replacing, but through this AMP process this was confirmed and has shown to be one of the most critical parts of the County Water System. In 2015, the County replaced the intake structures, vacuum prime system and other site improvements, however, the improvements proposed in this project were not improved in the 2015 project.</p> <p>The raw water pumps (RWPs) and RWP motors were originally installed in 1982. The RWPs have already been rebuilt once and have an estimated five years of remaining life. The RWP motors have been rewound twice and have less than 25% remaining life. An independent asset assessment determined that both the pumps and motors had a probability of failure of 50%. The RWPs are slated for replacement in the fiscal year of 2020 in the County’s CIP. Given the importance of the RWPS as the sole source of raw water for its considerable service population, the consequences of failure are considered catastrophic. Thus, there is a vital need to replace the RWPs and RWP motors.</p> <p>The Motor Control Center (MCC) was also originally installed in 1982 and is nearing its recommended useful life. The MCC is slated for replacement in the fiscal year of 2020 in the County’s CIP. The consequence of the MCC failing would be considered catastrophic as it runs the motors/pumps and needs to be replaced.</p> <p>The SCADA modifications are needed to provide additional information on system performance such as pump discharge pressure, suction pressure alarm, check valve limit switches and sump pump activity. The antenna needs to be relocated to improve the signal transfer. The associated electrical conduit also</p>		

requires improvements due to a missing weather head on the power pole. Miscellaneous electrical needs include the installation of a weather head. The SCADA modifications are slated for fiscal year 2020 in the County's CIP.

A dedicated generator is necessary at the RWPS in order to ensure the continuous operation of the system during power outages. The existing emergency generator and automatic transfer switch (ATS) have an estimated remaining life of six years and are generally in fair condition; however, the electrical access panel is rusted and the labeling and instructions on the indicator lights and controls are faded and illegible in some areas. The generator and ATS are slated for replacement in the fiscal year of 2020 in the County's CIP. Due to the high cost of replacement and catastrophic consequences associated with failure, the replacement of the emergency generator and ATS is included in this project.

The County has also identified a need to improve odor and taste of the water by removing iron and magnesium prior to treatment at the WTP. While iron and magnesium are secondary contaminants, their removal will improve water taste and odor, which would be beneficial to the County. The project then also includes the installation of a sodium permanganate system to oxidize iron and magnesium in order to improve water quality and assist with taste and odor.

The County is concerned with safety regarding the access to the lower level of the facility where the pumps and motors are located. The access is now through a hatch in the floor which does not provide suitable headroom when descending/ascending the steep ship ladder-style steps. The County staff should access the pump room at least 2 times a week, therefore, the County desires to make this access safer for their employees by widening the access hatch.

The sump pump and float are in fair condition with moderate consequences of failure. The reliability of the sump level alarm is questionable due to its deteriorating condition. The sump pump and float have surpassed their expected life and should to be replaced at this time.

Finally, there are general site improvements needed to stabilize steep embankments on either side of the RWPS. Erosion control efforts from the 2015 project were unsuccessful where slope erosion has continued to dominate the embankments. Vegetation is also intruding on the security fence and other areas within the property that needs to be removed.

The primary purpose of the project is to replace the aged equipment at the facility and shore up the needs for general site improvements as identified above. As part of this project, the County will replace two (2) horizontal split case pumps, two (2) motors, one (1) MCC, valves and piping associated with each pump, generator and ATS, sump pump and float, as well as make general site improvements, including modification of the SCADA system and relocation of the antenna, landscape bank stabilization, and safety improvements to access to the lower level of the pump room.

The project will not provide any expanded capacity to the WTP.

4.0 Alternatives Analysis

The following alternatives analysis details the four (4) alternatives evaluated against the needs of the Raw Water Pump Station (RWPS). The alternatives considered include: “Preferred Alternative – Alternative No. 1 – RWPS Improvements with 6 MGD Replacement Pumps”, “Alternative No. 2 – RWPS Improvements with 4 MGD Replacement Pumps”, “Alternative No. 3 – RWPS Improvements with 6 MGD Replacement Pumps and VFDs”, and “Alternative No. 4 – No Action”. With the exception of the “No Action” alternative, the three pump replacement alternatives differ only in the in the size and/or type of raw water pumps used to replace the existing pumps. That is to say, all other equipment replacements/upgrades and site improvements are identical for these alternatives and for the sake of brevity are discussed upfront in Section 4.0. In addition to the pump replacements, the three alternatives include:

- Replacement of check valves, butterfly valves, piping and appurtenances associated with pumps replacements;
- Replacement of 300 kW emergency generator and automatic transfer switch;
- Replacement of Motor Control Center (MCC) and miscellaneous electrical;
- Modification of SCADA system and relocation of antennae;
- Replacement of sump pump and float;
- Installation of a sodium permanganate system;
- Landscape bank stabilization;
- Modification of access hatch to pump station lower level.

4.1 Preferred Alternative – Alternative No. 1 – RWPS Improvements with 6 MGD Replacement Pumps

Table 4.1. RWPS Improvements with 6 MGD Replacement Pumps Preferred Alternative Alternative No. 1	
<i>Provide a description of the above alternative in accordance with Sections 3.6.1.1 through 3.6.1.8 of the guidance.</i>	
Supporting Information Appendix Reference:	Appendix 7
Description	
<p>Construct two (2) 6 MGD pumps with new motors in the two vacant spots within the lower level of the Montgomery County Raw Water Pump Station property and then remove the existing two (2) 6 MGD pumps. In addition to pump and motor replacements, the project includes:</p> <ul style="list-style-type: none"> • Replacement of check valves, butterfly valves, piping and appurtenances associated with pumps replacements; • Replacement of 300 kW emergency generator and automatic transfer switch; • Replacement of Motor Control Center (MCC) and miscellaneous electrical; • Modification of SCADA system and relocation of antennae; • Replacement of sump pump and float; • Installation of a sodium permanganate system; • Landscape bank stabilization; • Modification of access hatch to pump station lower level. 	

Table 4.1. RWPS Improvements with 6 MGD Replacement Pumps	
Is Figure Included? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If Yes, Figure #: Figure 3, Appendix 2
Alternative Feasibility: <input checked="" type="checkbox"/> Feasible	<input type="checkbox"/> Infeasible
Capital Cost: \$1,357,700	Present Worth: \$4,274,428
Environmental Impact Description	
<i>Provide a <u>qualitative</u> description of the environmental impacts and compare the impacts to that of the Preferred Alternative.</i>	
<p>This alternative is intended to have a positive environmental impact by reducing the risk of catastrophic failure of the sole source of potable water to Montgomery County and the six municipalities it serves.</p> <p>All construction activity will take place on the RWPS property with minimal impact to the surrounding environment. Operation of construction machinery will create additional noise at the RWPS along with exhaust fumes and potentially generating dust during the construction operations. These impacts will be temporary and once construction is complete, no extended or cumulative impacts will exist.</p> <p>Landscape bank stabilization will reduce slope erosion. Design and implementation of a sedimentation and erosion control plan will protect the areas adjacent to the site during construction. Upon completion of the project and adequate stabilization of the sloped embankments, erosion control devices will be removed.</p>	
Environmental Impact Analysis	
<input type="checkbox"/> Greater than Preferred Alternative <input type="checkbox"/> Less than Preferred Alternative <input checked="" type="checkbox"/> Same as Preferred Alternative	
Acceptance/Rejection	
Alternative: <input checked="" type="checkbox"/> Accepted	<input type="checkbox"/> Rejected
Rationale for Acceptance/Rejection	
<i>Discuss the rationale for acceptance/rejection of the above-referenced alternative.</i>	
<p>This alternative addresses the needs of Montgomery County to improve and replace aging infrastructure at the RWPS to ensure the reliable production of raw water for the County's WTP. The project will improve the overall operation, reliability, safety and quality of the RWPS and help ensure continued service for its current and future customers for decades to come.</p> <p>This alternative is accepted based on the Design Flow Analysis: while each feasible alternative satisfies the projected 20-year maximum daily flow, Alternatives No. 1 (preferred) and No. 3 can accommodate growth of the service area population not accounted for in the methodology of Section 2.3.3 due to data limitations and economic uncertainty.</p> <p>This alternative is also accepted based on the total present worth and estimated annual O&M costs. When compared with Alternative No. 3, the marginal efficiency gained using VFDs is outweighed by the annual O&M and replacement costs of the VFDs.</p>	

Table 4.1. RWPS Improvements with 6 MGD Replacement Pumps

It is noted that the capital cost of Alternative No. 1 is within the project budget; however, due to the high present worth cost, the sodium permanganate system will be evaluated further in design. A water quality evaluation will be needed to verify the dosing assumptions and that the added measure will not be cost prohibitive.



4.1.1 Preferred Alternative – Alternative No. 1 – Capital Costs

Table 4.1.1. Capital Costs Raw Water Pump Station Improvements Montgomery County				
<i>Complete the areas shown in gray below. Where shown, use pulldown menu to select options. The spreadsheet will calculate the capital costs.</i>				
	RWPS Improvements with 6 MGD Replacement Pumps			
Project Administration (\$):	\$219,000			
Component	Unit Cost ^a	Unit	Quantity	Total Cost
Mobilization (3% of Construction Cost)	\$30,200	LS	1	\$30,200
6 MGD Pump Replacement	\$90,000	EA	2	\$180,000
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$115,000
300kW Generator and ATS Replacement	\$150,000	EA	1	\$150,000
MCC Replacement	\$175,000	EA	1	\$175,000
SCADA Improvements	\$75,000	LS	1	\$75,000
Sump Pump and Float Replacement	\$5,000	LS	1	\$5,000
Sodium Permanganate System	\$75,000	LS	1	\$75,000
Landscape Bank Stabilization	\$50,000	LS	1	\$50,000
Lower Level Access Hatch	\$20,000	LS	1	\$20,000
Electrical Improvements	\$100,000	LS	1	\$100,000
Bypass Pumping	\$45,000	LS	1	\$45,000
Erosion Control	\$15,000	LS	1	\$15,000
			Total Construction Cost:	\$1,035,200
			Construction Contingency Cost:	\$103,500
			Project Administration Cost:	\$219,000
			Total Capital Cost:	\$1,357,700

^aUnit costs are in today's dollars, not future dollars.

4.1.2 Preferred Alternative – Alternative No. 1 – Project Cost Life Cycle Assumptions

Table 4.1.2. Project Cost Life Cycle Assumptions Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps			
<i>Complete the areas shown in gray.</i>			
Component	Expected Life Cycle	Replacement Expected?†	Rationale for Expected Life Cycle
Mobilization (3% of Construction Cost)	N/A	N/A	One time incidental cost
6 MGD Pump Replacement	20-40 years	Yes	Pumps are expected to last 40 years, however the motors are expected to last 20 years, therefore partial replacement cost is expected
Piping, Valves, and Appurtenances	40 years	No	Expected to last a minimum of 40 years
300kW Generator and ATS Replacement	25 years	No	Expected to last 25 years per AMP
MCC Replacement	50 years	No	Expected to last 50 years per AMP
SCADA Improvements	50 years	No	Expected to last 50 years per AMP
Sump Pump and Float Replacement	2 years	Yes	Historically requiring replacement every 2 years at this station
Sodium Permanganate System	25 years	No	Expected to last 25 years
Landscape Bank Stabilization	N/A	No	One time cost. Correct stabilization should last as long as the ground remains undisturbed.
Lower Level Access Hatch	50 years	No	Expected to last 50 years or longer
Electrical Improvements	50 years	No	Expected to last 50 years
Bypass Pumping	6 months	No	Temporary Construction Measure
Erosion Control	2 years	No	Temporary Construction Measure

†Period for replacement would be Years 1 through 20 only.

4.1.3 Preferred Alternative – Alternative No. 1 – Replacement Costs (Years 1 to 5)

Table 4.1.3. Replacement Costs (Years 1 to 5) Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps								
Current Inflation Rate based on Construction Cost Index: 2.97%				EPA Discount Rate: 4.875%				
Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year:				
				1	2	3	4	5
Mobilization (3% of Construction Cost)	\$30,200	LS	1	\$0	\$0	\$0	\$0	\$0
6 MGD Pump Replacement	\$90,000	EA	2	\$0	\$0	\$0	\$0	\$0
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$0	\$0	\$0	\$0	\$0
300kW Generator and ATS Replacement	\$150,000	EA	1	\$0	\$0	\$0	\$0	\$0
MCC Replacement	\$175,000	EA	1	\$0	\$0	\$0	\$0	\$0
SCADA Improvements	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Sump Pump and Float Replacement	\$5,000	LS	1	\$0	\$4,820	\$0	\$4,647	\$0
Sodium Permanganate System	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Landscape Bank Stabilization	\$50,000	LS	1	\$0	\$0	\$0	\$0	\$0
Lower Level Access Hatch	\$20,000	LS	1	\$0	\$0	\$0	\$0	\$0
Electrical Improvements	\$100,000	LS	1	\$0	\$0	\$0	\$0	\$0
Bypass Pumping	\$45,000	LS	1	\$0	\$0	\$0	\$0	\$0
Erosion Control	\$15,000	LS	1	\$0	\$0	\$0	\$0	\$0
Total Present Value of Replacement Costs (Years 1 to 5):				\$0	\$4,820	\$0	\$4,647	\$0

4.1.4 Preferred Alternative – Alternative No. 1 – Replacement Costs (Years 6 to 10)

Table 4.1.4. Replacement Costs (Years 6 to 10) Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps								
Current Inflation Rate based on Construction Cost Index: 2.97%				EPA Discount Rate: 4.875%				
Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year:				
				6	7	8	9	10
Mobilization (3% of Construction Cost)	\$30,200	LS	1	\$0	\$0	\$0	\$0	\$0
6 MGD Pump Replacement	\$90,000	EA	2	\$0	\$0	\$0	\$0	\$0
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$0	\$0	\$0	\$0	\$0
300kW Generator and ATS Replacement	\$150,000	EA	1	\$0	\$0	\$0	\$0	\$0
MCC Replacement	\$175,000	EA	1	\$0	\$0	\$0	\$0	\$0
SCADA Improvements	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Sump Pump and Float Replacement	\$5,000	LS	1	\$4,480	\$0	\$4,319	\$0	\$4,164
Sodium Permanganate System	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Landscape Bank Stabilization	\$50,000	LS	1	\$0	\$0	\$0	\$0	\$0
Lower Level Access Hatch	\$20,000	LS	1	\$0	\$0	\$0	\$0	\$0
Electrical Improvements	\$100,000	LS	1	\$0	\$0	\$0	\$0	\$0
Bypass Pumping	\$45,000	LS	1	\$0	\$0	\$0	\$0	\$0
Erosion Control	\$15,000	LS	1	\$0	\$0	\$0	\$0	\$0
Total Present Value of Replacement Costs (Years 6 to 10):				\$4,480	\$0	\$4,319	\$0	\$4,164

4.1.5 Preferred Alternative – Alternative No. 1 – Replacement Costs (Year 11 to 15)

<p align="center">Table 4.1.5. Replacement Costs (Years 11 to 15) Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps</p>								
Current Inflation Rate based on Construction Cost Index: 2.97%				EPA Discount Rate: 4.875%				
Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year:				
				11	12	13	14	15
Mobilization (3% of Construction Cost)	\$30,200	LS	1	\$0	\$0	\$0	\$0	\$0
6 MGD Pump Replacement	\$90,000	EA	2	\$0	\$0	\$0	\$0	\$0
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$0	\$0	\$0	\$0	\$0
300kW Generator and ATS Replacement	\$150,000	EA	1	\$0	\$0	\$0	\$0	\$0
MCC Replacement	\$175,000	EA	1	\$0	\$0	\$0	\$0	\$0
SCADA Improvements	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Sump Pump and Float Replacement	\$5,000	LS	1	\$0	\$4,014	\$0	\$3,870	\$0
Sodium Permanganate System	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Landscape Bank Stabilization	\$50,000	LS	1	\$0	\$0	\$0	\$0	\$0
Lower Level Access Hatch	\$20,000	LS	1	\$0	\$0	\$0	\$0	\$0
Electrical Improvements	\$100,000	LS	1	\$0	\$0	\$0	\$0	\$0
Bypass Pumping	\$45,000	LS	1	\$0	\$0	\$0	\$0	\$0
Erosion Control	\$15,000	LS	1	\$0	\$0	\$0	\$0	\$0
Total Present Value of Replacement Costs (Years 11 to 15):				\$0	\$4,014	\$0	\$3,870	\$0

4.1.6 Preferred Alternative – Alternative No. 1 – Replacement Costs (Year 16 to 20)

Table 4.1.6. Replacement Costs (Years 16 to 20) Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps									
Current Inflation Rate based on Construction Cost Index: 2.97%				EPA Discount Rate: 4.875%					
Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year:					
				16	17	18	19	20	
Mobilization (3% of Construction Cost)	\$30,200	LS	1	\$0	\$0	\$0	\$0	\$0	
6 MGD Pump Replacement	\$90,000	EA	2	\$0	\$0	\$0	\$0	\$0	
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$0	\$0	\$0	\$0	\$0	
300kW Generator and ATS Replacement	\$150,000	EA	1	\$0	\$0	\$0	\$0	\$0	
MCC Replacement	\$175,000	EA	1	\$0	\$0	\$0	\$0	\$0	
SCADA Improvements	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0	
Sump Pump and Float Replacement	\$5,000	LS	1	\$3,731	\$0	\$3,597	\$0	\$3,467	
Sodium Permanganate System	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0	
Landscape Bank Stabilization	\$50,000	LS	1	\$0	\$0	\$0	\$0	\$0	
Lower Level Access Hatch	\$20,000	LS	1	\$0	\$0	\$0	\$0	\$0	
Electrical Improvements	\$100,000	LS	1	\$0	\$0	\$0	\$0	\$0	
Bypass Pumping	\$45,000	LS	1	\$0	\$0	\$0	\$0	\$0	
Erosion Control	\$15,000	LS	1	\$0	\$0	\$0	\$0	\$0	
Total Present Value of Replacement Costs (Years 16 to 20):				\$3,731	\$0	\$3,597	\$0	\$3,467	
				Total Present Value of Replacement Costs (Life of Project):					\$41,109

4.1.7 Preferred Alternative – Alternative No. 1 – Present Value of Operations and Maintenance Costs (Year 1 to 10)

Table 4.1.7. Present Value of Operations and Maintenance Costs (Years 1-10)													
Raw Water Pump Station Improvements													
Montgomery County													
RWPS Improvements with 6 MGD Replacement Pumps													
<i>Complete the cells shown in gray below.</i>													
Current Inflation Rate Based on Municipal Cost Index: 0.09%										EPA Discount Rate: 4.875%			
Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year:									
				1	2	3	4	5	6	7	8	9	10
Electricity Demand for 6 MGD pumps (Total kWh/yr)	\$43,500	Year	1	\$41,514	\$39,618	\$37,809	\$36,083	\$34,436	\$32,863	\$31,363	\$29,931	\$28,564	\$27,260
Sodium Permanganate Solution (Total gal/yr)	\$180,000	Year	1	\$171,781	\$163,938	\$156,453	\$149,309	\$142,492	\$135,986	\$129,777	\$123,851	\$118,196	\$112,800
Sodium Permanganate System Maintenance	\$1,500	Year	1	\$1,432	\$1,366	\$1,304	\$1,244	\$1,187	\$1,133	\$1,081	\$1,032	\$985	\$940
Total Present Value of Yearly O&M Expenses (Years 1-10):				\$214,727	\$204,922	\$195,566	\$186,637	\$178,115	\$169,982	\$162,221	\$154,814	\$147,746	\$141,000

4.1.8 Preferred Alternative – Alternative No. 1 – Present Value of Operations and Maintenance Costs (Year 11 to 20)

Table 4.1.8. Present Value of Operations and Maintenance Costs (Years 11-20)													
Raw Water Pump Station Improvements													
Montgomery County													
RWPS Improvements with 6 MGD Replacement Pumps													
Current Inflation Rate Based on Municipal Cost Index: 0.09%										EPA Discount Rate: 4.875%			
Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year:									
				11	12	13	14	15	16	17	18	19	20
Electricity Demand for 6 MGD pumps (Total kWh/yr)	\$43,500	Year	1	\$26,015	\$24,827	\$23,694	\$22,612	\$21,580	\$20,594	\$19,654	\$18,757	\$17,900	\$17,083
Sodium Permanganate Solution (Total gal/yr)	\$180,000	Year	1	\$107,649	\$102,734	\$98,043	\$93,567	\$89,295	\$85,218	\$81,327	\$77,613	\$74,070	\$70,688
Sodium Permanganate System Maintenance	\$1,500	Year	1	\$897	\$856	\$817	\$780	\$744	\$710	\$678	\$647	\$617	\$589
Total Present Value of Yearly O&M Expenses (Years 11-20):				\$134,562	\$128,418	\$122,554	\$116,959	\$111,618	\$106,522	\$101,658	\$97,017	\$92,587	\$88,360
Total Present Value of Annual O&M Costs (Life of Project):													\$2,855,984

4.1.9 Preferred Alternative – Alternative No. 1 – Present Value of Intermittent Operations and Maintenance Costs (Year 1 to 10)

Table 4.1.9. Present Value of Intermittent Operations and Maintenance Costs (Years 1-10)													
Raw Water Pump Station Improvements													
Montgomery County													
RWPS Improvements with 6 MGD Replacement Pumps													
Current Inflation Rate Based on Municipal Cost Index: 0.09%										EPA Discount Rate: 4.875%			
Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year:									
				1	2	3	4	5	6	7	8	9	10
125 HP Motor Replacement	\$25,000	Ea	2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Present Value of Intermittent Operations & Maintenance Costs (Years 1-10):				\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

4.1.10 Preferred Alternative – Alternative No. 1 – Present Value of Intermittent Operations and Maintenance Costs (Year 11 to 20)

Table 4.1.10. Present Value of Intermittent Operations and Maintenance Costs (Years 11-20)													
Raw Water Pump Station Improvements													
Montgomery County													
RWPS Improvements with 6 MGD Replacement Pumps													
Current Inflation Rate Based on Municipal Cost Index: 0.09%										EPA Discount Rate: 4.875%			
Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year:									
				11	12	13	14	15	16	17	18	19	20
125 HP Motor Replacement	\$25,000	Ea	2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$19,635
Total Present Value of Intermittent Operations & Maintenance Costs (Years 11-20):				\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$19,635
Total Present Value of Intermittent Operations & Maintenance Costs (Life of Project):													\$19,635

4.2 Alternative No. 2 – RWPS Improvements with 4 MGD Replacement Pumps

Table 4.2. RWPS Improvements with 4 MGD Replacement Pumps Alternative No. 2	
<i>Provide a description of the above alternative in accordance with Sections 3.6.1.1 through 3.6.1.8 of the guidance.</i>	
Supporting Information Appendix Reference:	Appendix 7
Description	
<p>Construct two (2) 4 MGD pumps with new motors in the two vacant spots within the lower level of the Montgomery County Raw Water Pump Station property and then remove the existing two (2) 6 MGD pumps. In addition to pump and motor replacements, the project includes:</p> <ul style="list-style-type: none"> • Replacement of check valves, butterfly valves, piping and appurtenances associated with pumps replacements; • Replacement of 300 kW emergency generator and automatic transfer switch; • Replacement of Motor Control Center (MCC) and miscellaneous electrical; • Modification of SCADA system and relocation of antennae; • Replacement of sump pump and float; • Installation of a sodium permanganate system; • Landscape bank stabilization; • Modification of access hatch to pump station lower level. 	
Is Figure Included? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If Yes, Figure #: Figure 4, Appendix 2
Alternative Feasibility: <input checked="" type="checkbox"/> Feasible	<input type="checkbox"/> Infeasible
Capital Cost: \$1,339,600	Present Worth: \$3,300,407
Environmental Impact Description	
<i>Provide a <u>qualitative</u> description of the environmental impacts and compare the impacts to that of the Preferred Alternative.</i>	
<p>This alternative is intended to have a positive environmental impact by reducing the risk of catastrophic failure of the sole source of potable water to Montgomery County and the six municipalities it serves.</p> <p>All construction activity will take place on the RWPS property with minimal impact to the surrounding environment. Operation of construction machinery will create additional noise at the RWPS along with exhaust fumes and potentially generating dust during the construction operations. These impacts will be temporary and once construction is complete, no extended or cumulative impacts will exist.</p> <p>Landscape bank stabilization will reduce slope erosion. Design and implementation of a sedimentation and erosion control plan will protect the areas adjacent to the site during stabilization. Upon completion of the project and adequate stabilization of the sloped embankments, erosion control devices will be removed.</p>	

Table 4.2. RWPS Improvements with 4 MGD Replacement Pumps	
Environmental Impact Analysis	
<input type="checkbox"/> Greater than Preferred Alternative <input type="checkbox"/> Less than Preferred Alternative <input checked="" type="checkbox"/> Same as Preferred Alternative	
Acceptance/Rejection	
Alternative:	<input type="checkbox"/> Accepted <input checked="" type="checkbox"/> Rejected
Rationale for Acceptance/Rejection	
<i>Discuss the rationale for acceptance/rejection of the above-referenced alternative.</i>	
<p>This alternative addresses the needs of Montgomery County to improve and replace aging infrastructure at the RWPS to ensure the reliable production of raw water for the County's WTP. This alternative is only rejected, however, based on the projected 20-year maximum daily flow of 3.791 MGD which is 95% of the 4 MGD pump capacity. If future flows exceed the projections, new raw pumps would need to be installed to increase capacity. As the new raw water pumps have a life expectancy of 40 years, this alternative was not selected.</p>	

4.2.1 Alternative No. 2 – Capital Costs

Table 4.2.1. Capital Costs Raw Water Pump Station Improvements Montgomery County				
<i>Complete the areas shown in gray below. Where shown, use pulldown menus to select options. The spreadsheet will calculate the capital</i>				
Alternative:	RWPS Improvements with 4 MGD Replacement Pumps			
Project Administration (\$):	\$219,000			
Component	Unit Cost ^a	Unit	Quantity	Total Cost
Mobilization (3% of Construction Cost)	\$29,700	LS	1	\$29,700
4 MGD Pump Replacement	\$82,000	EA	2	\$164,000
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$115,000
300kW Generator and ATS Replacement	\$150,000	EA	1	\$150,000
MCC Replacement	\$175,000	EA	1	\$175,000
SCADA Improvements	\$75,000	LS	1	\$75,000
Sump Pump and Float Replacement	\$5,000	LS	1	\$5,000
Sodium Permanganate System	\$75,000	LS	1	\$75,000
Landscape Bank Stabilization	\$50,000	LS	1	\$50,000
Lower Level Access Hatch	\$20,000	LS	1	\$20,000
Electrical Improvements	\$100,000	LS	1	\$100,000
Bypass Pumping	\$45,000	LS	1	\$45,000
Erosion Control	\$15,000	LS	1	\$15,000
Total Construction Cost:				\$1,018,700
Construction Contingency Cost:				\$101,900
Project Administration Cost:				\$219,000
Total Capital Cost:				\$1,339,600

^aUnit costs are in today's dollars, not future dollars.

4.2.2 Alternative No. 2 – Project Cost Life Cycle Assumptions

Table 4.2.2. Project Cost Life Cycle Assumptions Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 4 MGD Replacement Pumps			
<i>Complete the areas shown in gray.</i>			
Component	Expected Life Cycle	Replacement Expected?†	Rationale for Expected Life Cycle
Mobilization (3% of Construction Cost)	N/A	N/A	One time incidental cost
4 MGD Pump Replacement	20-40 years	Yes	Pumps are expected to last 40 years, however the motors are expected to last 20 years, therefore partial replacement cost is expected
Piping, Valves, and Appurtenances	40 years	No	Expected to last a minimum of 40 years
300kW Generator and ATS Replacement	25 years	No	Expected to last 25 years per AMP
MCC Replacement	50 years	No	Expected to last 50 years per AMP
SCADA Improvements	50 years	No	Expected to last 50 years per AMP
Sump Pump and Float Replacement	2 years	Yes	Historically requiring replacement every 2 years at this station
Sodium Permanganate System	25 years	No	Expected to last 25 years
Landscape Bank Stabilization	N/A	No	One time cost. Correct stabilization should last as long as the ground remains undisturbed.
Lower Level Access Hatch	50 years	No	Expected to last 50 years or longer
Electrical Improvements	50 years	No	Expected to last 50 years
Bypass Pumping	6 months	No	Temporary Construction Measure
Erosion Control	2 years	No	Temporary Construction Measure

†Period for replacement would be Years 1 through 20 only.

4.2.3 Alternative No. 2 – Replacement Costs (Years 1 to 5)

Table 4.2.3. Replacement Costs (Years 1 to 5) Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 4 MGD Replacement Pumps								
Current Inflation Rate based on Construction Cost Index: 2.97%				EPA Discount Rate: 4.875%				
Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year:				
				1	2	3	4	5
Mobilization (3% of Construction Cost)	\$29,700	LS	1	\$0	\$0	\$0	\$0	\$0
4 MGD Pump Replacement	\$82,000	EA	2	\$0	\$0	\$0	\$0	\$0
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$0	\$0	\$0	\$0	\$0
300kW Generator and ATS Replacement	\$150,000	EA	1	\$0	\$0	\$0	\$0	\$0
MCC Replacement	\$175,000	EA	1	\$0	\$0	\$0	\$0	\$0
SCADA Improvements	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Sump Pump and Float Replacement	\$5,000	LS	1	\$0	\$4,820	\$0	\$4,647	\$0
Sodium Permanganate System	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Landscape Bank Stabilization	\$50,000	LS	1	\$0	\$0	\$0	\$0	\$0
Lower Level Access Hatch	\$20,000	LS	1	\$0	\$0	\$0	\$0	\$0
Electrical Improvements	\$100,000	LS	1	\$0	\$0	\$0	\$0	\$0
Bypass Pumping	\$45,000	LS	1	\$0	\$0	\$0	\$0	\$0
Erosion Control	\$15,000	LS	1	\$0	\$0	\$0	\$0	\$0
Total Present Value of Replacement Costs (Years 1 to 5):				\$0	\$4,820	\$0	\$4,647	\$0

4.2.4 Alternative No. 2 – Replacement Costs (Years 6 to 10)

Table 4.2.4. Replacement Costs (Years 6 to 10) Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 4 MGD Replacement Pumps								
Current Inflation Rate based on Construction Cost Index: 2.97%				EPA Discount Rate: 4.875%				
Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year:				
				6	7	8	9	10
Mobilization (3% of Construction Cost)	\$29,700	LS	1	\$0	\$0	\$0	\$0	\$0
4 MGD Pump Replacement	\$82,000	EA	2	\$0	\$0	\$0	\$0	\$0
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$0	\$0	\$0	\$0	\$0
300kW Generator and ATS Replacement	\$150,000	EA	1	\$0	\$0	\$0	\$0	\$0
MCC Replacement	\$175,000	EA	1	\$0	\$0	\$0	\$0	\$0
SCADA Improvements	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Sump Pump and Float Replacement	\$5,000	LS	1	\$4,480	\$0	\$4,319	\$0	\$4,164
Sodium Permanganate System	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Landscape Bank Stabilization	\$50,000	LS	1	\$0	\$0	\$0	\$0	\$0
Lower Level Access Hatch	\$20,000	LS	1	\$0	\$0	\$0	\$0	\$0
Electrical Improvements	\$100,000	LS	1	\$0	\$0	\$0	\$0	\$0
Bypass Pumping	\$45,000	LS	1	\$0	\$0	\$0	\$0	\$0
Erosion Control	\$15,000	LS	1	\$0	\$0	\$0	\$0	\$0
Total Present Value of Replacement Costs (Years 6 to 10):				\$4,480	\$0	\$4,319	\$0	\$4,164

4.2.5 Alternative No. 2 – Replacement Costs (Year 11 to 15)

Table 4.2.5. Replacement Costs (Years 11 to 15) Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 4 MGD Replacement Pumps								
Current Inflation Rate based on Construction Cost Index: 2.97%				EPA Discount Rate: 4.875%				
Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year:				
				11	12	13	14	15
Mobilization (3% of Construction Cost)	\$29,700	LS	1	\$0	\$0	\$0	\$0	\$0
4 MGD Pump Replacement	\$82,000	EA	2	\$0	\$0	\$0	\$0	\$0
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$0	\$0	\$0	\$0	\$0
300kW Generator and ATS Replacement	\$150,000	EA	1	\$0	\$0	\$0	\$0	\$0
MCC Replacement	\$175,000	EA	1	\$0	\$0	\$0	\$0	\$0
SCADA Improvements	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Sump Pump and Float Replacement	\$5,000	LS	1	\$0	\$4,014	\$0	\$3,870	\$0
Sodium Permanganate System	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Landscape Bank Stabilization	\$50,000	LS	1	\$0	\$0	\$0	\$0	\$0
Lower Level Access Hatch	\$20,000	LS	1	\$0	\$0	\$0	\$0	\$0
Electrical Improvements	\$100,000	LS	1	\$0	\$0	\$0	\$0	\$0
Bypass Pumping	\$45,000	LS	1	\$0	\$0	\$0	\$0	\$0
Erosion Control	\$15,000	LS	1	\$0	\$0	\$0	\$0	\$0
Total Present Value of Replacement Costs (Years 11 to 15):				\$0	\$4,014	\$0	\$3,870	\$0

4.2.6 Alternative No. 2 – Replacement Costs (Year 16 to 20)

Table 4.2.6. Replacement Costs (Years 16 to 20) Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 4 MGD Replacement Pumps								
Current Inflation Rate based on Construction Cost Index: 2.97%				EPA Discount Rate: 4.875%				
Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year:				
				16	17	18	19	20
Mobilization (3% of Construction Cost)	\$29,700	LS	1	\$0	\$0	\$0	\$0	\$0
4 MGD Pump Replacement	\$82,000	EA	2	\$0	\$0	\$0	\$0	\$0
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$0	\$0	\$0	\$0	\$0
300kW Generator and ATS Replacement	\$150,000	EA	1	\$0	\$0	\$0	\$0	\$0
MCC Replacement	\$175,000	EA	1	\$0	\$0	\$0	\$0	\$0
SCADA Improvements	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Sump Pump and Float Replacement	\$5,000	LS	1	\$3,731	\$0	\$3,597	\$0	\$3,467
Sodium Permanganate System	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Landscape Bank Stabilization	\$50,000	LS	1	\$0	\$0	\$0	\$0	\$0
Lower Level Access Hatch	\$20,000	LS	1	\$0	\$0	\$0	\$0	\$0
Electrical Improvements	\$100,000	LS	1	\$0	\$0	\$0	\$0	\$0
Bypass Pumping	\$45,000	LS	1	\$0	\$0	\$0	\$0	\$0
Erosion Control	\$15,000	LS	1	\$0	\$0	\$0	\$0	\$0
Total Present Value of Replacment Costs (Years 16 to 20):				\$3,731	\$0	\$3,597	\$0	\$3,467
				Total Present Value of Replacement Costs (Life of Project):				
				\$41,109				

4.2.7 Alternative No. 2 – Present Value of Operations and Maintenance Costs (Year 1 to 10)

Table 4.2.7. Present Value of Operations and Maintenance Costs (Years 1-10)													
Raw Water Pump Station Improvements													
Montgomery County													
RWPS Improvements with 4 MGD Replacement Pumps													
<i>Complete the cells shown in gray below.</i>													
Current Inflation Rate Based on Municipal Cost Index: 0.09%										EPA Discount Rate: 4.875%			
Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year:									
				1	2	3	4	5	6	7	8	9	10
Electricity Demand for 4 MGD pumps (Total kWh/yr)	\$28,500	Year	1	\$27,199	\$25,957	\$24,772	\$23,641	\$22,561	\$21,531	\$20,548	\$19,610	\$18,714	\$17,860
Sodium Permanganate Solution (Total gal/yr)	\$120,000	Year	1	\$114,521	\$109,292	\$104,302	\$99,539	\$94,995	\$90,657	\$86,518	\$82,568	\$78,798	\$75,200
Sodium Permanganate System Maintenance	\$1,500	Year	1	\$1,432	\$1,366	\$1,304	\$1,244	\$1,187	\$1,133	\$1,081	\$1,032	\$985	\$940
Total Present Value of Yearly O&M Expenses (Years 1-10):				\$143,151	\$136,615	\$130,377	\$124,424	\$118,743	\$113,322	\$108,147	\$103,209	\$98,497	\$94,000

4.2.8 Alternative No. 2 – Present Value of Operations and Maintenance Costs (Year 11 to 20)

Table 4.2.8. Present Value of Operations and Maintenance Costs (Years 11-20)													
Raw Water Pump Station Improvements													
Montgomery County													
RWPS Improvements with 4 MGD Replacement Pumps													
Current Inflation Rate Based on Municipal Cost Index: 0.09%										EPA Discount Rate: 4.875%			
Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year:									
				11	12	13	14	15	16	17	18	19	20
Electricity Demand for 4 MGD pumps (Total kWh/yr)	\$ 28,500	Year	1	\$17,044	\$16,266	\$15,524	\$14,815	\$14,138	\$13,493	\$12,877	\$12,289	\$11,728	\$11,192
Sodium Permanganate Solution (Total gal/yr)	\$ 120,000	Year	1	\$71,766	\$68,489	\$65,362	\$62,378	\$59,530	\$56,812	\$54,218	\$51,742	\$49,380	\$47,125
Sodium Permanganate System Maintenance	\$ 1,500	Year	1	\$897	\$856	\$817	\$780	\$744	\$710	\$678	\$647	\$617	\$589
Total Present Value of Yearly O&M Expenses (Years 11-20):				\$89,708	\$85,612	\$81,703	\$77,972	\$74,412	\$71,015	\$67,772	\$64,678	\$61,725	\$58,906
Total Present Value of Annual O&M Costs (Life of Project):												\$1,903,989	

4.2.9 Alternative No. 2 – Present Value of Intermittent Operations and Maintenance Costs (Year 1 to 10)

Table 4.2.9. Present Value of Intermittent Operations and Maintenance Costs (Years 1-10)													
Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 4 MGD Replacement Pumps													
Current Inflation Rate Based on Municipal Cost Index: 0.09%						EPA Discount Rate: 4.875%							
Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year:									
				1	2	3	4	5	6	7	8	9	10
100 HP Motor Replacement	\$20,000	Ea	2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Present Value of Intermittent Operations & Maintenance Costs (Years 1-10):				\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

4.2.10 Alternative No. 2 – Present Value of Intermittent Operations and Maintenance Costs (Year 11 to 20)

Table 4.2.10. Present Value of Intermittent Operations and Maintenance Costs (Years 11-20)													
Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 4 MGD Replacement Pumps													
Current Inflation Rate Based on Municipal Cost Index: 0.09%						EPA Discount Rate: 4.875%							
Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year:									
				11	12	13	14	15	16	17	18	19	20
100 HP Motor Replacement	\$20,000	Ea	2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$15,708
Total Present Value of Intermittent Operations & Maintenance Costs (Years 11-20):				\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$15,708
Total Present Value of Intermittent Operations & Maintenance Costs (Life of Project):												\$15,708	

4.3 Alternative No. 3 – RWPS Improvements with 6 MGD Replacement Pumps and VFDs

Table 4.3. RWPS Improvements with 6 MGD Replacement Pumps and VFDs Alternative No. 3	
<i>Provide a description of the above alternative in accordance with Sections 3.6.1.1 through 3.6.1.8 of the guidance.</i>	
Supporting Information Appendix Reference:	Appendix 7
Description	
<p>Construct two (2) 6 MGD pumps with new variable frequency drives (VFDs) and motors in the two vacant spots within the lower level of the Montgomery County Raw Water Pump Station property and then remove the existing two (2) 6 MGD pumps. In addition to pump and motor replacements, the project includes:</p> <ul style="list-style-type: none"> • Replacement of check valves, butterfly valves, piping and appurtenances associated with pumps replacements; • Replacement of 300 kW emergency generator and automatic transfer switch; • Replacement of Motor Control Center (MCC) and miscellaneous electrical; • Modification of SCADA system and relocation of antennae; • Replacement of sump pump and float; • Installation of a sodium permanganate system; • Landscape bank stabilization; • Modification of access hatch to pump station lower level. 	
Is Figure Included? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	If Yes, Figure #: Figure 5, Appendix 2
Alternative Feasibility: <input checked="" type="checkbox"/> Feasible	<input type="checkbox"/> Infeasible
Capital Cost: \$1,484,700	Capital Cost: \$4,421,979
Environmental Impact Description	
<i>Provide a qualitative description of the environmental impacts and compare the impacts to that of the Preferred Alternative.</i>	
<p>This alternative is intended to have a positive environmental impact by reducing the risk of catastrophic failure of the sole source of potable water to Montgomery County and the six municipalities it serves.</p> <p>All construction activity will take place on the RWPS property with minimal impact to the surrounding environment. Operation of construction machinery will create additional noise at the RWPS along with exhaust fumes and potentially generating dust during the construction operations. These impacts will be temporary and once construction is complete, no extended or cumulative impacts will exist.</p> <p>Landscape bank stabilization will reduce slope erosion. Design and implementation of a sedimentation and erosion control plan will protect the areas adjacent to the site during stabilization. Upon completion of the project and adequate stabilization of the sloped embankments, erosion control devices will be removed.</p>	

Table 4.3. RWPS Improvements with 6 MGD Replacement Pumps and VFDs	
Environmental Impact Analysis	
<input type="checkbox"/> Greater than Preferred Alternative <input type="checkbox"/> Less than Preferred Alternative <input checked="" type="checkbox"/> Same as Preferred Alternative	
Acceptance/Rejection	
Alternative:	<input type="checkbox"/> Accepted <input checked="" type="checkbox"/> Rejected
Rationale for Acceptance/Rejection	
<i>Discuss the rationale for acceptance/rejection of the above-referenced alternative.</i>	
<p>This alternative addresses the needs of Montgomery County to improve and replace aging infrastructure at the RWPS to ensure the reliable production of raw water for the County's WTP. This alternative also improves the overall operation, reliability, safety and quality of the RWPS and would help ensure continued service for its current and future customers for decades to come. This alternative is rejected due to the total present worth and annual O&M costs as they compare to Alternative No. 1, the "Preferred Alternative".</p>	

4.3.1 Alternative No. 3 – Capital Costs

Table 4.3.1. Capital Costs Raw Water Pump Station Improvements Montgomery County				
<i>Complete the areas shown in gray below. Where shown, use pulldown menus to select options. The spreadsheet will calculate the capital costs</i>				
Alternative:		RWPS Improvements with 6 MGD Replacement Pumps with VFDs		
Project Administration (\$):		\$219,000		
Component	Unit Cost^a	Unit	Quantity	Total Cost
Mobilization (3% of Construction Cost)	\$33,600	LS	1	\$33,600
6 MGD Pump Replacement	\$90,000	EA	2	\$180,000
Variable Frequency Drives	\$51,000	EA	2	\$102,000
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$115,000
300kW Generator and ATS Replacement	\$150,000	EA	1	\$150,000
MCC Replacement	\$175,000	EA	1	\$175,000
SCADA Improvements	\$75,000	LS	1	\$75,000
Sump Pump and Float Replacement	\$5,000	LS	1	\$5,000
Sodium Permanganate System	\$75,000	LS	1	\$75,000
Landscape Bank Stabilization	\$50,000	LS	1	\$50,000
Lower Level Access Hatch	\$20,000	LS	1	\$20,000
5 Ton HVAC System	\$10,000	EA	1	\$10,000
Electrical Improvements	\$100,000	LS	1	\$100,000
Bypass Pumping	\$45,000	LS	1	\$45,000
Erosion Control	\$15,000	LS	1	\$15,000
Total Construction Cost:				\$1,150,600
Contingency Cost:				\$115,100
Project Administration Cost:				\$219,000
Total Capital Cost:				\$1,484,700

^aUnit costs are in today's dollars, not future dollars.

4.3.2 Alternative No. 3 – Project Cost Life Cycle Assumptions

Table 4.3.2. Project Cost Life Cycle Assumptions Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps with VFDs			
<i>Complete the areas shown in gray.</i>			
Component	Expected Life Cycle	Replacement Expected?†	Rationale for Expected Life Cycle
Mobilization (3% of Construction Cost)	N/A	N/A	One time incidental cost
6 MGD Pump Replacement	20-40 years	Yes	Pumps are expected to last 40 years, however the motors are expected to last 20 years, therefore partial replacement cost is expected
Variable Frequency Drives	20 years	Yes	Expected to last 20 years
Piping, Valves, and Appurtenances	40 years	No	Expected to last a minimum of 40 years
300kW Generator and ATS Replacement	25 years	No	Expected to last 25 years per AMP
MCC Replacement	50 years	No	Expected to last 50 years per AMP
SCADA Improvements	50 years	No	Expected to last 50 years per AMP
Sump Pump and Float Replacement	2 years	Yes	Historically requiring replacement every 2 years at this station
Sodium Permanganate System	25 years	No	Expected to last 25 years
Landscape Bank Stabilization	N/A	N/A	One time cost. Correct stabilization should last as long as the ground remains undisturbed.
Lower Level Access Hatch	50 years	No	Expected to last 50 years or longer
5 Ton HVAC System	20 years	Yes	Expected to last 20 years
Electrical Improvements	50 years	No	Expected to last 50 years
Bypass Pumping	6 months	No	Temporary Construction Measure
Erosion Control	2 years	No	Temporary Construction Measure

†Period for replacement would be Years 1 through 20 only.

4.3.3 Alternative No. 3 – Replacement Costs (Years 1 to 5)

Table 4.3.3. Replacement Costs (Years 1 to 5) Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps with VFDs								
Current Inflation Rate based on Construction Cost Index: 2.97%				EPA Discount Rate: 4.875%				
Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year:				
				1	2	3	4	5
Mobilization (3% of Construction Cost)	\$33,600	LS	1	\$0	\$0	\$0	\$0	\$0
6 MGD Pump Replacement	\$90,000	EA	2	\$0	\$0	\$0	\$0	\$0
Variable Frequency Drives	\$51,000	EA	2	\$0	\$0	\$0	\$0	\$0
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$0	\$0	\$0	\$0	\$0
300kW Generator and ATS Replacement	\$150,000	EA	1	\$0	\$0	\$0	\$0	\$0
MCC Replacement	\$175,000	EA	1	\$0	\$0	\$0	\$0	\$0
SCADA Improvements	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Sump Pump and Float Replacement	\$5,000	LS	1	\$0	\$4,820	\$0	\$4,647	\$0
Sodium Permanganate System	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Landscape Bank Stabilization	\$50,000	LS	1	\$0	\$0	\$0	\$0	\$0
Lower Level Access Hatch	\$20,000	LS	1	\$0	\$0	\$0	\$0	\$0
5 Ton HVAC System	\$10,000	EA	1	\$0	\$0	\$0	\$0	\$0
Electrical Improvements	\$100,000	LS	1	\$0	\$0	\$0	\$0	\$0
Bypass Pumping	\$45,000	LS	1	\$0	\$0	\$0	\$0	\$0
Erosion Control	\$15,000	LS	1	\$0	\$0	\$0	\$0	\$0
Total Present Value of Replacement Costs (Years 1 to 5):				\$0	\$4,820	\$0	\$4,647	\$0

4.3.4 Alternative No. 3 – Replacement Costs (Years 6 to 10)

Table 4.3.4. Replacement Costs (Years 6 to 10) Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps with VFDs								
Current Inflation Rate based on Construction Cost Index: 2.97%				EPA Discount Rate: 4.875%				
Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year:				
				6	7	8	9	10
Mobilization (3% of Construction Cost)	\$33,600	LS	1	\$0	\$0	\$0	\$0	\$0
6 MGD Pump Replacement	\$90,000	EA	2	\$0	\$0	\$0	\$0	\$0
Variable Frequency Drives	\$51,000	EA	2	\$0	\$0	\$0	\$0	\$0
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$0	\$0	\$0	\$0	\$0
300kW Generator and ATS Replacement	\$150,000	EA	1	\$0	\$0	\$0	\$0	\$0
MCC Replacement	\$175,000	EA	1	\$0	\$0	\$0	\$0	\$0
SCADA Improvements	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Sump Pump and Float Replacement	\$5,000	LS	1	\$4,480	\$0	\$4,319	\$0	\$4,164
Sodium Permanganate System	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Landscape Bank Stabilization	\$50,000	LS	1	\$0	\$0	\$0	\$0	\$0
Lower Level Access Hatch	\$20,000	LS	1	\$0	\$0	\$0	\$0	\$0
5 Ton HVAC System	\$10,000	EA	1	\$0	\$0	\$0	\$0	\$0
Electrical Improvements	\$100,000	LS	1	\$0	\$0	\$0	\$0	\$0
Bypass Pumping	\$45,000	LS	1	\$0	\$0	\$0	\$0	\$0
Erosion Control	\$15,000	LS	1	\$0	\$0	\$0	\$0	\$0
Total Present Value of Replacement Costs (Years 6 to 10):				\$4,480	\$0	\$4,319	\$0	\$4,164

4.3.5 Alternative No. 3 – Replacement Costs (Year 11 to 15)

<p align="center">Table 4.3.5. Replacement Costs (Years 11 to 15) Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps with VFDs</p>								
Current Inflation Rate based on Construction Cost Index: 2.97%				EPA Discount Rate: 4.875%				
Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year:				
				11	12	13	14	15
Mobilization (3% of Construction Cost)	\$33,600	LS	1	\$0	\$0	\$0	\$0	\$0
6 MGD Pump Replacement	\$90,000	EA	2	\$0	\$0	\$0	\$0	\$0
Variable Frequency Drives	\$51,000	EA	2	\$0	\$0	\$0	\$0	\$0
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$0	\$0	\$0	\$0	\$0
300kW Generator and ATS Replacement	\$150,000	EA	1	\$0	\$0	\$0	\$0	\$0
MCC Replacement	\$175,000	EA	1	\$0	\$0	\$0	\$0	\$0
SCADA Improvements	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Sump Pump and Float Replacement	\$5,000	LS	1	\$0	\$4,014	\$0	\$3,870	\$0
Sodium Permanganate System	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0
Landscape Bank Stabilization	\$50,000	LS	1	\$0	\$0	\$0	\$0	\$0
Lower Level Access Hatch	\$20,000	LS	1	\$0	\$0	\$0	\$0	\$0
5 Ton HVAC System	\$10,000	EA	1	\$0	\$0	\$0	\$0	\$0
Electrical Improvements	\$100,000	LS	1	\$0	\$0	\$0	\$0	\$0
Bypass Pumping	\$45,000	LS	1	\$0	\$0	\$0	\$0	\$0
Erosion Control	\$15,000	LS	1	\$0	\$0	\$0	\$0	\$0
Total Present Value of Replacement Costs (Years 11 to 15):				\$0	\$4,014	\$0	\$3,870	\$0

4.3.6 Alternative No. 3 – Replacement Costs (Year 16 to 20)

Table 4.3.6. Replacement Costs (Years 16 to 20) Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps with VFDs									
Current Inflation Rate based on Construction Cost Index: 2.97%				EPA Discount Rate: 4.875%					
Component	Unit Cost	Unit	Quantity	Present Value of Replacement Costs in Year:					
				16	17	18	19	20	
Mobilization (3% of Construction Cost)	\$33,600	LS	1	\$0	\$0	\$0	\$0	\$0	
6 MGD Pump Replacement	\$90,000	EA	2	\$0	\$0	\$0	\$0	\$0	
Variable Frequency Drives	\$51,000	EA	2	\$0	\$0	\$0	\$0	\$70,735	
Piping, Valves, and Appurtenances	\$115,000	LS	1	\$0	\$0	\$0	\$0	\$0	
300kW Generator and ATS Replacement	\$150,000	EA	1	\$0	\$0	\$0	\$0	\$0	
MCC Replacement	\$175,000	EA	1	\$0	\$0	\$0	\$0	\$0	
SCADA Improvements	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0	
Sump Pump and Float Replacement	\$5,000	LS	1	\$3,731	\$0	\$3,597	\$0	\$3,467	
Sodium Permanganate System	\$75,000	LS	1	\$0	\$0	\$0	\$0	\$0	
Landscape Bank Stabilization	\$50,000	LS	1	\$0	\$0	\$0	\$0	\$0	
Lower Level Access Hatch	\$20,000	LS	1	\$0	\$0	\$0	\$0	\$0	
5 Ton HVAC System	\$10,000	EA	1	\$0	\$0	\$0	\$0	\$6,935	
Electrical Improvements	\$100,000	LS	1	\$0	\$0	\$0	\$0	\$0	
Bypass Pumping	\$45,000	LS	1	\$0	\$0	\$0	\$0	\$0	
Erosion Control	\$15,000	LS	1	\$0	\$0	\$0	\$0	\$0	
Total Present Value of Replacement Costs (Years 16 to 20):				\$3,731	\$0	\$3,597	\$0	\$81,137	
				Total Present Value of Replacement Costs (Life of Project):					\$118,779

4.3.7 Alternative No. 3 – Present Value of Operations and Maintenance Costs (Year 1 to 10)

Table 4.3.7. Present Value of Operations and Maintenance Costs (Years 1-10)													
Raw Water Pump Station Improvements													
Montgomery County													
RWPS Improvements with 6 MGD Replacement Pumps with VFDs													
<i>Complete the cells shown in gray below.</i>													
Current Inflation Rate Based on Municipal Cost Index: 0.09%											EPA Discount Rate: 4.875%		
Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year:									
				1	2	3	4	5	6	7	8	9	10
Electricity Demand for 6 MGD pumps w/ VFDs (Total kWh/yr)	\$39,000	Yr	1	\$37,219	\$35,520	\$33,898	\$32,350	\$30,873	\$29,464	\$28,118	\$26,834	\$25,609	\$24,440
Sodium Permanganate Solution (Total gal/yr)	\$180,000	Yr	1	\$171,781	\$163,938	\$156,453	\$149,309	\$142,492	\$135,986	\$129,777	\$123,851	\$118,196	\$112,800
Sodium Permanganate System Maintenance	\$1,500	Yr	1	\$1,432	\$1,366	\$1,304	\$1,244	\$1,187	\$1,133	\$1,081	\$1,032	\$985	\$940
Total Present Value of Yearly O&M Expenses (Years 1-10):				\$210,432	\$200,824	\$191,655	\$182,904	\$174,553	\$166,583	\$158,977	\$151,718	\$144,791	\$138,180

4.3.8 Alternative No. 3 – Present Value of Operations and Maintenance Costs (Year 11 to 20)

Table 4.3.8. Present Value of Operations and Maintenance Costs (Years 11-20)													
Raw Water Pump Station Improvements													
Montgomery County													
RWPS Improvements with 6 MGD Replacement Pumps with VFDs													
Current Inflation Rate Based on Municipal Cost Index: 0.09%											EPA Discount Rate: 4.875%		
Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year:									
				11	12	13	14	15	16	17	18	19	20
Electricity Demand for 6 MGD pumps w/ VFDs (Total kWh/yr)	\$39,000	Yr	1	\$23,324	\$22,259	\$21,243	\$20,273	\$19,347	\$18,464	\$17,621	\$16,816	\$16,048	\$15,316
Sodium Permanganate Solution (Total gal/yr)	\$180,000	Yr	1	\$107,649	\$102,734	\$98,043	\$93,567	\$89,295	\$85,218	\$81,327	\$77,613	\$74,070	\$70,688
Sodium Permanganate System Maintenance	\$1,500	Yr	1	\$897	\$856	\$817	\$780	\$744	\$710	\$678	\$647	\$617	\$589
Total Present Value of Yearly O&M Expenses (Years 11-20):				\$131,871	\$125,849	\$120,103	\$114,619	\$109,386	\$104,392	\$99,625	\$95,076	\$90,735	\$86,592
Total Present Value of Annual O&M Costs (Life of Project):													\$2,798,864

4.3.9 Alternative No. 3 – Present Value of Intermittent Operations and Maintenance Costs (Year 1 to 10)

Table 4.3.9. Present Value of Intermittent Operations and Maintenance Costs (Years 1-10)														
Raw Water Pump Station Improvements														
Montgomery County														
RWPS Improvements with 6 MGD Replacement Pumps with VFDs														
Current Inflation Rate Based on Municipal Cost Index: 0.09%										EPA Discount Rate: 4.875%				
Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year:										
				1	2	3	4	5	6	7	8	9	10	
125 HP Motor	\$25,000	Ea	2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Present Value of Intermittent Operations & Maintenance Costs (Years 1-10):				\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

4.3.10 Alternative No. 3 – Present Value of Intermittent Operations and Maintenance Costs (Year 11 to 20)

Table 4.3.10. Present Value of Intermittent Operations and Maintenance Costs (Years 11-20)														
Raw Water Pump Station Improvements														
Montgomery County														
RWPS Improvements with 6 MGD Replacement Pumps with VFDs														
Current Inflation Rate Based on Municipal Cost Index: 0.09%										EPA Discount Rate: 4.875%				
Component	Unit Cost	Unit	Quantity	Present Value of O&M Costs for Year:										
				11	12	13	14	15	16	17	18	19	20	
125 HP Motor	\$25,000	Ea	2	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$19,635
Total Present Value of Intermittent Operations & Maintenance Costs (Years 11-20):				\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$19,635
				Total Present Value of Intermittent Operations & Maintenance Costs (Life of Project):										\$19,635

4.4 Alternative No. 4 – No Action

The following alternative description and analysis details Alternative No. 4, the “No Action” alternative.

Table 4.4. No-Action Alternative	
No-Action	
<i>Provide a description of the above alternative in accordance with Sections 3.6.1.1 through 3.6.1.8 of the guidance.</i>	
Supporting Information Appendix Reference:	N/A
Description	
The “No Action” alternative involves no rehabilitation or replacement of any critical raw water pump station component at the Montgomery County RWPS.	
Is Figure Included? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If Yes, Figure #: N/A
Alternative Feasibility: <input type="checkbox"/> Feasible	<input checked="" type="checkbox"/> Infeasible
Capital Cost: N/A	Present Worth: N/A
Environmental Impact Description	
<i>Provide a qualitative description of the environmental impacts and compare the impacts to that of the Preferred Alternative.</i>	
The “No Action” alternative involves the continued operation raw water pump station components nearing the end of their life cycle. In turn, continued use of aging equipment increases the probability of failure which has been characterized as ranging from <i>major</i> to <i>catastrophic</i> . Failure of the raw water pumps would disrupt service to customers of Montgomery County and six other municipalities, leading to issues of health and sanitation.	
Environmental Impact Analysis	
<input checked="" type="checkbox"/> Greater than Preferred Alternative <input type="checkbox"/> Less than Preferred Alternative <input type="checkbox"/> Same as Preferred Alternative	
Acceptance/Rejection	
Alternative: <input type="checkbox"/> Accepted	<input checked="" type="checkbox"/> Rejected
Rationale for Acceptance/Rejection	
<i>Discuss the rationale for acceptance/rejection of the above-referenced alternative.</i>	
The “No Action” alternative does not provide for any replacement or rehabilitation of the deteriorating equipment considered critical for the continuity of service. This alternative does not provide any benefit to Montgomery County and promotes the growing risk of mechanical failure within the raw water pump station. Thus, this alternative is not considered a feasible alternative for the County and no further evaluation was performed.	

4.4.1 Alternative No. 4 – Capital Costs

This alternative is not feasible; therefore, no capital costs are provided.

4.4.2 Alternative No. 4 – Project Cost Life Cycle Assumptions

This alternative is not feasible; therefore, no life cycle assumptions are provided.

4.4.3 Alternative No. 4 – Replacement Costs

This alternative is not feasible; therefore, no replacement costs are provided.

4.4.4 Alternative No. 4 – Present Value of Operations and Maintenance Costs

This alternative is not feasible; therefore, no present value of O&M costs is provided.

4.4.5 Alternative No. 4 – Present Value of Intermittent Operations and Maintenance Costs

This alternative is not feasible; therefore, no present value of intermittent O&M costs is provided.

4.5 Alternatives Analysis Summary

Table 4.5. Alternatives Analysis Summary					
		Alternative Name			
		Alternative No. 2 RWPS Improvements with with 4 MGD Pumps	Alternative No. 3 RWPS Improvements with 6 MGD Replacement Pumps and VFDs	No-Action	Preferred Alternative Equipment Replacement with 6 MGD Pumps
Capital Cost		\$1,339,600	\$1,484,700	N/A	\$1,357,700
Present Worth		\$3,300,407	\$4,421,979	N/A	\$4,274,428
Feasibility		<input checked="" type="checkbox"/> Feasible <input type="checkbox"/> Infeasible	<input checked="" type="checkbox"/> Feasible <input type="checkbox"/> Infeasible	<input type="checkbox"/> Feasible <input checked="" type="checkbox"/> Infeasible	X
Impact Analysis	Capital Costs	<input checked="" type="checkbox"/> Less than Preferred <input type="checkbox"/> Greater than Preferred <input type="checkbox"/> Same as Preferred	<input type="checkbox"/> Less than Preferred <input checked="" type="checkbox"/> Greater than Preferred <input type="checkbox"/> Same as Preferred	<input type="checkbox"/> Less than Preferred <input type="checkbox"/> Greater than Preferred <input type="checkbox"/> Same as Preferred	X
	Present Worth	<input checked="" type="checkbox"/> Less than Preferred <input type="checkbox"/> Greater than Preferred <input type="checkbox"/> Same as Preferred	<input type="checkbox"/> Less than Preferred <input checked="" type="checkbox"/> Greater than Preferred <input type="checkbox"/> Same as Preferred	<input type="checkbox"/> Less than Preferred <input type="checkbox"/> Greater than Preferred <input type="checkbox"/> Same as Preferred	X
	Environmental	<input type="checkbox"/> Less than Preferred <input type="checkbox"/> Greater than Preferred <input checked="" type="checkbox"/> Same as Preferred	<input type="checkbox"/> Less than Preferred <input type="checkbox"/> Greater than Preferred <input checked="" type="checkbox"/> Same as Preferred	<input type="checkbox"/> Less than Preferred <input checked="" type="checkbox"/> Greater than Preferred <input type="checkbox"/> Same as Preferred	X
Rationale for Rejection/Acceptance		<i>Rejected –</i> Water Demand Projections: Detailed rationale narrative following this table.	<i>Rejected –</i> Present Worth Cost: Detailed rationale narrative following this table.	<i>Rejected –</i> Does not address the need or purpose of the project.	<i>Accepted –</i> Present Worth Cost: Detailed rationale narrative following this table.

Each alternative was evaluated for feasibility to determine if the project would address the aging infrastructure of the raw water pump station systems to ensure uninterrupted service to the customers of Montgomery County. The feasibility evaluation also considered the general operational costs of the alternatives including the Capital Cost and Present Worth to find the most cost-effective plan.

The feasibility analysis found that three (3) alternatives met the criteria to address the needs and concerns of the County and one was determined to be the “Preferred” alternative based on the 20-year water demand projections and the total present worth and estimated annual O&M costs.

Alternative No. 1, the “Preferred Alternative” addresses the needs of Montgomery County to improve and replace aging infrastructure at the RWPS to ensure the reliable production of raw water for the County’s WTP. The project will improve the overall operation, reliability, safety and quality of the RWPS and help ensure continued service for its current and future customers for decades to come. Based on the Design Flow Analysis, each feasible alternative satisfies the projected 20-year maximum daily flow, however, Alternatives No. 1 and No. 3 are better able to accommodate hypothetical growth of the service area population not accounted for in the methodology of **Section 2.3.3** due to data limitations and economic uncertainty. Conversely, Alternative No. 2, which includes 4 MGD pump replacements, was rejected based on the *projected 20-year maximum daily flow* of 3.791 MGD which is 95% of the 4 MGD pump capacity. If future flows exceed the projections, new raw pumps would need to be installed to increase capacity. As the new raw water pumps have a life expectancy of 40 years, Alternative No. 2 was not selected. Finally, Alternative No. 3 was rejected based on the total present worth and estimated annual O&M costs. While Alternative No. 3 provides a marginal improvement to efficiency due to new VFDS, the efficiency gained is outweighed by the annual O&M and replacement costs of the VFDS.

The “Preferred Alternative” will provide the County with a cost-effective approach to address the higher priority items in need of replacement/rehabilitation and also begin to address capital improvement projects set forth in the County’s CIP. This project will provide increased continuity of service for all of the water treatment plant systems critical to the safety and welfare of the public and also provide safer access to the lower level of the pump station. The Total Present Worth for this alternative is \$4,274,428. The Capital Costs are \$1,357,700 with Replacement Costs and Total O&M being \$41,109 and \$2,875,619, respectively.

4.5.1 Total Present Worth for Feasible Alternatives

Table 4.5.1. Total Present Worth for Feasible Alternatives						
Raw Water Pump Station Improvements						
Montgomery County						
	Capital Costs	Replacement Costs Present Worth	O&M Costs Present Worth			Total Present Worth
			Annual	Intermittent	Total	
RWPS Improvements with 6 MGD Replacement Pumps	\$1,357,700	\$41,109	\$2,855,984	\$19,635	\$2,875,619	\$4,274,428
RWPS Improvements with 4 MGD Replacement Pumps	\$1,339,600	\$41,109	\$1,903,989	\$15,708	\$1,919,698	\$3,300,407
RWPS Improvements with 6 MGD Replacement Pumps with VFDS	\$1,484,700	\$118,779	\$2,798,864	\$19,635	\$2,818,500	\$4,421,979

4.6 Project Description

The project description of the preferred alternative, “Alternative No. 1 – RWPS Improvements with 6 MGD Replacement Pumps” is provided below.

4.6.1 Preferred Alternative Project Description

Table 4.6.1 Preferred Alternative Project Description Alternative No. 1 - RWPS Improvements with 6 MGD Replacement Pumps Montgomery County				
Project Vicinity	Appendix 2, Figure 1	Project Location	Appendix 2, Figure 3	
Map Reference:		Map Reference::		
Capital Cost:	\$1,357,700	Present Worth:	\$4,274,428	
<i>Detailed description of the project, including sizes and capacities of project components:</i>				
<p>Montgomery County proposes improvements to its raw water pump station (RWPS) including a like-for-like replacement of the existing raw water pumps with no increase to its permitted capacity of 6 MGD. The project includes like-for-like replacement of facility’s two (2) 6 MGD horizontal split case centrifugal pumps and associated motors, including replacement of check valves, butterfly valves, piping and appurtenances associated with pumps replacements, replacement of the existing 300-kW emergency generator and automatic transfer switch (ATS), replacement and relocation of the Motor Control Center (MCC) and miscellaneous electrical accessories, modification of the SCADA system with relocation of the existing antennae, sump pump and float replacement, installation of a sodium permanganate system, landscape bank stabilization, and modification of access hatch to pump station lower level.</p> <p>The RWPS has four designated locations for raw water pumps, two of which are occupied by the existing 6 MGD pumps (positions #1 and #2). We propose to install two (2) new 6 MGD horizontal split case centrifugal pumps in the empty slots (positions #3 and #4) so that the existing pumps can continue to operate during construction, thereby reducing bypass pumping. Position #3 has an existing 30” intake flange, an existing check valve and an existing butterfly valve which connects to the discharge header pipe. Similarly, Position #4 has an existing 30” intake flange and an existing butterfly valve leading to the discharge header pipe, but lacks a check valve (see page 38, Raw Water Assessment Summary, Appendix 3). Beginning at the intake flanges of Positions #3 and #4, new installations will include two (2) 2” vacuum lines, two (2) 18” butterfly valves, two (2) primer valves, two (2) raw water pumps, two (2) raw water pump motors, discharge piping, one (1) check valve at position #4, and all appurtenances associated with the pump replacements.</p> <p>We propose to install one (1) new Motor Control Center (MCC) on the upper floor to replace the existing MCC. The upper floor has ample space such that the new MCC can be installed while the existing MCC continues to operate during construction.</p> <p>Proposed SCADA modifications and improvements will be designed to provide enhanced information on system performance such as pump discharge pressure, suction pressure alarm, check valve limit switch status and sump pump activity. The SCADA antenna will be relocated to the position indicated in Appendix 2, Figure 3, in order to improve the signal transfer. A weather</p>				

head will be added to the power pole containing the associated electrical conduit.

The existing emergency generator and automatic transfer switch (ATS) on site at the RWPS will be replaced with a new 300kW generator and ATS at its current location (see Figure 3).

Montgomery County proposes to pretreat the raw water for taste and odor control and improve water quality through removal of organic content, iron and manganese with a sodium permanganate system. The County prefers liquid form (sodium permanganate) because it is easier to transport, store and handle when compared to the dry powder form (potassium permanganate). Sodium permanganate will be injected into the raw water line at the RWPS prior to reaching the WTP. This will help prevent biofilm growth while allowing sufficient detention time for the permanganate to be consumed prior to adding coagulants, thus reducing potential colloidal byproducts.

The County proposes to improve access to the lower level of the RWPS facility where the pumps and motors are located. The access is now through a hatch in the floor which does not provide comfortable headroom when descending/ascending the steep ship ladder-style steps. It is especially difficult to negotiate the access hatch while transporting equipment and tools, therefore, the access hatch will be widened to create more headroom.

The sump pump and float will be replaced because they are recommended for replacement every two years and the float signals were not verified to be in working order.

Finally, the County proposes general site improvements to stabilize steep embankments on either side of the RWPS. Erosion control efforts from the 2015 project were unsuccessful where slope erosion has continued to dominate the embankments. Slopes will be stabilized by enhancing vegetation cover, flow diffusing cover, or redirecting water flow. Vegetation is also intruding on the security fence and other areas within the property and will be removed accordingly.

Discuss permit requirements and status of each permit for the proposed project:

The implementation of this project is not anticipated to require significant permitting. The landscape bank stabilization component of the project may require an Erosion Control permit as a result of the stabilization activities. All additional construction activity will be conducted inside the RWPS or within the fence line of the property as seen in Figure 3 of Appendix 2. A public water supply permit may be required to review the sodium permanganate system. The proper State sections will be contacted to inform them of the impending work.

Discuss any sustainability considerations:

There are no sustainability considerations associated with this project.

Discuss all funding sources for the project:

This project is funded by the Division of Water Infrastructure with a State Reserve Project Grant of \$157,650 and Drinking Water State Revolving Funds Loan in the amount of \$1,200,050 with \$521,200 eligible for principal forgiveness. The grant fee and loan closing cost of \$26,400 will be paid by local funds.

5.0 Environmental Information Document

This project meets the "minimum criteria" for a categorical exclusion from substantive environmental review requirements (CE) under 15A NCAC 1C.0408. The submittal for the Categorical Exclusion is included in Appendix 5 with all checklists, supporting information, and notification documents.

6.0 Financial Analysis

6.1 Applicant's/LGU's Financial Condition

Table 6.1. Applicant's/LGU's Financial Condition Raw Water Pump Station Improvements RWPS Improvements with 6 MGD Replacement Pumps		
Utility Bill as Percent of Median Household Income		
<i>Use the pulldown menu to select the type of rate structure used for water and sewer. If using a rate structure other than uniform, then there is no need to complete the base charge (charge and volume) or volumetric charge.</i>		
	Sewer Rate Structure	Water Rate Structure
Rate Structure:	Other	Other
Base Charge:		
Thousands of Gallons in Base Charge:		
Volumetric Charge per 1,000 gallons:		
Monthly Bill for 5,000 gallons:	\$0.00	\$41.00
Combined Monthly Water and Sewer Bill for 5,000 gallons:	\$41.00	
Median Household Income:	\$34,819	
Monthly Median Household Income for LGU:	\$2,902	
Bill as % of Median Household Income:	0.00%	1.41%
Overall Bill as % of Median Household Income:	1.41%	
<i>Additional Information if needed (see Subchapter 8.1 of Part B of the guidance).</i>		
Montgomery County provides water to 6 municipalities in addition to their direct customers, however they only provide sewer service to 3 municipalities. Therefore the project is assessed based on their water utility bill only.		

6.2 Funding Distribution

Table 6.2. Funding Distribution Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps					
Enter data into the gray areas. Where applicable, use the pulldown menus as shown by the arrows.					
	Funding Source ^a	Amount	Funding Type	Specified Interest Rate from LOIF ^b (if applicable)	Repayment Period (if applicable)
Main Division Funding:	DWSRF	\$678,850	Loan	0.000%	20
Funding 1:	DWSRF-PF	\$521,200	Principal Forgiveness	0.000%	N/A
Funding 2:	DW-SRP	\$157,650	Grant	N/A	N/A
Funding 3:	Local Funds	Closing Cost	Cash	N/A	N/A
Closing/Administrative Fee(s):		\$26,400	If Other, list:		
Total Funded Amount (minus applicable closing/administrative		\$1,357,700			
Total Project Cost (with closing/administrative fee(s)):		\$1,384,100			

^aFor SRP grants, grant administrative fee is 1.5% of Total grant award.

For SRP and SRF loans, loan administrative fee is 2.0% of Total loan award.

^bLOIF is Letter of Intent to Fund issued by the Division.

6.3 Year 1 Interest and Repayment

Table 6.3. Year 1 Interest and Repayment Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps					
	Funding Source	Total Funding Amount	Year 1 Principal Payment	Year 1 Interest Payment	Year 1 Total Payment (Principal + Interest)
Main DWI Funding :	DWSRF	\$678,850	\$33,943	\$0	\$33,943
Funding 1:	DWSRF-PF	\$521,200			
Funding 2:	DW-SRP	\$157,650			
Funding 3:	Local Funds	Closing Cost			
Total Payment @ Specified Interest Rate(s)^a:					\$33,943

^aThe interest rates are shown on Table 6.2

6.4 User Fee Increase Due to Project

Table 6.4. User Fee Increase Due to Project Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps							
Select Customer Type for Financing Project ^c		Average Water Usage Per Month (gallons)	Number of Connections	Total Monthly Water Usage by Customer Type (gallons)	Total Monthly Water Usage for Customer Base (gallons):		80,795,122,500
<input checked="" type="checkbox"/>	Residential	14,174,167	5,610	79,517,075,000	# of 5,000 Gallon Units to Finance Project:		16,159,025
<input checked="" type="checkbox"/>	Non-Residential	8,577,500	149	1,278,047,500	Year 1 O&M Expenses Due to Project:		\$214,727
	Funding Source	Year 1 Annual Repayment	Year 1 Annual O&M Costs	Total Year 1 Annual Costs @ Specified Interest Rate	Year 1 Monthly Costs @ Specified Interest Rate	Monthly Cost/ 5,000 Gallons Due to Project @ Specified Interest Rate (All Users)	Monthly Cost/5,000 Gallons Due to Project @ Specified Interest Rate (Residential Users Only)
DWI Main Funding Source:	DWSRF	\$33,943	\$214,727	\$248,670	\$20,722	\$0.00	\$0.00
Funding Source 1:	DWSRF-PF						
Funding Source 2:	DW-SRP						
Funding Source 3:	Local Funds						
Total Year 1 Annual Cost @ Specified Interest Rate:				\$248,670			
Total Year 1 Monthly Cost @ Specified Interest Rate:					\$20,722		
Total Monthly Cost to Treat 5,000 Gallons @ Specified Interest Rate:						\$0.00	
Total Monthly Cost to Treat 5,000 Gallons @ Specified Interest Rate (Residential Users Only):							\$0.00

6.5 Impacts to User Rates

Table 6.5. Impacts to User Rates Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps			
Current Sewer Bill (\$/5,000 gallons):	N/A		
Current Water Bill (\$/5,000 gallons):	\$41.00		
Current - Combined Water & Sewer Bill (\$/5,000 gallons):	\$41.00		
	Funding Source	User Rate Increase Due to Project @ Specified Interest Rate (All Users)	User Rate Increase Due to Project @ Specified Rate (Residential Users Only)
Main IFS Funding Source:	DWSRF	\$0.00	\$0.00
Funding Source 1:	DWSRF-PF		
Funding Source 2:	DW-SRP		
Funding Source 3:	Local Funds		
Total User Rate Increase Due to DWI Loan(s) (\$/5,000 gal.):		\$0.00	\$0.00
Total Increase Due to All Loans(s) (\$/5,000 gal.):		\$0.00	\$0.00
New Sewer Bill Due to DWI Loan(s) (\$/5,000 gal.):		N/A	N/A
New Sewer Bill Due to All Loan(s) (\$/5,000 gal.):		N/A	N/A
Percent Change in Sewer Bill Due to DWI Loan(s):		N/A	N/A
Percent Change in Sewer Bill Due to All Loan(s):		N/A	N/A
New Sewer & Water Bills Due to DWI Loan(s) (\$/5,000 gal.):		\$41.00	\$41.00
New Water & Sewer Bills Due to All Loan(s) (\$/5,000 gal.):		\$41.00	\$41.00
Percent Change in Sewer & Water Bills Due to DWI Loan(s):		0.00%	0.00%
Percent Change in Sewer & Water Bills Due to All Loan(s):		0.00%	0.00%

^aChange in User Fee to finance DWI Loan.

^bChange in User Fee to finance ALL funding sources.

6.6 Impact to Bills Due to Project

Table 6.6. Impact to Bills Due to Project Raw Water Pump Station Improvements Montgomery County RWPS Improvements with 6 MGD Replacement Pumps					
Sewer Bill as % Monthly MHI:		N/A		Water Bill as % Monthly MHI: 1.41%	
Current Sewer Bill (\$/5,000 gal.):		N/A		Current Water Bill (\$/5,000 gal.): \$41.00	
Current Sewer & Water Bill (\$/5,000 gal.):		41.00		Sewer & Water Bill as % Monthly MHI: 1.41%	
Monthly MHI for LGU:		\$2,902			
		Sewer Bill Due to DWI Loans	Sewer Bill Due to All Loans	Water & Sewer Bills Due to DWI Loans	Water & Sewer Bills Due to All Loans
Specified Interest Rate (All Users)	New	N/A	N/A	\$41.00	\$41.00
	New %MHI Due to Project	N/A	N/A	1.41%	1.41%
	Potentially Significant Impact?	N/A	N/A	No	No
Specified Interest Rate (Residential Users Only)	New	N/A	N/A	\$41.00	\$41.00
	New %MHI Due to Project	N/A	N/A	1.41%	1.41%
	Potentially Significant Impact?	N/A	N/A	No	No
<i>If the user fee increases will be significantly increased, discuss why the LGU has determined to proceed with the project.</i>					
<i>If a different financial model has been used to determine project financing, then discuss how the Applicant will accommodate the project in terms of financing it.</i>					

7.0 Public Participation

Public Participation for DWSRF programs is completed during the DWSRF Environmental Process.

APPENDIX 1

Submittal Checklist for Engineering Reports/Environmental Information Documents

(Last updated: May 2017)

This checklist must accompany the initial submittal of all Engineering Reports/Environmental Information Documents. If your submittal does not contain this checklist, the Project Manager will not start review until it is received.

A. Number of Reports Submitted

Number of Copies Submitted: 2 copies 4 copies (FONSIs only) Other:

B. Contact Information

Owner Information

Is the contact person (Elected Official or Authorized Representative) different from the application? Yes No

First Name Chris	Last Name Hildreth	Suffix	Position Director of Development and Infrastructure	<input type="checkbox"/> Elected Official <input checked="" type="checkbox"/> Authorized Representative	
Mailing Address 1 PO Box 425		Mailing Address 2		City Troy	State NC
				Zip Code 27371	
E-Mail Address chris.hildreth@montgomerycountync.com				Phone Number (910) 439-6197	Extension (if applicable)

Consultant Information

Is the contact person different from the application? Yes No

Firm Name The Wooten Company	First Name Courtney	Last Name Gamble	Suffix P.E.
Mailing Address 1 300 S Main St	Mailing Address 2 Lower Level	City Winston-Salem	State NC
		Zip Code 27101	
E-Mail Address cgamble@thewootencompany.com		Phone Number (336) 722-5326	Extension (if applicable)

Environmental Information Document Contact Information

Did a separate firm prepare the Environmental Information Document? Yes No

If Yes, complete the information below. If No, then continue to Part C (Project Information).

Firm Name	First Name	Last Name	Suffix
Mailing Address 1	Mailing Address 2	City	State
		Zip Code	
E-Mail Address		Phone Number	Extension (if applicable)

C. Project Information

Project Name

Montgomery County
Raw Water Pump Station Improvements


Project Type

Check all that apply in terms of project type. Note that for the CDBG-I program, projects in both wastewater and water may be checked.

<input type="checkbox"/> Wastewater Treatment Plant Equipment Repair and Replacement <input type="checkbox"/> Wastewater Treatment Plant Expansion <input type="checkbox"/> Collection System Rehabilitation and Replacement <input type="checkbox"/> Collection System Expansion <input type="checkbox"/> Reclaimed Water <input type="checkbox"/> Stormwater Best Management Practices <input type="checkbox"/> Stream/Buffer/Wetland Restoration <input type="checkbox"/> Rainwater Harvesting	<input checked="" type="checkbox"/> Water Treatment Plant Equipment Repair and Replacement <input type="checkbox"/> Water Treatment Plant Expansion <input type="checkbox"/> Water Line Rehabilitation and Replacement <input type="checkbox"/> Water Storage Repair/Replacement/Expansion <input type="checkbox"/> Water Source Development
--	--

D. Environmental Information	
Check the box for the appropriate final information document required for the project and based upon the minor construction activities listed in Appendix A of the guidance (CWSRF, DWSRF, WW-SRP, and DW-SRP only), and any discussion with Division staff. Note: Under the CDBG-I program, the Responsible Entity will be in charge of the environmental review process. The Consultant should check which environmental document the Responsible Entity is preparing.	
Final Environmental Document	
<input type="checkbox"/> Certificate of Exemption (CDBG-I only)	<input type="checkbox"/> Categorical Exclusion Not Subject to §58.5 (CDBG-I only)
<input type="checkbox"/> Categorical Exclusion Subject to §58.5 (CDBG-I only)	<input type="checkbox"/> Finding of No Significant Impact (all funding programs)
<input checked="" type="checkbox"/> Categorical Exclusion (CWSRF and DWSRF only)	<input type="checkbox"/> Record of Decision (all funding programs)
<input type="checkbox"/> Approval Only (WW-SRP and DW-SRP)	
Check the box(es) for the river basin(s) where the project is found. This information is used for programmatic reporting purposes.	
<input type="checkbox"/> Broad	<input type="checkbox"/> New
<input type="checkbox"/> Cape Fear	<input type="checkbox"/> Pasquotank
<input type="checkbox"/> Catawba	<input type="checkbox"/> Roanoke
<input type="checkbox"/> Chowan	<input type="checkbox"/> Savannah
<input type="checkbox"/> French Broad	<input type="checkbox"/> Tar-Pamlico
<input type="checkbox"/> Hiwassee	<input type="checkbox"/> Watauga
<input type="checkbox"/> Little Tennessee	<input type="checkbox"/> White Oak
<input type="checkbox"/> Lumber	<input checked="" type="checkbox"/> Yadkin
<input type="checkbox"/> Neuse	

E. Funding Information			
Estimated Project Cost			
Provide the estimated Project Cost: \$1,384,100 including grant & loan fee estimates			
Funding Source(s)			
Check the box(es) for each source of funding, including those outside of the Division. Place the amount(s) in the appropriate column.			
<input type="checkbox"/> CWSRF	\$	<input type="checkbox"/> North Carolina Rural Center	\$
<input checked="" type="checkbox"/> DWSRF	\$ 1,200,050	<input type="checkbox"/> USDA Grant/Loan	\$
<input type="checkbox"/> CDBG-I	\$	<input type="checkbox"/> Bonds	\$
<input type="checkbox"/> WW-SRP	\$	<input checked="" type="checkbox"/> Local Funds	\$ 26,400
<input checked="" type="checkbox"/> DW-SRP	\$ 157,650	<input type="checkbox"/> Bank Loans	\$
		<input type="checkbox"/> Other, Specify: DWSRF Loan	\$

F. Signature	
This submittal checklist has been completed and is, to the best of my knowledge, accurate.	
Signature:	
Date:	11/30/18

APPENDIX 2

Project Vicinity
Raw Water Pump Station
Montgomery County, NC
 November 2018

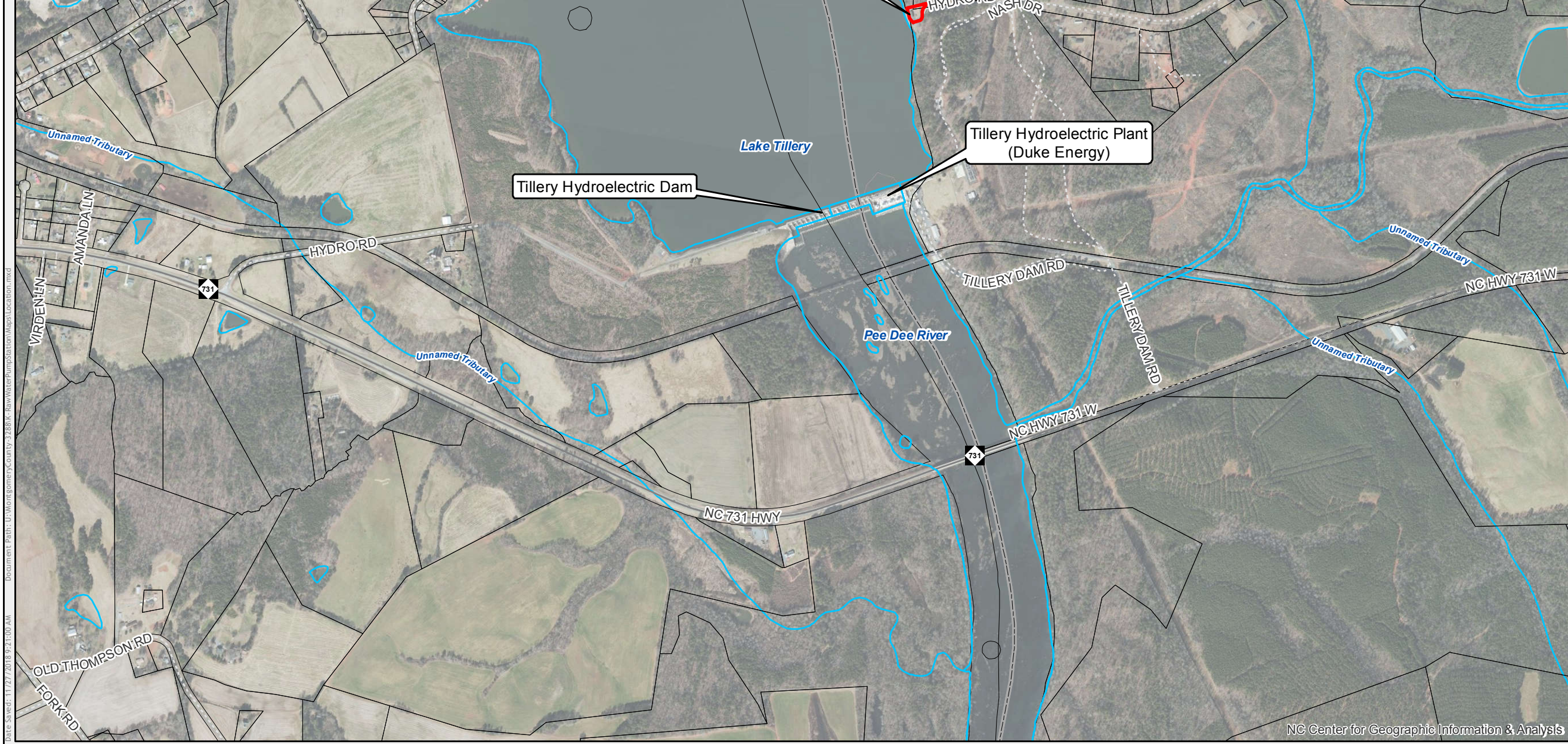
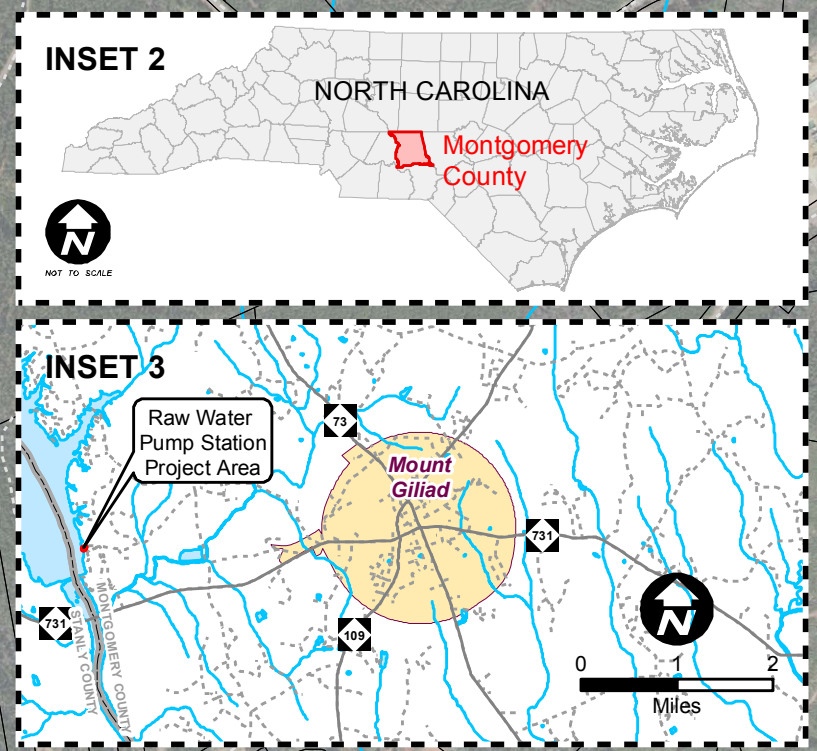
- Legend**
- Street
 - NC Route
 - Stream
 - River/Lake
 - ▭ Raw Water Pump Station Project Area
 - ▭ Parcel
 - ▭ County Boundary

1 inch = 1,000 feet

0 500 1,000
Feet



The Wooten Company makes every effort to produce and publish GIS maps using the most current and accurate information possible, however, the maps are strictly for planning purposes only. The maps are compiled from recorded deeds, plats, and other public and private records and data. Users of the maps are hereby notified that the aforementioned public primary information sources should be consulted for verification of the information on this map. The Wooten Company assumes NO responsibility for the information contained on the maps unless the map is signed and sealed by a licensed Professional Land Surveyor. Please contact the GIS Group at (919) 828-0521 or tcchan@thewootencompany.com for data source information.












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Montgomery County WTP Service Area

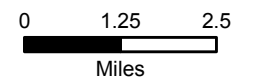
November 2018

Legend

-  Raw Water Intake and Water Treatment Plant
-  Interstate
-  US Route
-  NC Route
-  Ramp
-  Lake
-  Municipality Served by Montgomery County
-  Other Municipality
-  County Boundary

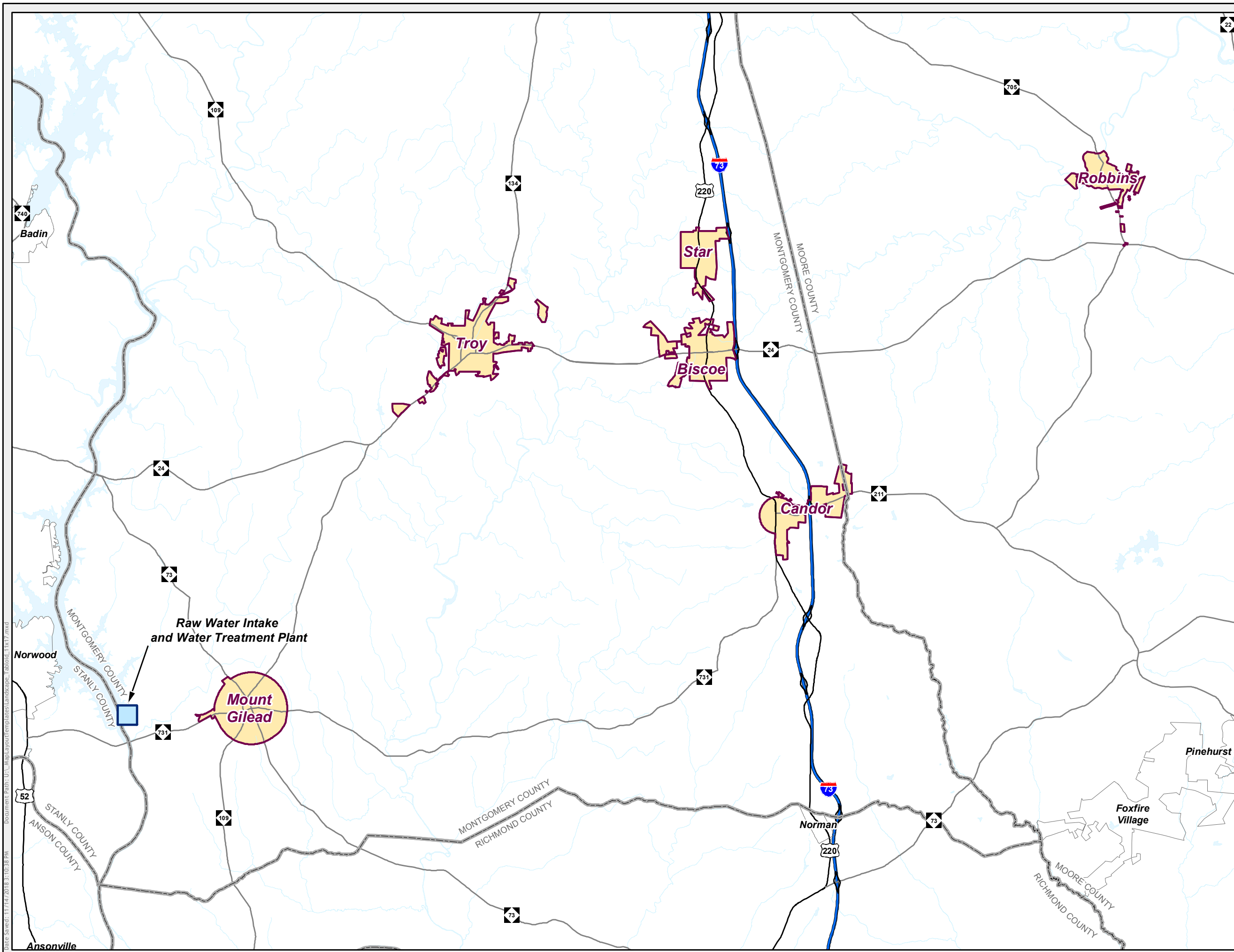


1 inch = 2.5 miles



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Alternative 1 RWPS Improvements with 6 MGD Replacement Pumps

DWI Project Nos.
H-SRP-D-18-0161
and WIF1951
Raw Water Pump Station
Improvements

Montgomery County, NC
35.2112° N, 80.0639° W

November 2018

The Wooten Company, NC OneMap

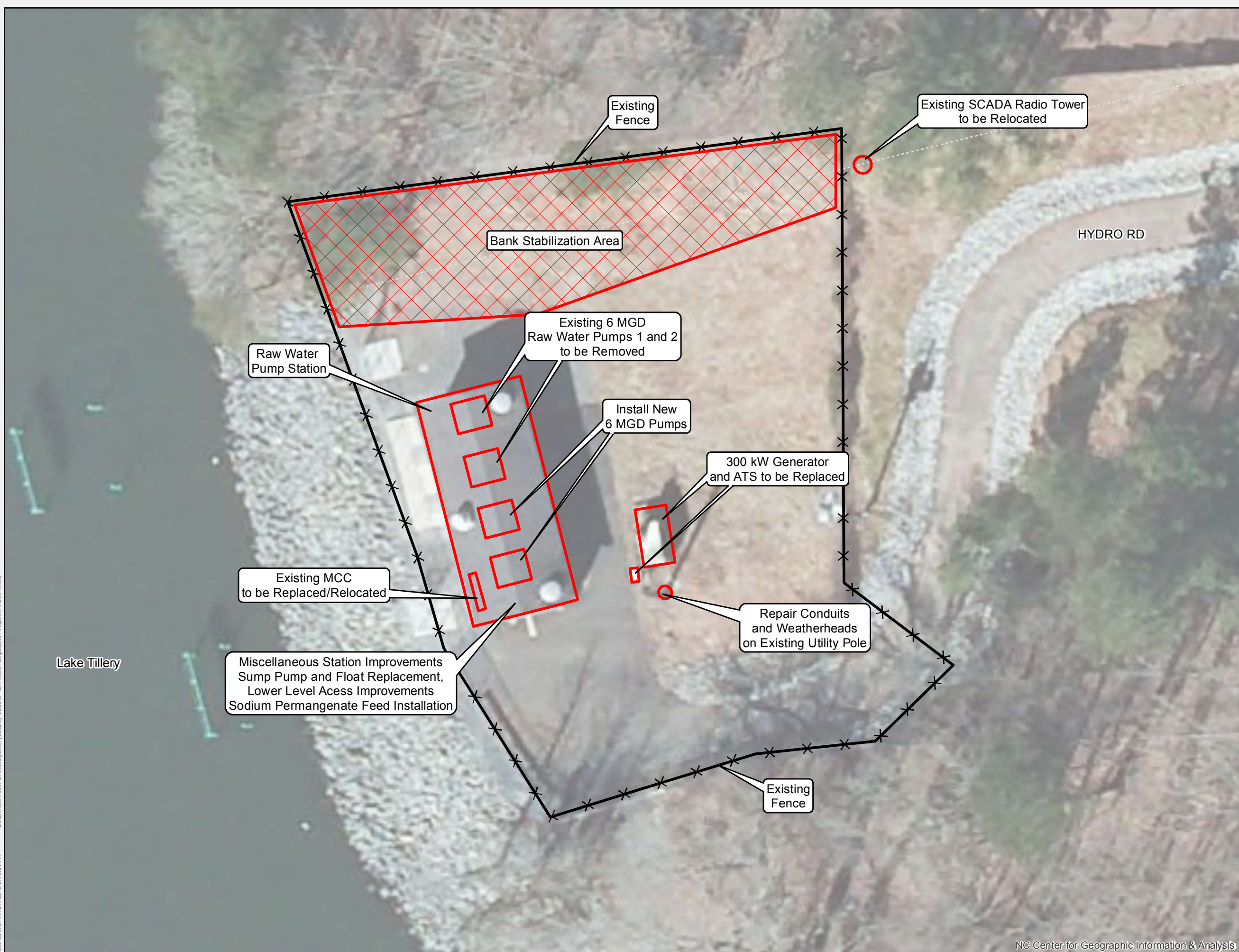


1 inch = 20 feet
0 10 20
Feet



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**Alternative 2
RWPS Improvements with
4 MGD Replacement Pumps**

**DWI Project Nos.
H-SRP-D-18-0161
and WIF1951
Raw Water Pump Station
Improvements**

Montgomery County, NC
35.2112° N, 80.0639° W

November 2018

The Wooten Company, NC OneMap

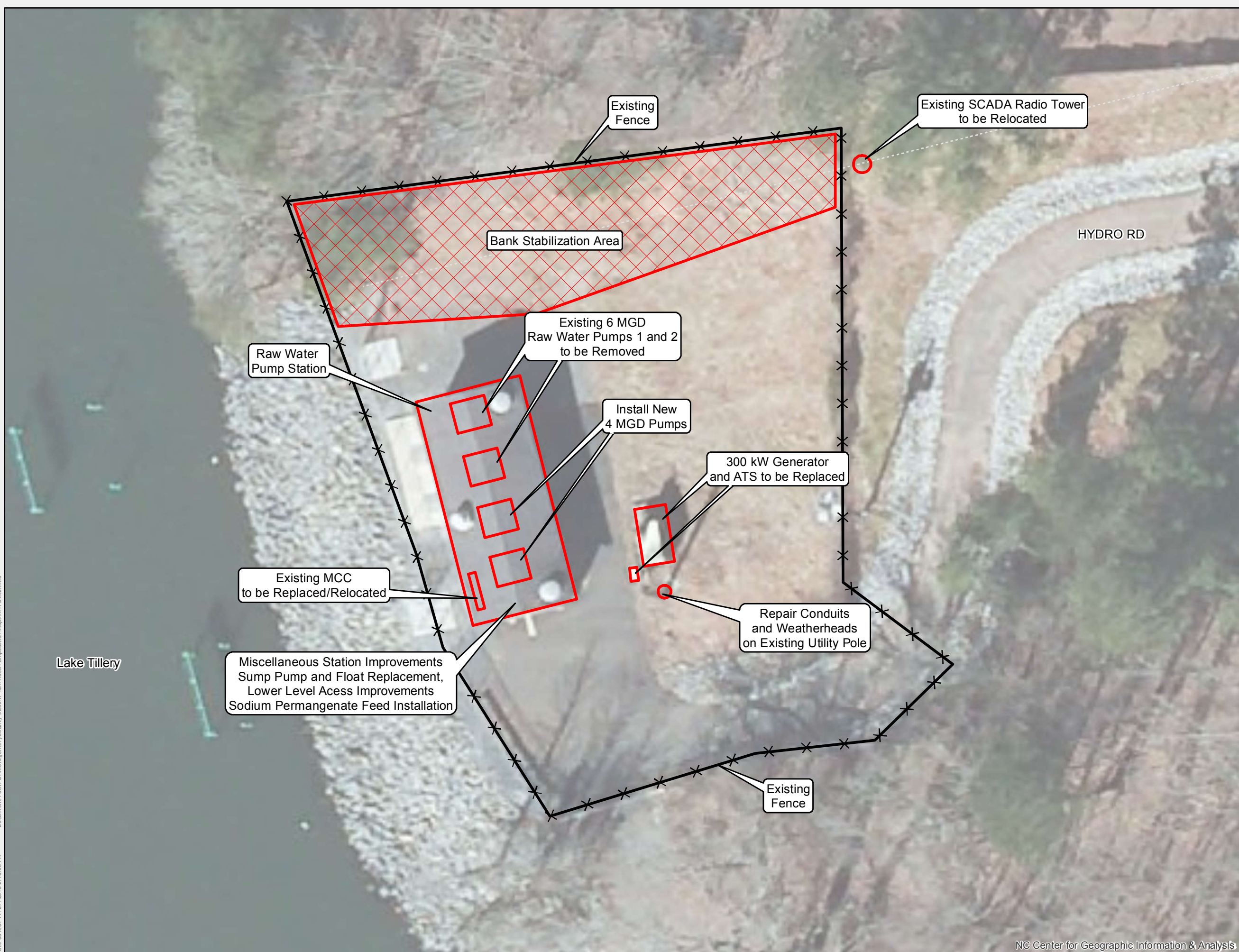


1 inch = 20 feet
0 10 20
Feet



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Alternative 3
RWPS Improvements with
6 MGD Replacement Pumps
with VFDs

DWI Project Nos.
H-SRP-D-18-0161
and WIF1951
Raw Water Pump Station
Improvements

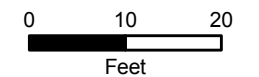
Montgomery County, NC
35.2112° N, 80.0639° W

November 2018

The Wooten Company, NC OneMap

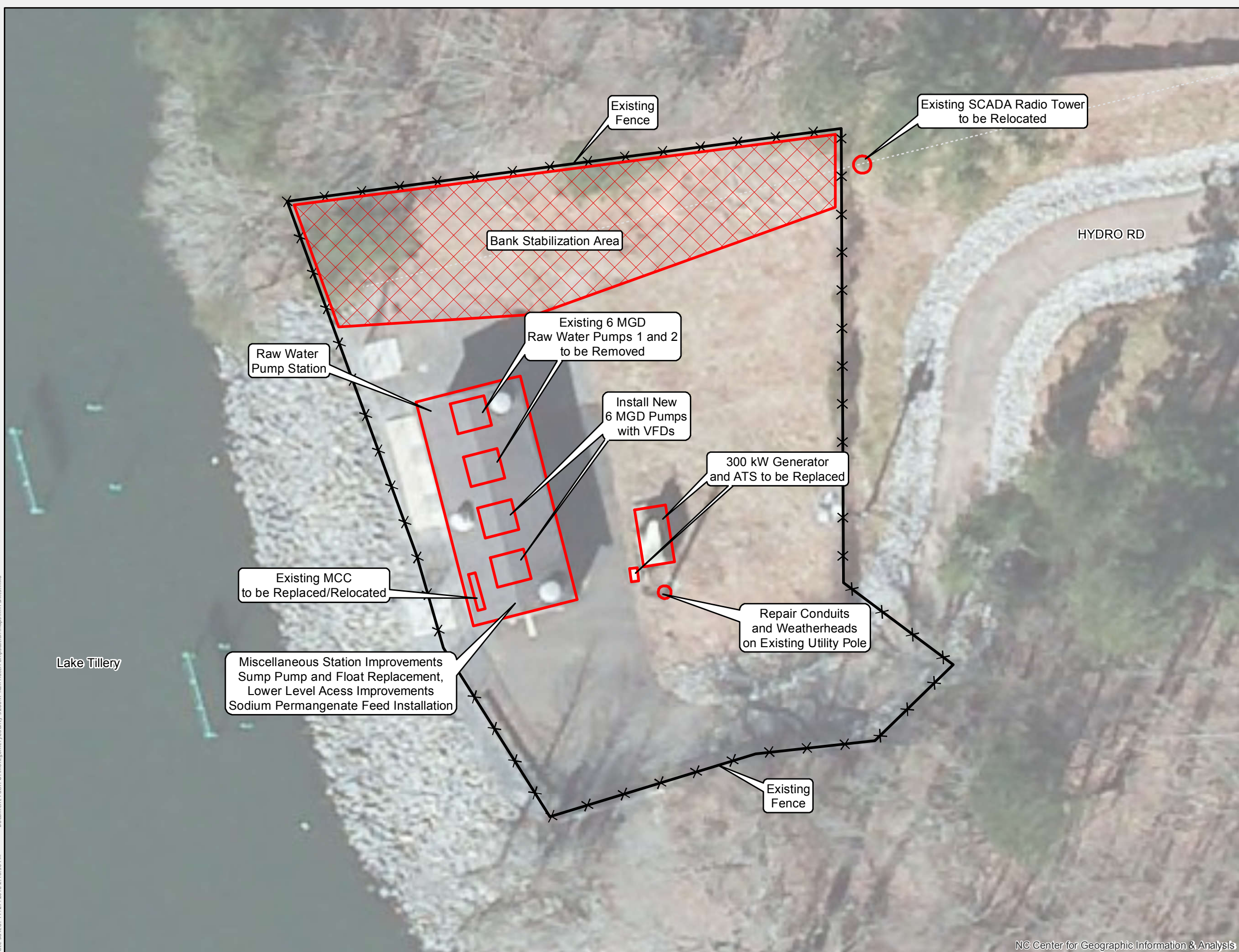


1 inch = 20 feet



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APPENDIX 3

3.a

Raw Water Intake Asset Assessment



Executive Summary

Montgomery County

Raw Water Intake

Asset Assessment

Asset Assessment Methodology

1. This report provides assessment results conducted for equipment, components and systems in the following Public Utility facility:
 - a. Montgomery County Raw Water Intake
2. Specific assessments were performed in the following areas:
 - a. Structural Integrity
 - b. Pumps and Motors
 - c. Valves and Actuators
 - d. Electrical Inspection
 - e. Piping Inspection
 - f. Overall Site Evaluation
 - g. Overall Station Inspection
3. Assessment results are summarized for each type of asset (equipment, component or system) and listed on the attached “**Asset Summary Sheets & Risk Analysis**” document. Report details include, but are not limited to:
 - a. Asset Name
 - b. Installation Year
 - c. Condition
 - d. Consequences of Failure
 - e. Replacement Year
 - f. Replacement Cost
 - g. Repair Cost
 - h. Remaining Life
 - i. Expected Life
 - j. Probability of Failure %

4. Condition was determined for each asset based on:
 - a. Probability of Failure (determined by CRU formula weighted per remaining/expected life, exposure environment, performance data, maintenance/failure history, operational status, vibration and electrical condition).
 - b. Consequences of Failure (based on operational impact at component level).
 - c. A “Criticality Value” and specific “CRU Designed Inspection” documents were used to assign condition grades based on the scales explained below.

5. Criticality Value – A standardized scale used to determine failure probability & consequences based on a condition grade from 1 to 5 as shown in **Figure 1** below:

Figure 1

Condition Grade	1	2	3	4	5
Probability of Failure	90% of remaining life	75% of remaining life	50% of remaining life	25% of remaining life	0% of remaining life
Consequences of Failure	Insignificant	Minor	Moderate	Major	Catastrophic

6. Specific Component Scoring Criteria - Based on equipment age, operational & maintenance historical data, visual inspection & performance testing results, the overall asset was assigned an average score using criteria that is repeatable and non-subjective per the following scale:

Excellent	Very Good	Good	Fair	Poor
≤ 1.0	1.1 to 2.0	2.1 to 3.0	3.1 to 4.0	4.1 to 5.0

7. The following CRU designed documents were used to determine the average scores and are attached.
- a. **CRU Overall Ratings Guide** – provided high level guidelines to determine if equipment was in Excellent, Very Good, Good, Fair or Poor condition.
 - b. **CRU Designed Inspection Grade Criteria** – provided individual inspection points for each component in the asset category.
 - 1) A score of 1 to 5 was assigned for each component inspection point in the asset category and added together to determine a total asset score.
 - 2) The total asset scores were then divided by the number of individual inspection points to determine the average score.
 - 3) The average score was reviewed to determine the equipment condition (for example an average score of 1.5 would indicate the equipment is in “Very Good” condition).
 - c. **CRU Designed Average Equipment Life** – provided guidelines for factoring equipment age to determine if equipment was in Excellent, Very Good, Fair or Poor condition.
8. Based on results and manufacturer maintenance recommendations, a Preventive Maintenance Matrix (PM Matrix) was developed and issued to the customer per the **Underwood Procedure, CRU-PM-MATRIX-01** format (this is a document separate from the information contained in this Executive Summary).

9. Photos are attached as supporting documentation to identify and provide additional detail for conditions assessed, as required.

Asset Summary Sheets & Risk Analysis

Sheet 1 of 5

Montgomery County System Inventory & Risk Analysis		1194 Hydro Rd Mt. Gilead, NC 27306				Raw Water Intake			
Asset	Installation Year	Condition	Consequence of Failure	Replacement Year	Replacement Cost	Repair Cost	Remaining Life	Expected Life	Probability of Failure %
Building (Concrete/Steel Integrity)	1982	Fair 3.1	Moderate 3	N/A					
Intake, Wet Well, Valve Boxes	1982	Fair 3.1	Moderate 3	N/A					
Crane/Hoist (manual)	1982	Fair 3.1	Moderate 3	2032	9,000.00	N/A	14 years	50 yrs.	N/A
Raw Water Pump #1 (Aurora 411-BF)/rotating assy. replaced	1982/2009	Good 2.7	Major 4	2024	40,000.00	18,000.00 (rotating assembly)	6 years	40 yrs.	50% (2.54)
Raw Water Pump #2 (Aurora 411-BF)/rotating assy. replaced	1982/2009	Good 2.7	Major 4	2024	40,000.00	18,000.00 (rotating assembly)	6 years	40 yrs.	50% (2.54)
Raw Water Pump Motor #1 (U.S. Motors Frame 445T, 125 HP)	1982 (rewound twice)	Good 2.7	Moderate 3	2022	11,000.00	6,500.00	4 years	15 to 20 yrs.	50% (2.54)
Raw Water Pump Motor #2 (U.S. Motors Frame 445T, 125 HP)	1982 (rewound twice)	Good 2.7	Moderate 3	2022	11,000.00	6,500.00	4 years	15 to 20 yrs.	50% (2.54)
Check Valve #1 (CCNE 18" Swing Check)	2004	Very Good 1.7	Minor 2	2039	40,000.00	5,500.00	21 years	30 to 40 yrs.	N/A
Check Valve #2 (CCNE 18" Swing Check)	2004	Very Good 1.7	Minor 2	2039	40,000.00	5,500.00	21 years	30 to 40 yrs.	N/A

* Replacement cost based on end of life cost calculated at 5% per year from current factory replacement cost.

** Repair cost based on repair interval from CRU Designed Average Equipment Life table

Asset Summary Sheets & Risk Analysis

Sheet 2 of 5

Montgomery County System Inventory & Risk Analysis		1194 Hydro Rd Mt. Gilead, NC 27306				Raw Water Intake			
Asset	Installation Year	Condition	Consequence of Failure	Replacement Year	Replacement Cost	Repair Cost	Remaining Life	Expected Life	Probability of Failure %
Check Valve #3 (CCNE 18" Swing Check - INACTIVE)	2004	Very Good 1.7	Insignificant 1	-----	40,000. ⁰⁰	N/A	N/A	N/A	N/A
Butterfly Valve #1 (American Darling 18" with Gear Actuator)	1982	Very Good 1.7	Minor 2	2022	5,500. ⁰⁰	N/A	4 years	40 yrs.	N/A
Butterfly Valve #2 (American Darling 18" with Gear Actuator)	1982	Very Good 1.7	Minor 2	2022	5,500. ⁰⁰	N/A	4 years	40 yrs.	N/A
Butterfly Valve #3 (Dezurik 18" with Gear Actuator)	2004	Very Good 1.7	Minor 2	2044	17,500. ⁰⁰	N/A	26 years	40 yrs.	N/A
Butterfly Valve #4 (Dezurik 18" with Gear Actuator)	2004	Very Good 1.7	Minor 2	2044	17,500. ⁰⁰	N/A	26 years	40 yrs.	N/A
Butterfly Valve #5 (Dezurik 36" with Chain Wheel/Gear Actuator)	2004	Very Good 1.7	Minor 2	2044	25,000. ⁰⁰	N/A	26 years	40 yrs.	N/A

Asset Summary Sheets & Risk Analysis

Montgomery County System Inventory & Risk Analysis		1194 Hydro Rd Mt. Gilead, NC 27306				Raw Water Intake			
Asset	Installation Year	Condition	Consequence of Failure	Replacement Year	Replacement Cost	Repair Cost	Remaining Life	Expected Life	Probability of Failure %
Butterfly Valve #6 (Dezurik 18" with Gear Actuator - INACTIVE)	2004	Very Good 1.7	Insignificant 1	-----	17,500.00	N/A	N/A	N/A	N/A
Butterfly Valve #7 (Dezurik 18" with Gear Actuator - INACTIVE)	2004	Very Good 1.7	Insignificant 1	-----	17,500.00	N/A	N/A	N/A	N/A
Gate Valve #1 (American Darling 8" with Chain Wheel Actuator & Pressure Relief/Sustaining Valve)	1982	Very Good 1.7	Minor 2	2022	1,600.00	N/A	4 years	40 yrs.	N/A
Gate Valve #2 (American Darling 8" with Chain Wheel Actuator & Pressure Relief/Sustaining Valve)	1982	Very Good 1.7	Minor 2	2022	1,600.00	N/A	4 years	40 yrs.	N/A
Vacuum Pump: Two Ingersoll Rand V255 Air Compressors & 5HP Baldor Motors	1982/2004	Good 2.7	Moderate 3	2024	12,000.00	5,000.00	6 years	20 years	N/A

Asset Summary Sheets & Risk Analysis

Sheet 4 of 5

Montgomery County System Inventory & Risk Analysis		1194 Hydro Rd Mt. Gilead, NC 27306				Raw Water Intake			
Asset	Installation Year	Condition	Consequence of Failure	Replacement Year	Replacement Cost	Repair Cost	Remaining Life	Expected Life	Probability of Failure %
Air Release Valve, CLA-VAL, 6", Model MTB3666-CAV-116, Stock# 20181204J (Raw Water Line)	2004	Very Good 1.7	Minor 2	2029	40,000.00	8,500.00	11 years	25 years	N/A
Motor Control Center/Switchgear (50 yr. maximum life, 45 yr. recommended)	1982	Fair 3.3	Catastrophic 5	2032	200,000.00	50,000.0	14 years	50 years	N/A
Conduit	1982	Good 3	Minor 2	2032	20,000.00	N/A	14 years	50 years	N/A
Electrical panels	1982	Good 3	Moderate 3	2032	15,000.00	N/A	14 years	50 years	N/A
Emergency Generator	prior 2000	By others	Major 4	2025	150,000.00	15,000.0	7 years	25 years	N/A
Piping	1982/2004	Good 2.7	Major 4	2079	400,000.00	N/A	61 years	75 years	N/A
Electrical Supply to Site	1982	Poor 4.1	Catastrophic 5	<i>Duke Energy</i>	<i>Duke Energy</i>	N/A	N/A	N/A	N/A
Drainage	1982	Very Good 1.7	Minor 2	As needed	10,000.00	N/A	N/A	N/A	N/A
Security - Fencing/Gate	1982	Very Good 1.7	Minor 2	2032	25,000.00	N/A	14 years	50 years	N/A

Asset Summary Sheets & Risk Analysis

Sheet 5 of 5

Montgomery County System Inventory & Risk Analysis		1194 Hydro Rd Mt. Gilead, NC 27306				Raw Water Intake			
Asset	Installation Year	Condition	Consequence of Failure	Replacement Year	Replacement Cost	Repair Cost	Remaining Life	Expected Life	Probability of Failure %
Grade/Drive/Asphalt	1982/2015	Very Good 1.7	Minor 2	2040	150,000. ⁰⁰	N/A	22 years	25 years	N/A
Lighting	1982	Very Good 1.7	Minor 2	Every 10 yrs.	6,000. ⁰⁰	2,500. ⁰⁰	N/A	10 years	N/A
HVAC	1982	Very Good 1.7	Insignificant 1	As needed	4,000. ⁰⁰	N/A	N/A	10 years	N/A
Sump & Sump Pumps	1982	Fair 4.0	Moderate 3	Every 2-3 yrs.	1,000. ⁰⁰	N/A	N/A	2 years	N/A

Asset Summary Sheets & Risk Analysis

Sheet 1 of 1

Montgomery County System Inventory & Risk Analysis		724 Hydro Rd. Mt. Gilead, NC 27306				Raw Water Meter			
Asset	Installation Year	Condition	Consequence of Failure	Replacement Year	Replacement Cost*	Repair Cost**	Remaining Life	Expected Life	Probability of Failure %
Building (Concrete/Steel Integrity)	1985	Good 2.6	Moderate 3	N/A					
Raw Water Meter Badger Meter Serial# 972339, Style PMT-SC	1985	Good 3.0	Minor 2	2035	15,000. ⁰⁰	N/A	17 years	50 years	N/A
Rosemount Transmitter Serial # 080309100	1985	Good 3.0	Minor 2	As needed	952. ⁰⁰	N/A	N/A	N/A	N/A
Flow Control Butterfly Valve, American 16" BFV Model 2016	1985	Very Good 1.3	Minor 2	2025	5,500. ⁰⁰	N/A	7 years	40 years	N/A
Flow Control Actuator, AUMA Model SAR10.1	(unknown)	Very Good 1.3	Minor 2	N/A	6,500. ⁰⁰	N/A	N/A	25 years	N/A
Piping	1985	Good 2.6	Major 4	2060	40,000. ⁰⁰	N/A	42 years	75 years	N/A
Electrical	1985	Very Good 1.3	Moderate 3	2035	5,000. ⁰⁰	N/A	17 years	50 years	N/A
Overall Site	1985	Fair 3.5	Minor 2	2035	25,000. ⁰⁰	N/A	17 years	50 years	N/A

* Replacement cost based on end of life cost calculated at 5% per year from current factory replacement cost.

** Repair cost based on repair interval from CRU Designed Average Equipment Life table

**CRU Designed
Overall Ratings Guide**

Excellent	Very Good	Good	Fair	Poor
Operating same as new	Operates almost like new	Operational	Some operational issues	Subject to failure at anytime
Looks like new	No past operational issues	Meets all needs	Downtime exceeding expectations	Excessive downtime
No operational issues	Has planned maintenance but not always executed	No present issues	No regular maintenance	No maintenance
Dedicated routine maintenance	Periodic Monitoring in place	Has had minimal downtime	Starting to evaluate replacement	Replacements required
Established preventive maintenance program	Semi-established preventive maintenance program	Routine maintenance	Components beginning to run to critical failure	Run to failure
Planned maximum life cycle	Anticipating maximum life cycle	Meets average life cycle expectations	Average life cycle below expectations	Past life cycle
Minimum hours	Low hours/usage	Higher hours	Excessive Hours	Hours past design expectations

**CRU Designed
Average Equipment Life**

Years	Equipment
15 years	Raw Water Horizontal Split Case Pump Rebuild Cycle
40 years	Raw Water Horizontal Split Case Pump Replacement
30 years	Finish Water Horizontal Split Case Pump Rebuild Cycle
50 years	Finish Water Horizontal Split Case Pump Replacement
30 years	End Suction Pump Replacement
15 years	End Suction Pump Rebuild Cycle
15 years	Raw Water Vertical Turbine Pump Rebuild Cycle
40 years	Raw Water Vertical Turbine Pump Replacement
30 years	Finish Water Vertical Turbine Pump Rebuild Cycle
50 years	Finish Water Vertical Turbine Pump Replacement
15-20 years	Electrical Motors > 40 HP
10-15 years	Electrical Motors < 40 HP
20 years	Vacuum Pump Replacement
30 years	MCC Rebuild/Repair
50 years	MCC Replacement
50 years	Wiring & Conduit
25 years	Generator
40 years	Valves – Gate & Butterfly
20 years	Check Valves Repair
30-40 years	Check Valves Replacement
1 year	Air Release Valve Inspection

**CRU Designed
Average Equipment Life**

Years	Equipment
25 years	Air Release Valve Replacement
10 years	Pump Control Valve Rebuild
50 years	Pump Control Valve Replacement
40 years	Electrical Hoist Replacement
75 years	Piping Replacement
50 years	Chain Link Fence Replacement
25 years	Asphalt Repaved
10 years	Lighting Replacement
10 years	HVAC Replacement
2 years	Sump Pumps Replacement
15 years	Submersible Non-Clog Replacement
7.5 years	Submersible Non-Clog Rebuild Cycle
15 years	Rubber Expansion Joint Replacement
5 years	Gauge Replacement

Raw Water Intake

CRU Designed Inspection Grade Criteria
STRUCTURAL INTEGRITY

Asset #	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5
CONCRETE					
#1	No cracking or spalling, sealer good	No cracking or spalling Needs sealing/coating.	Minor cracking or spalling. Needs coating	Moderate spalling & cracking Needs repair.	Major cracking, spalling. Needs repair.
Score				4	
BUILDING					
#2	Roof				
	No leaks. New.	No leaks. Almost like new.	No leaks. Normal aging.	Some leaking. Needs minor repair.	Excessive leaking. Needs major repair.
Score			3		
#3	HVAC				
	HVAC operational. < 5 years old.	HVAC operational. <10 years old.	HVAC operational. < 20 years old.	HVAC operational but needs repair. < 30 years old.	HVAC non-operational. > 30 years old.
Score			3		
#4	Structural Integrity				
	Sound. New.	Sound. Almost like new.	Sound. Normal aging.	Decaying. Repairs needed.	Decaying. Safety Issues. Repairs needed.
Score				4	
#5	Floor				
	Smooth. Level. Drains operational & sealed.	Smooth. Level. Drains operational.	Rough. Level. Drains operational.	Rough. Cracked. Drain issues.	Rough. Cracked. Drain non-operational.
Score				4	
#6	Penetrations				
	Filled. No degradation.	Filled. Minor degradation.	Filled. Moderate degradation.	Open.	Open causing equipment degradation.
Score			3		
#7	Doors/Windows				
	Solid. No drag. Easy to open.	Solid. Drags but easy to open.	Drags. Approaching repairs.	Needs repair. Drags hard to open or close.	Needs repair. Major difficulty in opening/closing.
Score		2			
#8	Ladders/Steps				
	Like new.	No loose members. Normal wear.	Above average wear.	Needs repair.	OHSA non-compliant. Safety Issues.
Score		2			
Total Score =	0	4	9	12	0
Structural Integrity Average Score = (Total Score 25/8)			3.1		

CRU Designed Inspection Grade Criteria

PIPING

PIPING					
Asset #	Excellent 1	Very Good 2	Good 3	Fair 4	Poor 5
#1	Age < 10 years	Age < 20 years	Age < 40 years	Age < 60 years	Age < 75 years
Score			3		
#2	No leaks.	N/A	Previous signs of leaks.	N/A	Drips/Leaks.
Score			3		
#3	Adequate support.	N/A	Questionable support	N/A	Inadequate support
Score	1				
#4	No stresses.	N/A	Minor stresses.	N/A	Major stresses.
Score			3		
#5	No looseness.	Questionable looseness.	Minor looseness.	Moderate looseness.	Major looseness.
Score		2			
#6	No corrosion.	N/A	Some corrosion.	N/A	Excessive Corrosion.
Score			3		
#7	Pipe hangers restraints optimal.	Pipe hangers restraints adequate.	Pipe hangers restraints adequate. Minimum restraint.	Pipe hangers restraints minimal support. Inadequate restraint.	Pipe hangers restraints unsupported. Loose fittings/bolts. Unrestrained.
Score			3		
#8	Labeled.	N/A	Some/Poorly labeled.	N/A	Not labeled.
Score					5
#9	Alignment optimal.	Alignment adequate.	Alignment fair	Alignment bad.	Gross misalignment.
Score		2			
Total Score =	1	4	15	0	5
Piping Asset Average Score = (Total Score 25/9) =			2.7		

CRU Designed Inspection Grade Criteria
VALVES/ACTUATORS

VALVES/ACTUATORS					
Asset #	Excellent 1	Very Good 2	Good 3	Fair 4	Poor 5
#1	Age < 5 years	Age < 10 years	Age < 15 years	Age < 20 years	Age < 40 years
Score	1				
#2	Correct application.	N/A	Questionable application.	N/A	Wrong application.
Score	1				
#3	Still Manufactured? – Yes	N/A	N/A	N/A	Still Manufactured? - NO
Score	1				
#4	AWWA spec. – Yes	N/A	N/A	N/A	AWWA spec. - NO
Score	1				
#5	Operates properly? – Yes	N/A	Operates occasionally.	N/A	Operates properly? - NO
Score	1				
#6	Internal Leakage? None	Internal Leakage? Possible	Internal Leakage? Some	Internal Leakage? Excessive	Internal Leakage? Bad/Failure imminent
Score	1				
#7	External leakage? None	External leakage? A little	External leakage? Some	External leakage? Excessive	External leakage? Bad/Failure imminent
Score	1				
#8	Corrosion? None	Corrosion? A little	Corrosion? Some	Corrosion? Degraded.	Corrosion? Excessive
Score		2			
#9	Operation? Manual & Auto? Yes	N/A	N/A	N/A	Operation? Manual & Auto? NO
Score			N/A		
#10	Safety Features? Yes	N/A	N/A	N/A	Safety Features? NO
Score			N/A		
#11	Visual Position Indication? Yes	N/A	N/A	N/A	Visual Position Indication? NO
Score	1				
#12	Remote Position Indication? Yes	N/A	N/A	N/A	Remote Position Indication? NO
Score					5
Total Score =	7	2	3	0	5
Valves/Actuators Asset Average Score = (Total Score 17/10)				1.7	
=					

CRU Designed Inspection Grade Criteria

PUMPS

PUMPS					
Asset #	Excellent 1	Very Good 2	Good 3	Fair 4	Poor 5
#1	90% of remaining life	75% of remaining life	50% of remaining life	25% of remaining life	0% of remaining life
Score				4	
#2	Meets original output	With 5% original output	Within 15% original output	Within 20% original output	Off > 20% original output
Score	1				
#3	Vibration within allowable range	N/A	Vibration up to 10% over allowable range	N/A	Vibration off allowable range > 20%
Score			3		
#4	Pump Packing leakage within spec	N/A	Pump Packing leakage questionable	N/A	Packing leakage out of spec
Score	1				
#5	Mech Seal – No leakage	N/A	Mech Seal – dry to slightly wet	N/A	Mech Seal – excessive leakage
Score			N/A		
#6	Bearing < 2500 hours	Bearing < 5000 hours	Bearing < 10,000 hours	Bearing < 20,000 hours	Bearing > 20,000 hours
Score				4	
#7	Bearing – normal heat	N/A	Bearing – warm	N/A	Bearing –hot
Score			3		
#8	Bearing Lubrication scheduled & performed religiously	Bearing Lubrication scheduled & performed most of time	Bearing Lubrication scheduled & performed sometimes	Bearing Lubrication scheduled but never performed	Bearing Lubrication never scheduled or performed
Score			3		
#9	Grease no leakage	N/A	Grease some leakage	N/A	Grease excessive leakage
Score			3		
#10	Environment – Dry/Clean with HVAC	Environment - Dry/Clean without HVAC	Environment – Clean/damp	Environment – Dirty/damp	Environment – Dirty/wet
Score			3		
#11	Concrete – large mass	Concrete – moderate mass	Concrete – minimal mass/fair grout	Concrete – eroding mass/poor bad grouting & spalling	No defined base
Score	1				

(Pumps continued next page)

CRU Designed Inspection Grade Criteria

PUMPS (continued)

#12	Metal Bases – no corrosion, no cracks, no hollow spots, level	Metal Bases – light corrosion, no cracks, minimum to no hollow spots, level	Metal Bases – moderate corrosion, no cracks, moderate hollow spots, level	Metal Bases – corrosion, no cracks, moderate hollow spots, levelness Issues	Metal Bases – heavy corrosion, cracks, large hollow spots, levelness issues
Score				4	
#13	Documented Maintenance History. No Failures.	N/A	Incomplete Maintenance History. Some Failures.	N/A	No Documented Maintenance History. Multiple Failures.
Score			3		
Total =	3	0	18	12	0
Pump Asset Average Score = (Total Score 33/12) =			2.7		

CRU Designed Inspection Grade Criteria

MOTORS

MOTORS					
Asset #	Excellent 1	Very Good 2	Good 3	Fair 4	Poor 5
#1	90% of remaining life	75% of remaining life	50% of remaining life	25% of remaining life	0% of remaining life
Score					5
#2	Amperage 90% or less of nameplate	Amperage 95%	Amperage full	Amperage 5% over	Amperage 10% over
Score			3		
#3	Infrared – no action required (Δ 0-14F)	Infrared continue to monitor (Δ 15-39F)	Infrared repair at next overall outage (Δ 40-99F)	Infrared alarm schedule next train outage monitor (Δ 100-179F)	Infrared high alarm immediate action required monitor (Δ >180F)
Score	1				
#4	Bearings – no noise within 25% of allowable vibration	Bearings – no noise within 50% of allowable vibration	Bearings – noise within allowable vibration	Bearings – noise up to 10% over allowable vibration	Bearings – noise > 10% allowable vibration
Score			3		
#5	Bearing < 2500 hours	Bearing < 5000 hours	Bearing < 10,000 hours	Bearing < 20,000 hours	Bearing > 20,000 hours
Score					5
#6	Bearing – normal heat	N/A	Bearing – warm	N/A	Bearing –hot
Score					5
#7	Bearing Lubrication scheduled & performed religiously	Bearing Lubrication scheduled & performed most of time	Bearing Lubrication scheduled & performed sometimes	Bearing Lubrication scheduled & but never performed	Bearing Lubrication never scheduled or performed
Score			3		
#8	Grease no leakage	N/A	Grease some leakage	N/A	Grease excessive leakage
Score			3		
#9	Coupling Alignment within allowable range	N/A	N/A	N/A	Coupling Alignment out of allowable range
Score	1				
#10	Belts - new, properly tensioned, checked per scheduled frequency	Belts - < 3 yrs. old, properly tensioned, checked periodically	Belts – up to 5 yrs. old, tensioned, checked sometimes	Belts – over 5 yrs. old, tensioned, squealing, not checked	Belts – over 5 yrs. old, not tensioned, squealing, not checked
Score			N/A		

(Motors continued next page)

CRU Designed Inspection Grade Criteria
MOTORS (continued)

MOTORS (continued)					
Asset #	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5
#11	Concrete – large mass	Concrete – moderate mass	Concrete – minimal mass/fair grout	Concrete – eroding mass/poor bad grouting & spalling	No defined base
Score	1				
#12	Metal Bases – no corrosion, no cracks, no hollow spots, level	Metal Bases – no corrosion, no cracks, minimum to no hollow spots, level	Metal Bases – some corrosion, no cracks, moderate hollow spots, level	Metal Bases – corrosion, no cracks, moderate hollow spots, levelness Issues	Metal Bases – heavy corrosion, cracks, large hollow spots, levelness issues
Score		2			
#13	Documented Maintenance History. No Failures.	N/A	Incomplete Maintenance History. Some Failures.	N/A	No Documented Maintenance History. Multiple Failures.
Score			3		
#14	Has not been rewind	N/A	Has been rewind 1 time	N/A	Has been rewind >1 time
Score	1				
Total=	4	2	15	0	15
Motor Asset Average Score = (Total Score 36/13) =			2.7		

CRU Designed Inspection Grade Criteria

OVERALL SITE

Asset #	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5
EXTERIOR PAINT					
#1	Age < 4 years old.	Age <8 years old.	Age < 12 yrs. old.	Age < 16 yrs. old.	Age > 20 yrs. old.
Score		2			
#2	No flaking	N/A	Some flaking	N/A	Excessive flaking
Score	1				
#3	No fading	N/A	Some fading	N/A	Excessive fading
Score	1				
#4	No weathering	N/A	Some weathering	N/A	Excessive weathering
Score	1				
#5	No cracking	N/A	Some cracking	N/A	Excessive cracking
Score	1				
INTERIOR PAINT					
#6	Age < 5 years old.	Age <10 years old.	Age < 15 years old.	Age < 20 years old.	Age > 30 years old.
Score		2			
#7	No flaking	N/A	Some flaking	N/A	Excessive flaking
Score	1				
#8	No fading	N/A	Some fading	N/A	Excessive fading
Score	1				
#9	No weathering	N/A	Some weathering	N/A	Excessive weathering
Score	1				
#10	No cracking	N/A	Some cracking	N/A	Excessive cracking
Score	1				

(Overall Site continued next page)

CRU Designed Inspection Grade Criteria
OVERALL SITE (continued)

Asset #	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5
SITE					
#11	No erosion	N/A	Signs/moderate of erosion	N/A	Excessive Erosion
Score			3		
#12	Secure	Semi-Secure	Secure potentially compromised	Security compromised	Not secure
Score	1				
#13	Fence like new	Fence good	Fence shows age	Fence needs repair	Fence compromised
Score			3		
#14	Gate like new	Gate good	Gate shows age	Gate needs repair or lightly damage	Gate compromised
Score		2			
#15	Locks like new	Locks good	Locks troublesome	Locks troublesome	Locks missing or don't lock
Score	1				
#16	Immaculate	Well maintained	Generally maintained	Fairly maintained – needs improvement	Not maintained
Score				4	
#17	Aesthetically pleasing	N/A	Needs aesthetic work	N/A	Aesthetics bad
Score			3		
#18	Proper drainage	N/A	Drainage issues developing	N/A	Drainage poor – imminent issues
Score			3		
#19	Proper Signage	Proper Signage starting to fade	Improper Signage – difficult to read	Improper Signage – unreadable need to replace	No Signage
Score	1				
Total =	11	6	12	4	0
Overall Site Average Score = (Total Score 33/19) =				1.7	

CRU Designed Inspection Grade Criteria
ELECTRICAL

ELECTRICAL					
Asset #	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5
#1	90% of remaining life	75% of remaining life	50% of remaining life	25% of remaining life	0% of remaining life
Score					5
#2	Components no corrosion	Components discoloration	Components light corrosion	Components corrosion/heat damage	Components excessive corrosion/damage
Score			3		
#3	No looseness of hardware	Evidence of possible hardware looseness	Evidence of previous repair	Evidence of numerous repair	Numerous repairs & bad Infrared
Score					5
#4	Proper labeling	Proper labeling - some labels missing	Poor labeling	Poor labeling - unreadable	Improper or No labeling
Score			3		
#5	All wires in track	Wires orderly	Wires somewhat orderly	Wires unorganized & questionable	Wires in total disarray
Score			3		
#6	Conduits sealed like new	Conduits sealed	Conduits unsealed – good condition	Conduits unsealed – poor condition	Conduits broken or nonexistent with exposed wiring
Score			3		
#7	Infrared – no action required (Δ0-14F)	Infrared continue to monitor (Δ15-39F)	Infrared repair at next overall outage (Δ40-99F)	Infrared alarm schedule next train outage monitor (Δ100-179F)	Infrared high alarm immediate action required monitor (Δ> 180F)
Score			3		
#8	Wiring no discoloration	Wiring slight discoloration	Wiring moderate discoloration	Wiring heavy discoloration – possible arcing/heat	Wiring heavy discoloration/corrosion – imminent failure
Score		2			
Total =	0	2	15	0	10
Electrical Average Score = (Total Score 27/8) =				3.3	

Raw Water Meter

CRU Designed Inspection Grade Criteria
STRUCTURAL INTEGRITY

Asset #	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5
CONCRETE					
#1	No cracking or spalling, sealer good	No cracking or spalling Needs sealing/coating.	Minor cracking or spalling. Needs coating	Moderate spalling & cracking Needs repair.	Major cracking, spalling. Needs repair.
Score			3		
BUILDING					
#2	Roof				
	No leaks. New.	No leaks. Almost like new.	No leaks. Normal aging.	Some leaking. Needs minor repair.	Excessive leaking. Needs major repair.
Score	N/A				
#3	HVAC				
	HVAC operational. < 5 years old.	HVAC operational. <10 years old.	HVAC operational. < 20 years old.	HVAC operational but needs repair. < 30 years old.	HVAC non-operational. > 30 years old.
Score	N/A				
#4	Structural Integrity				
	Sound. New.	Sound. Almost like new.	Sound. Normal aging.	Decaying. Repairs needed.	Decaying. Safety Issues. Repairs needed.
Score			3		
#5	Floor				
	Smooth. Level. Drains operational & sealed.	Smooth. Level. Drains operational.	Rough. Level. Drains operational.	Rough. Cracked. Drain issues.	Rough. Cracked. Drain non-operational.
Score		2			
#6	Penetrations				
	Filled. No degradation.	Filled. Minor degradation.	Filled. Moderate degradation.	Open.	Open causing equipment degradation.
Score		2			
#7	Doors/Windows				
	Solid. No drag. Easy to open.	Solid. Drags but easy to open.	Drags. Approaching repairs.	Needs repair. Drags hard to open or close.	Needs repair. Major difficulty in opening/closing.
Score	N/A				
#8	Ladders/Steps				
	Like new.	No loose members. Normal wear.	Above average wear.	Needs repair.	OHSA non-compliant. Safety Issues.
Score			3		
Total Score =	0	4	9	0	0
Structural Integrity Average Score = (Total Score 13/5)			2.6		

CRU Designed Inspection Grade Criteria

PIPING

PIPING					
Asset #	Excellent 1	Very Good 2	Good 3	Fair 4	Poor 5
#1	Age < 10 years	Age < 20 years	Age < 40 years	Age < 60 years	Age < 75 years
Score			3		
#2	No leaks.	N/A	Previous signs of leaks.	N/A	Drips/Leaks.
Score			3		
#3	Adequate support.	N/A	Questionable support	N/A	Inadequate support
Score	1				
#4	No stresses.	N/A	Minor stresses.	N/A	Major stresses.
Score	1				
#5	No looseness.	Questionable looseness.	Minor looseness.	Moderate looseness.	Major looseness.
Score	1				
#6	No corrosion.	N/A	Some corrosion.	N/A	Excessive Corrosion.
Score					5
#7	Pipe hangers restraints optimal.	Pipe hangers restraints adequate.	Pipe hangers restraints adequate. Minimum restraint.	Pipe hangers restraints minimal support. Inadequate restraint.	Pipe hangers restraints unsupported. Loose fittings/bolts. Unrestrained.
Score			3		
#8	Labeled.	N/A	Some/Poorly labeled.	N/A	Not labeled.
Score					5
#9	Alignment optimal.	Alignment adequate.	Alignment fair	Alignment bad.	Gross misalignment.
Score		2			
Total Score =	3	2	9	0	10
Piping Asset Average Score = (Total Score 24/9) =			2.6		

CRU Designed Inspection Grade Criteria
VALVES/ACTUATORS

VALVES/ACTUATORS					
Asset #	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5
#1	Age < 5 years	Age < 10 years	Age < 15 years	Age < 20 years	Age < 40 years
Score			3		
#2	Correct application.	N/A	Questionable application.	N/A	Wrong application.
Score	1				
#3	Still Manufactured? – Yes	N/A	N/A	N/A	Still Manufactured? - NO
Score	1				
#4	AWWA spec. – Yes	N/A	N/A	N/A	AWWA spec. - NO
Score	1				
#5	Operates properly? – Yes	N/A	Operates occasionally.	N/A	Operates properly? - NO
Score	1				
#6	Internal Leakage? None	Internal Leakage? Possible	Internal Leakage? Some	Internal Leakage? Excessive	Internal Leakage? Bad/Failure imminent
Score	1				
#7	External leakage? None	External leakage? A little	External leakage? Some	External leakage? Excessive	External leakage? Bad/Failure imminent
Score	1				
#8	Corrosion? None	Corrosion? A little	Corrosion? Some	Corrosion? Degraded.	Corrosion? Excessive
Score			3		
#9	Operation? Manual & Auto? Yes	N/A	N/A	N/A	Operation? Manual & Auto? NO
Score	1				
#10	Safety Features? Yes	N/A	N/A	N/A	Safety Features? NO
Score	1				
#11	Visual Position Indication? Yes	N/A	N/A	N/A	Visual Position Indication? NO
Score	1				
#12	Remote Position Indication? Yes	N/A	N/A	N/A	Remote Position Indication? NO
Score	1				
Total Score =	10	0	6	0	0
Valves/Actuators Asset Average Score = (Total Score 16/12)				1.3	
=					

CRU Designed Inspection Grade Criteria

METER

METER					
Asset #	Excellent 1	Very Good 2	Good 3	Fair 4	Poor 5
#1	90% of remaining life	75% of remaining life	50% of remaining life	25% of remaining life	0% of remaining life
Score					5
#2	Meets original output	With 5% original output	Within 15% original output	Within 20% original output	Off > 20% original output
Score	1				
#3	Leakage within spec	N/A	Leakage questionable	N/A	Leakage out of spec
Score			3		
#4	Documented Maintenance History. No Failures.	N/A	Incomplete Maintenance History. Some Failures.	N/A	No Documented Maintenance History. Multiple Failures.
Score			3		
Total =	1	0	6	0	5
Pump Asset Average Score = (Total Score 12/4) =			3.0		

CRU Designed Inspection Grade Criteria

MOTORS

MOTORS					
Asset #	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5
#1	90% of remaining life	75% of remaining life	50% of remaining life	25% of remaining life	0% of remaining life
Score	3				
#2	Amperage 90% or less of nameplate	Amperage 95%	Amperage full	Amperage 5% over	Amperage 10% over
Score	3				
#3	Infrared – no action required (Δ 0-14F)	Infrared continue to monitor (Δ 15-39F)	Infrared repair at next overall outage (Δ 40-99F)	Infrared alarm schedule next train outage monitor (Δ 100-179F)	Infrared high alarm immediate action required monitor (Δ >180F)
Score	1				
#4	Bearings – no noise within 25% of allowable vibration	Bearings – no noise within 50% of allowable vibration	Bearings – noise within allowable vibration	Bearings – noise up to 10% over allowable vibration	Bearings – noise > 10% allowable vibration
Score	N/A				
#5	Bearing < 2500 hours	Bearing < 5000 hours	Bearing < 10,000 hours	Bearing < 20,000 hours	Bearing > 20,000 hours
Score	N/A				
#6	Bearing – normal heat	N/A	Bearing – warm	N/A	Bearing –hot
Score	N/A				
#7	Bearing Lubrication scheduled & performed religiously	Bearing Lubrication scheduled & performed most of time	Bearing Lubrication scheduled & performed sometimes	Bearing Lubrication scheduled & but never performed	Bearing Lubrication never scheduled or performed
Score	N/A				
#8	Grease no leakage	N/A	Grease some leakage	N/A	Grease excessive leakage
Score	N/A				
#9	Coupling Alignment within allowable range	N/A	N/A	N/A	Coupling Alignment out of allowable range
Score	1				
#10	Belts - new, properly tensioned, checked per scheduled frequency	Belts - < 3 yrs. old, properly tensioned, checked periodically	Belts – up to 5 yrs. old, tensioned, checked sometimes	Belts – over 5 yrs. old, tensioned, squealing, not checked	Belts – over 5 yrs. old, not tensioned, squealing, not checked
Score	N/A				

(Motors continued next page)

CRU Designed Inspection Grade Criteria
MOTORS (continued)

MOTORS (continued)					
Asset #	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5
#11	Concrete – large mass	Concrete – moderate mass	Concrete – minimal mass/fair grout	Concrete – eroding mass/poor bad grouting & spalling	No defined base
Score	N/A				
#12	Metal Bases – no corrosion, no cracks, no hollow spots, level	Metal Bases – no corrosion, no cracks, minimum to no hollow spots, level	Metal Bases – some corrosion, no cracks, moderate hollow spots, level	Metal Bases – corrosion, no cracks, moderate hollow spots, levelness Issues	Metal Bases – heavy corrosion, cracks, large hollow spots, levelness issues
Score	N/A				
#13	Documented Maintenance History. No Failures.	N/A	Incomplete Maintenance History. Some Failures.	N/A	No Documented Maintenance History. Multiple Failures.
Score	3				
#14	Has not been rewind	N/A	Has been rewind 1 time	N/A	Has been rewind >1 time
Score	1				
Total=	3	0	9	0	0
Motor Asset Average Score = (Total Score 12/6) =			2.0		

CRU Designed Inspection Grade Criteria

OVERALL SITE

Asset #	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5
EXTERIOR PAINT					
#1	Age < 4 years old.	Age <8 years old.	Age < 12 yrs. old.	Age < 16 yrs. old.	Age > 20 yrs. old.
Score					5
#2	No flaking	N/A	Some flaking	N/A	Excessive flaking
Score					5
#3	No fading	N/A	Some fading	N/A	Excessive fading
Score			3		
#4	No weathering	N/A	Some weathering	N/A	Excessive weathering
Score					5
#5	No cracking	N/A	Some cracking	N/A	Excessive cracking
Score					5
INTERIOR PAINT					
#6	Age < 5 years old.	Age <10 years old.	Age < 15 years old.	Age < 20 years old.	Age > 30 years old.
Score					
#7	No flaking	N/A	Some flaking	N/A	Excessive flaking
Score			N		
#8	No fading	N/A	Some fading	N/A	Excessive fading
Score			A		
#9	No weathering	N/A	Some weathering	N/A	Excessive weathering
Score					
#10	No cracking	N/A	Some cracking	N/A	Excessive cracking
Score					

(Overall Site continued next page)

CRU Designed Inspection Grade Criteria
OVERALL SITE (continued)

Asset #	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5
SITE					
#11	No erosion	N/A	Signs/moderate of erosion	N/A	Excessive Erosion
Score	1				
#12	Secure	Semi-Secure	Secure potentially compromised	Security compromised	Not secure
Score	N/A				
#13	Fence like new	Fence good	Fence shows age	Fence needs repair	Fence compromised
Score	N/A				
#14	Gate like new	Gate good	Gate shows age	Gate needs repair or lightly damage	Gate compromised
Score	N/A				
#15	Locks like new	Locks good	Locks troublesome	Locks troublesome	Locks missing or don't lock
Score	N/A				
#16	Immaculate	Well maintained	Generally maintained	Fairly maintained – needs improvement	Not maintained
Score			3		
#17	Aesthetically pleasing	N/A	Needs aesthetic work	N/A	Aesthetics bad
Score			3		
#18	Proper drainage	N/A	Drainage issues developing	N/A	Drainage poor – imminent issues
Score	1				
#19	Proper Signage	Proper Signage starting to fade	Improper Signage – difficult to read	Improper Signage – unreadable need to replace	No Signage
Score					5
Total =	1	0	9	0	25
Overall Site Average Score = (Total Score 35/10) =				3.5	

CRU Designed Inspection Grade Criteria

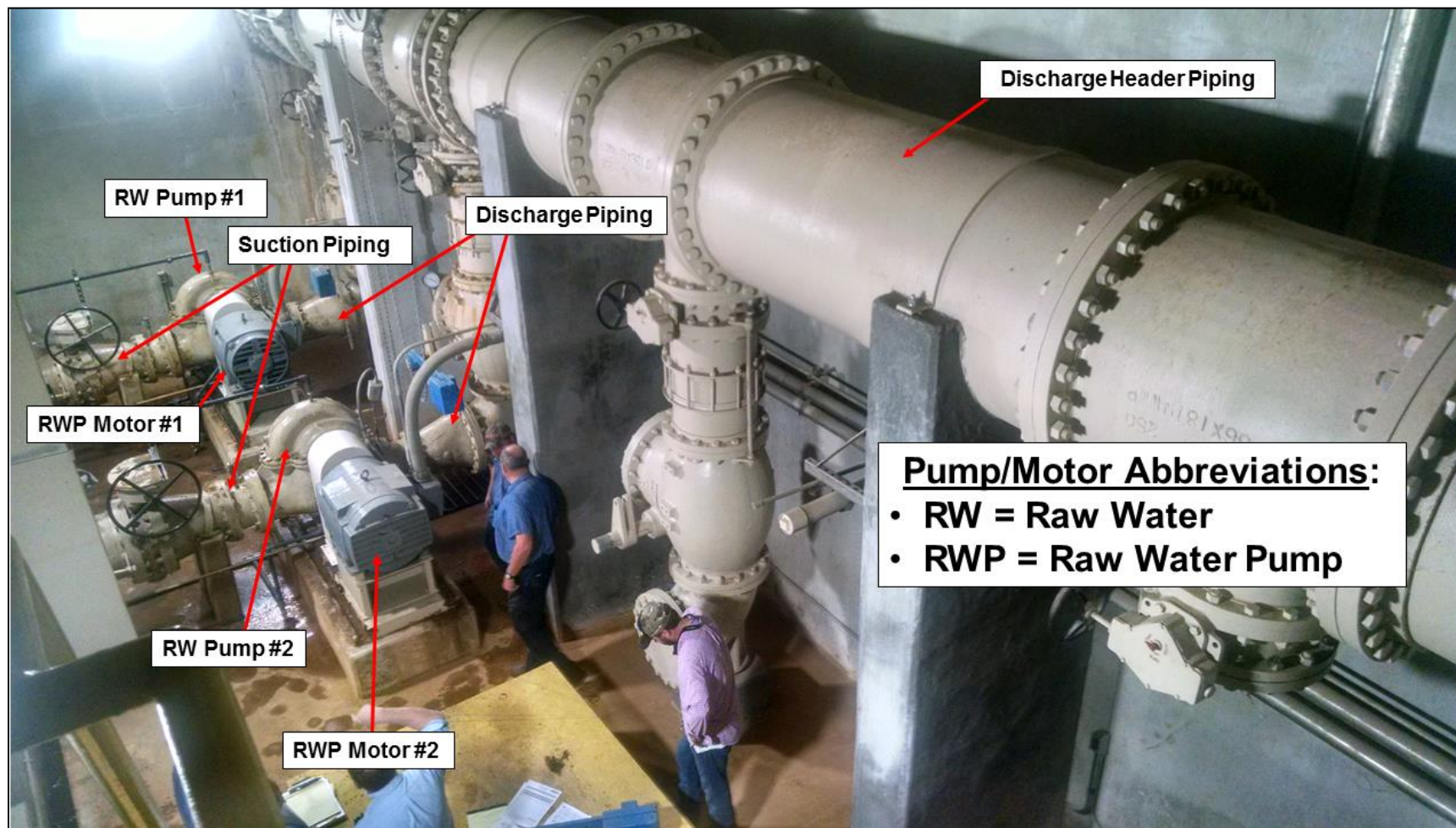
ELECTRICAL

ELECTRICAL					
Asset #	Excellent	Very Good	Good	Fair	Poor
	1	2	3	4	5
#1	90% of remaining life	75% of remaining life	50% of remaining life	25% of remaining life	0% of remaining life
Score		2			
#2	Components no corrosion	Components discoloration	Components light corrosion	Components corrosion/heat damage	Components excessive corrosion/damage
Score		2			
#3	No looseness of hardware	Evidence of possible hardware looseness	Evidence of previous repair	Evidence of numerous repair	Numerous repairs & bad Infrared
Score	1				
#4	Proper labeling	Proper labeling - some labels missing	Poor labeling	Poor labeling - unreadable	Improper or No labeling
Score	1				
#5	All wires in track	Wires orderly	Wires somewhat orderly	Wires unorganized & questionable	Wires in total disarray
Score	1				
#6	Conduits sealed like new	Conduits sealed	Conduits unsealed – good condition	Conduits unsealed – poor condition	Conduits broken or nonexistent with exposed wiring
Score		2			
#7	Infrared – no action required (Δ0-14F)	Infrared continue to monitor (Δ15-39F)	Infrared repair at next overall outage (Δ40-99F)	Infrared alarm schedule next train outage monitor (Δ100-179F)	Infrared high alarm immediate action required monitor (Δ> 180F)
Score	1				
#8	Wiring no discoloration	Wiring slight discoloration	Wiring moderate discoloration	Wiring heavy discoloration – possible arcing/heat	Wiring heavy discoloration/corrosion – imminent failure
Score	1				
Total =	6	5	0	0	0
Electrical Average Score = (Total Score 11/8) =				1.3	

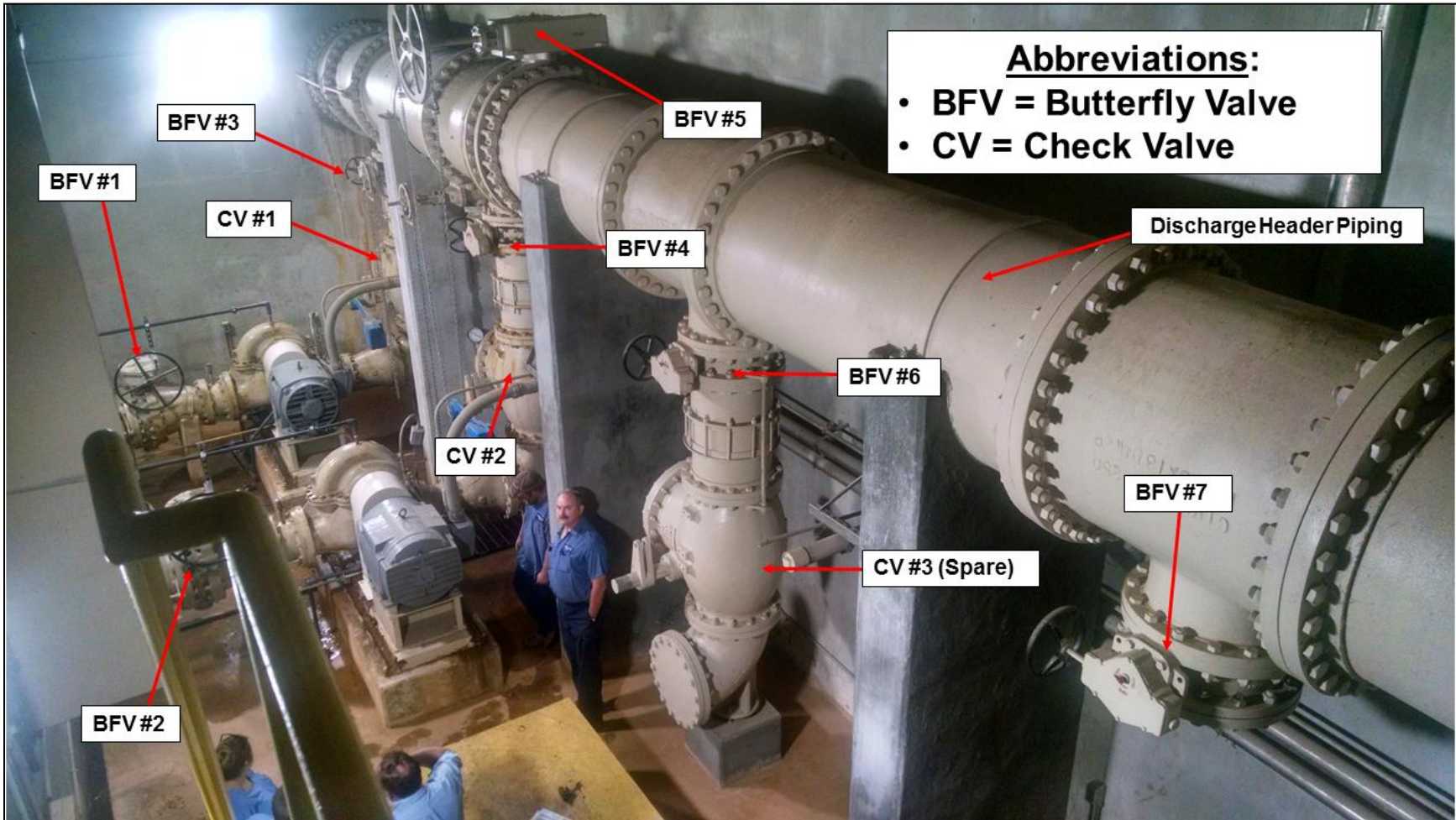
Performance Testing

See attached report.

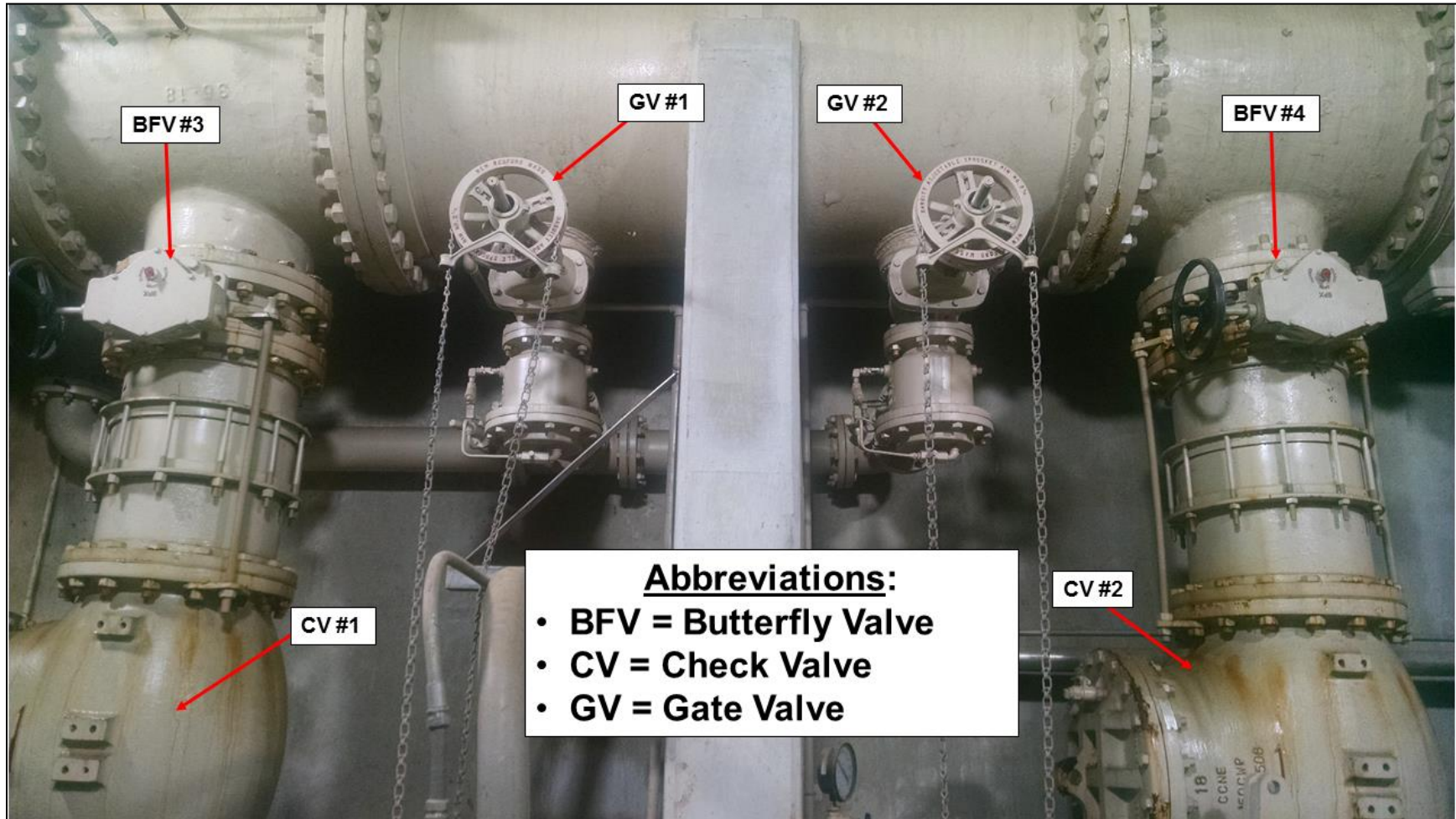
Equipment Identification Reference: Raw Water Pumps, Motors & Piping



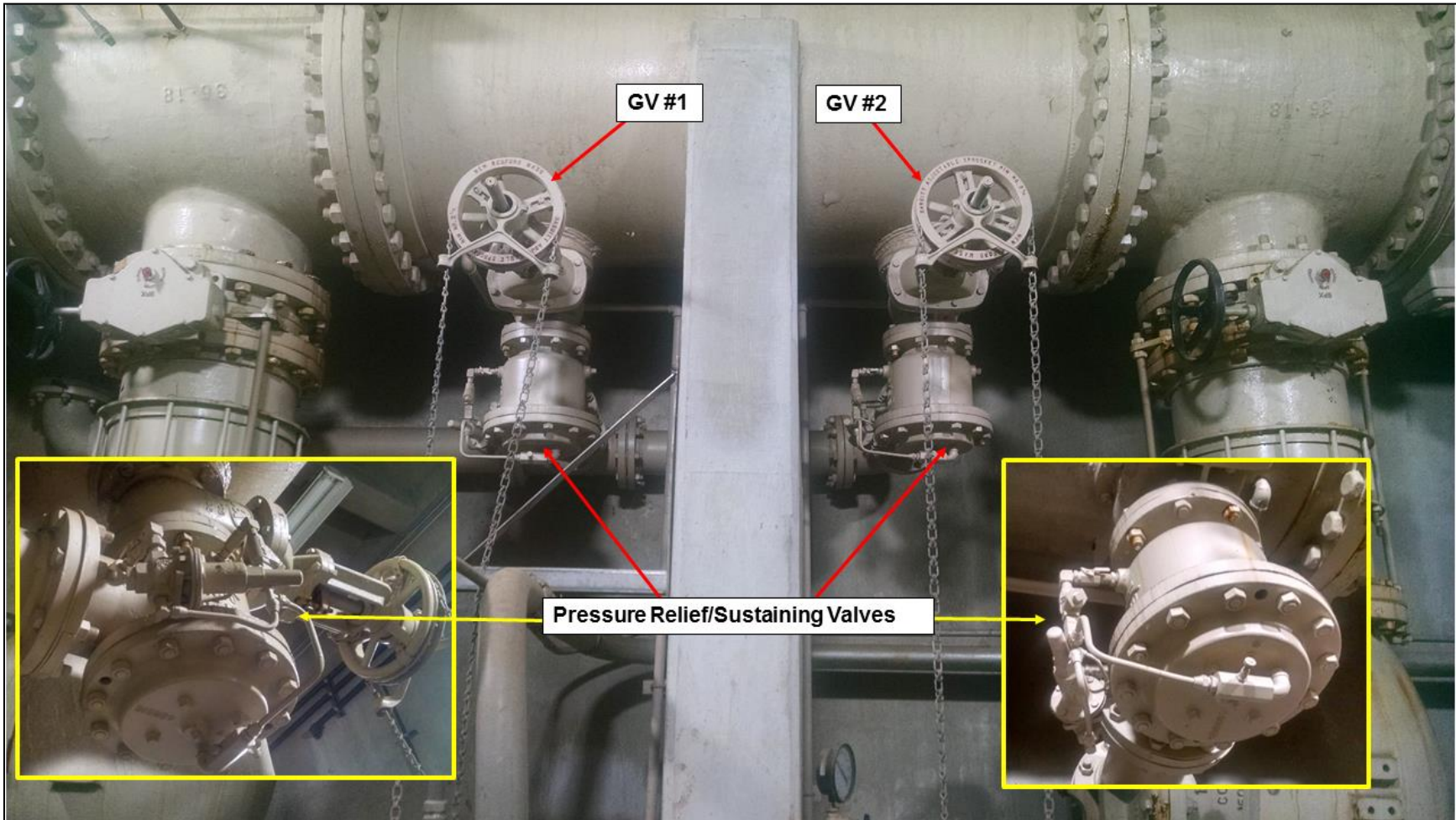
Equipment Identification Reference: Raw Water Valves



Equipment Identification Reference: Raw Water Valves



Equipment Identification Reference: Raw Water Valves



PUMP INFORMATION

Raw Water Pump #1



Pump	Aurora - Horizontal Split Case Centrifugal
Type	411-BF
Serial#	83-4872-1
RPM	1175
GPM	4200
Ft. Hd.	88
Size	10 X 12 X 18

PUMP INFORMATION

Raw Water Pump #2



Pump	Aurora - Horizontal Split Case Centrifugal
Type	411-BF
Serial#	89-16009
RPM	1175
GPM	4200
Ft. Hd.	88
Size	10 X 12 X 18

MOTOR INFORMATION

**Raw Water Pump #1
MOTOR**

Motor	US Electrical Motors
HP	125
Frame	445T
Type	RE
Volt	460
Amps	151
RPM	1185
Design	B
Code	G
Service Factor	1.15
Shaft End Bearing	6220-J
Opposite End Bearing	6313-J
ID	CJ2720203 840280-792



MOTOR INFORMATION

**Raw Water Pump #2
MOTOR**

Motor	US Electrical Motors
HP	125
Frame	445T
Type	RE
Volt	460
Amps	151
RPM	1185
Design	B
Code	G
Service Factor	1.15
Shaft End Bearing	6220-J
Opposite End Bearing	6313-J
ID	CJ2720203 840281-792



VALVE INFORMATION

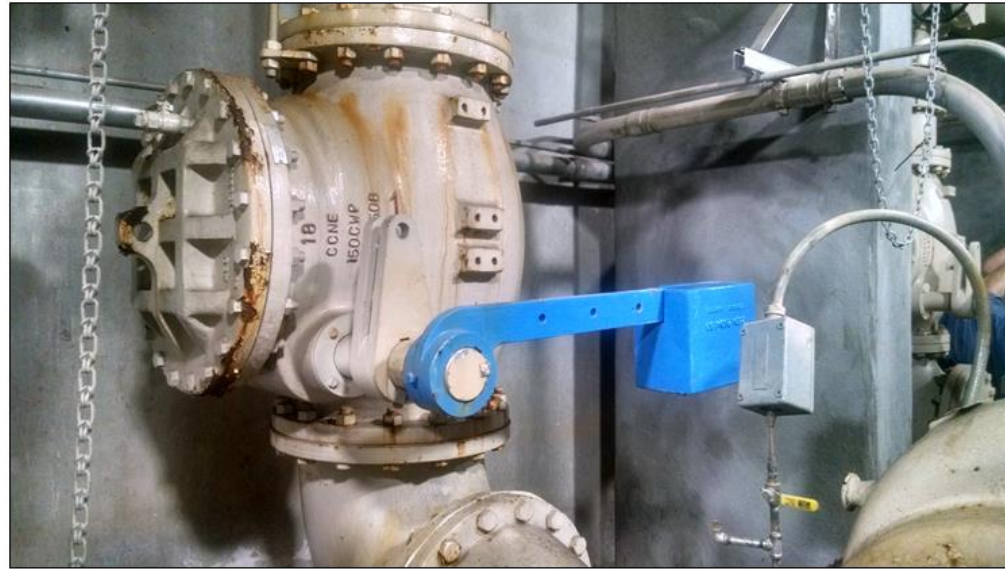
Check Valve #1



Manufacturer	CCNE
Type	Swing Check Valve Outside Lever and Weight
Size	18"
Working Pressure	1500
Class	AWWA C508
Function	Check Valve RW Pump #1 Discharge

VALVE INFORMATION

Check Valve #2



Manufacturer	CCNE
Type	Swing Check Valve Outside Lever and Weight
Size	18"
Working Pressure	1500
Class	AWWAC508
Function	Check Valve RW Pump #2 Discharge

VALVE INFORMATION

**Check Valve #3
(Spare)**



Manufacturer	CCNE
Type	Swing Check Valve Outside Lever and Weight
Size	18"
Working Pressure	1500
Class	AWWA C508
Function	Spare Check Valve if RWP #3 installed

VALVE INFORMATION

Butterfly Valve #1



Manufacturer	American Darling
Type	Butterfly
Size	18"
Laying Length	8"
Actuator	Gear
Function	Suction Valve for RW Pump #1

VALVE INFORMATION

Butterfly Valve #2



Manufacturer	American Darling
Type	Butterfly
Size	18"
Laying Length	8"
Actuator	Gear
Function	Suction Valve for RW Pump #2

VALVE INFORMATION

Butterfly Valve #3

Manufacturer	DeZurik
Type	Butterfly
Size	18"
Laying Length	8"
Actuator	Gear
Function	Discharge Valve for RW Pump #1



VALVE INFORMATION

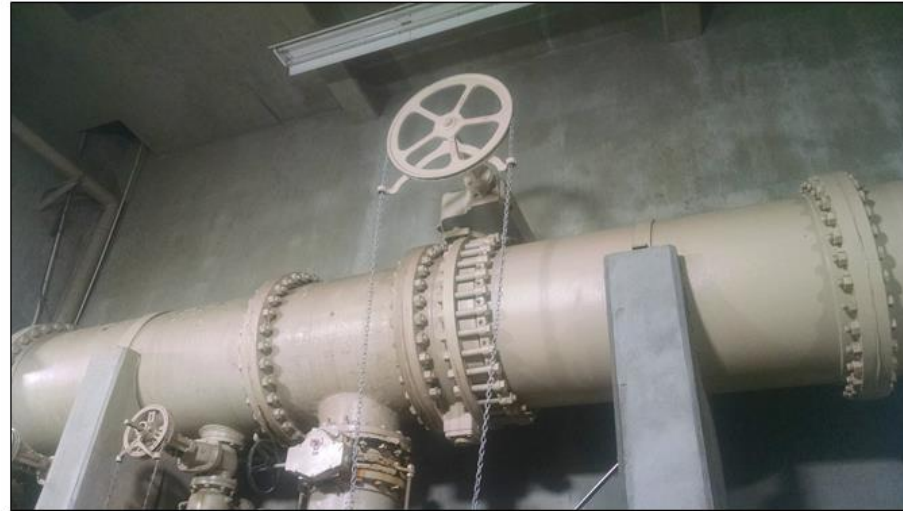
Butterfly Valve #4

Manufacturer	DeZurik
Type	Butterfly
Size	18"
Laying Length	8"
Actuator	Gear
Function	Discharge Valve for RW Pump #2



VALVE INFORMATION

Butterfly Valve #5

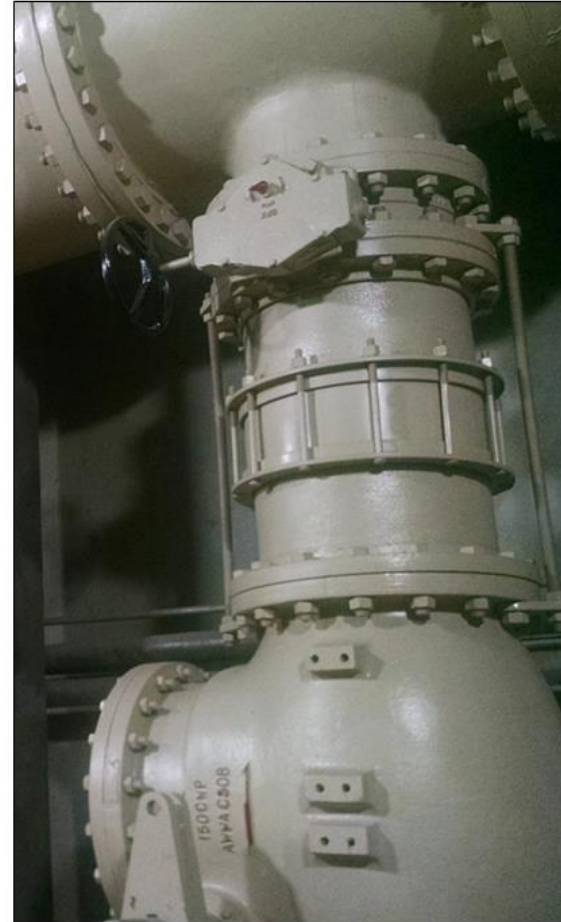


Manufacturer	DeZurik
Type	Butterfly
Size	36"
Laying Length	12"
Actuator	Chain Wheel / Gear
Function	Discharge Header Valve

VALVE INFORMATION

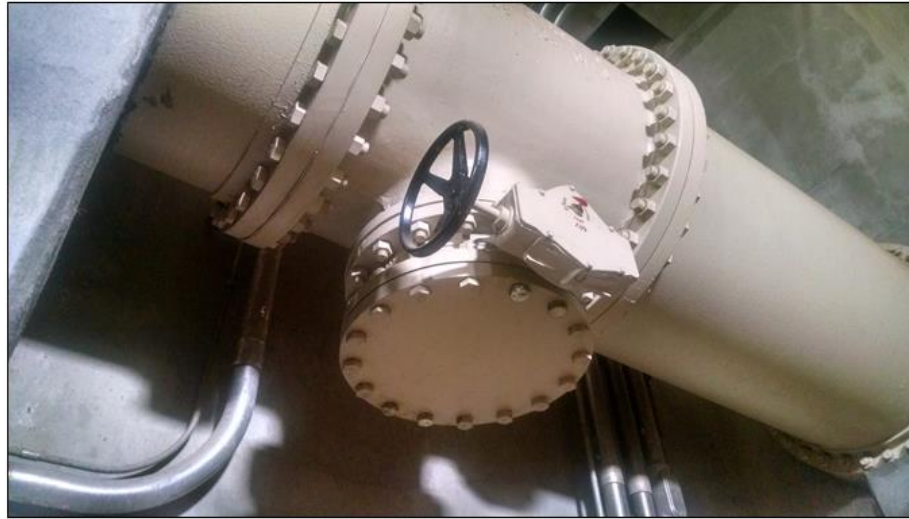
**Butterfly Valve #6
(Spare)**

Manufacturer	DeZurik
Type	Butterfly
Size	18"
Laying Length	8"
Actuator	Gear
Function	Discharge Valve for RW Pump #3 (pump #3 not installed)



VALVE INFORMATION

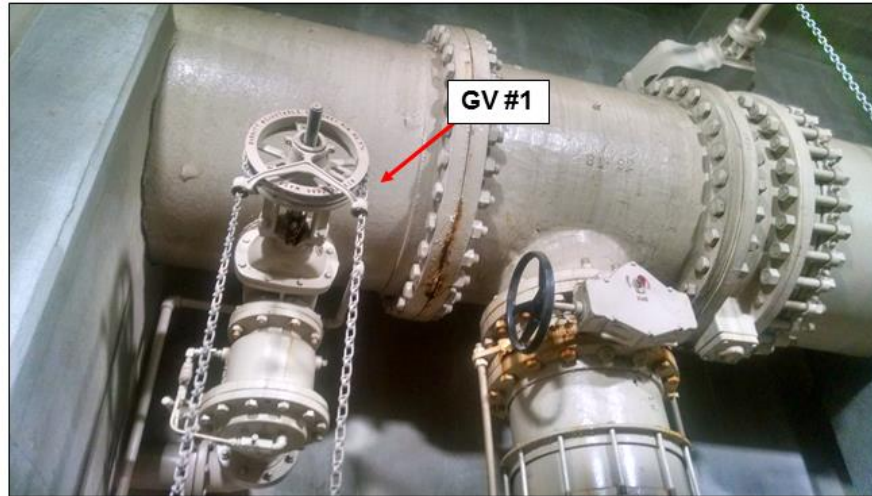
**Butterfly Valve #7
(spare)**



Manufacturer	DeZurik
Type	Butterfly
Size	18"
Laying Length	8"
Actuator	Gear
Function	Discharge Valve for RW Pump #4 (pump #4 not installed)

VALVE INFORMATION

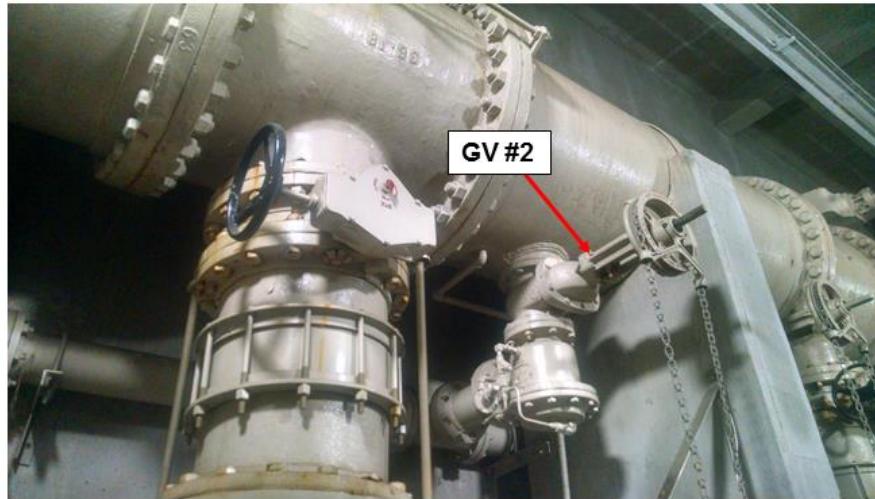
Gate Valve #1



Manufacturer	American Darling
Type	Gate
Size	8"
Laying Length	8"
Actuator	Chain Wheel
Function	Tap off Header for Pressure Relief/Sustaining

VALVE INFORMATION

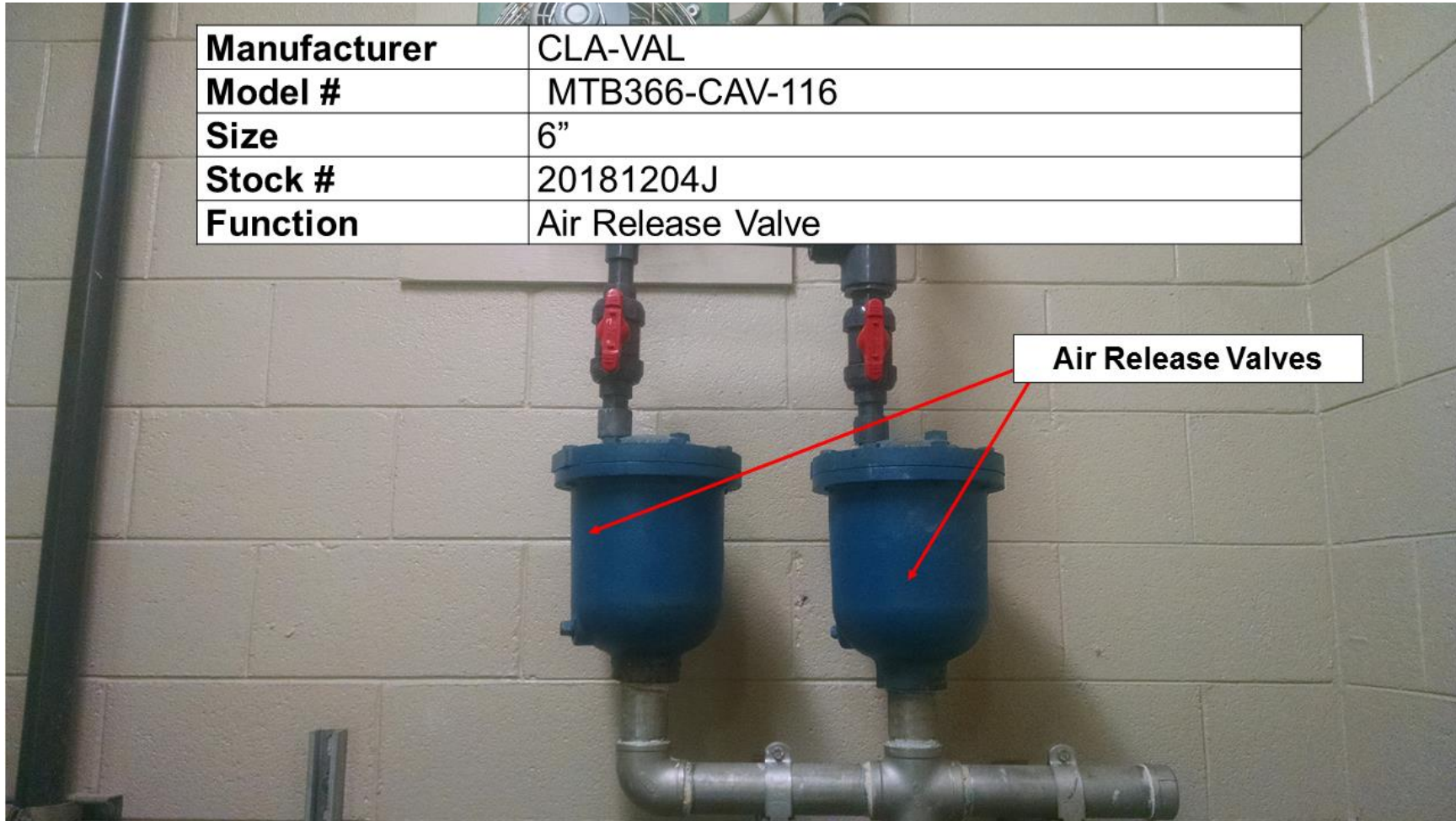
Gate Valve #2



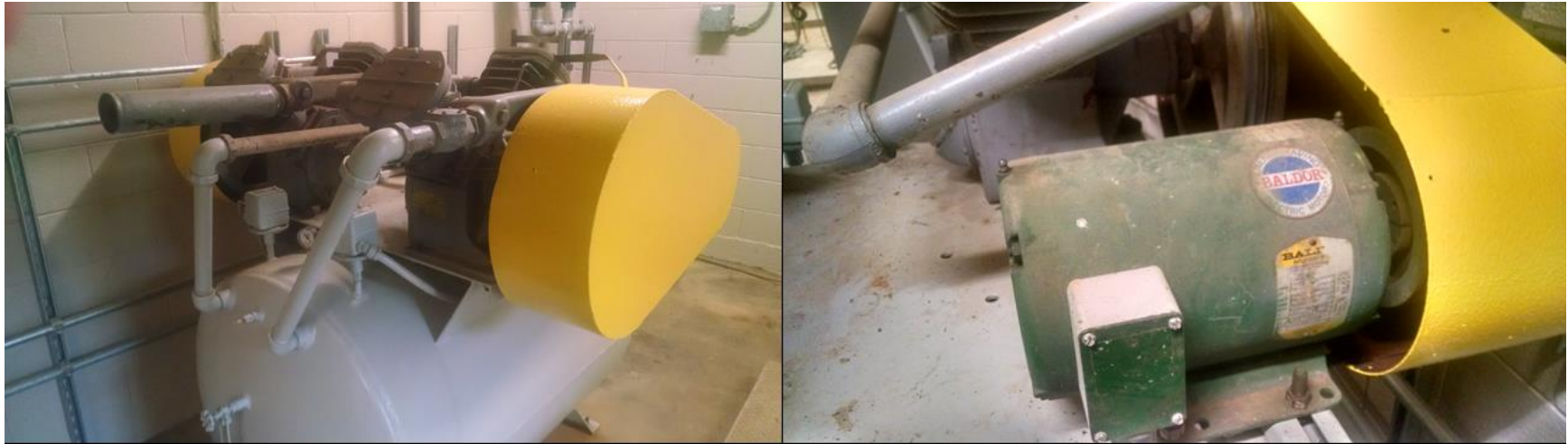
Manufacturer	American Darling
Type	Gate
Size	8"
Laying Length	8"
Actuator	Chain Wheel
Function	Tap off Header for Pressure Relief/Sustaining

VALVE INFORMATION

Manufacturer	CLA-VAL
Model #	MTB366-CAV-116
Size	6"
Stock #	20181204J
Function	Air Release Valve



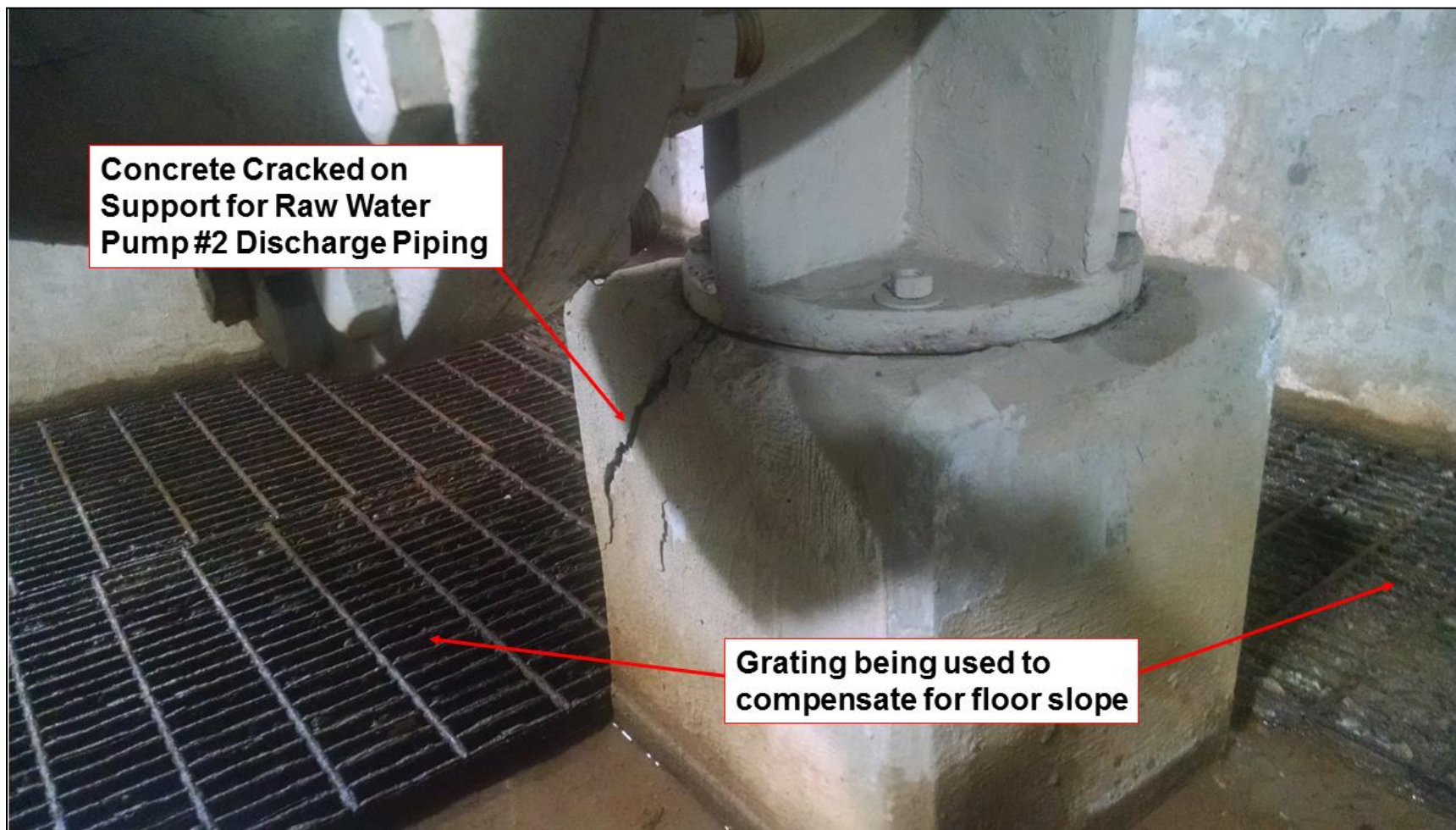
AIR COMPRESSOR INFORMATION



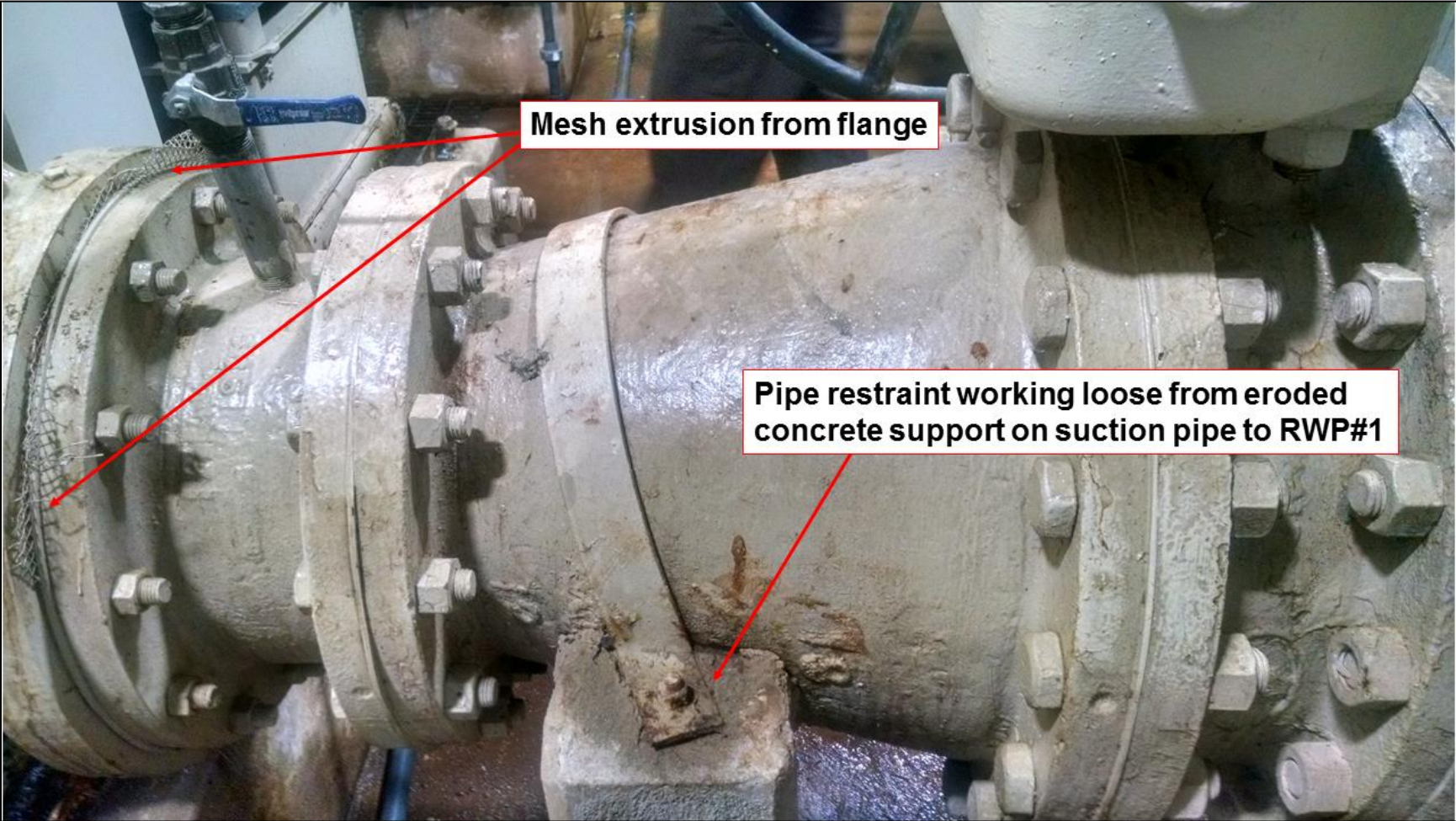
Compressor	Ingersoll-Rand (Quantity = 2)
Mod #:	V 255
Serial #:	30 T
Belts (3 each)	A 78

Motor	Baldor (Quantity = 2)
Cat #:	M32187
Spec #	36B01Y46
Frame:	184T
HP	5
Serial #	F683
Volts:	208/230/460
Amps:	14.8/14.7
RPM	1725

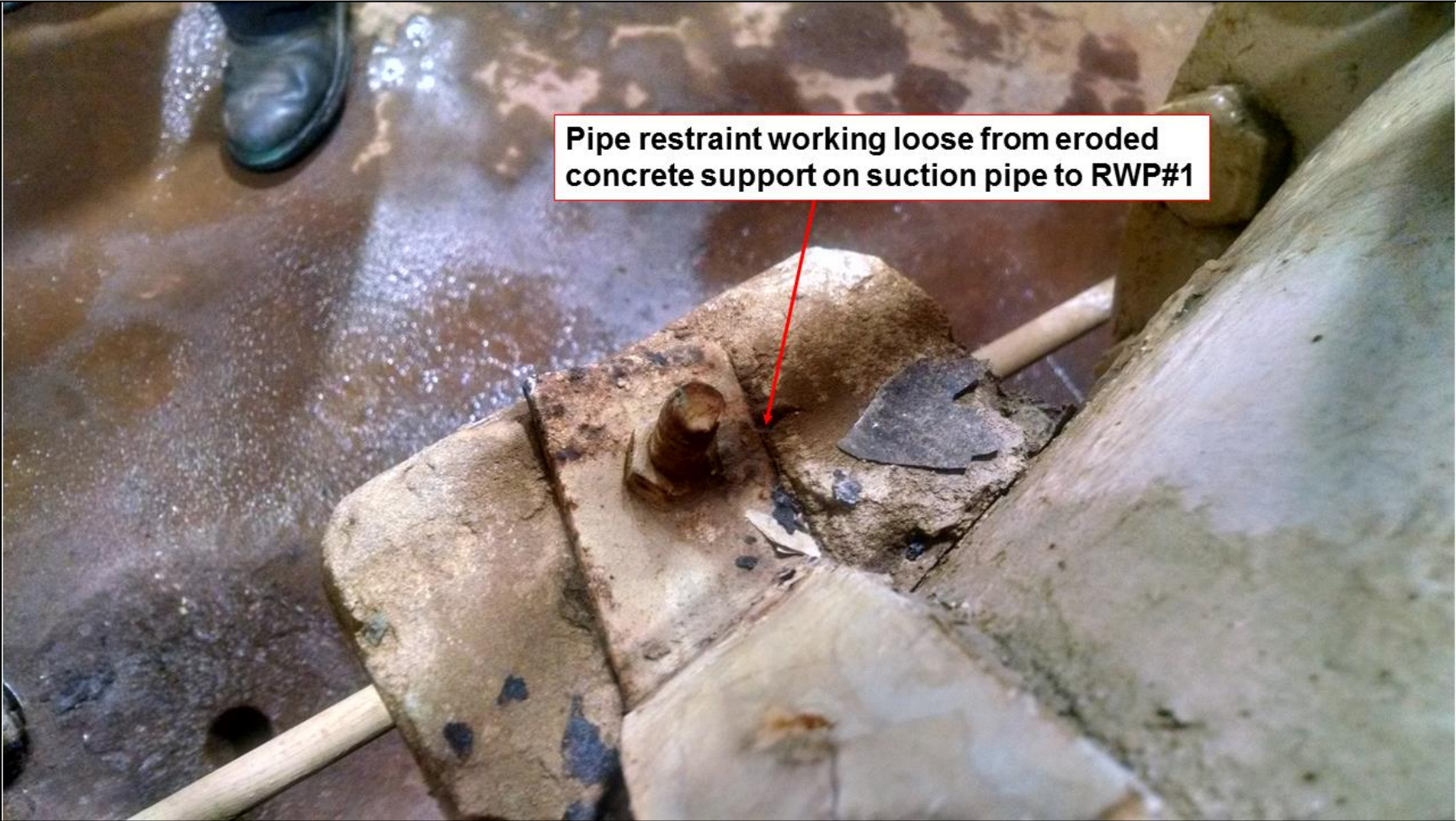
STRUCTURED INSPECTION - Concrete Integrity (overall)



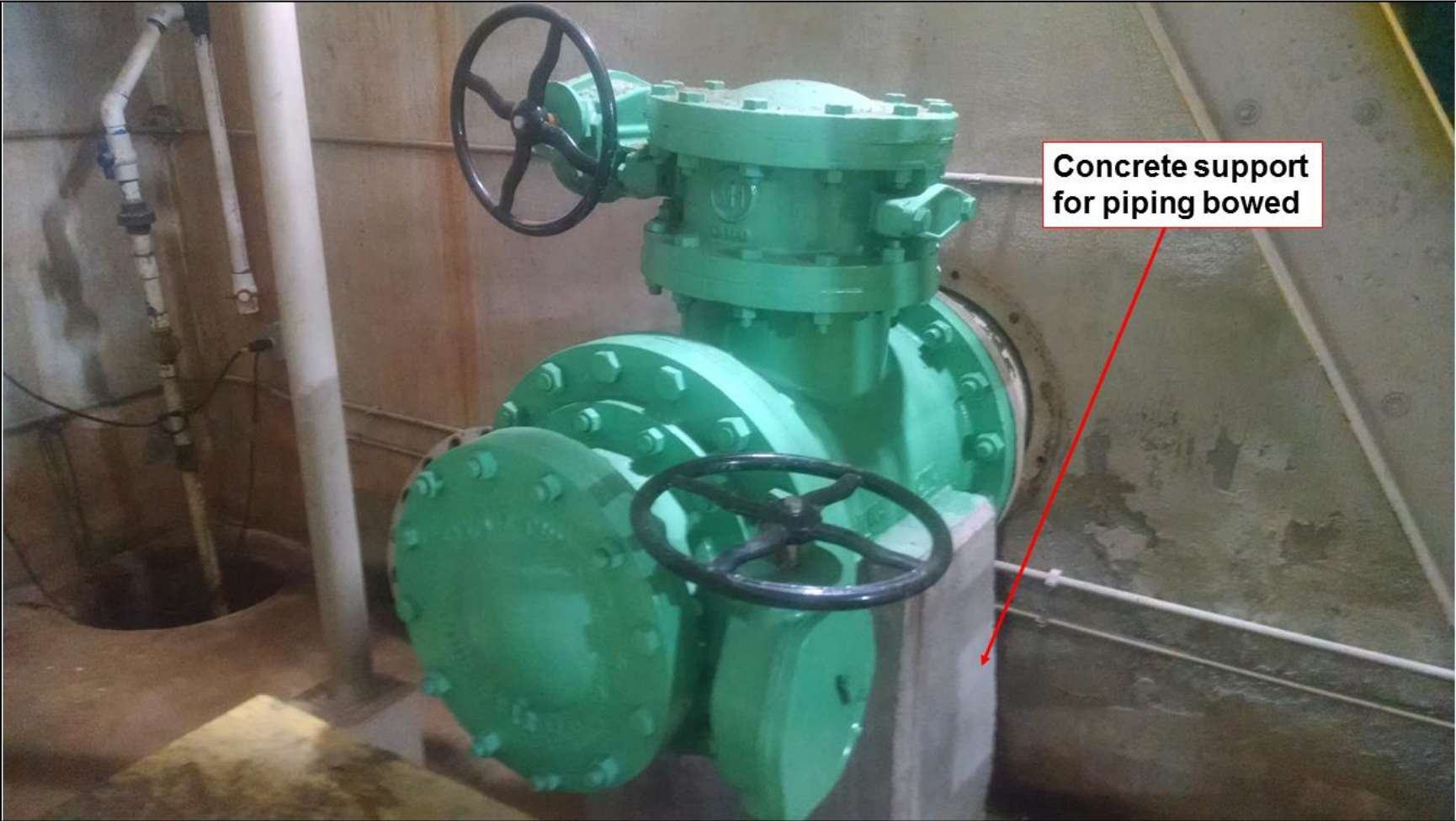
STRUCTURED INSPECTION - Concrete Integrity (overall)



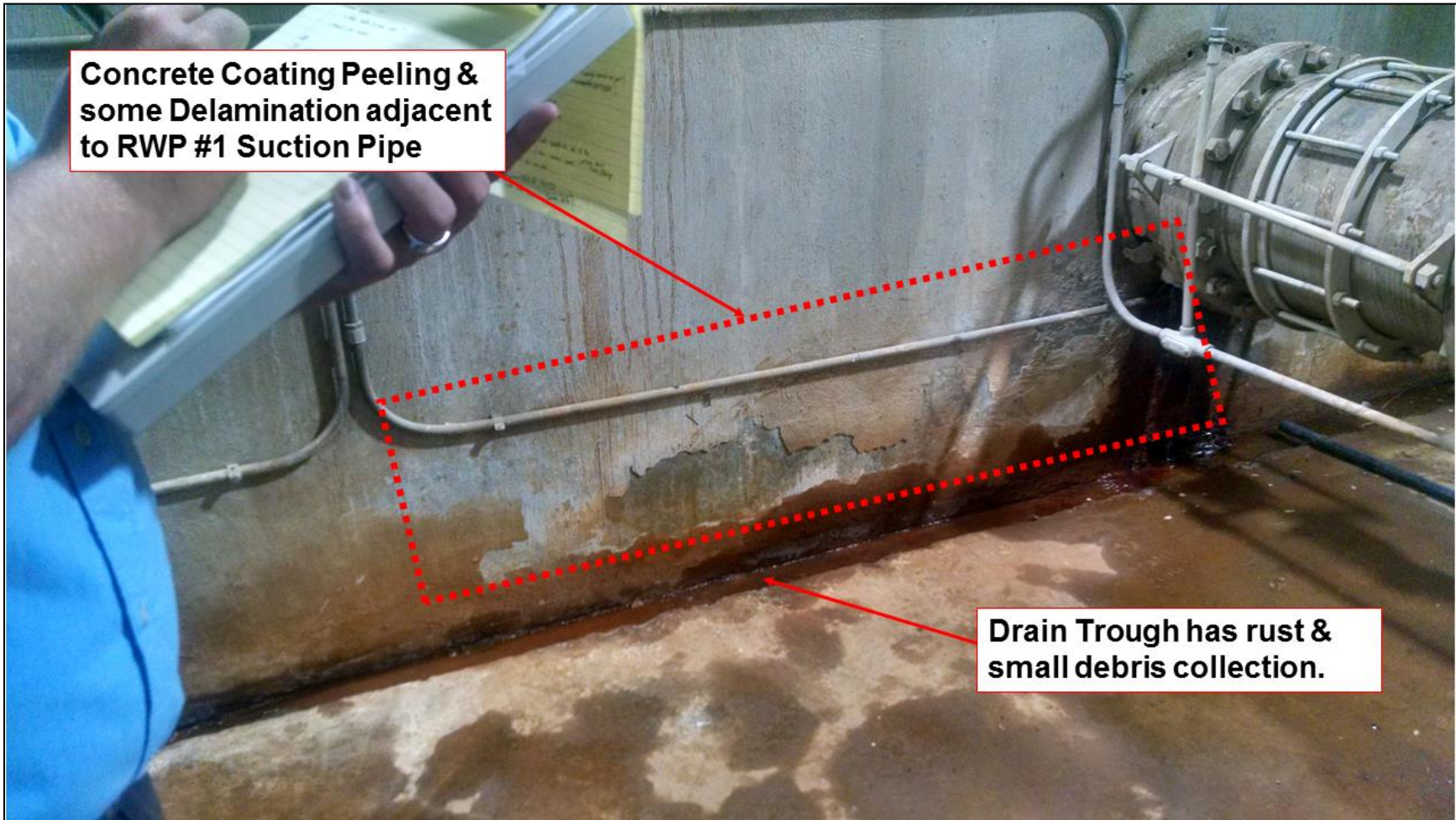
STRUCTURED INSPECTION - Concrete Integrity (overall)



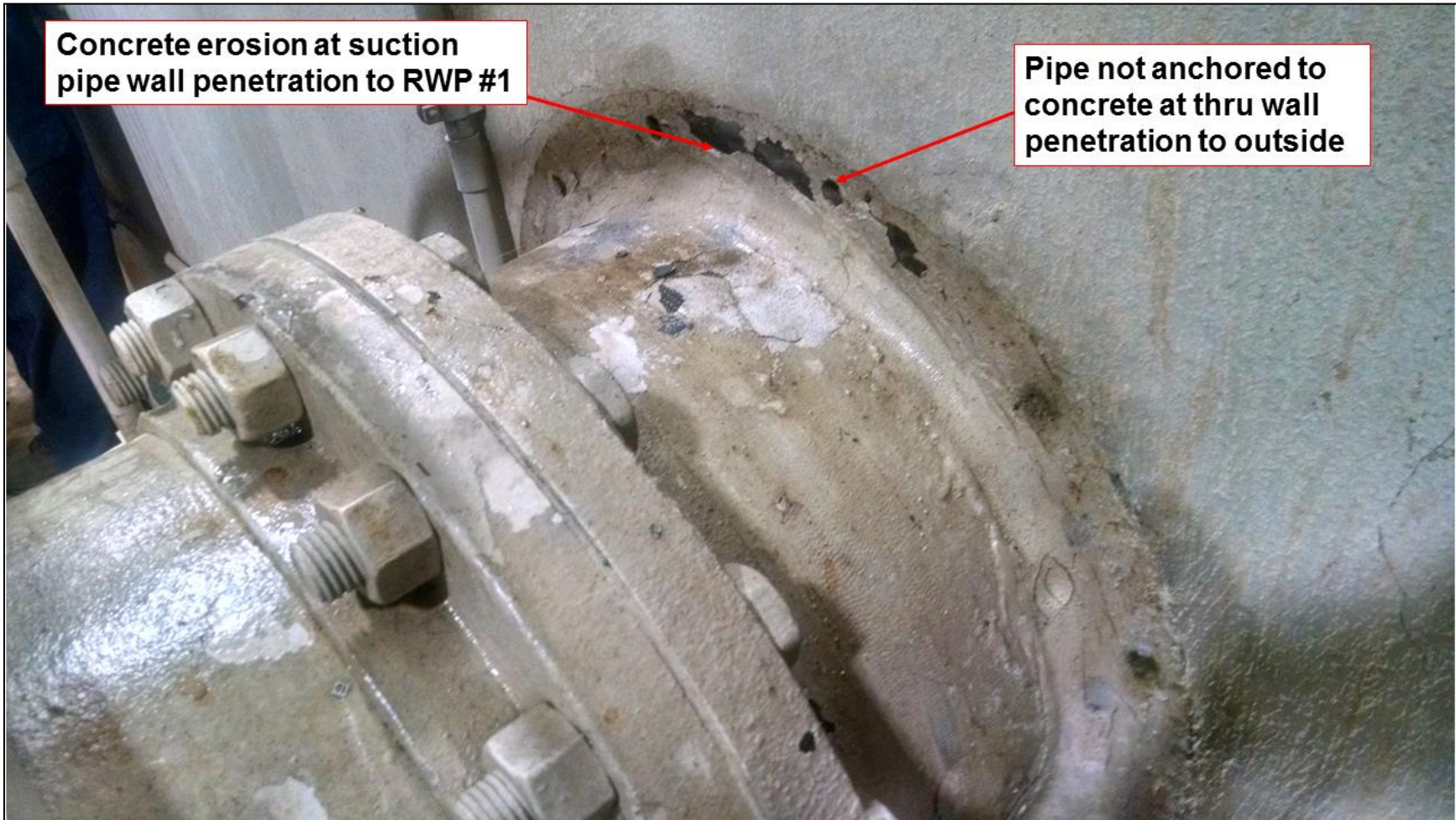
STRUCTURED INSPECTION - Concrete Integrity (overall)



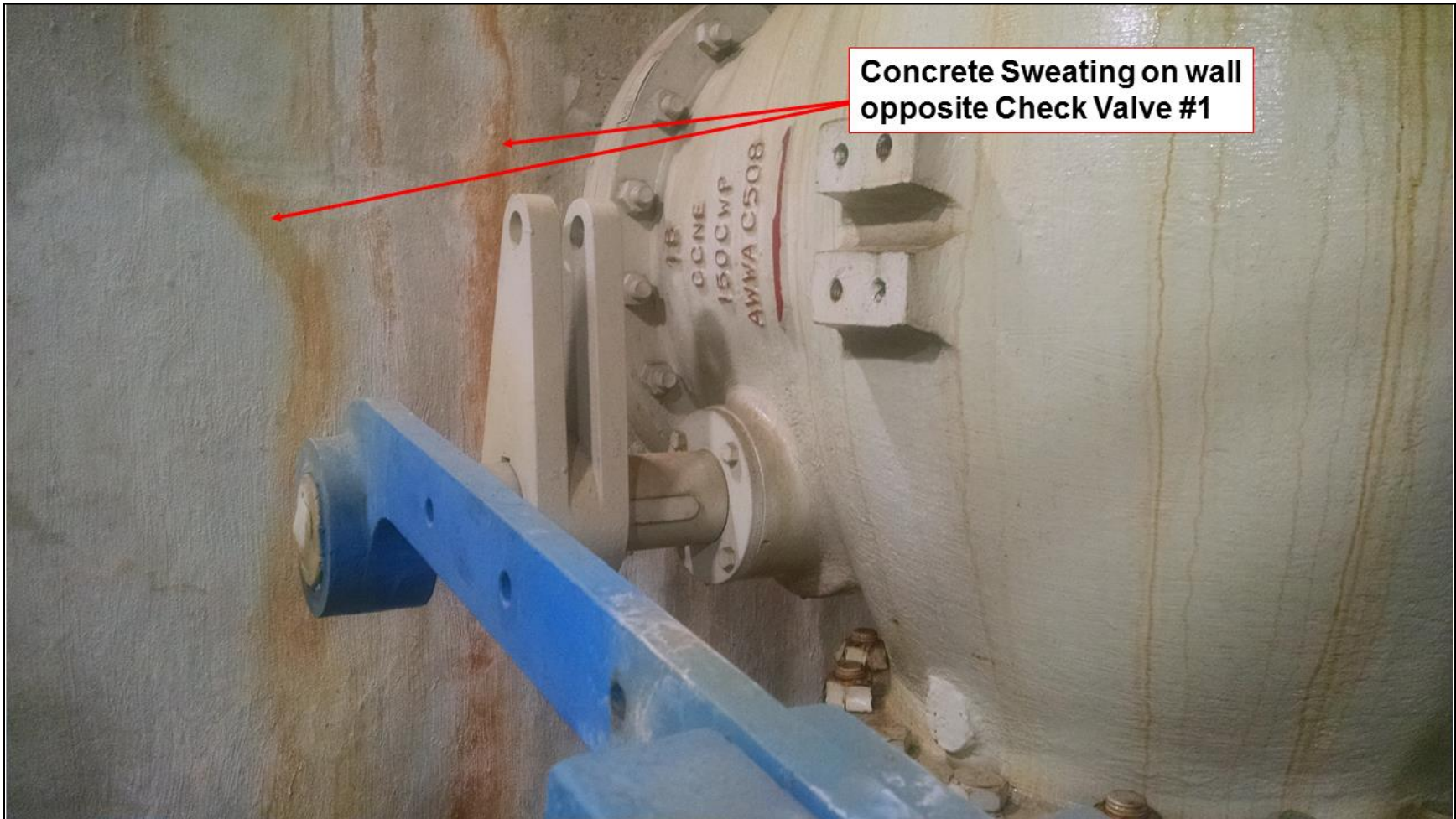
STRUCTURED INSPECTION - Walls



STRUCTURED INSPECTION - Walls



STRUCTURED INSPECTION - Walls



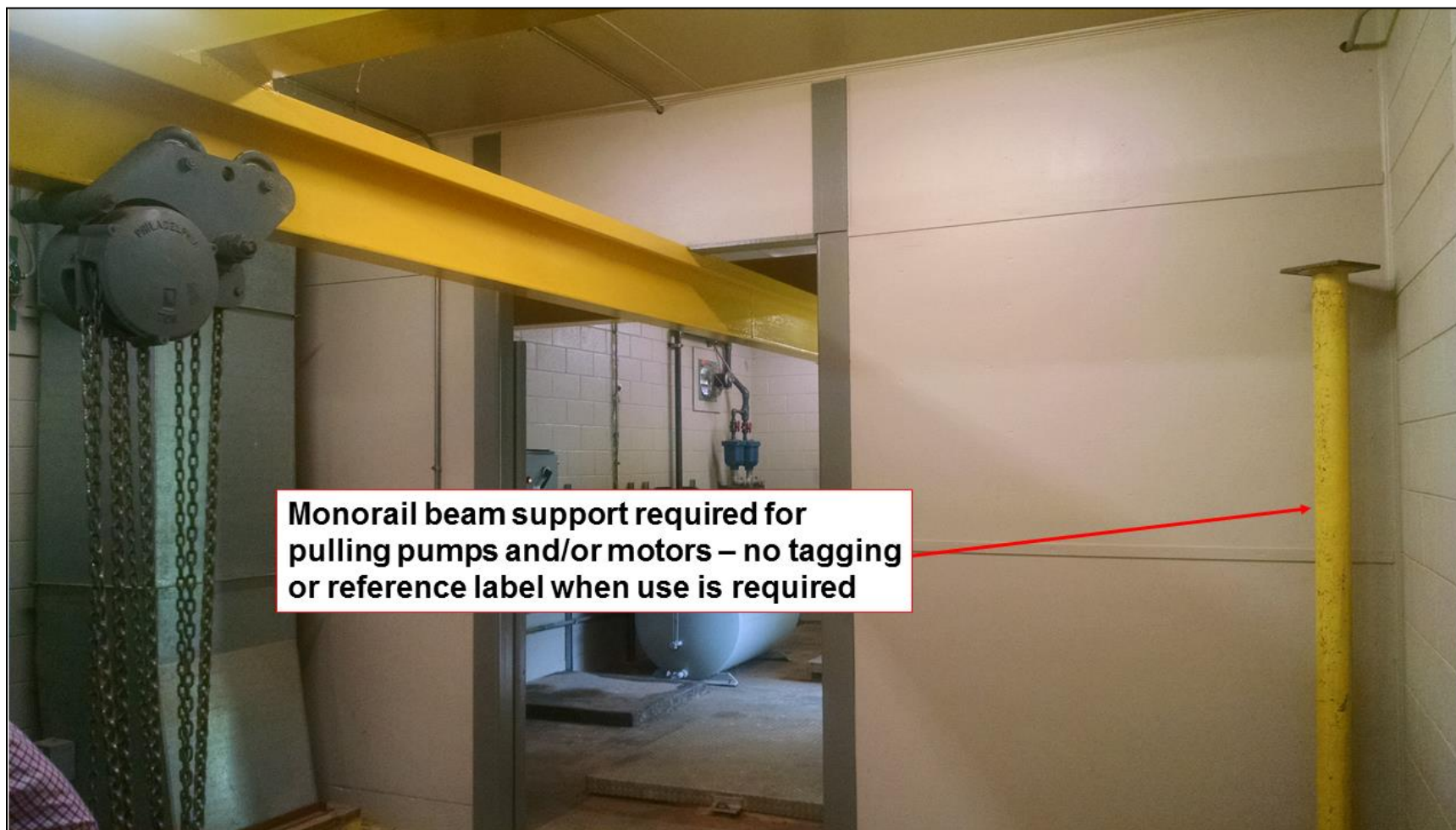
STRUCTURED INSPECTION - Hoist & Monorail



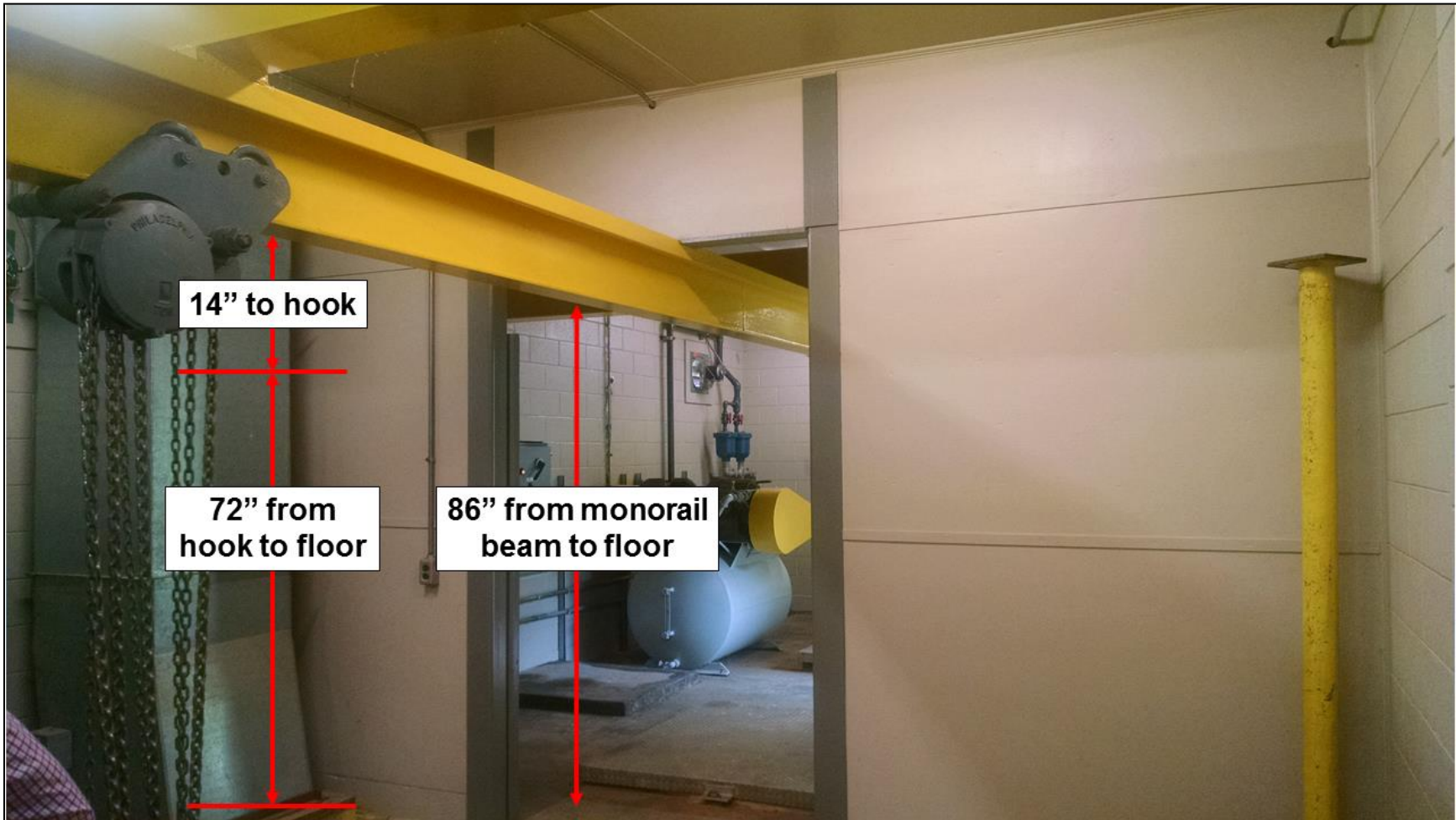
STRUCTURED INSPECTION - Hoist & Monorail



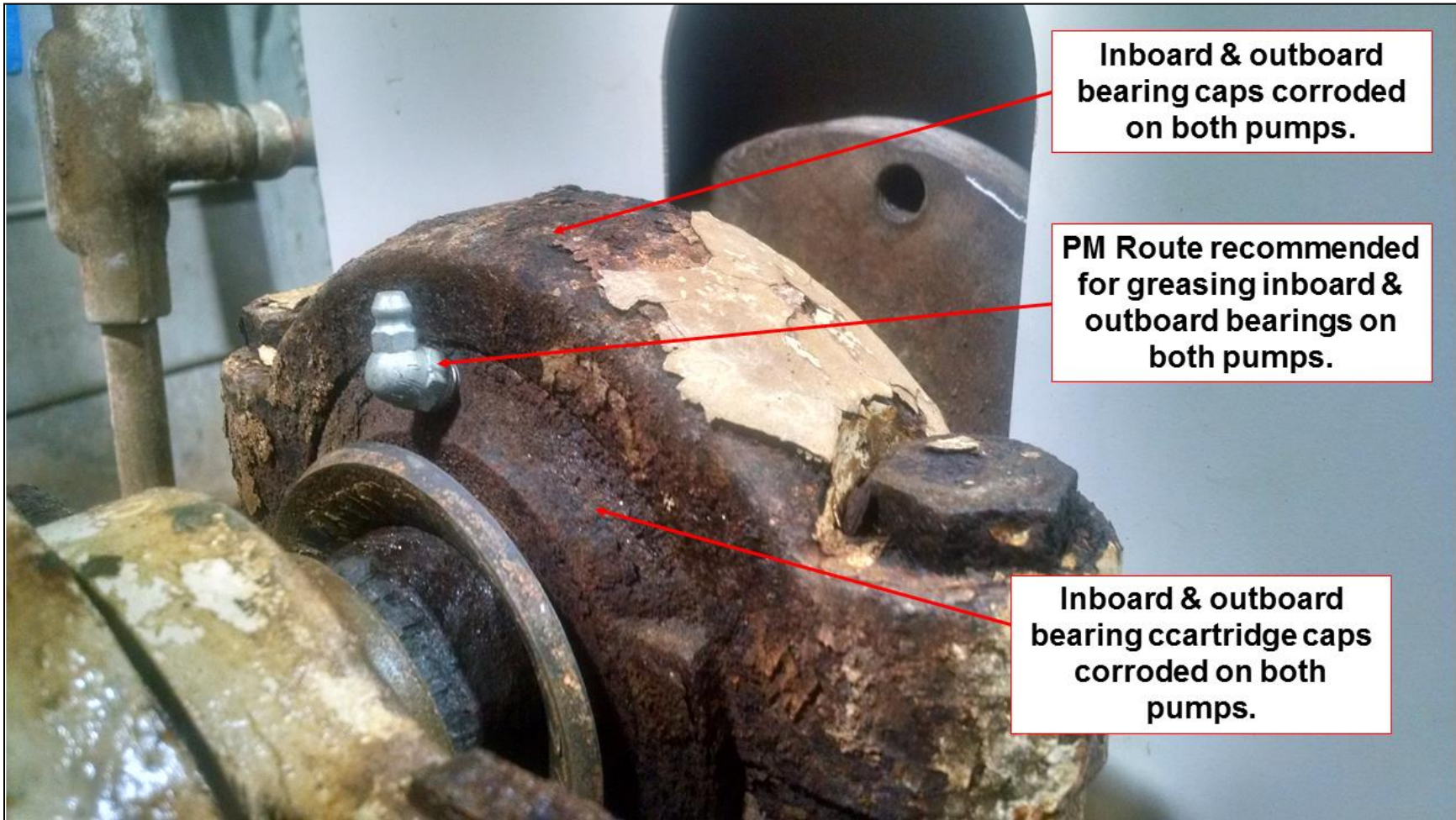
STRUCTURED INSPECTION - Hoist & Monorail



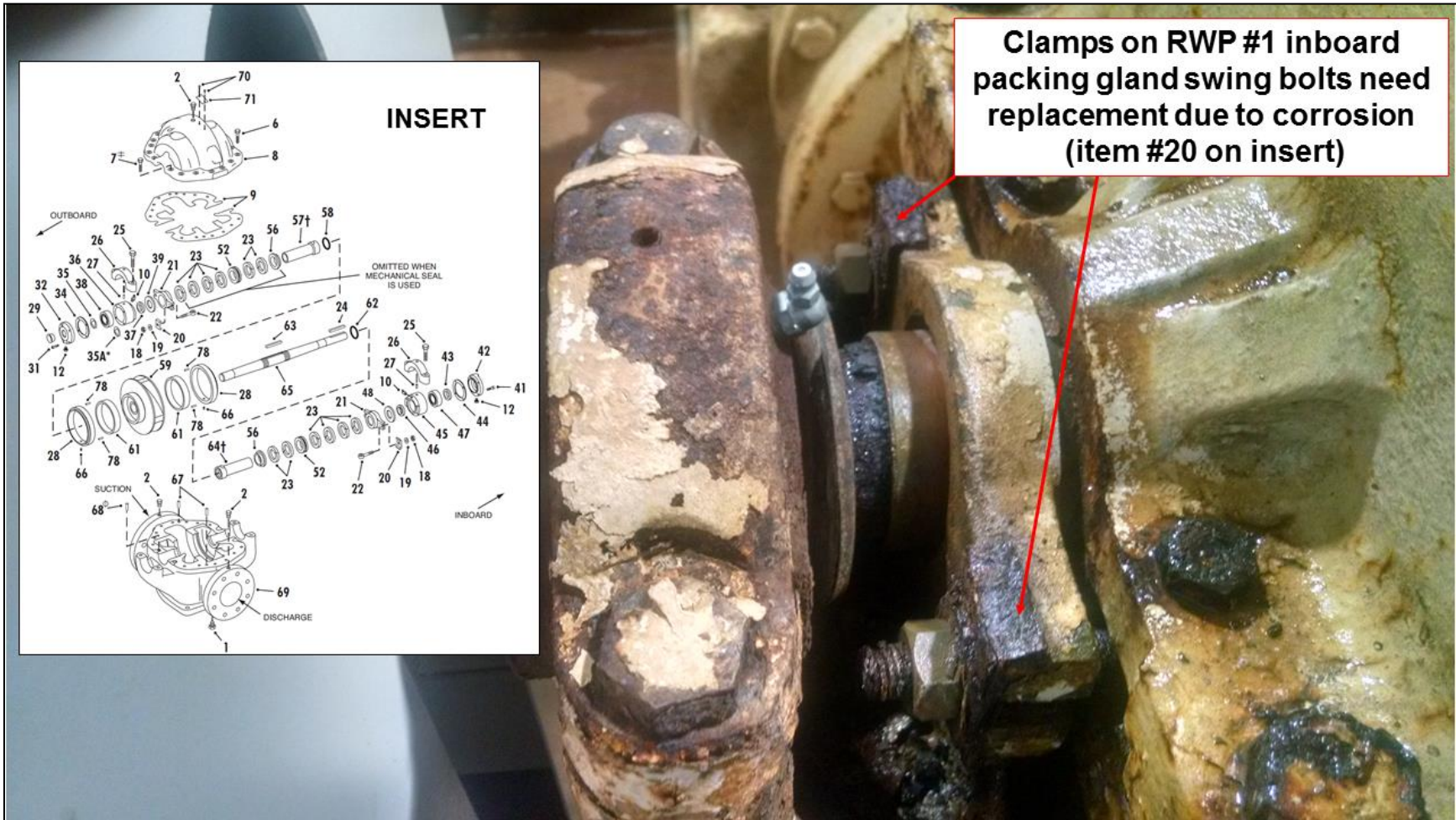
STRUCTURED INSPECTION - Hoist & Monorail



PUMPS - Bearings



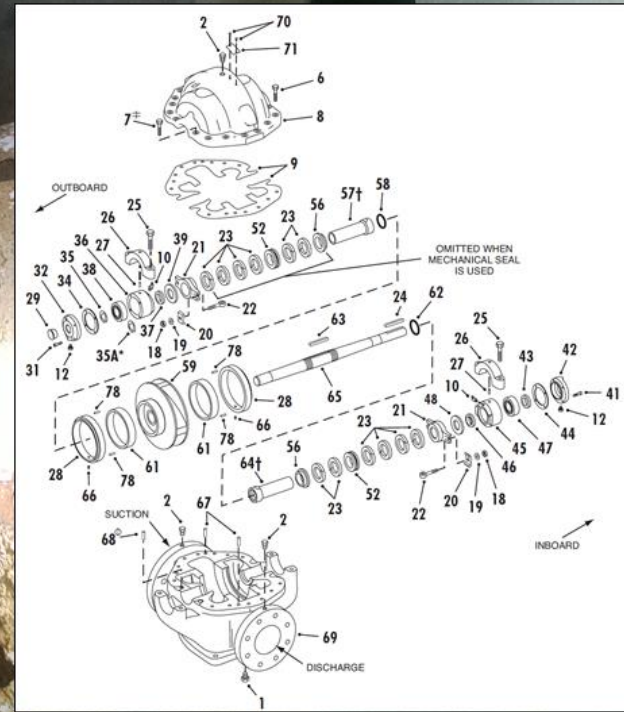
PUMPS - Packing



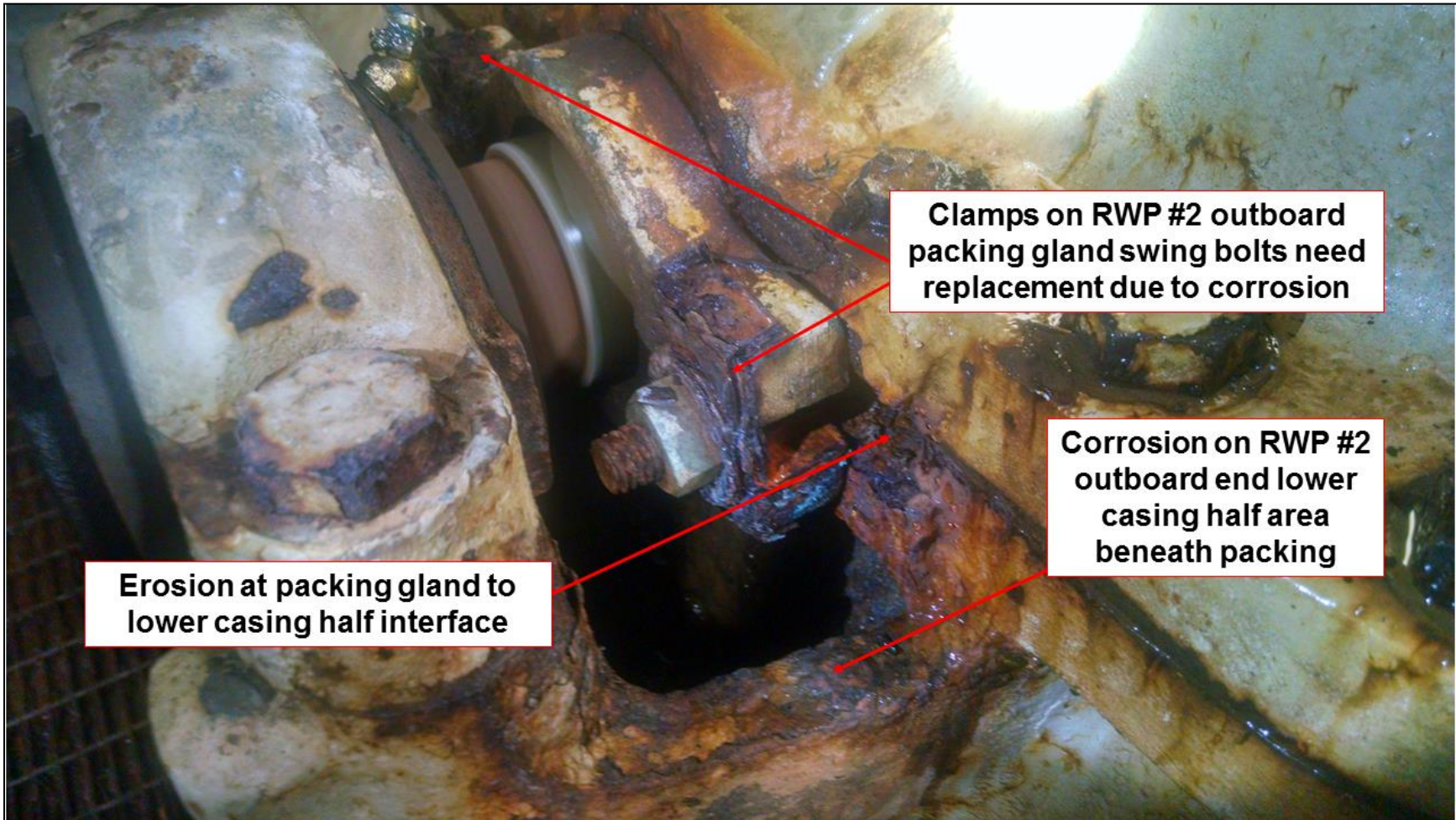
PUMPS - Packing

Clamps on RWP #2 inboard packing gland swing bolts need replacement due to corrosion (item #20 on insert)

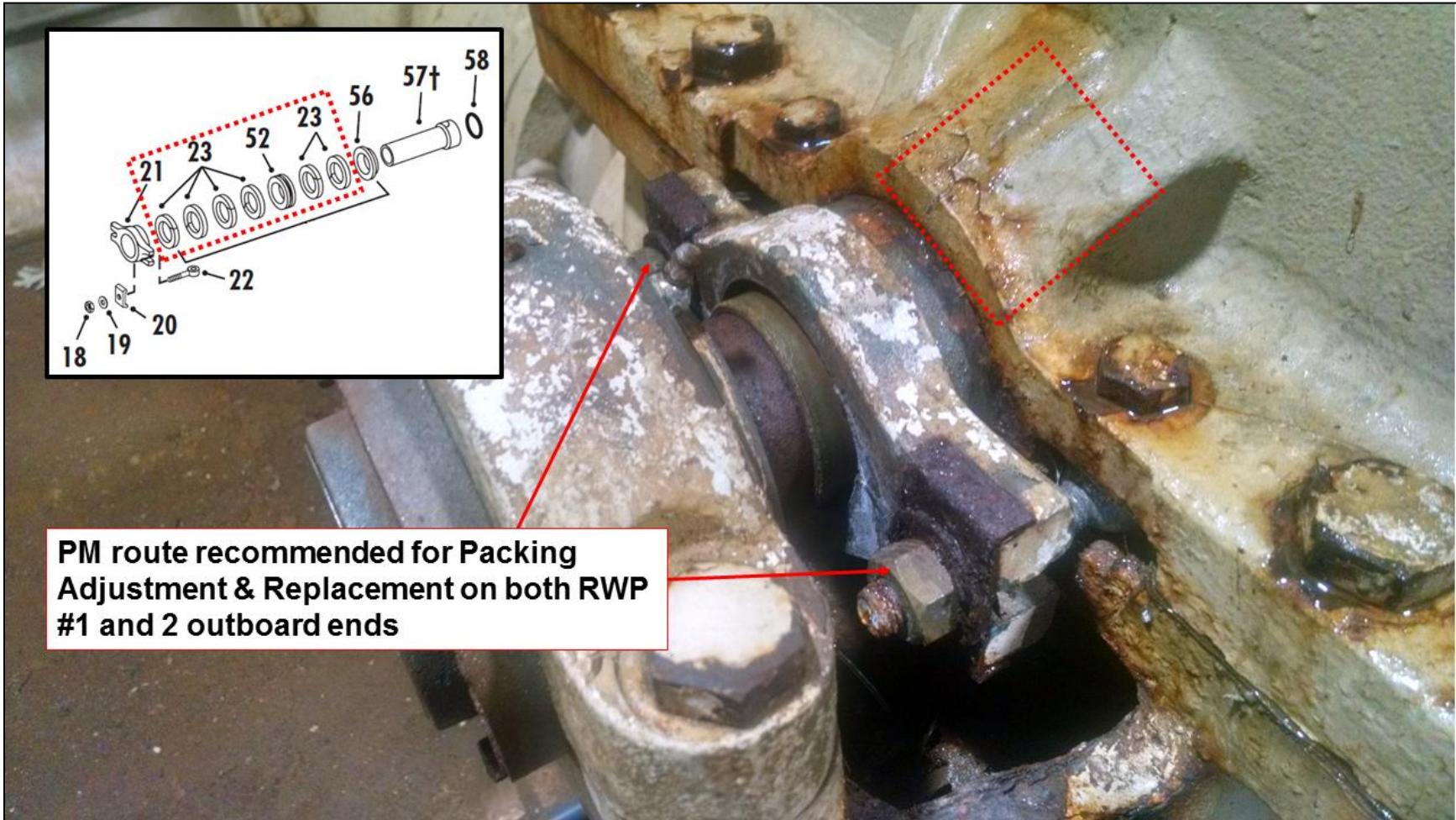
Corrosion on RWP #2 inboard end lower casing half area beneath packing



PUMPS - Packing



PUMPS - Packing



PUMPS - Mechanical Joints



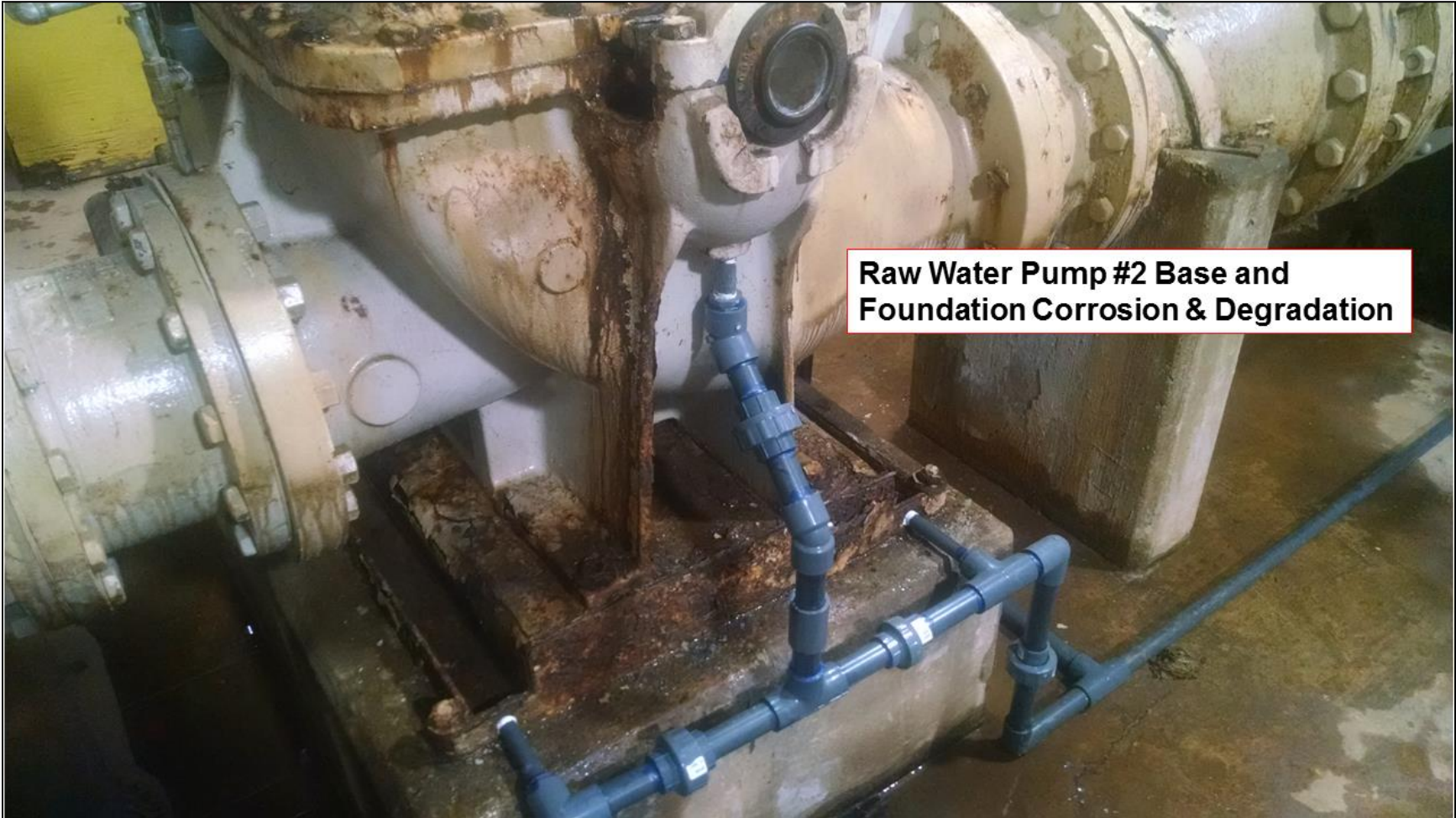
PUMPS - Mechanical Joints



**Some casing gasket extrusion
on both RWP #1 and #2**

PUMPS – Base & Foundation

(Same condition exists on RWP#1 base & foundation)

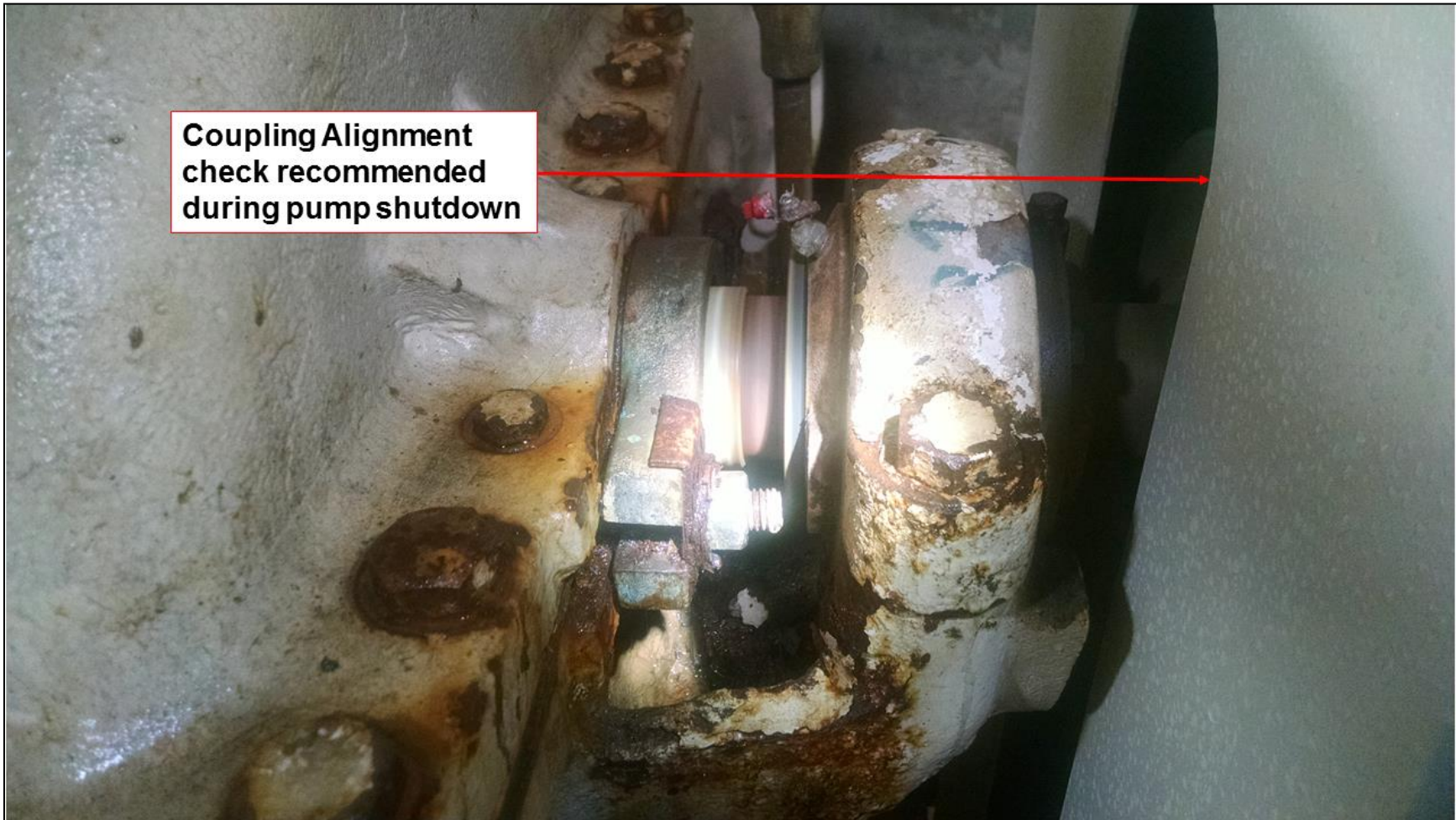


PUMPS – Base & Foundation

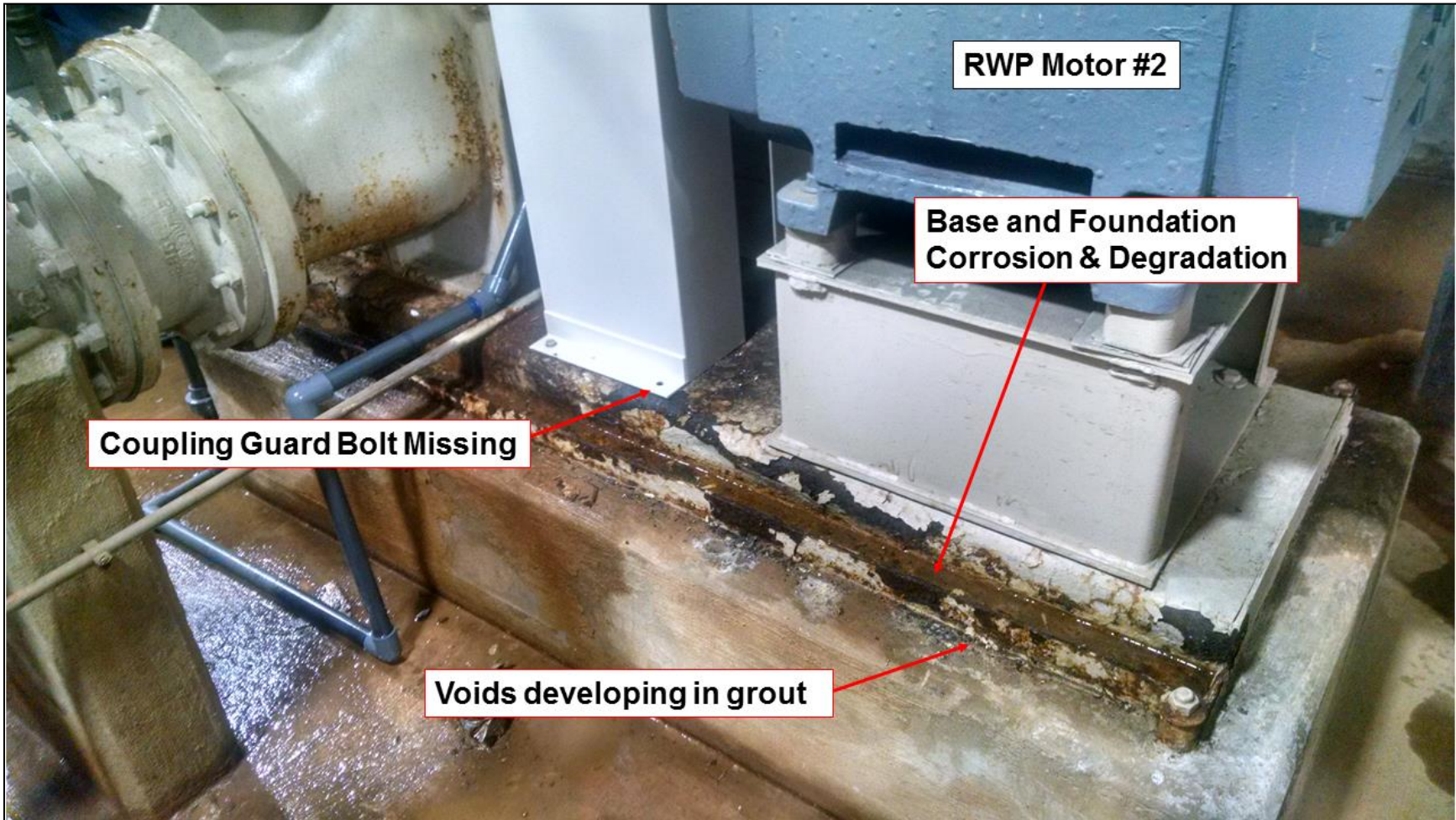
(Same condition exists on RWP#1 base & foundation)



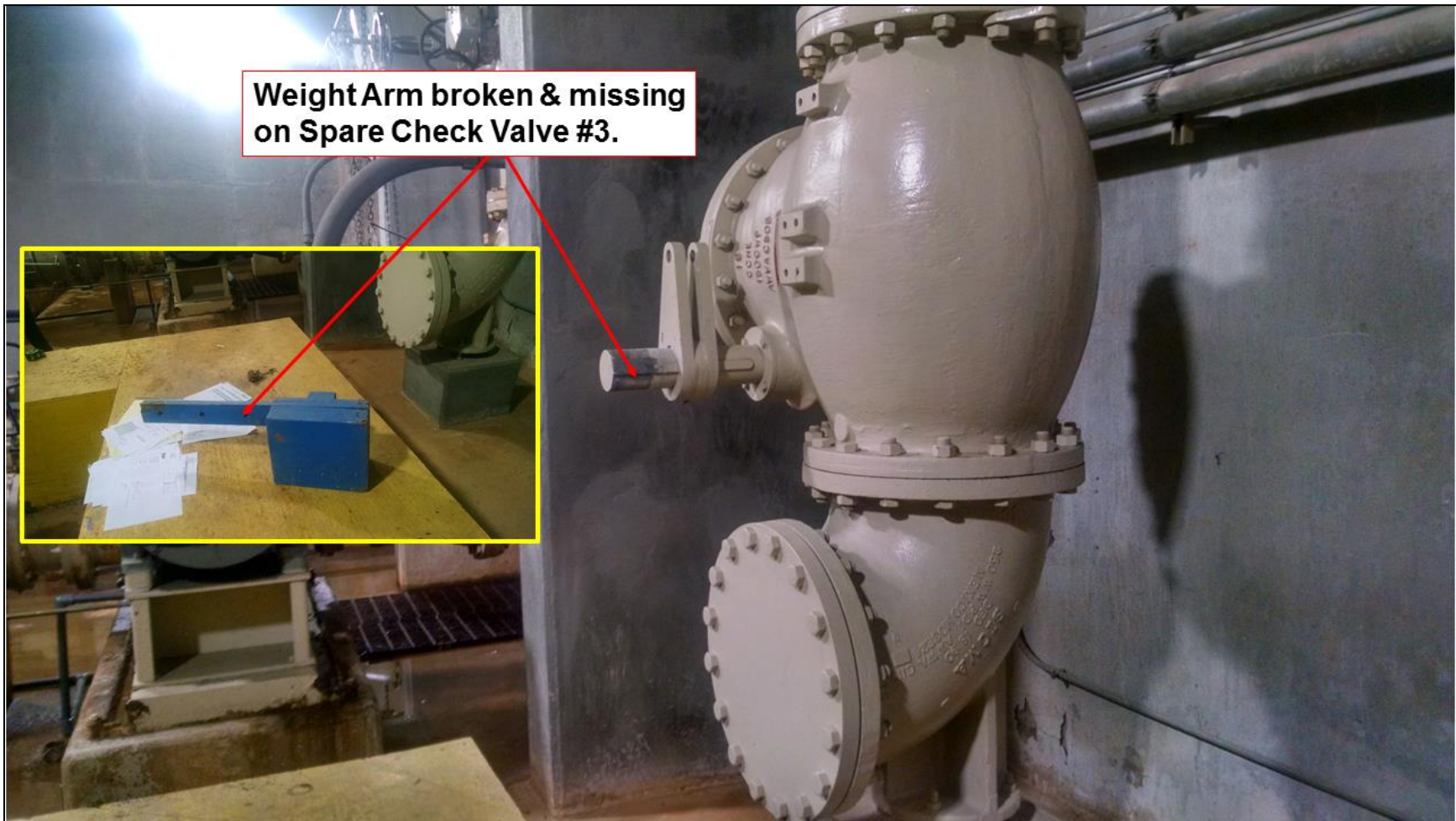
MOTORS - Coupling



MOTORS – Base & Foundation



VALVES



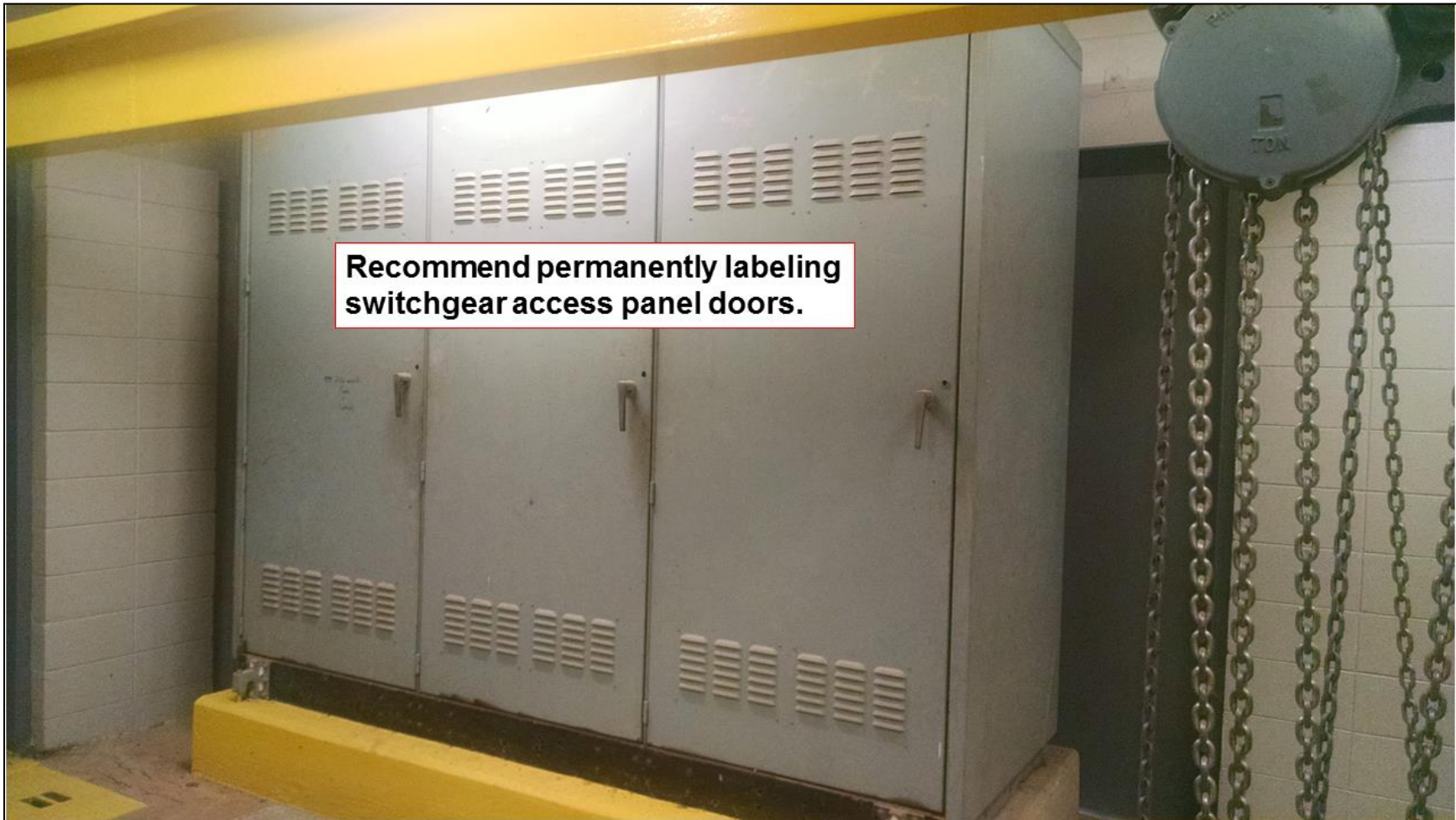
Air Compressor

No problems noted with motor, pulleys or belts.

Recommended periodic belt tensioning, alignment & adjustment



Electrical – Switchgear



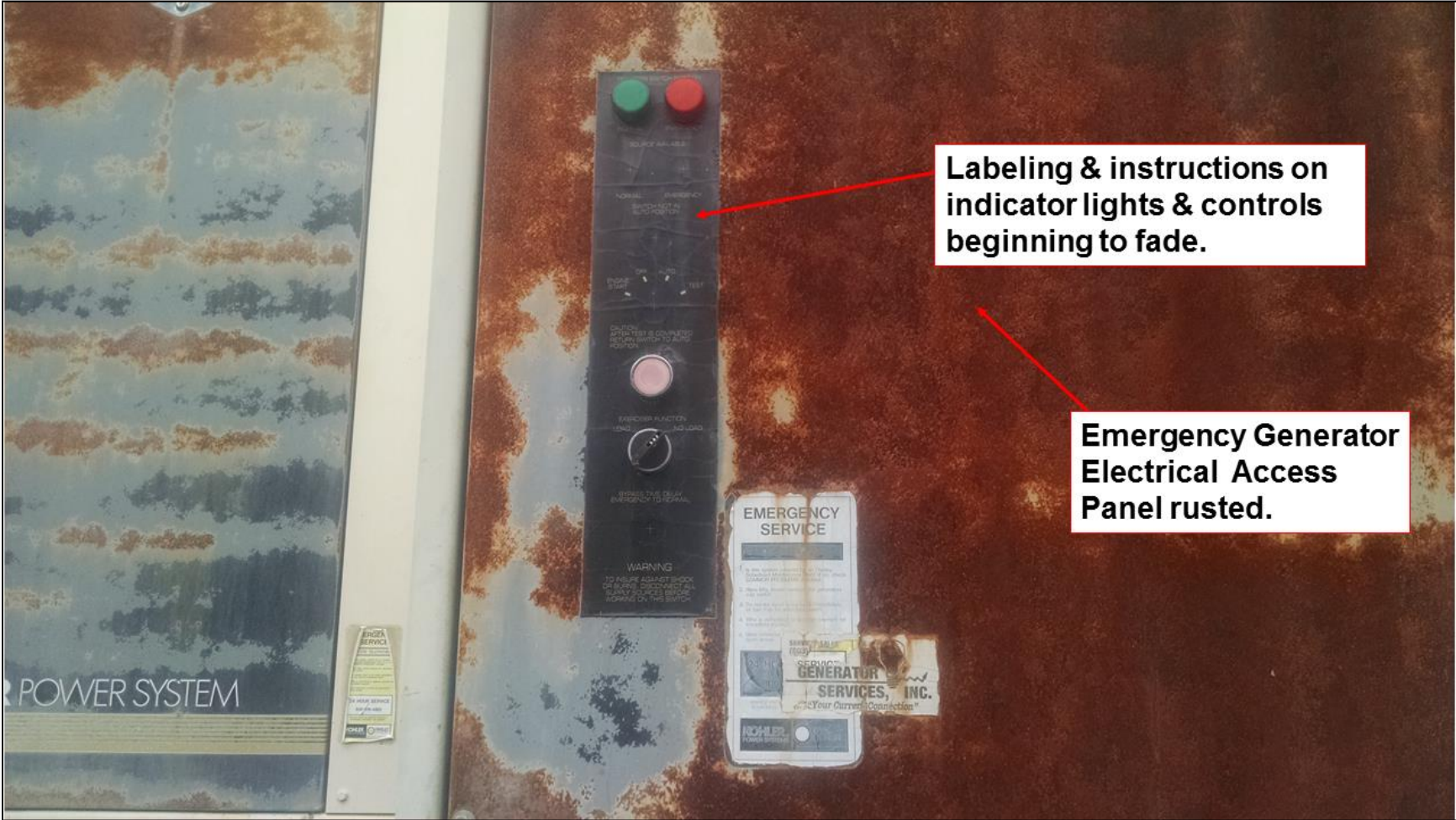
Electrical – Indicator Panel



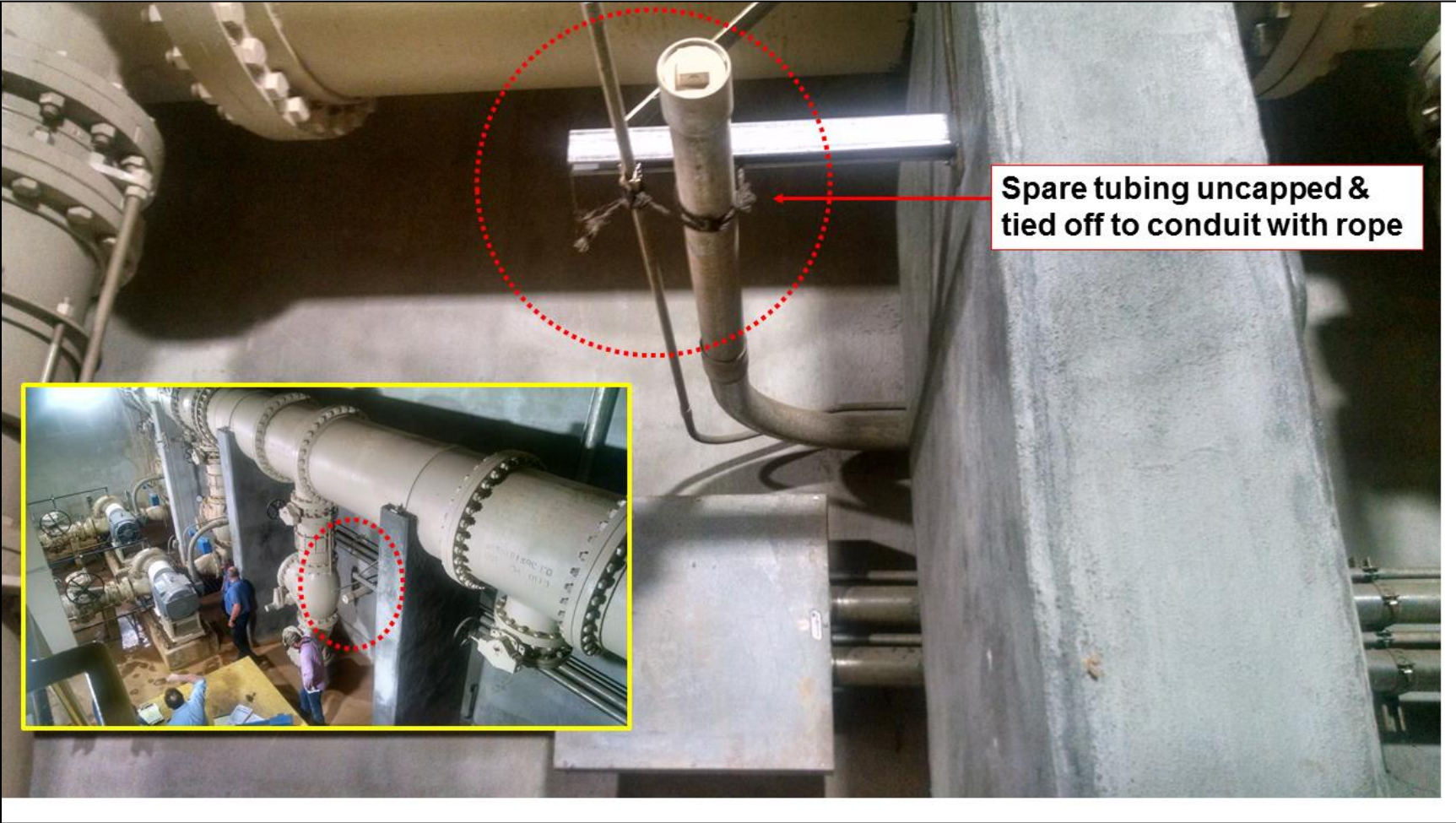
Electrical – Emergency Generator



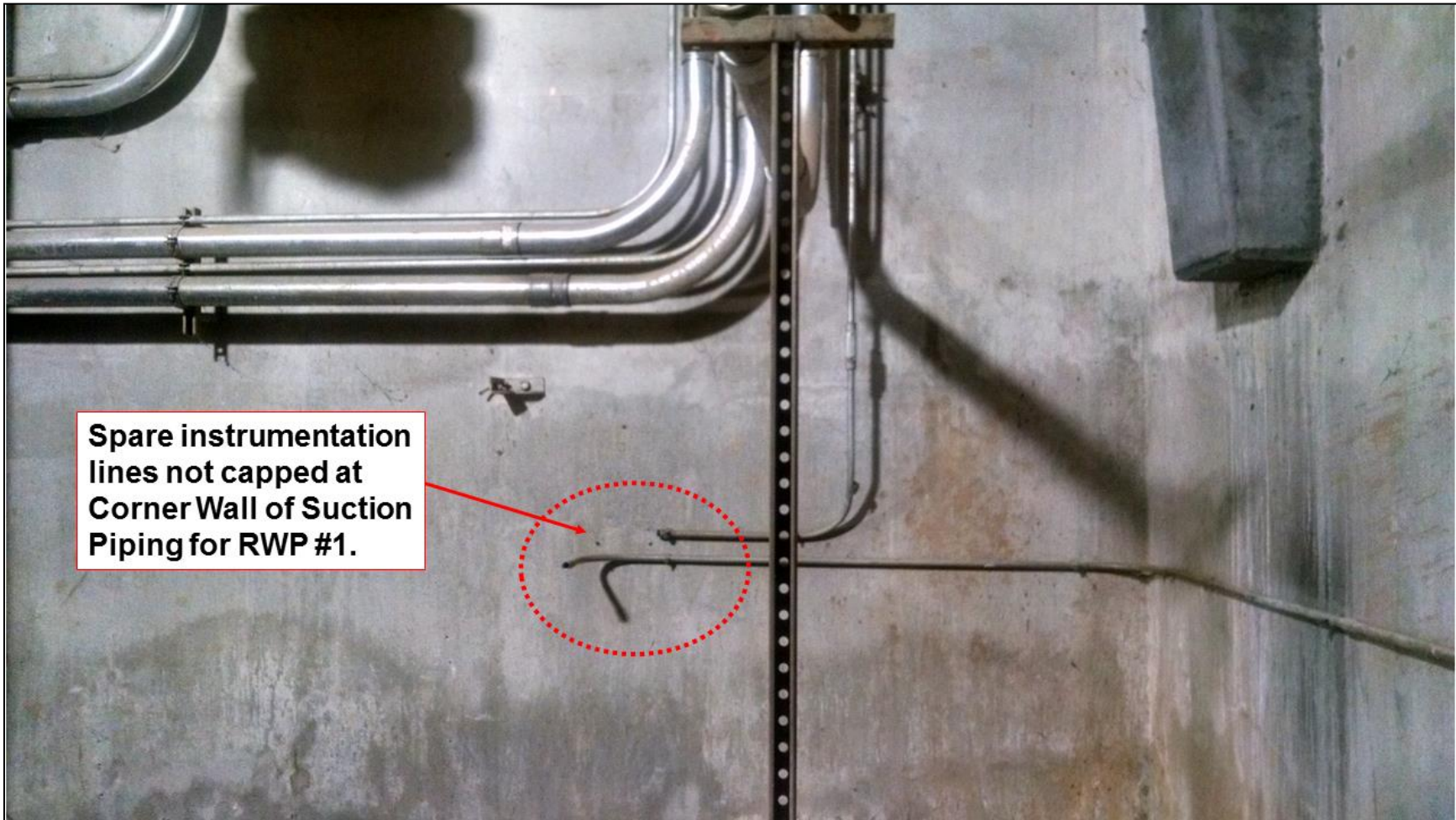
Electrical – Emergency Generator



INSTRUMENTATION - Tubing



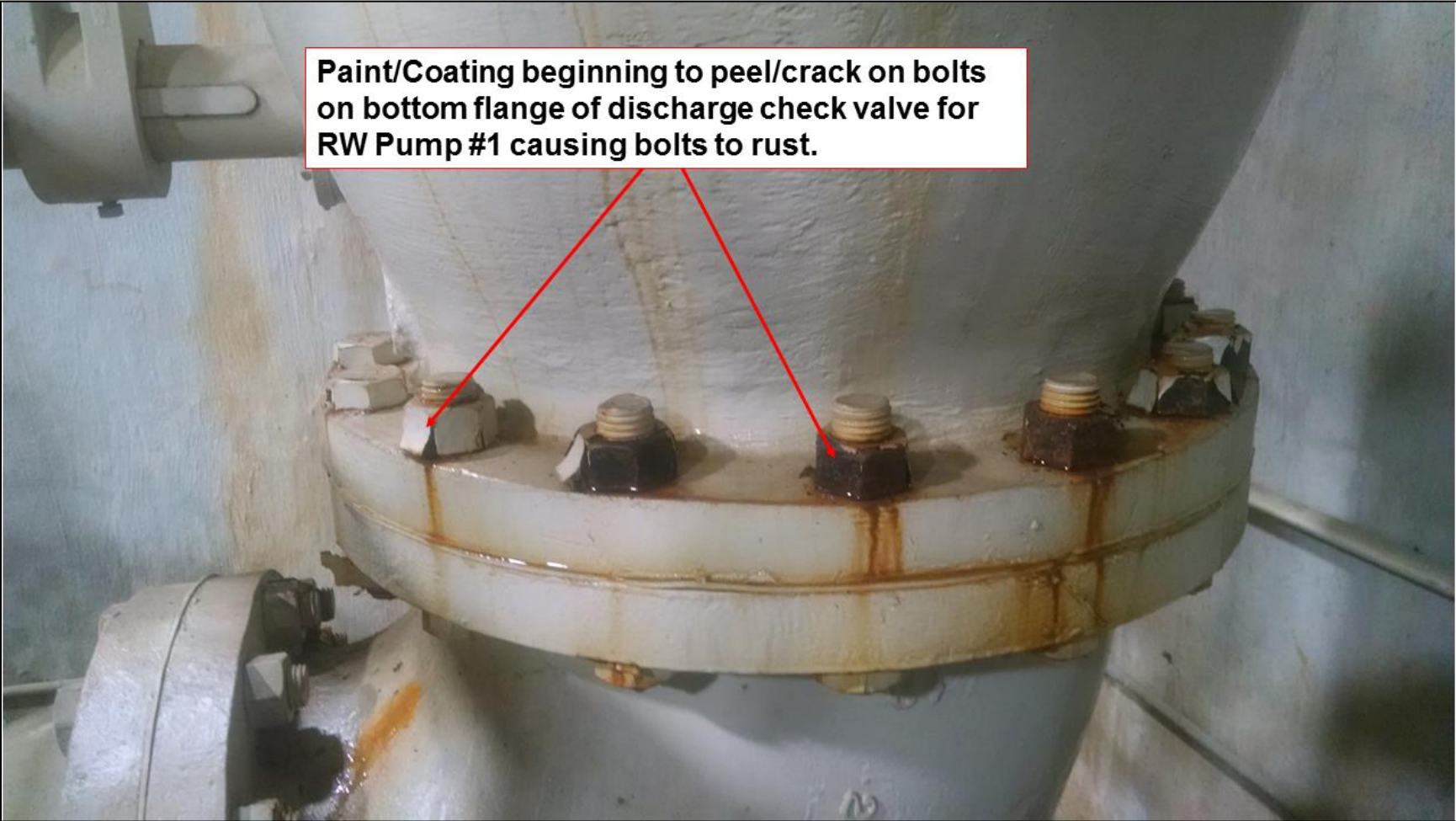
INSTRUMENTATION - Tubing



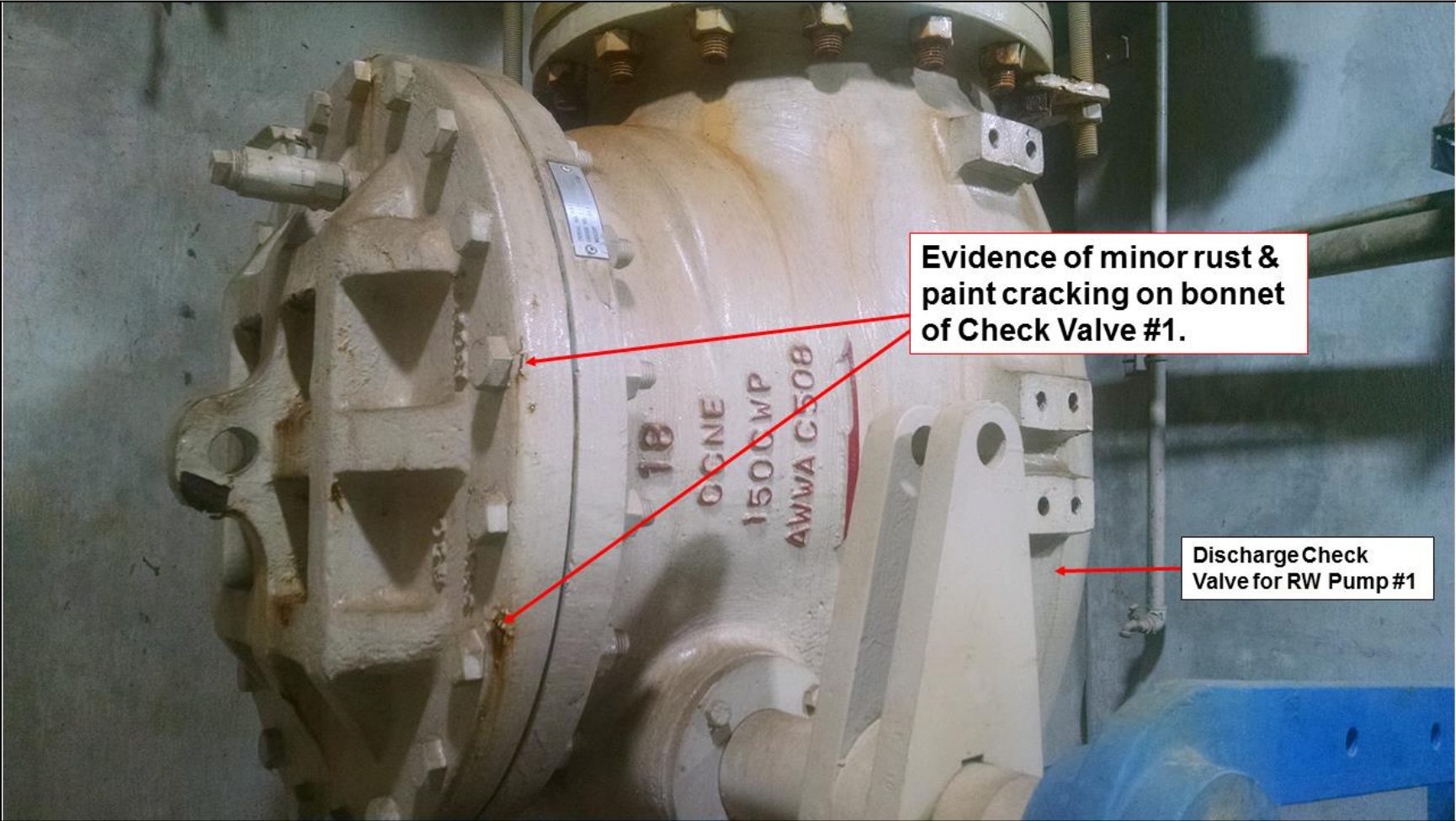
INSTRUMENTATION – Sump Level Alarm



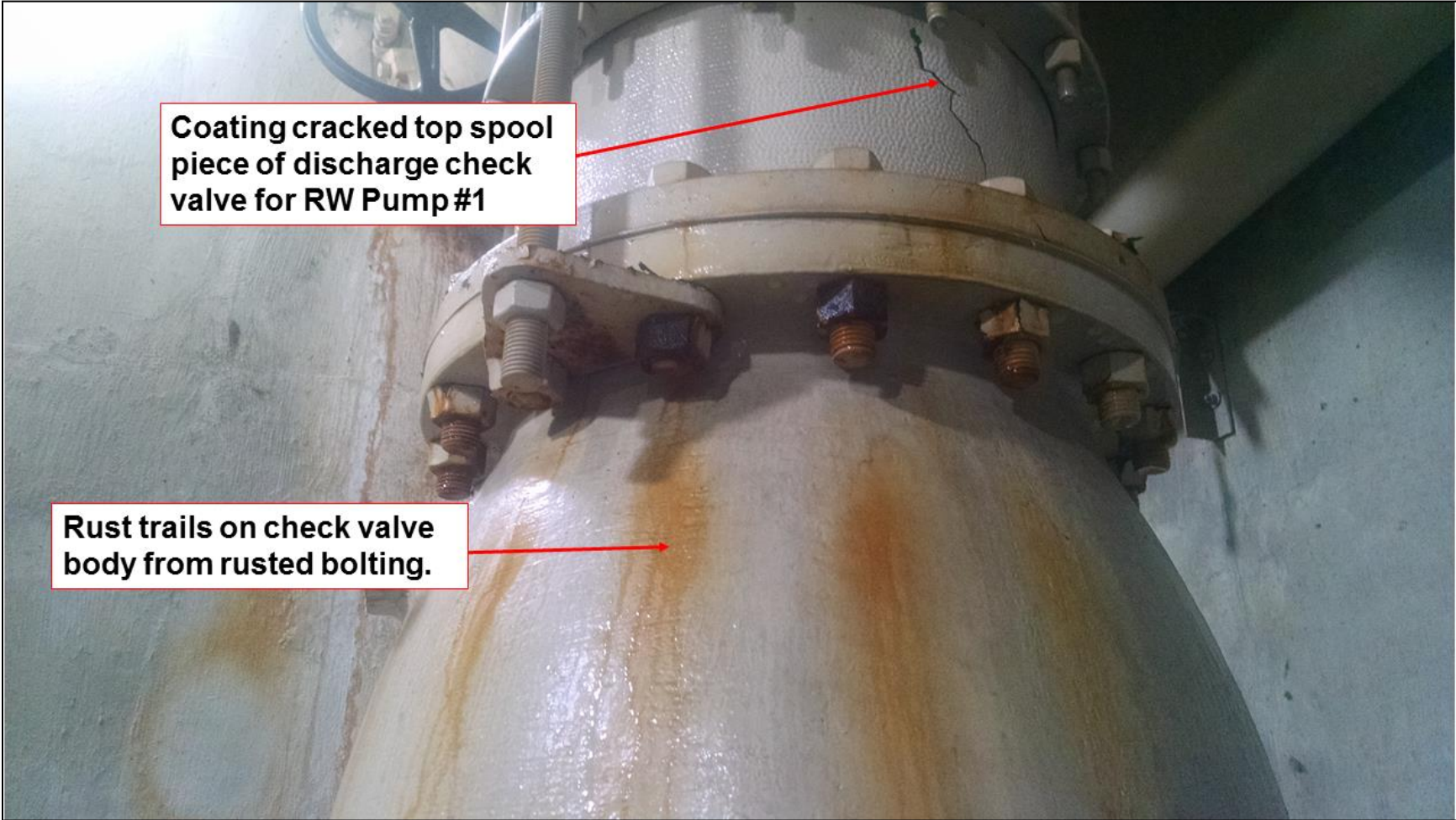
PIPING – Painting/Coating



PIPING – Painting/Coating



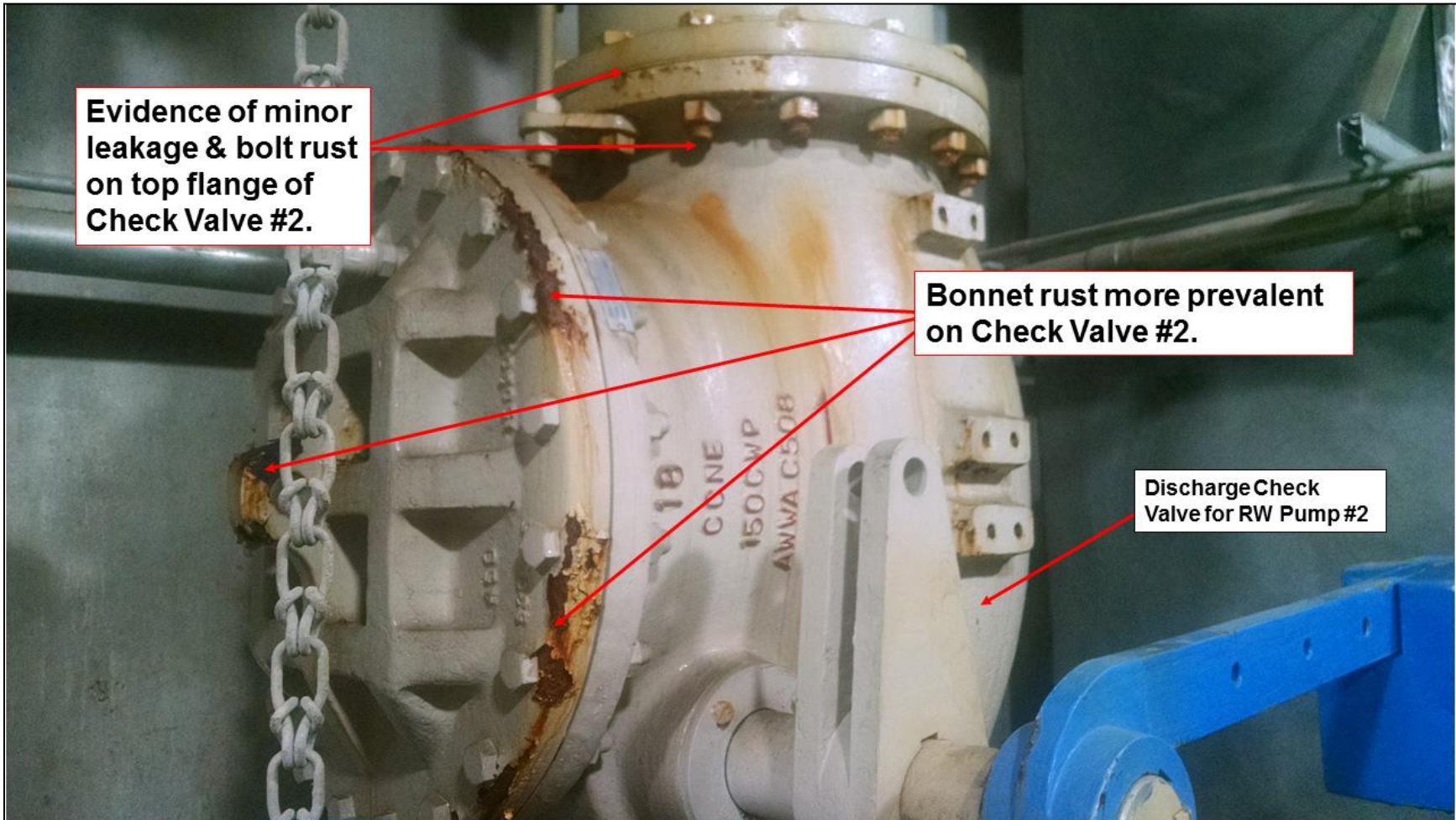
PIPING – Painting/Coating



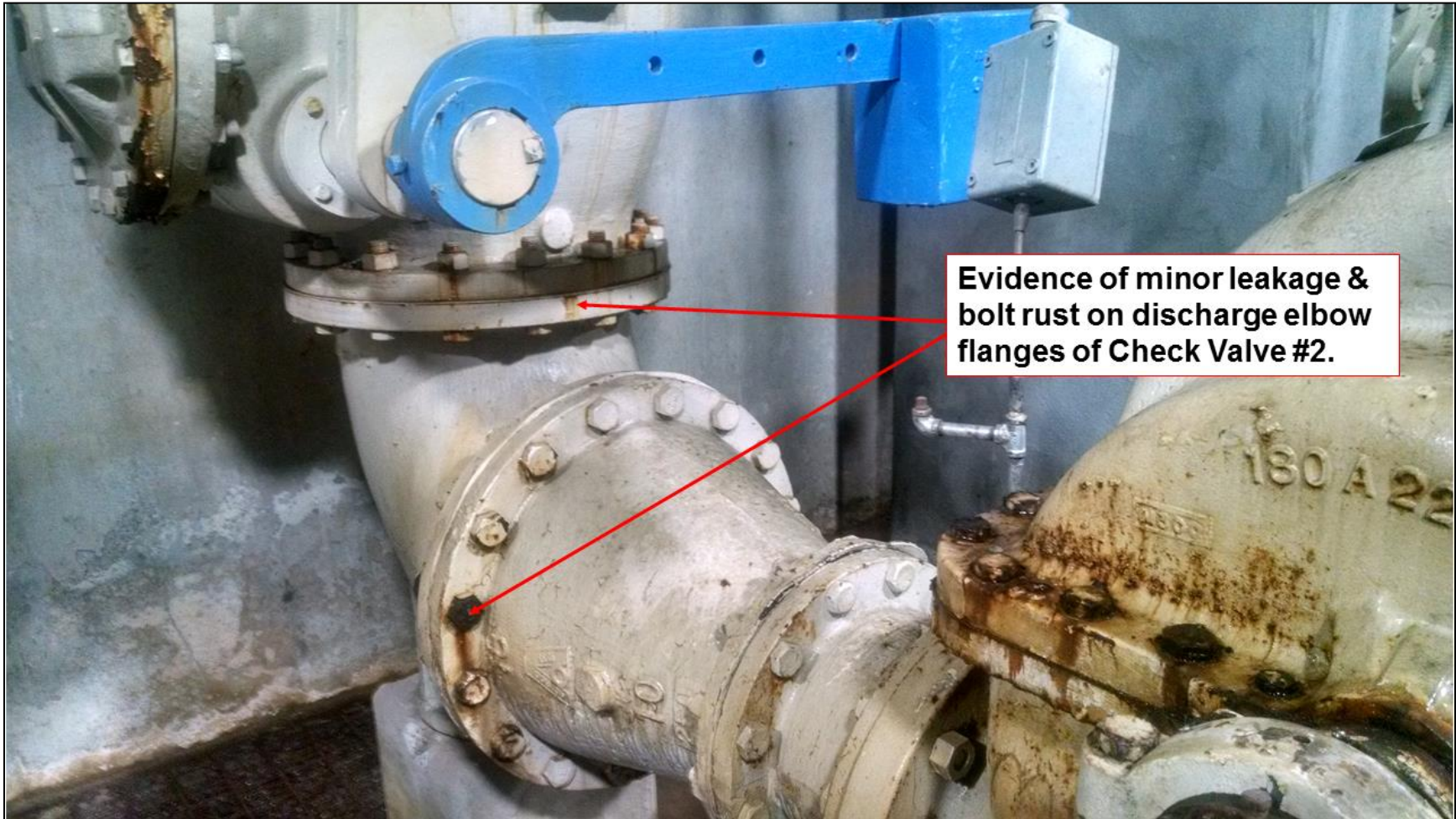
**Coating cracked top spool
piece of discharge check
valve for RW Pump #1**

**Rust trails on check valve
body from rusted bolting.**

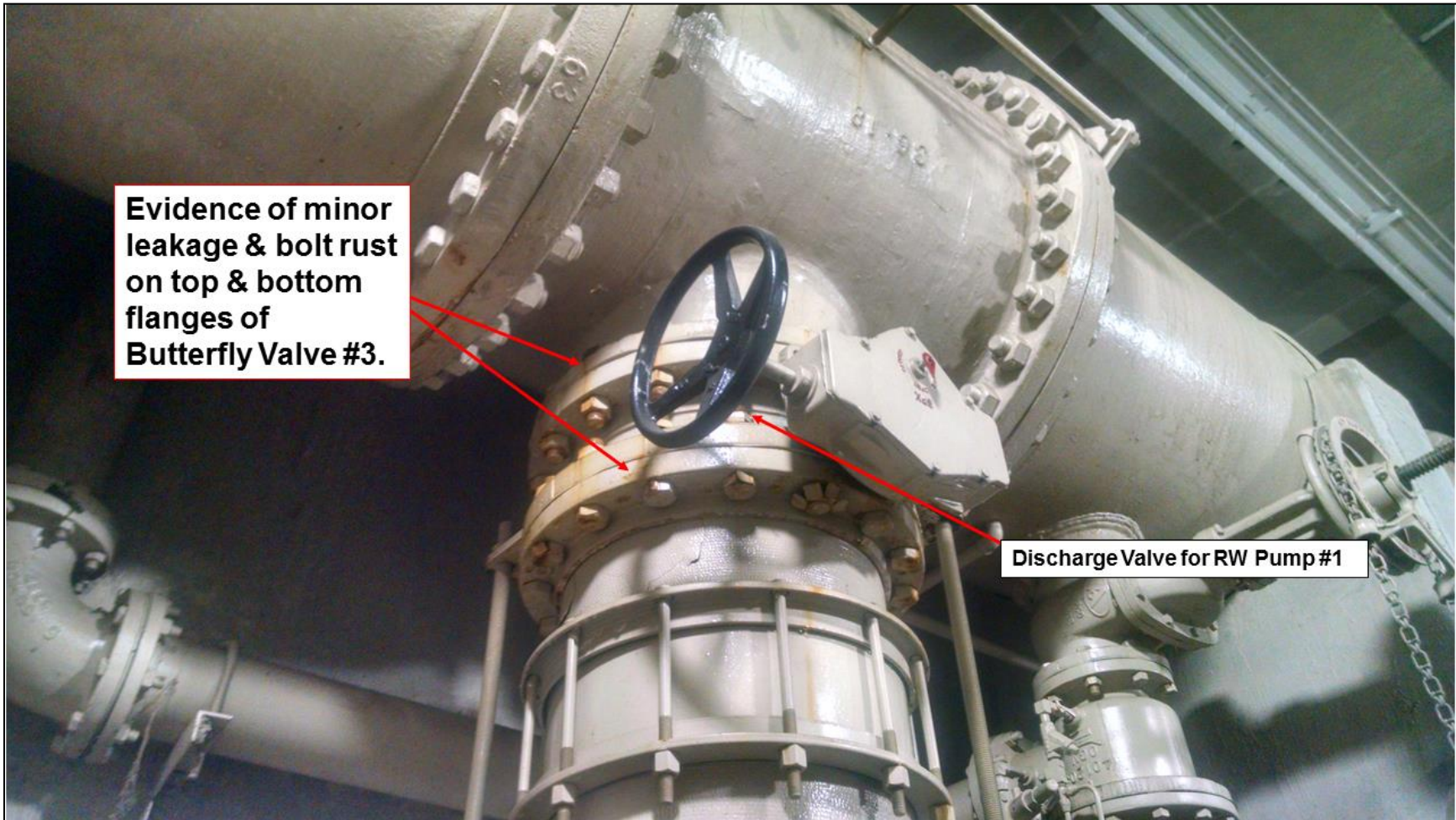
PIPING - Flanges



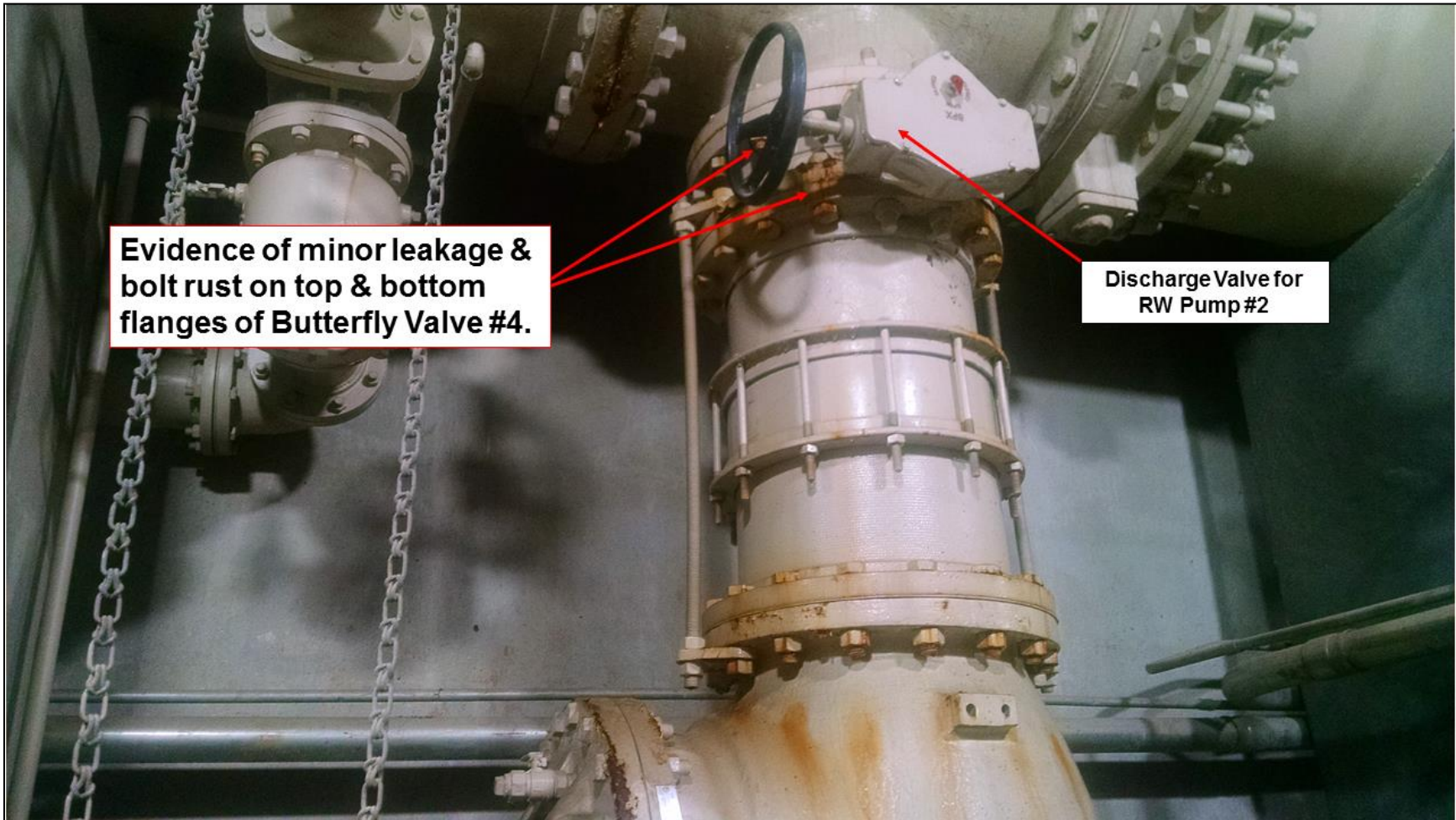
PIPING - Flanges



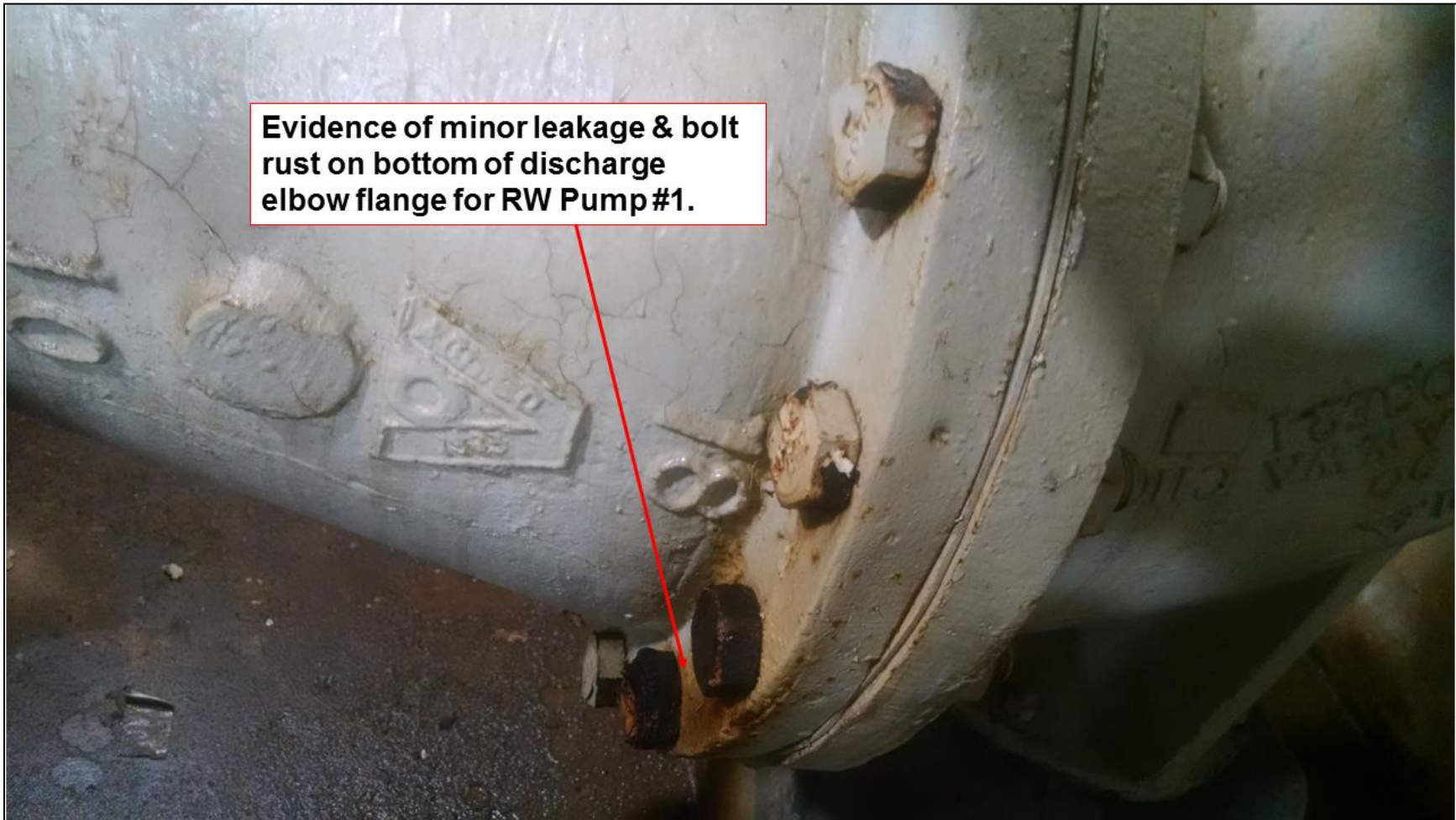
PIPING - Flanges



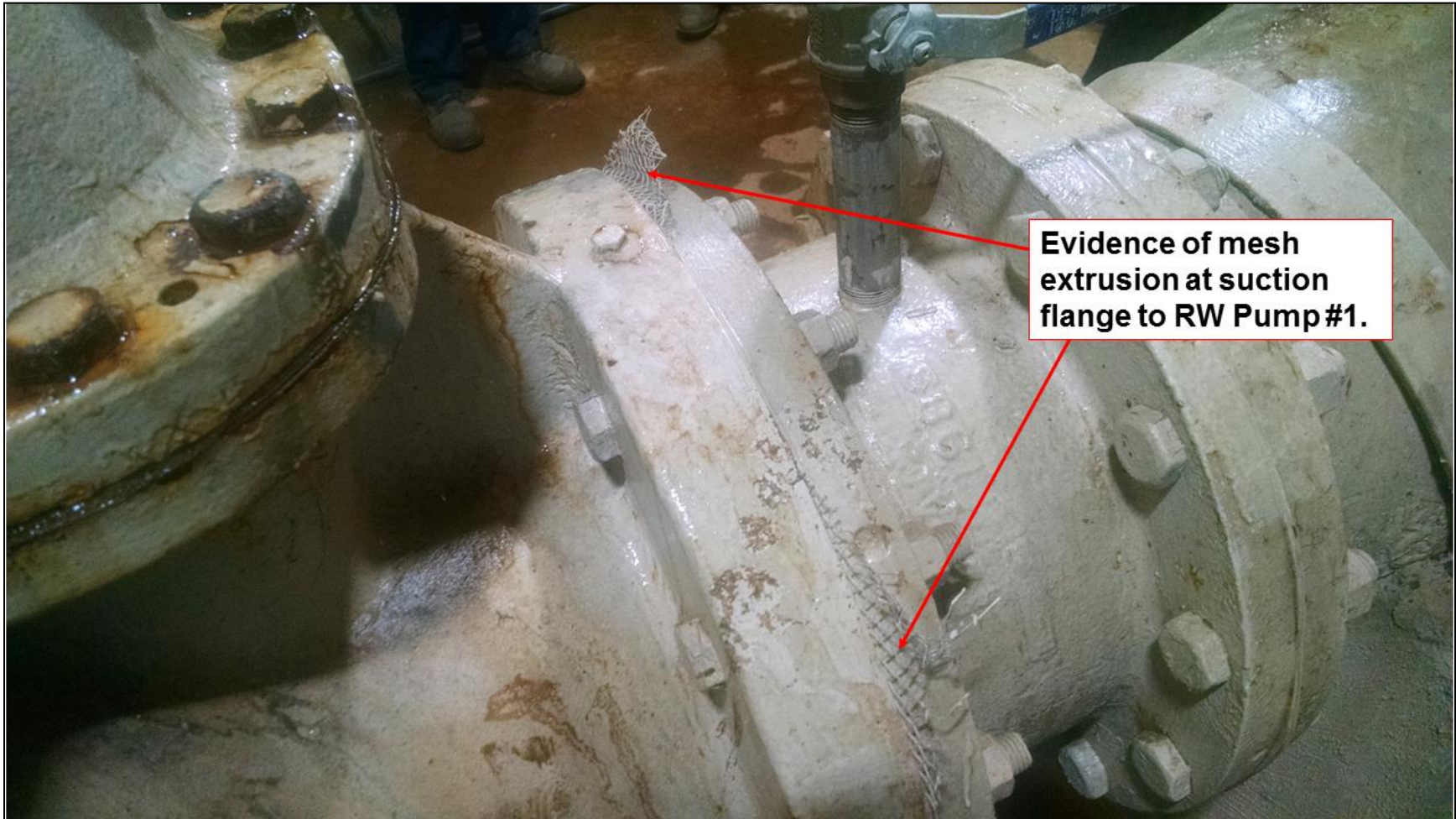
PIPING - Flanges



PIPING - Flanges



PIPING - Flanges



Overall Site Inspection - Safety



Overall Site Inspection - Safety



Overall Site Inspection – Electrical Supply to Site



Overall Site Inspection – Drainage, Security, Grade



Overall Site Inspection – Drainage, Security, Grade



Overall Site Inspection – Drainage, Security, Grade



Overall Site Inspection – Drainage, Security, Grade



Overall Site Inspection – Light Fixture



3.b

Capital Improvement Plan

Montgomery County Public Utilities – FY-19 Capital Improvement Program

FY-19 CAPITAL IMPROVEMENT PROJECT LIST				FY-19	FY-20	FY-21	FY-22	FY-23	FY-24	FY-25	FY-26	FY-27	FY-28	10-YR CIP			
			Unrestricted Fund Balance	\$5,717,495	\$5,119,195	\$4,184,455	\$3,929,415	\$2,900,875	\$1,968,335	\$1,170,295	\$942,255	\$1,126,715	\$1,330,175				
			Current Capital Contributions:	\$900,000	\$900,000	\$900,000	\$900,000	\$900,000	\$900,000	\$900,000	\$900,000	\$900,000	\$900,000				
			Available Capital Funds	\$6,617,495	\$6,019,195	\$5,084,455	\$4,829,415	\$3,800,875	\$2,868,335	\$2,070,295	\$1,842,255	\$2,026,715	\$2,230,175				
Project	Total Costs	Grant Funding	MC Funding											TOTAL			
1	Chemical Feed Rehabilitation	\$600,000	\$250,000	\$350,000	\$350,000									\$350,000			
2	Station #1 & #2 Rehabilitation	\$2,100,000	\$1,000,000	\$1,100,000	\$550,000	\$550,000								\$1,100,000			
3	Fairway Shores Water Main Replacement	\$1,525,000	\$412,500	\$1,112,500	\$482,500	\$482,500								\$965,000			
4	Raw Water Pump Station (RWPS) Improvements	\$1,500,000	\$750,000	\$750,000	\$115,800	\$634,200								\$750,000			
5	Wadeville Elevated Tank (Debt Issuance)	\$2,500,000	\$0	\$2,500,000		\$168,040	\$168,040	\$168,040	\$168,040	\$168,040	\$168,040	\$168,040	\$168,040	\$1,512,360			
6	Station #5 Rehabilitation	\$316,000	\$0	\$316,000		\$316,000								\$316,000			
7	High Service Pump #3 Addition	\$290,000	\$0	\$290,000		\$290,000								\$290,000			
8	WTP Generator Replacement	\$165,000	\$0	\$165,000		\$165,000								\$165,000			
9	Station #3 - PRV Replacements	\$216,000	\$0	\$216,000		\$216,000								\$216,000			
10	1 MG Clearwell	\$1,080,000	\$0	\$1,080,000			\$540,000	\$540,000						\$1,080,000			
11	WTP Misc Facility Improvements	\$666,000	\$0	\$666,000			\$666,000							\$666,000			
12	Biscoe Industrial Park - 12" Water Main	\$1,109,000	\$0	\$1,109,000			\$554,500	\$554,500						\$1,109,000			
13	Biscoe Industrial Park - Booster Pump Station	\$1,140,000	\$0	\$1,140,000				\$570,000	\$570,000					\$1,140,000			
14	Biscoe Industrial Park - Elevated Tank	\$2,920,000	\$1,000,000	\$1,920,000					\$960,000	\$960,000				\$1,920,000			
15	Station #8 & #12 Replacements	\$480,000	\$240,000	\$240,000							\$240,000			\$240,000			
16	WTP Sedimentation Basin Improvements	\$615,000	\$0	\$615,000							\$307,500	\$307,500		\$615,000			
17	Station #9 Rehabilitation	\$221,000	\$0	\$221,000								\$221,000		\$221,000			
18	Lake Tillery Elevated Tank	\$1,940,000	\$0	\$1,940,000									\$970,000	\$970,000			
Totals:				\$19,383,000	\$3,652,500	\$15,730,500	\$1,498,300	\$1,834,740	\$1,155,040	\$1,928,540	\$1,832,540	\$1,698,040	\$1,128,040	\$715,540	\$696,540	\$1,138,040	\$13,625,360

FY-19 CIP PROJECT DATA
MCPU

PROJECT TITLE	Raw Water Pump Station (RWPS) Improvements	
DEPARTMENT	Public Utilities	
PRIORITY	High	
TYPE OF PROJECT	2 - Maintenance / Replacement	

PROJECT DESCRIPTION
This project replaces numerous components in the raw water pump station - pumps, motors, valves (check, butterfly, and gate), generator, MCC and controls, SCADA Improvements, and safety improvements.

PROJECT JUSTIFICATION
Due to the age of the raw water pump station and its components, many are in need of significant repair and/or replacement. Instead of replacing individual components, at various times, this project replaces and/or upgrades the mechanical and electrical infrastructure for this station to improve the reliability and performance.

Project Alternatives
Continue operating the RWPS and repairing individual components as they fail.

Operating Impact / Other Comments
This project will improve overall operation, reliability, and safety of the RWPS.

CAPITAL COST BREAKDOWN	Prior to FY-19	FY-19	FY-20	FY-21	FY-22	FY-23	Future Years
Planning & Engineering		\$115,800	\$84,000				
Purchase							
Construction			\$1,182,000				
Equipment							
Contingency			\$118,200				
Other							
Total Project Costs	\$0	\$115,800	\$1,384,200	\$0	\$0	\$0	\$0

FUNDING SOURCE(S)	Prior to FY-19	FY-19	FY-20	FY-21	FY-22	FY-23	Future Years
Debt Financing (private)							
Debt Financing (public)							
General Fund							
Public Utility Fund		\$115,800	\$634,200				
GO Bonds							
Grants			\$750,000				
Other							
Total Current Funding	\$0	\$115,800	\$634,200	\$0	\$0	\$0	\$0
Total Grant Funding	\$0	\$0	\$750,000	\$0	\$0	\$0	\$0

TOTAL PROJECT COSTS: **\$1,500,000**

Raw Water Intake - Debrief Overall Score Sheet

Excellent	Very Good	Good	Fair	Poor
≤ 1.0	1.1 to 2.0	2.1 to 3.0	3.1 to 4.0	4.1 to 5.0

Structural Integrity Total Average Score = 25/8	3.1
Piping Asset Total Average Score = 25/9	2.7
Valves/Actuators Asset Total Average Score = 17/10	1.7
Pump Asset Total Average Score = 33/12	2.7
Motor Asset Total Average Score = 36/13	2.7
Overall Site Total Average Score = 33/19	1.7
Electrical Total Average Score = 27/8	3.3

Areas of concern for Raw Water Intake are Structural Integrity (Fair) and overall Electrical (Fair).

Structural Integrity (Fair):

- Concrete cracked/chipped on support for RWP #2 discharge piping.
- Concrete coating peeling & some delamination adjacent to RWP #1 suction pipe.
- Concrete coating peeling & some delamination on wall behind discharge piping between RWP #1 & 2.
- Paint/Coating beginning to peel/crack on bonnet of discharge check valves for RWP #1 & 2.
- Coating cracked top spool piece of discharge check valve for RW Pump #1
- Drain trough has rust & small debris collection.
- Concrete sweating at wall of suction piping between RWP #1 & 2.
- Concrete sweating on wall opposite Check Valve #1.
- Concrete erosion at suction pipe wall penetration to RWP #1.
- Pipe not anchored to concrete at thru wall penetration to outside.
- Concrete support bowed for suction piping blanked with blind flange (intended for RW Pump #4 if installed).
- No capacity labeling on monorail or hoist.
- Monorail beam support required for pulling pumps and/or motors – no tagging or reference label when use is required.
- Grating being used to compensate for floor slope.
- Floor erosion & some debris present.

Electrical (Fair):

- Duke Energy needs to replace pole that is leaning and temporarily shored.

Raw Water Intake – Debrief (continued)

Electrical (Fair): (continued)

- Weather heads need to be installed on site power supply from main utility pole.
- Switchgear access panel doors not labeled.

Piping (Good): Exceptions: Pipe restraint working loose from eroded concrete support on suction pipe to RWP#1. Mesh extrusion from suction flange to RW Pump #1. Minor leakage & bolt rust on top flange of Check Valves #1 & #2. Spare instrumentation lines not capped. Minor rust & paint cracking on bonnet of Check Valves #1 & #2 - bonnet rust more prevalent on Check Valve #2. Minor leakage & bolt rust on discharge elbow flanges of Check Valve #2. Minor leakage & bolt rust on top & bottom flanges of Butterfly Valves #3 &4. Minor leakage & bolt rust on bottom of discharge elbow flange for RW Pump #1.

Valves/Actuators (Very Good): Exceptions: Weight Arm broken & missing on Spare Check Valve #3.

Pumps (Good): Aurora - Horizontal Split Case Centrifugal Model 411-BF. Exceptions: RWP #1 & 2 casing gasket leakage and fastener corrosion. RWP #1 & 2 clamps on packing gland swing bolts need replacement due to corrosion. RWP #1 & 2 base and foundation corrosion & degradation. Corrosion on RWP #2 inboard end lower casing half area beneath packing. Some casing gasket extrusion on both RWP #1 and #2. Corrosion on RWP #1 & 2 inboard/outboard end bearing clamps & outside of bearing cartridges.

Motors (Good): US Electrical Motors Frame 445T. Exceptions: RWP Motors #1 & #2 - base and foundation corrosion & degradation, coupling guard bolt missing, voids developing in grout.

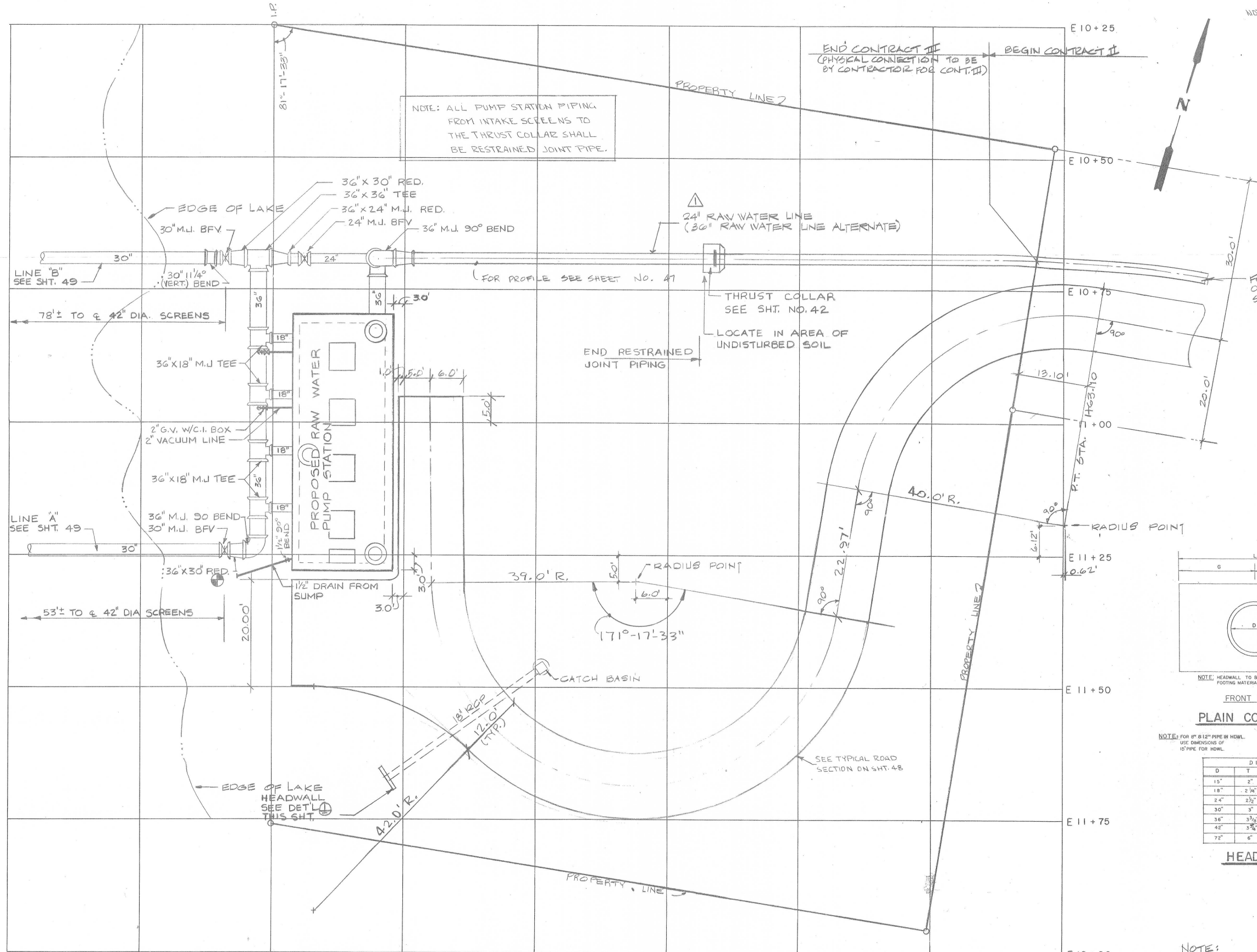
Air Compressors: (Good). Ingersoll Rand Model V255. No exceptions.

Overall Site (Very Good): Exceptions: Slope erosion. Vegetation coming up through gravel at intake area, encroaching security fence and at switchgear rear door area. Labeling & instructions on emergency generator indicator lights & controls beginning to fade. Emergency Generator electrical access panel rusted. Stairs to lower level beneath access hatch need to be labeled head bump hazard. Each equipment maintenance access hatch to lower level needs safety label. Need to verify functional sump level alarm. Light fixture cover open allowing birds or wasps to nest.

See Executive Summary Report for specific details and photographic evidence concerning conditions summarized above.

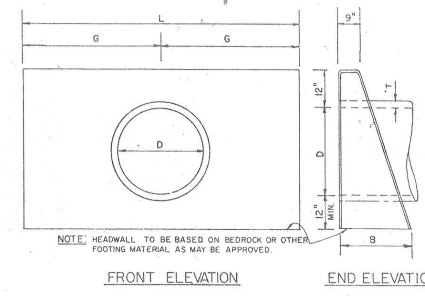
3.c

RWPS Record Drawings



NOTE: ALL PUMP STATION PIPING FROM INTAKE SCREENS TO THE THRUST COLLAR SHALL BE RESTRAINED JOINT PIPE.

NOTE: CONTRACTOR II SHALL PROVIDE NECESSARY TEMPORARY BLOCKING FOR PRESSURE TESTING LINES.



PLAIN CONCRETE HEADWALL

NOTE: FOR 8" & 12" PIPE IN HDWL. USE DIMENSIONS OF 12" PIPE FOR HDWL. NOTE: HEADWALL TO BE CONSTRUCTED IN "L" SHAPE OR OTHERS AS REQ'D BY ENGINEERS.

DIMENSION TABLE					
D	T	H	B	G	L
15"	2"	3'-3"	1'-7 1/2"	1'-11"	3'-10"
18"	2 1/4"	3'-6"	1'-9"	2'-4"	4'-8"
24"	2 1/2"	4'-0"	2'-0"	3'-2"	6'-4"
30"	3"	4'-6"	2'-3"	4'-0"	8'-0"
36"	3 3/8"	5'-0"	2'-6"	4'-10"	9'-8"
42"	3 3/4"	5'-6"	2'-9"	5'-8"	11'-4"
72"	6"	10'-0"	5'-0"	9'-8"	19'-4"

HEADWALL DETAILS 1

Appendix 3.C
 1982 Record Drawings
 RWPS Site Plan
 Not Provided to Scale

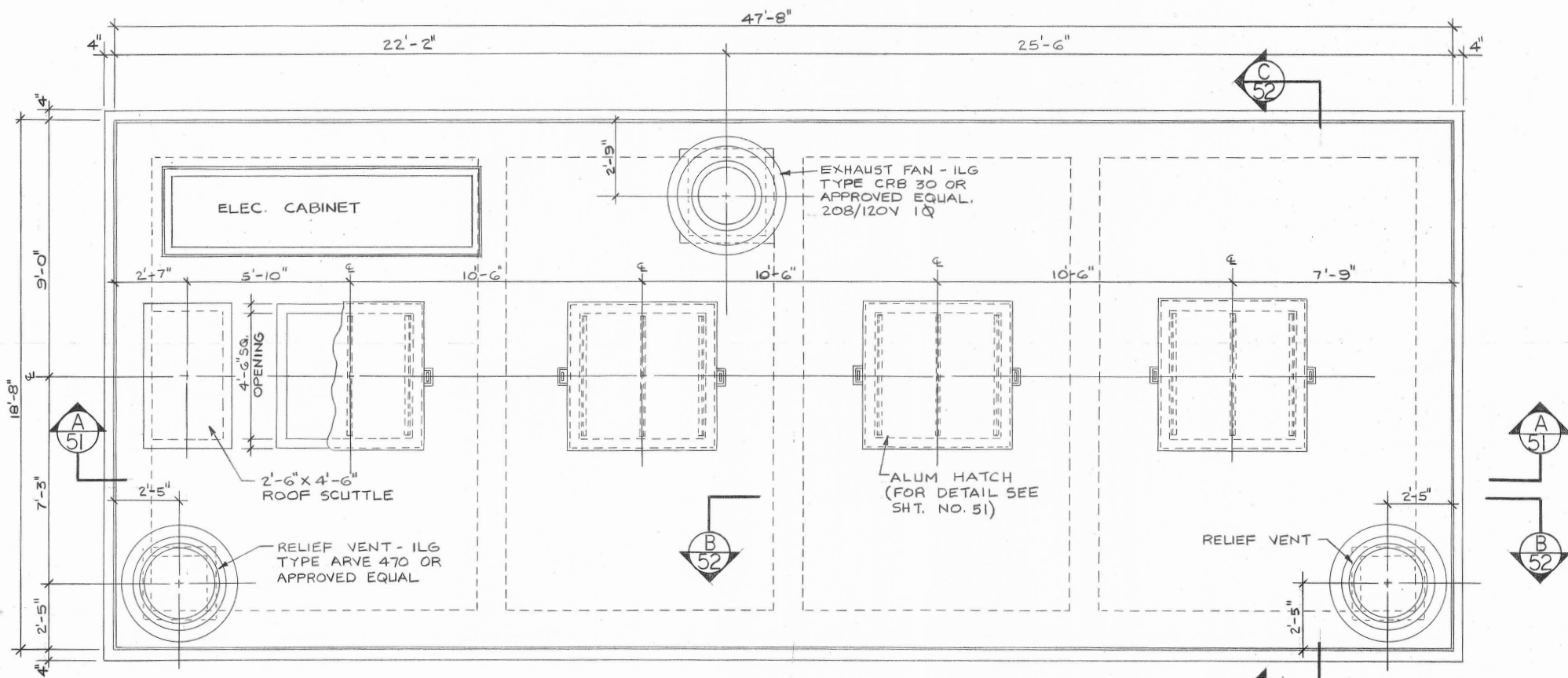
PHASE II - WATER FACILITIES PROJECT
 CONTRACT III - GENERAL
 MONTGOMERY COUNTY, NORTH CAROLINA

STAKING PLAN
 RAW WATER PUMP STA.

Moore, Gardner & Associates, Inc. • Consulting Engineers
 SURFIDE BEACH SOUTH CAROLINA
 MEMPHIS TENNESSEE
 BATON ROUGE LOUISIANA

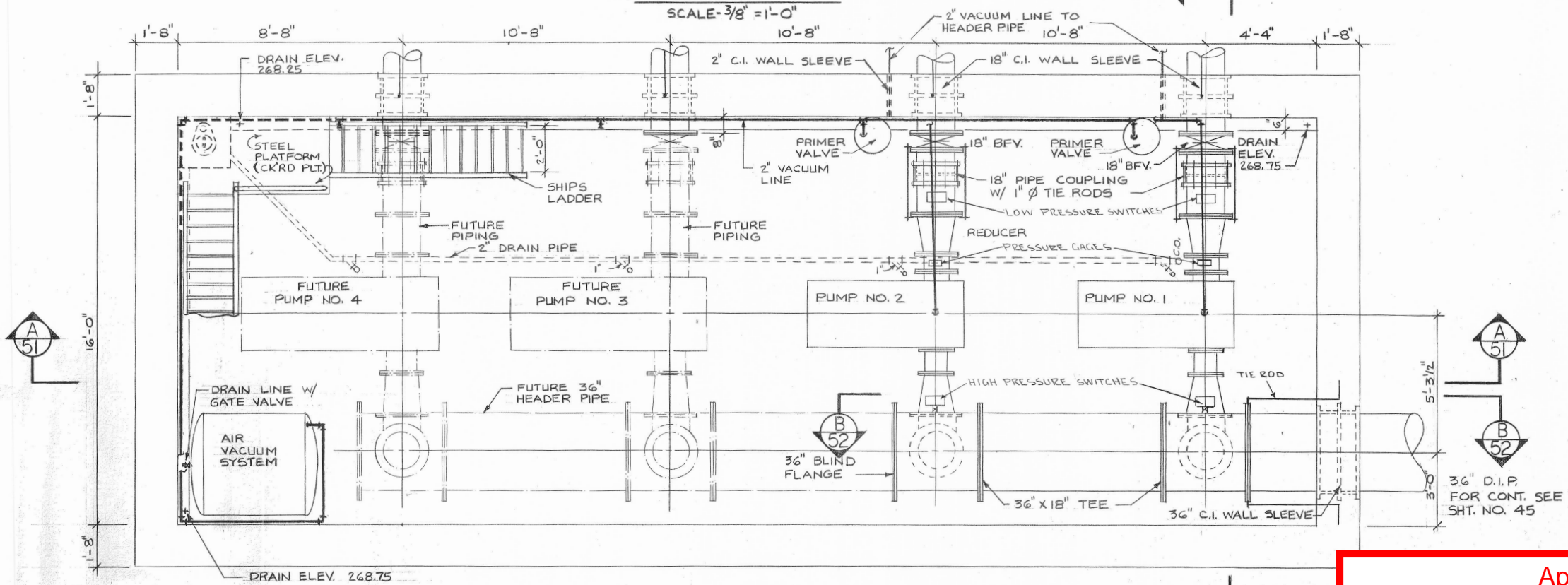
SEAL
 NORTH CAROLINA PROFESSIONAL ENGINEER
 HIRSH J. MARTIANO
 7707
 N. J. Martiano

DATE: 11/11/82
 OFFICE: ASHEBORO
 DRAWN BY: KDY
 CHECKED BY: [Signature]
 APPROVED BY: [Signature]
 SCALE: 1/16" = 1'-0"
 JOB NO. 207131
 SHEET NO. 45 OF 158



TOP PLAN

SCALE - 3/8" = 1'-0"

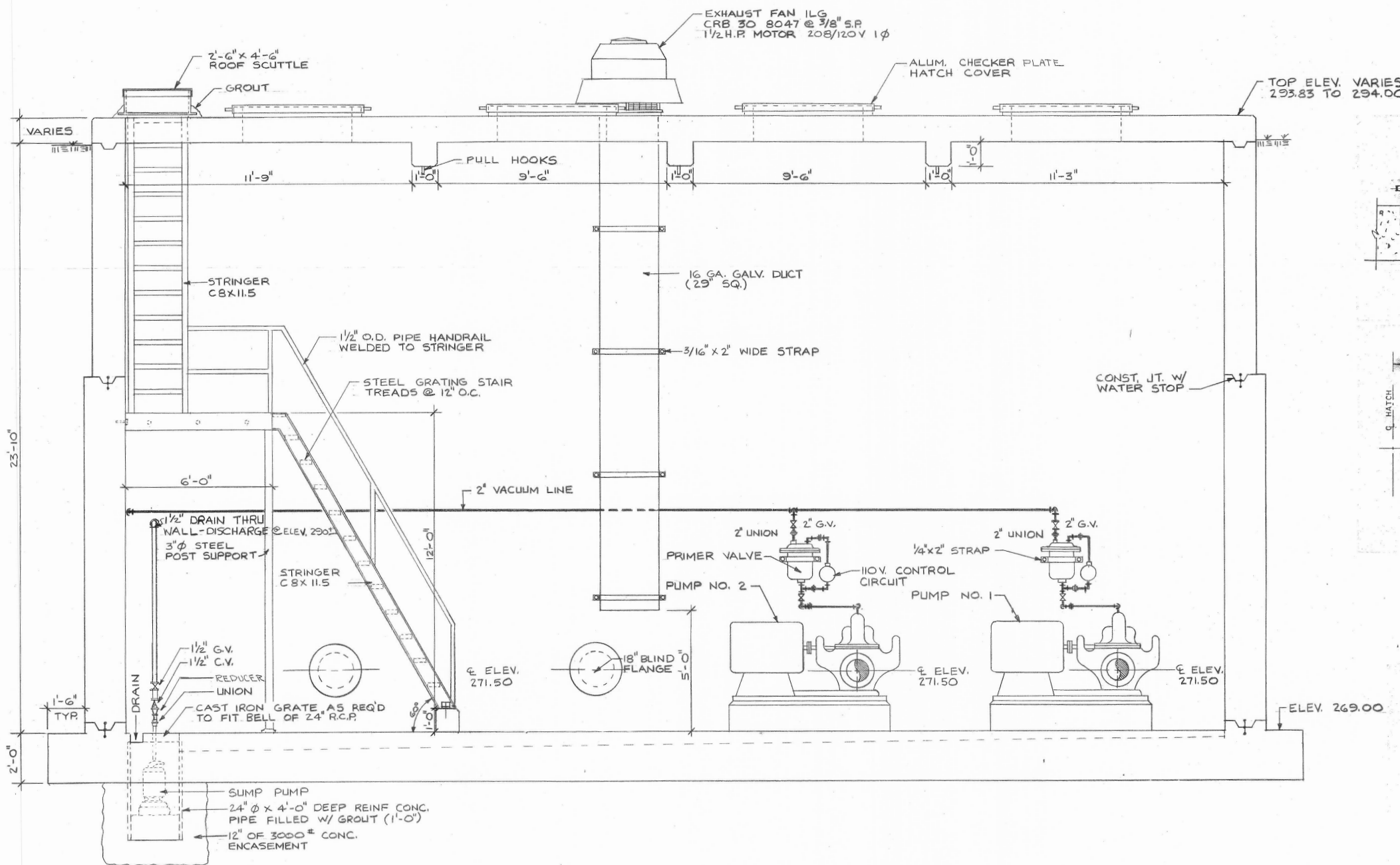


SECTIONAL PLAN

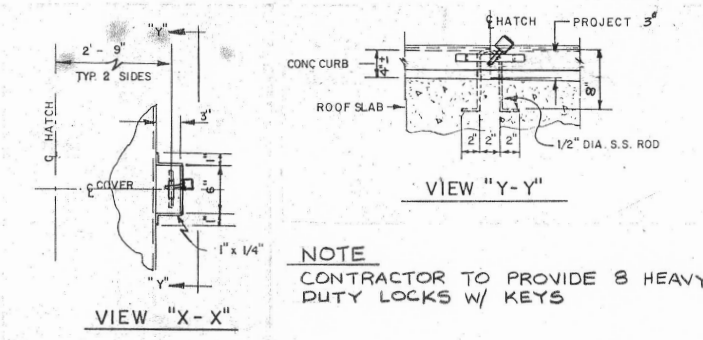
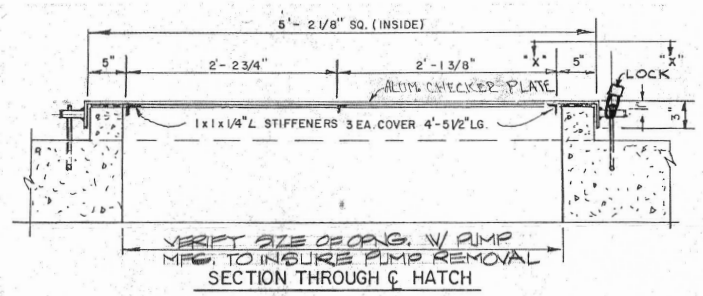
SCALE - 3/8" = 1'-0"

Appendix 3.C
 1982 Record Drawings
 RWPS Plan Views
 Not Provided to Scale

PHASE II - WATER FACILITIES PROJECT CONTRACT III - GENERAL	RAW WATER PUMP STA, TOP PLAN & SECTIONAL PLAN	REVISIONS	DATE	MARK	APP'D
MONTGOMERY COUNTY, NORTH CAROLINA			9-82		
Moore, Gardner & Associates, Inc. Consulting Engineers					
ASHBORO, CARY NORTH CAROLINA					
RICHMOND VIRGINIA					
SURFIDE BEACH SOUTH CAROLINA					
MEMPHIS TENNESSEE					
BATON ROUGE LOUISIANA					
Professional Seal: NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 7707 HIRSH J. MARTINO					
DATE: 11/1/82					
OFFICE: ASHEBORO					
DRAWN BY: EDH			DATE: 9/82		
CHECKED BY: [Signature]			DATE: [Signature]		
APPROVED BY: [Signature]			DATE: 1-83		
SCALE: NOTED					
JOB NO. 207131					
SHEET NO. 50 OF 158					

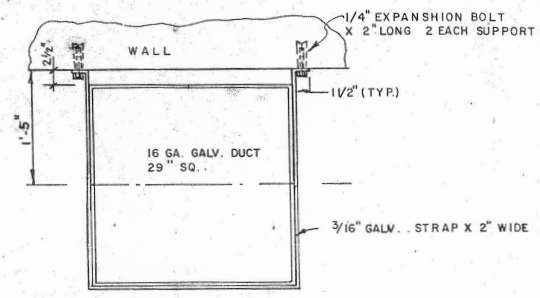


SECTION A
SCALE - 3/8" = 1'-0"

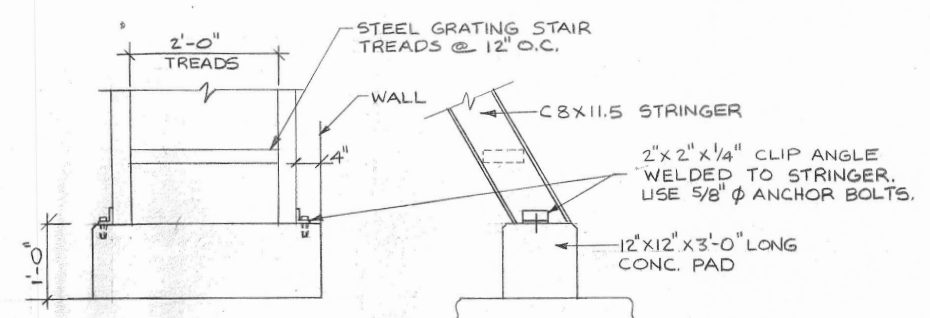


NOTE
CONTRACTOR TO PROVIDE 8 HEAVY DUTY LOCKS W/ KEYS

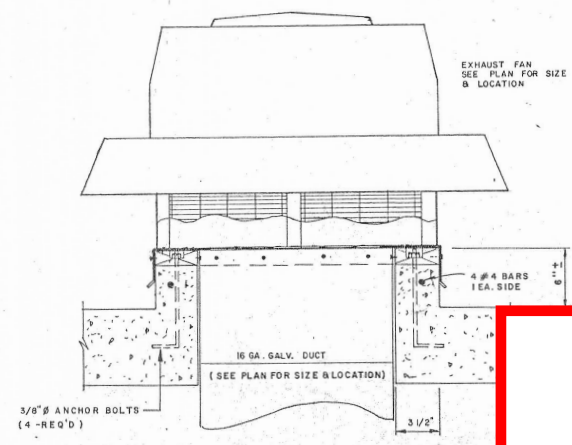
HATCH DETAILS
SCALE 1" = 1'-0"



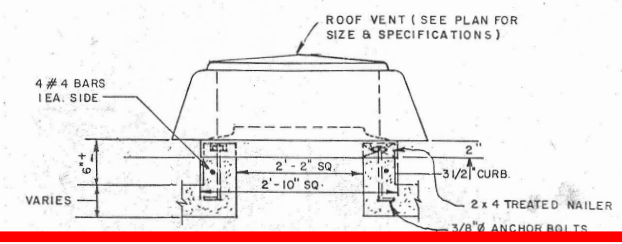
DUCT SUPPORT DETAIL
NO SCALE



STAIR DETAILS
NO SCALE



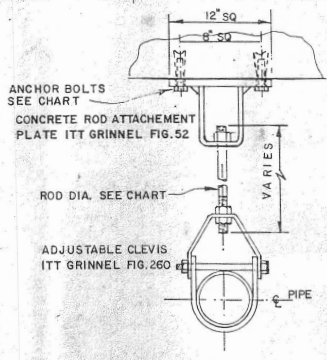
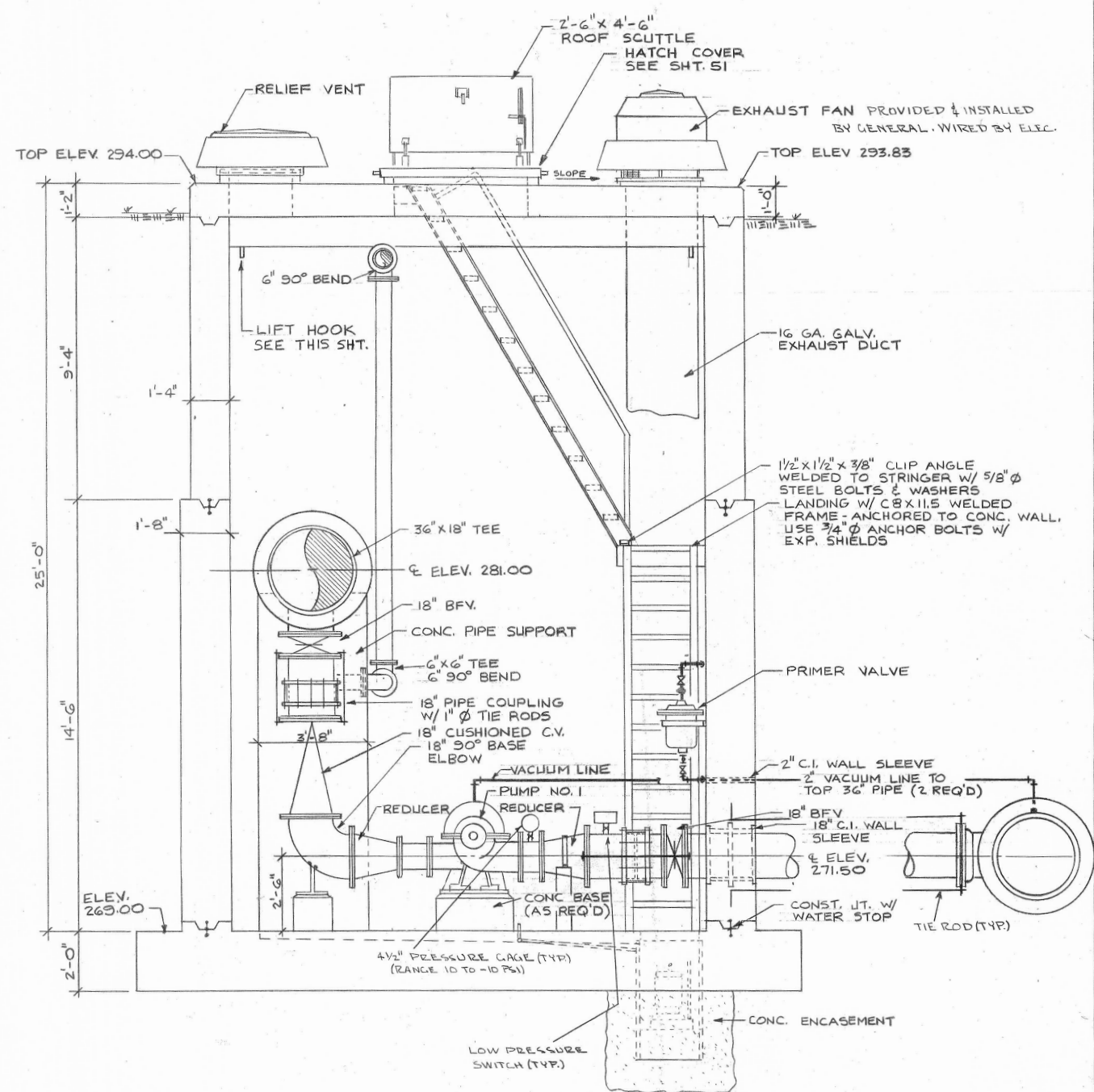
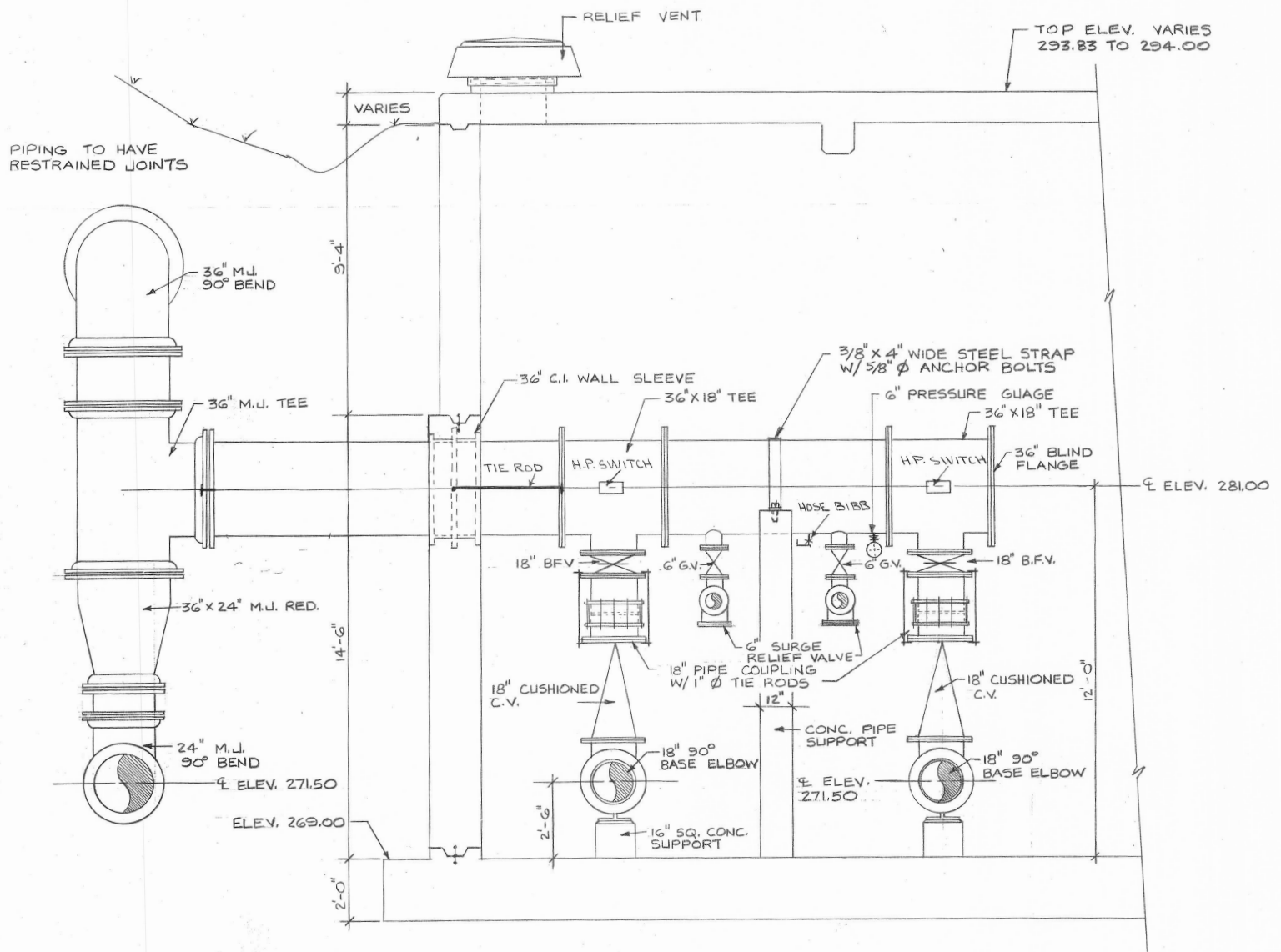
EXHAUST FAN DETAIL
NO SCALE



ROOF VENT DETAIL
NO SCALE

Appendix 3.C
1982 Record Drawings
RWPS Lower Level Section View
Not Provided to Scale

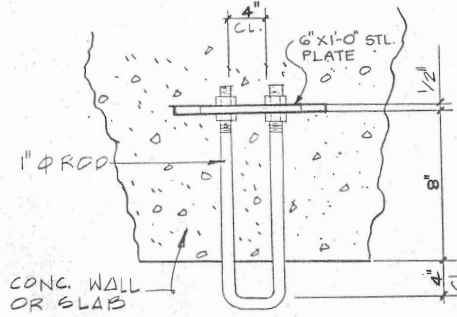
PHASE II - WATER FACILITIES PROJECT CONTRACT III - GENERAL MONTGOMERY COUNTY, NORTH CAROLINA	SECTION & DETAILS	SURFIDE BEACH SOUTH CAROLINA	MEMPHIS TENNESSEE	BATON ROUGE LOUISIANA
Moore, Gardner & Associates, Inc. • Consulting Engineers				
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 7707 HIRAM J. MARZIANO Date: 11/1/82 Office: ASHEBORO Drawn by: KDT Checked by: [Signature] Approved by: [Signature] Scale: NOTED Job No.: 207131 Sheet No.: 51 of 150				



PIPE SIZE	ROD DIA.	ANCHOR BOLT SIZE
6"	5/8"	1/2" x 2" LG.

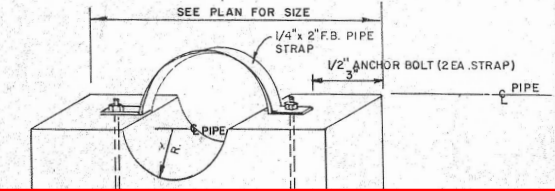
PIPE HANGER DETAIL
NO SCALE

SECTION B
SCALE - 3/8" = 1'-0"



TYP. LIFT & PULL HOOK
SCALE: 1 1/2" = 1'-0"

SECTION C
SCALE - 3/8" = 1'-0"



Appendix 3.C
1982 Record Drawings
RWPS Lower Level Section Views
Not Provided to Scale

PHASE II - WATER FACILITIES PROJECT
CONTRACT III - GENERAL
MONTGOMERY COUNTY, NORTH CAROLINA

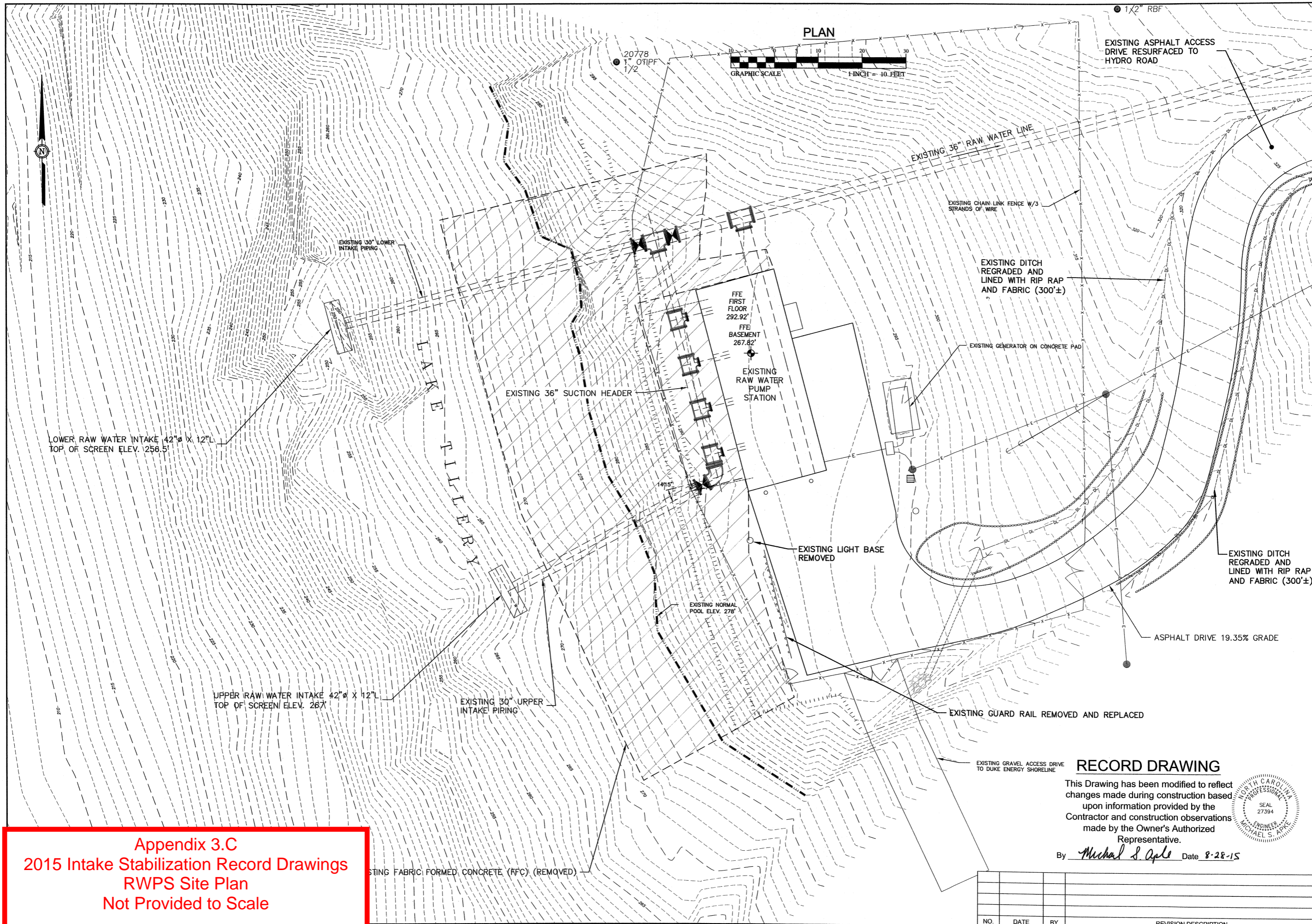
SECTIONS & DETAILS

Moore, Gardner & Associates, Inc. Consulting Engineers
MEMPHIS, TENNESSEE
SURFIDE BEACH, SOUTH CAROLINA
RICHMOND, VIRGINIA
ASHEBORO, CAROLINA

PROFESSIONAL SEAL
NORTH CAROLINA
HIRAM J. MARZIANO
7707
ENGINEER

DATE: 9-82
DRAWN BY: [Signature]
CHECKED BY: [Signature]
DATE: 9-82
SCALE: NOTED
JOB NO. 207131
SHEET NO. 52 OF 158

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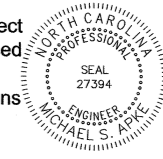


Appendix 3.C
2015 Intake Stabilization Record Drawings
RWPS Site Plan
Not Provided to Scale

RECORD DRAWING

This Drawing has been modified to reflect changes made during construction based upon information provided by the Contractor and construction observations made by the Owner's Authorized Representative.

By *Michael S. Aple* Date *8-28-15*



NO.	DATE	BY	REVISION DESCRIPTION

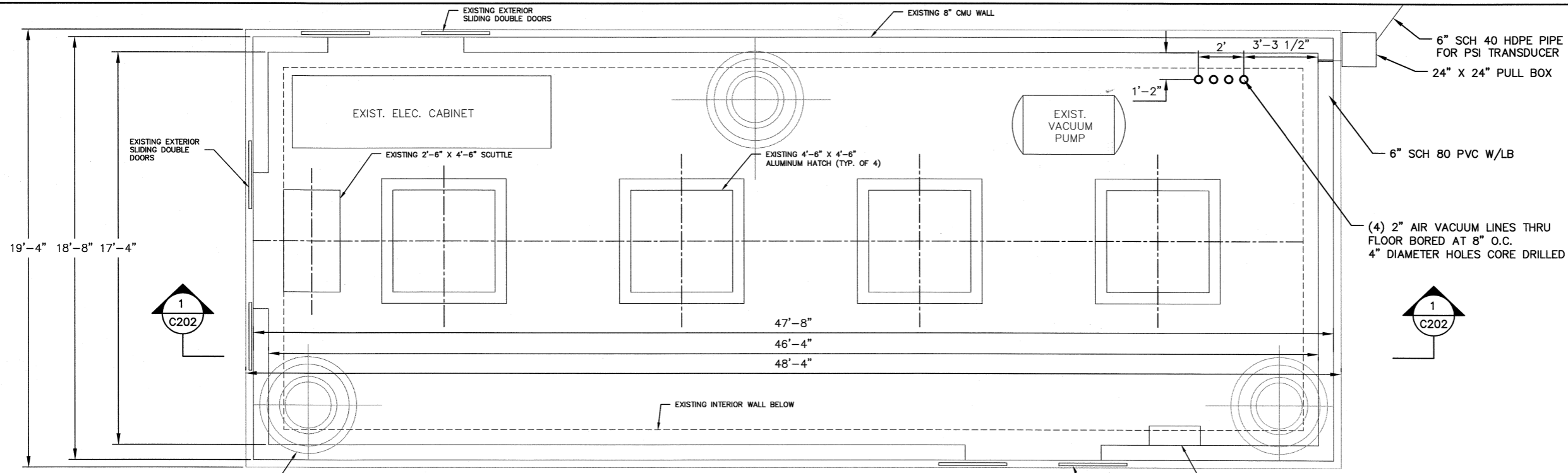


RAW WATER INTAKE STABILIZATION
 MONTGOMERY COUNTY, NORTH CAROLINA

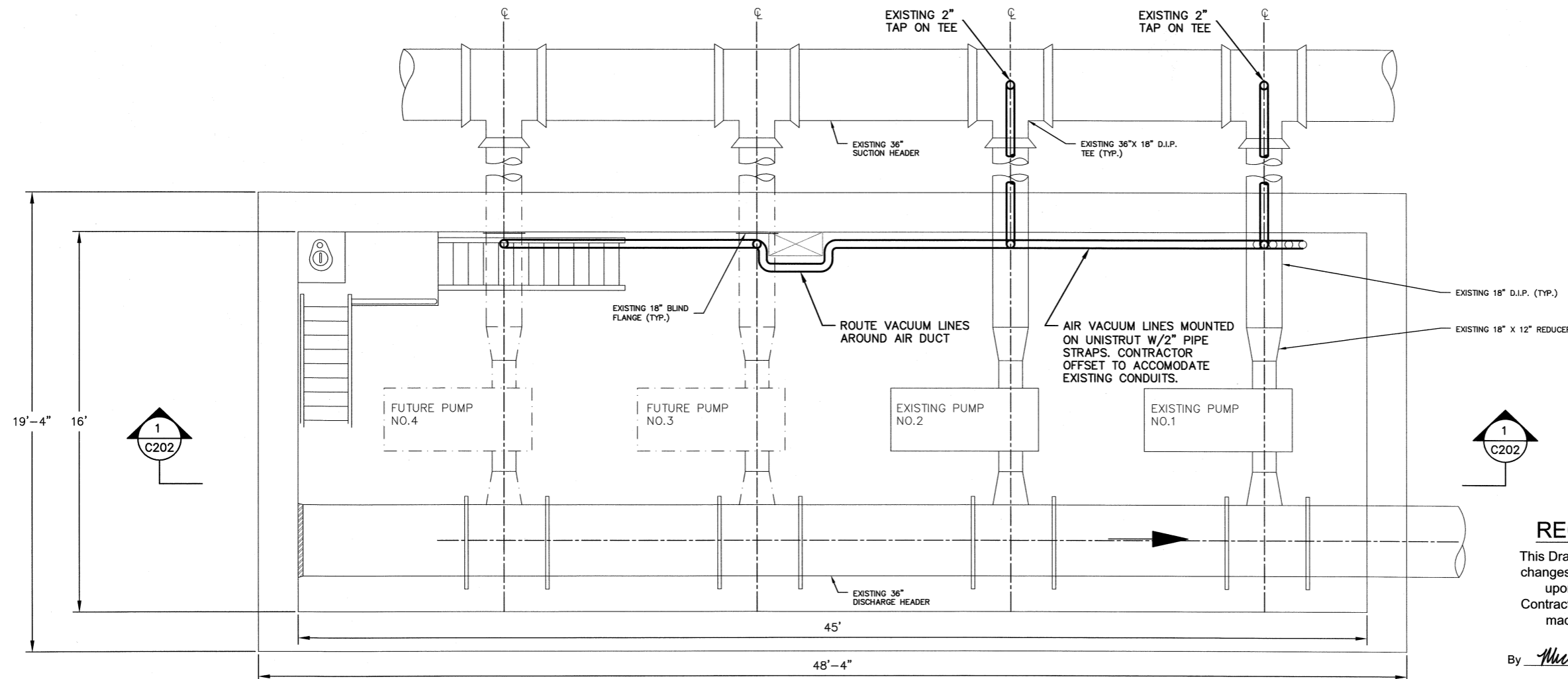
JOB NO.: 12.04000
 DATE: AUGUST, 2012
 DESIGNED BY: CT
 CADD BY: WW
 DESIGN REVIEW: _____
 CONST. REVIEW: _____
 RD 12.04000 02 Plan.dwg

EXISTING CONDITIONS AND EROSION CONTROL

SHEET
CE-101



1
C201
UPPER FLOOR PLAN
SCALE 3/8"=1'-0"



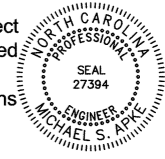
2
C201
LOWER FLOOR PLAN
SCALE 3/8"=1'-0"

Appendix 3.C
2015 Intake Stabilization Record Drawings
RWPS Floor Plans
Not Provided to Scale

RECORD DRAWING

This Drawing has been modified to reflect changes made during construction based upon information provided by the Contractor and construction observations made by the Owner's Authorized Representative.

By Michael S. Aspl Date 8/28/15



NO.	DATE	BY	REVISION DESCRIPTION

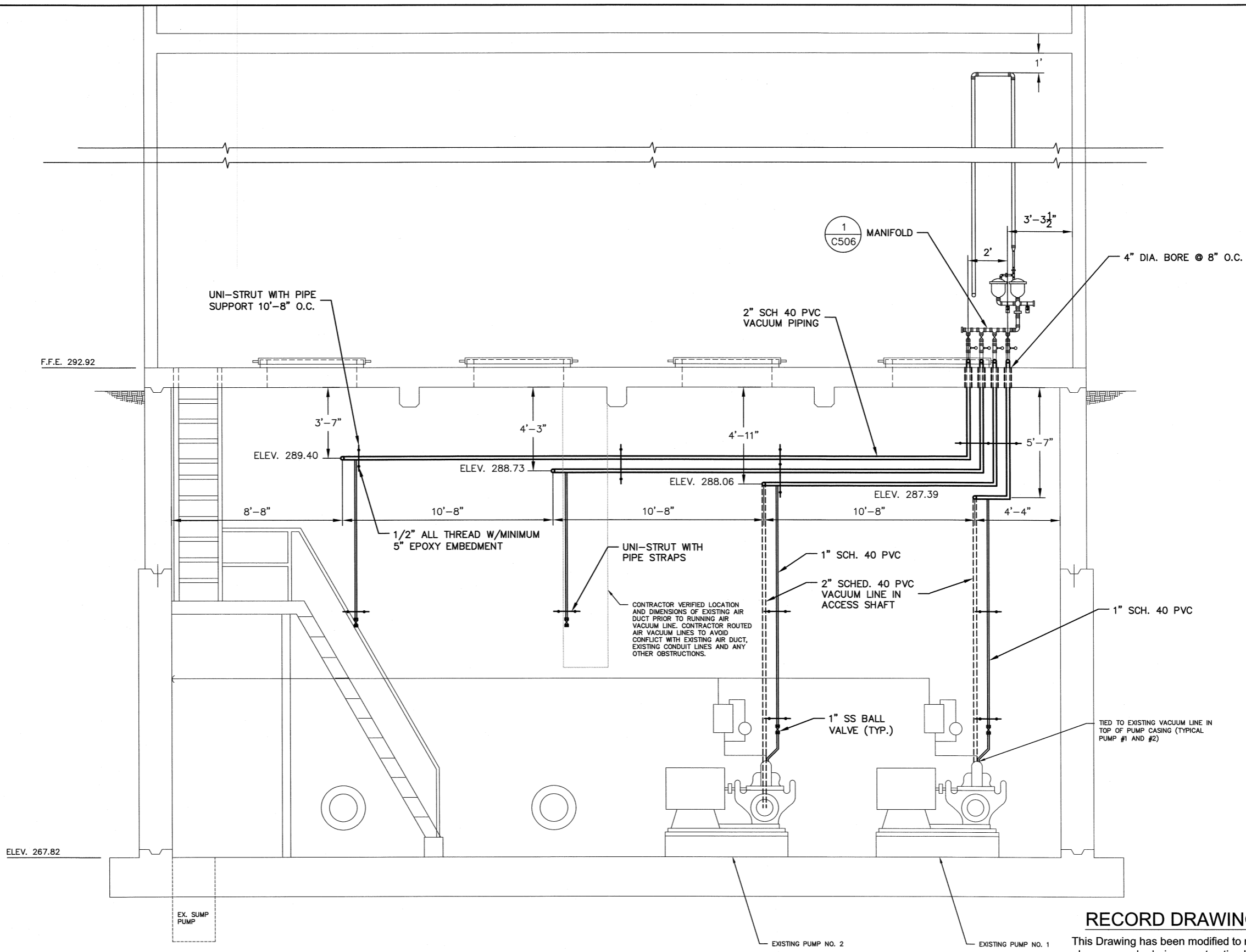
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**RAW WATER INTAKE
 STABILIZATION**
 MONTGOMERY COUNTY, NORTH CAROLINA

JOB NO.: 12.04000
 DATE: AUGUST, 2012
 DESIGNED BY: CT
 CADD BY: WW
 DESIGN REVIEW:
 CONST. REVIEW:
 RD 12.04000 03 BLDG
 PLAN.dwg

EXISTING BUILDING
 SECTION

SHEET
C-202



RECORD DRAWING

This Drawing has been modified to reflect changes made during construction based upon information provided by the Contractor and construction observations made by the Owner's Authorized Representative.
 By *Michael S. Apple* Date *8/20/15*



1
 BUILDING SECTION A-A
 SCALE 3/8"=1'-0"

Appendix 3.C
2015 Intake Stabilization Record Drawings
RWPS Section View
Not Provided to Scale

NO.	DATE	BY	REVISION DESCRIPTION

Z:\Vot\Drawings\2012\12.04000\Arch\Bldg\RecordRD 12.04000 03 BLDG PLAN.dwg 4/8/2015 8:51 AM WYNN WILSON

APPENDIX 4

4.a

WTP Service Area
Historical Population
Data

MONTGOMERY COUNTY WTP SERVICE AREA HISTORICAL POPULATION DATA

	2000	2010	2017
Montgomery County	8,752	12,754	14,473
Town of Biscoe	1,700	1,700	1,749
Town of Candor	825	840	843
Town of Mt. Gilead	1,389	1,181	1,200
Town of Star	807	876	875
Town of Troy	3,632	4,500	4,300
Town of Robbins	1,195	1,097	1,107
WTP Service Area	18,300	22,948	24,547

SOURCE(S): Local Water Supply Planning - North Carolina Division of Water Resources

4.b

WTP Service Area

2017 Demands by User

Type

2017 DEMANDS BY USER TYPE

	Water Demand By User Type (MGD)					Total Demand
	Residential	Commercial	Industrial	Institutional	Unaccounted For	
Montgomery County :	0.466	0.282	0.000	0.000	0.463	1.211
Town of Biscoe :	0.160	0.060	0.090	0.010	0.020	0.340
Town of Candor :	0.039	0.013	0.057	0.003	0.011	0.123
Town of Mt. Gilead :	0.072	0.000	0.000	0.000	0.036	0.108
Town of Robbins :	0.093	0.014	0.005	0.008	0.027	0.147
Town of Star :	0.020	0.011	0.005	0.013	0.010	0.059
Town of Troy :	0.260	0.044	0.060	0.010	0.055	0.429
WTP Service Area :	1.110	0.424	0.217	0.044	0.622	2.417

Montgomery County Bulk Sales : 1.206 "Sum of Wholesale Purchasers"

4.c

WTP Service Area
Summary of Population
Projection

WTP SERVICE AREA SUMMARY OF POPULATION PROJECTIONS

POPULATION PROJECTIONS								
Year	County	Biscoe	Candor	Mt. Gilead	Star	Troy	Robbins	Total System Population
2017	14,473	1,749	843	1,200	875	4,300	1,107	24,547
2018	14,714	1,867	845	1,213	878	4,300	1,118	24,936
2019	14,859	1,986	848	1,227	880	4,300	1,129	25,228
2020	15,003	2,104	850	1,240	883	4,300	1,140	25,520
2021	15,148	2,104	850	1,240	883	4,300	1,140	25,665
2022	15,293	2,150	850	1,252	888	4,320	1,152	25,906
2023	15,438	2,174	850	1,259	891	4,330	1,158	26,099
2024	15,582	2,197	850	1,265	893	4,340	1,164	26,291
2025	15,727	2,220	850	1,271	896	4,350	1,170	26,484
2026	15,872	2,243	850	1,277	899	4,360	1,176	26,677
2027	16,016	2,266	850	1,283	901	4,370	1,182	26,869
2028	16,161	2,290	850	1,290	904	4,380	1,188	27,062
2029	16,306	2,313	850	1,296	906	4,390	1,194	27,255
2030	16,451	2,336	850	1,302	909	4,400	1,200	27,448
2031	16,595	2,336	850	1,302	909	4,400	1,200	27,592
2032	16,740	2,392	850	1,315	915	4,400	1,210	27,822
2033	16,885	2,420	850	1,322	917	4,400	1,215	28,009
2034	17,029	2,448	850	1,328	920	4,400	1,220	28,196
2035	17,174	2,477	850	1,335	923	4,400	1,225	28,383
2036	17,319	2,505	850	1,341	926	4,400	1,230	28,570
2037	17,464	2,533	850	1,348	929	4,400	1,235	28,757
2038	17,608	2,561	850	1,354	931	4,400	1,240	28,944
2039	17,753	2,589	850	1,361	934	4,400	1,245	29,132
2040	17,898	2,617	850	1,367	937	4,400	1,250	29,319

SOURCE(S): Local Water Supply Planning - North Carolina Division of Water Resources

4.d

WTP Service Area
Future Demands by
User Type

FUTURE DEMANDS BY USER TYPE

		Residential Demands								Total	Bulk Sales
		Population	County	Biscoe	Candor	Mt. Gilead	Robbins	Star	Troy		
Current Year (2018) :		24,936	0.480	0.171	0.039	0.073	0.094	0.020	0.260	1.137	0.657
Year 5 :		26,099	0.504	0.199	0.039	0.076	0.097	0.020	0.262	1.197	0.693
Year 10 :		27,062	0.528	0.209	0.039	0.077	0.100	0.021	0.265	1.239	0.711
Year 15 :		28,009	0.551	0.221	0.039	0.079	0.102	0.021	0.266	1.280	0.729
Year 20 :		28,944	0.575	0.234	0.039	0.081	0.104	0.021	0.266	1.321	0.746

		Commercial Demands								Total	Bulk Sales
		Population	County	Biscoe	Candor	Mt. Gilead	Robbins	Star	Troy		
Current Year (2018) :		24,936	0.291	0.064	0.013	0.000	0.014	0.011	0.044	0.437	0.146
Year 5 :		26,099	0.305	0.075	0.013	0.000	0.015	0.011	0.044	0.463	0.158
Year 10 :		27,062	0.319	0.079	0.013	0.000	0.015	0.011	0.045	0.482	0.163
Year 15 :		28,009	0.334	0.083	0.013	0.000	0.015	0.012	0.045	0.502	0.168
Year 20 :		28,944	0.348	0.088	0.013	0.000	0.016	0.012	0.045	0.521	0.173

		Industrial Demands								Total	Bulk Sales
		Population	County	Biscoe	Candor	Mt. Gilead	Robbins	Star	Troy		
Current Year (2018) :		24,936	-	0.096	0.057	0.000	0.005	0.005	0.060	0.223	0.223
Year 5 :		26,099	-	0.112	0.057	0.000	0.005	0.005	0.060	0.240	0.240
Year 10 :		27,062	-	0.118	0.057	0.000	0.005	0.005	0.061	0.247	0.247
Year 15 :		28,009	-	0.125	0.057	0.000	0.005	0.005	0.061	0.254	0.254
Year 20 :		28,944	-	0.132	0.057	0.000	0.006	0.005	0.061	0.262	0.262

		Institutional Demands								Total	Bulk Sales
		Population	County	Biscoe	Candor	Mt. Gilead	Robbins	Star	Troy		
Current Year (2018) :		24,936	-	0.011	0.003	0.000	0.008	0.013	0.010	0.045	0.045
Year 5 :		26,099	-	0.012	0.003	0.000	0.008	0.013	0.010	0.047	0.047
Year 10 :		27,062	-	0.013	0.003	0.000	0.009	0.013	0.010	0.048	0.048
Year 15 :		28,009	-	0.014	0.003	0.000	0.009	0.014	0.010	0.050	0.050
Year 20 :		28,944	-	0.015	0.003	0.000	0.009	0.014	0.010	0.051	0.051

		Unaccounted For								Total	Bulk Sales
		Population	County	Biscoe	Candor	Mt. Gilead	Robbins	Star	Troy		
Current Year (2018) :		24,936	0.422	0.020	0.011	0.037	0.027	0.005	0.061	0.582	0.160
Year 5 :		26,099	0.347	0.025	0.011	0.037	0.026	0.006	0.072	0.523	0.176
Year 10 :		27,062	0.360	0.035	0.011	0.037	0.026	0.006	0.072	0.547	0.187
Year 15 :		28,009	0.373	0.041	0.011	0.037	0.026	0.006	0.072	0.566	0.193
Year 20 :		28,944	0.387	0.045	0.011	0.037	0.026	0.006	0.072	0.584	0.197

	Biscoe	Candor	Mt. Gilead	Robbins	Star	Troy	Total
Year 20 Bulk Sales :	0.513	0.124	0.118	0.161	0.058	0.455	1.429

SOURCE(S): Local Water Supply Planning - North Carolina Division of Water Resources

4.e

Summary of Flow Projections

WTP SERVICE AREA SUMMARY OF FLOW PROJECTIONS

AVERAGE DAILY FLOW PROJECTIONS (PRODUCTION)								Total ADF Demand	DEMAND V/S PERCENT OF SUPPLY (6.0 MGD)
Year	County	Bischoe	Candor	Mt. Gilead	Star	Troy	Robbins		
2017	1.208	0.340	0.123	0.108	0.054	0.429	0.147	2.409	40%
2018	1.193	0.361	0.123	0.110	0.054	0.435	0.148	2.424	40%
2019	1.159	0.383	0.124	0.111	0.055	0.440	0.149	2.419	40%
2020	1.125	0.404	0.124	0.111	0.055	0.446	0.149	2.415	40%
2021	1.133	0.406	0.124	0.111	0.055	0.446	0.149	2.425	40%
2022	1.146	0.416	0.124	0.112	0.055	0.448	0.151	2.452	41%
2023	1.156	0.423	0.124	0.113	0.056	0.449	0.151	2.470	41%
2024	1.166	0.429	0.124	0.113	0.056	0.449	0.152	2.489	41%
2025	1.176	0.435	0.124	0.113	0.056	0.450	0.153	2.508	42%
2026	1.186	0.441	0.124	0.114	0.056	0.451	0.153	2.526	42%
2027	1.197	0.448	0.124	0.114	0.056	0.452	0.154	2.545	42%
2028	1.207	0.454	0.124	0.114	0.056	0.453	0.155	2.563	43%
2029	1.217	0.460	0.124	0.115	0.057	0.454	0.155	2.582	43%
2030	1.227	0.466	0.124	0.115	0.057	0.455	0.156	2.600	43%
2031	1.235	0.467	0.124	0.115	0.057	0.455	0.156	2.608	43%
2032	1.248	0.478	0.124	0.116	0.057	0.455	0.157	2.635	44%
2033	1.258	0.484	0.124	0.116	0.057	0.455	0.158	2.652	44%
2034	1.269	0.490	0.124	0.117	0.057	0.455	0.158	2.670	44%
2035	1.279	0.496	0.124	0.117	0.058	0.455	0.159	2.687	45%
2036	1.289	0.501	0.124	0.117	0.058	0.455	0.160	2.704	45%
2037	1.300	0.507	0.124	0.118	0.058	0.455	0.160	2.722	45%
2038	1.310	0.513	0.124	0.118	0.058	0.455	0.161	2.739	46%
2039	1.321	0.519	0.124	0.119	0.058	0.455	0.161	2.756	46%
2040	1.331	0.525	0.124	0.119	0.058	0.455	0.162	2.774	46%

SOURCE(S): Local Water Supply Planning - North Carolina Division of Water Resources

Montgomery County Population and Usage Information

Includes Flow For County Customers, Carolina Forest, and Wood Run

SURFACE WATER SOURCE AND USAGE

Plant Capacity : 6.0 MGD

Stream : Pee Dee River (Yadkin River (18-1))

Reservoir : Lake Tillery

Avg. Day Withdrawal : 2.573 MGD

Max. Day Withdrawal : 3.755 MGD

	2017	2020	2030	2040
Unaccounted Water	0.463	0.339	0.365	0.393

Based on 2017 LWSP - Unaccounted for water is assumed to be lost through sludge production/waste

HISTORICAL POPULATION SERVED (LWSP)				RESIDENTIAL CONNECTION ESTIMATES			COMMERCIAL CONNECTION ESTIMATES	
	<i>Population</i>	<i>Residential Conn.</i>	<i>Commercial Conn.</i>	<i>Population Per Conn.</i>	<i>ADF Residential</i>	<i>ADF per Person</i>	<i>ADF Commercial</i>	<i>ADF per Person</i>
2012	13,743	5,286	139	2.60	0.462	33.62	0.253	18.41
2013	14,044	5,401	139	2.60	0.446	31.76	0.277	19.72
2014	14,136	5,437	137	2.60	0.466	32.97	0.279	19.74
2015	14,432	5,551	140	2.60	0.481	33.33	0.294	20.37
2016	14,417	5,574	147	2.59	0.462	32.05	0.300	20.81
2017	14,473	5,610	149	2.58	0.466	32.20	0.282	19.48
R² :	0.943		Average :	2.59	0.464	32.65	0.281	19.76

Year	Linear Extrapolation	Calculated Estimate Residential Conn.	Calculated Residential ADF	Calculated Commercial ADF	Total ADF	Unaccounted Water Lost	Total Service Area Demand (ADF)
2018	14,714	5,671	0.480	0.291	0.771	0.422	1.193
2019	14,859	5,727	0.485	0.294	0.779	0.380	1.159
2020	15,003	5,783	0.490	0.296	0.786	0.339	1.125
2021	15,148	5,839	0.495	0.299	0.794	0.339	1.133
2022	15,293	5,895	0.499	0.302	0.801	0.344	1.146
2023	15,438	5,950	0.504	0.305	0.809	0.347	1.156
2024	15,582	6,006	0.509	0.308	0.817	0.349	1.166
2025	15,727	6,062	0.514	0.311	0.824	0.352	1.176
2026	15,872	6,118	0.518	0.314	0.832	0.355	1.186
2027	16,016	6,173	0.523	0.316	0.839	0.357	1.197
2028	16,161	6,229	0.528	0.319	0.847	0.360	1.207
2029	16,306	6,285	0.532	0.322	0.855	0.362	1.217
2030	16,451	6,341	0.537	0.325	0.862	0.365	1.227
2031	16,595	6,397	0.542	0.328	0.870	0.365	1.235
2032	16,740	6,452	0.547	0.331	0.877	0.371	1.248
2033	16,885	6,508	0.551	0.334	0.885	0.373	1.258
2034	17,029	6,564	0.556	0.336	0.892	0.376	1.269
2035	17,174	6,620	0.561	0.339	0.900	0.379	1.279
2036	17,319	6,676	0.565	0.342	0.908	0.382	1.289
2037	17,464	6,731	0.570	0.345	0.915	0.385	1.300
2038	17,608	6,787	0.575	0.348	0.923	0.387	1.310
2039	17,753	6,843	0.580	0.351	0.930	0.390	1.321
2040	17,898	6,899	0.584	0.354	0.938	0.393	1.331
2041	18,042	6,954	0.589	0.356	0.946	0.393	1.339

SOURCE(S): Local Water Supply Planning - North Carolina Division of Water Resources

TOWN OF BISCOE - POPULATION AND USAGE INFORMATION

Total Contracted Water Supply : 0.900 MGD

2017 GPCD by User

	Type
Residential :	91
Commercial :	34
Industrial :	51
Institutional :	6

LWSP PLANNING PROJECTIONS

	2017	2020	2030	2040	2050	2060
Year-Round Population	1,749	2,104	2,336	2,617	2,930	3,230
Residential	0.160	0.110	0.120	0.160	0.179	0.197
Commercial	0.060	0.040	0.069	0.085	0.104	0.120
Industrial	0.090	0.056	0.263	0.294	0.328	0.361
Institutional	0.010	0.020	0.006	0.006	0.006	0.006
Unaccounted For	0.020	0.019	0.039	0.046	0.052	0.058
Service Area Demand	0.340	0.245	0.497	0.591	0.669	0.742

ENGINEERING REPORT TREND PROJECTIONS

	2017	2020	2030	2040	2050	2060
Year-Round Population	1,749	2,104	2,336	2,617	2,930	3,230
Residential	0.160	0.192	0.214	0.239	0.268	0.295
Commercial	0.060	0.072	0.080	0.090	0.101	0.111
Industrial	0.090	0.108	0.120	0.135	0.151	0.166
Institutional	0.010	0.012	0.013	0.015	0.017	0.018
Unaccounted For	0.020	0.024	0.027	0.030	0.034	0.037
Service Area Demand	0.340	0.409	0.454	0.509	0.570	0.628

FLOW PROJECTION FOR PLANNING PERIOD

Year	Avg. Daily Flow	Population	Residential	Commercial	Industrial	Institutional	*Unaccounted For
2017	0.34	1,749	0.160	0.060	0.090	0.010	0.020
2018	0.36	1,867	0.171	0.064	0.096	0.011	0.020
2019	0.38	1,986	0.182	0.068	0.102	0.011	0.019
2020	0.40	2,104	0.192	0.072	0.108	0.012	0.019
2021	0.41	2,104	0.192	0.072	0.108	0.012	0.021
2022	0.42	2,150	0.197	0.074	0.111	0.012	0.023
2023	0.42	2,174	0.199	0.075	0.112	0.012	0.025
2024	0.43	2,197	0.201	0.075	0.113	0.013	0.027
2025	0.44	2,220	0.203	0.076	0.114	0.013	0.029
2026	0.44	2,243	0.205	0.077	0.115	0.013	0.031
2027	0.45	2,266	0.207	0.078	0.117	0.013	0.033
2028	0.45	2,290	0.209	0.079	0.118	0.013	0.035
2029	0.46	2,313	0.212	0.079	0.119	0.013	0.037
2030	0.47	2,336	0.214	0.080	0.120	0.013	0.039
2031	0.47	2,336	0.214	0.080	0.120	0.013	0.040
2032	0.48	2,392	0.219	0.082	0.123	0.014	0.040
2033	0.48	2,420	0.221	0.083	0.125	0.014	0.041
2034	0.49	2,448	0.224	0.084	0.126	0.014	0.042
2035	0.50	2,477	0.227	0.085	0.127	0.014	0.043
2036	0.50	2,505	0.229	0.086	0.129	0.014	0.043
2037	0.51	2,533	0.232	0.087	0.130	0.014	0.044
2038	0.51	2,561	0.234	0.088	0.132	0.015	0.045
2039	0.52	2,589	0.237	0.089	0.133	0.015	0.045
2040	0.52	2,617	0.239	0.090	0.135	0.015	0.046

*Unaccounted-for data provided for years 2018, 2020, 2030 and 2040; linear interpolation used for intervening years

SOURCE(S): Local Water Supply Planning - North Carolina Division of Water Resources

TOWN OF CANDOR - POPULATION AND USAGE INFORMATION

Total Contracted Water Supply : 0.170 MGD

2017 GPCD by User

	Type
Residential :	46
Commercial :	15
Industrial :	68
Institutional :	4

LWSP PLANNING PROJECTIONS

	2017	2020	2030	2040	2050	2060
Year-Round Population	843	850	850	850	850	850
Residential	0.039	0.040	0.040	0.040	0.040	0.040
Commercial	0.013	0.015	0.015	0.015	0.015	0.015
Industrial	0.057	0.055	0.055	0.055	0.055	0.055
Institutional	0.003	0.002	0.002	0.002	0.002	0.002
Unaccounted For	0.011	0.011	0.011	0.011	0.011	0.011
Service Area Demand	0.123	0.123	0.123	0.123	0.123	0.123

ENGINEERING REPORT TREND PROJECTIONS

	2017	2020	2030	2040	2050	2060
Year-Round Population	843	850	850	850	850	850
Residential	0.039	0.039	0.039	0.039	0.039	0.039
Commercial	0.013	0.013	0.013	0.013	0.013	0.013
Industrial	0.057	0.057	0.057	0.057	0.057	0.057
Institutional	0.003	0.003	0.003	0.003	0.003	0.003
Unaccounted For	0.011	0.072	0.072	0.072	0.072	0.072
Service Area Demand	0.123	0.185	0.185	0.185	0.185	0.185

FLOW PROJECTION FOR PLANNING PERIOD

Year	Avg. Daily Flow	Population	Residential	Commercial	Industrial	Institutional	*Unaccounted For
2017	0.12	843	0.039	0.013	0.057	0.003	0.011
2018	0.12	845	0.039	0.013	0.057	0.003	0.011
2019	0.12	848	0.039	0.013	0.057	0.003	0.011
2020	0.12	850	0.039	0.013	0.057	0.003	0.011
2021	0.12	850	0.039	0.013	0.057	0.003	0.011
2022	0.12	850	0.039	0.013	0.057	0.003	0.011
2023	0.12	850	0.039	0.013	0.057	0.003	0.011
2024	0.12	850	0.039	0.013	0.057	0.003	0.011
2025	0.12	850	0.039	0.013	0.057	0.003	0.011
2026	0.12	850	0.039	0.013	0.057	0.003	0.011
2027	0.12	850	0.039	0.013	0.057	0.003	0.011
2028	0.12	850	0.039	0.013	0.057	0.003	0.011
2029	0.12	850	0.039	0.013	0.057	0.003	0.011
2030	0.12	850	0.039	0.013	0.057	0.003	0.011
2031	0.12	850	0.039	0.013	0.057	0.003	0.011
2032	0.12	850	0.039	0.013	0.057	0.003	0.011
2033	0.12	850	0.039	0.013	0.057	0.003	0.011
2034	0.12	850	0.039	0.013	0.057	0.003	0.011
2035	0.12	850	0.039	0.013	0.057	0.003	0.011
2036	0.12	850	0.039	0.013	0.057	0.003	0.011
2037	0.12	850	0.039	0.013	0.057	0.003	0.011
2038	0.12	850	0.039	0.013	0.057	0.003	0.011
2039	0.12	850	0.039	0.013	0.057	0.003	0.011
2040	0.12	850	0.039	0.013	0.057	0.003	0.011

*Unaccounted-for data provided for years 2017, 2020, 2030 and 2040; linear interpolation used for intervening years

SOURCE(S): Local Water Supply Planning - North Carolina Division of Water Resources

TOWN OF MOUNT GILEAD - POPULATION AND USAGE INFORMATION

Total Contracted Water Supply : 0.200 MGD

Indicates Questionable Data

2017 GPCD by User

Type	
Residential :	60
Commercial :	0
Industrial :	0
Institutional :	0

LWSP PLANNING PROJECTIONS

	2017	2020	2030	2040	2050	2060
Year-Round Population	1,200	1,240	1,302	1,367	1,435	1,507
Residential	0.072	0.074	0.074	0.074	0.074	0.074
Commercial	0.000	0.000	0.000	0.000	0.000	0.000
Industrial	0.000	0.000	0.000	0.000	0.000	0.000
Institutional	0.000	0.000	0.000	0.000	0.000	0.000
Unaccounted For	0.036	0.037	0.037	0.037	0.037	0.037
Service Area Demand	0.108	0.111	0.111	0.111	0.111	0.111

ENGINEERING REPORT TREND PROJECTIONS

	2017	2020	2030	2040	2050	2060
Year-Round Population	1,200	1,240	1,302	1,367	1,435	1,507
Residential	0.072	0.074	0.078	0.082	0.086	0.090
Commercial	0.000	0.000	0.000	0.000	0.000	0.000
Industrial	0.000	0.000	0.000	0.000	0.000	0.000
Institutional	0.000	0.000	0.000	0.000	0.000	0.000
Unaccounted For	0.036	0.072	0.072	0.072	0.072	0.072
Service Area Demand	0.108	0.146	0.150	0.154	0.158	0.162

FLOW PROJECTION FOR PLANNING PERIOD

Year	Avg. Daily Flow	Population	Residential	Commercial	Industrial	Institutional	*Unaccounted For
2017	0.11	1,200	0.072	0.000	0.000	0.000	0.037
2018	0.11	1,213	0.073	0.000	0.000	0.000	0.037
2019	0.11	1,227	0.074	0.000	0.000	0.000	0.037
2020	0.11	1,240	0.074	0.000	0.000	0.000	0.037
2021	0.11	1,240	0.074	0.000	0.000	0.000	0.037
2022	0.11	1,252	0.075	0.000	0.000	0.000	0.037
2023	0.11	1,259	0.076	0.000	0.000	0.000	0.037
2024	0.11	1,265	0.076	0.000	0.000	0.000	0.037
2025	0.11	1,271	0.076	0.000	0.000	0.000	0.037
2026	0.11	1,277	0.077	0.000	0.000	0.000	0.037
2027	0.11	1,283	0.077	0.000	0.000	0.000	0.037
2028	0.11	1,290	0.077	0.000	0.000	0.000	0.037
2029	0.11	1,296	0.078	0.000	0.000	0.000	0.037
2030	0.12	1,302	0.078	0.000	0.000	0.000	0.037
2031	0.12	1,302	0.078	0.000	0.000	0.000	0.037
2032	0.12	1,315	0.079	0.000	0.000	0.000	0.037
2033	0.12	1,322	0.079	0.000	0.000	0.000	0.037
2034	0.12	1,328	0.080	0.000	0.000	0.000	0.037
2035	0.12	1,335	0.080	0.000	0.000	0.000	0.037
2036	0.12	1,341	0.080	0.000	0.000	0.000	0.037
2037	0.12	1,348	0.081	0.000	0.000	0.000	0.037
2038	0.12	1,354	0.081	0.000	0.000	0.000	0.037
2039	0.12	1,361	0.082	0.000	0.000	0.000	0.037
2040	0.12	1,367	0.082	0.000	0.000	0.000	0.037

*Unaccounted-for data provided for years 2017, 2020, 2030 and 2040; linear interpolation used for intervening years

SOURCE(S): Local Water Supply Planning - North Carolina Division of Water Resources

TOWN OF ROBBINS - POPULATION AND USAGE INFORMATION

Total Contracted Water Supply : 0.250 MGD

2017 GPCD by User

	Type
Residential :	84
Commercial :	13
Industrial :	5
Institutional :	7

LWSP PLANNING PROJECTIONS

	2017	2020	2030	2040	2050	2060
Year-Round Population	1,107	1,140	1,200	1,250	1,300	1,350
Residential	0.093	0.090	0.093	0.095	0.097	0.099
Commercial	0.014	0.015	0.016	0.017	0.018	0.019
Industrial	0.005	0.005	0.005	0.005	0.005	0.005
Institutional	0.008	0.008	0.009	0.009	0.010	0.010
Unaccounted For	0.027	0.026	0.026	0.026	0.026	0.027
Service Area Demand	0.147	0.144	0.149	0.152	0.156	0.160

ENGINEERING REPORT TREND PROJECTIONS

	2017	2020	2030	2040	2050	2060
Year-Round Population	1,107	1,140	1,200	1,250	1,300	1,350
Residential	0.093	0.096	0.101	0.105	0.109	0.113
Commercial	0.014	0.014	0.015	0.016	0.016	0.017
Industrial	0.005	0.005	0.005	0.006	0.006	0.006
Institutional	0.008	0.008	0.009	0.009	0.009	0.010
Unaccounted For	0.027	0.072	0.072	0.072	0.072	0.072
Service Area Demand	0.147	0.196	0.202	0.208	0.213	0.218

FLOW PROJECTION FOR PLANNING PERIOD

Year	Avg. Daily Flow	Population	Residential	Commercial	Industrial	Institutional	*Unaccounted For
2017	0.15	1,107	0.093	0.014	0.005	0.008	0.027
2018	0.15	1,118	0.094	0.014	0.005	0.008	0.027
2019	0.15	1,129	0.095	0.014	0.005	0.008	0.026
2020	0.15	1,140	0.096	0.014	0.005	0.008	0.026
2021	0.15	1,140	0.096	0.014	0.005	0.008	0.026
2022	0.15	1,152	0.097	0.015	0.005	0.008	0.026
2023	0.15	1,158	0.097	0.015	0.005	0.008	0.026
2024	0.15	1,164	0.098	0.015	0.005	0.008	0.026
2025	0.15	1,170	0.098	0.015	0.005	0.008	0.026
2026	0.15	1,176	0.099	0.015	0.005	0.008	0.026
2027	0.15	1,182	0.099	0.015	0.005	0.009	0.026
2028	0.15	1,188	0.100	0.015	0.005	0.009	0.026
2029	0.16	1,194	0.100	0.015	0.005	0.009	0.026
2030	0.16	1,200	0.101	0.015	0.005	0.009	0.026
2031	0.16	1,200	0.101	0.015	0.005	0.009	0.026
2032	0.16	1,210	0.102	0.015	0.005	0.009	0.026
2033	0.16	1,215	0.102	0.015	0.005	0.009	0.026
2034	0.16	1,220	0.102	0.015	0.006	0.009	0.026
2035	0.16	1,225	0.103	0.015	0.006	0.009	0.026
2036	0.16	1,230	0.103	0.016	0.006	0.009	0.026
2037	0.16	1,235	0.104	0.016	0.006	0.009	0.026
2038	0.16	1,240	0.104	0.016	0.006	0.009	0.026
2039	0.16	1,245	0.105	0.016	0.006	0.009	0.026
2040	0.16	1,250	0.105	0.016	0.006	0.009	0.026

*Unaccounted-for data provided for years 2017, 2020, 2030 and 2040; linear interpolation used for intervening years

TOWN OF TROY - POPULATION AND USAGE INFORMATION

Total Contracted Water Supply : 1.000 MGD

2017 GPCD by User

Type	
Residential :	60
Commercial :	10
Industrial :	14
Institutional :	2

LWSP PLANNING PROJECTIONS

	2017	2020	2030	2040	2050	2060
Year-Round Population	4,300	4,300	4,400	4,400	4,400	4,400
Residential	0.260	0.300	0.320	0.320	0.320	0.320
Commercial	0.044	0.004	0.005	0.005	0.005	0.005
Industrial	0.060	0.030	0.030	0.030	0.030	0.030
Institutional	0.010	0.007	0.008	0.008	0.008	0.008
Unaccounted For	0.055	0.049	0.052	0.052	0.052	0.052
Service Area Demand	0.429	0.390	0.415	0.415	0.415	0.415

ENGINEERING REPORT TREND PROJECTIONS

	2017	2020	2030	2040	2050	2060
Year-Round Population	4,300	4,300	4,400	4,400	4,400	4,400
Residential	0.260	0.260	0.266	0.266	0.266	0.266
Commercial	0.044	0.044	0.045	0.045	0.045	0.045
Industrial	0.060	0.060	0.061	0.061	0.061	0.061
Institutional	0.010	0.010	0.010	0.010	0.010	0.010
Unaccounted For	0.055	0.072	0.072	0.072	0.072	0.072
Service Area Demand	0.429	0.446	0.455	0.455	0.455	0.455

FLOW PROJECTION FOR PLANNING PERIOD

Year	Avg. Daily Flow	Population	Residential	Commercial	Industrial	Institutional	*Unaccounted For
2017	0.43	4,300	0.260	0.044	0.060	0.010	0.055
2018	0.43	4,300	0.260	0.044	0.060	0.010	0.061
2019	0.44	4,300	0.260	0.044	0.060	0.010	0.066
2020	0.45	4,300	0.260	0.044	0.060	0.010	0.072
2021	0.45	4,300	0.260	0.044	0.060	0.010	0.072
2022	0.45	4,320	0.261	0.044	0.060	0.010	0.072
2023	0.45	4,330	0.262	0.044	0.060	0.010	0.072
2024	0.45	4,340	0.262	0.044	0.061	0.010	0.072
2025	0.45	4,350	0.263	0.045	0.061	0.010	0.072
2026	0.45	4,360	0.264	0.045	0.061	0.010	0.072
2027	0.45	4,370	0.264	0.045	0.061	0.010	0.072
2028	0.45	4,380	0.265	0.045	0.061	0.010	0.072
2029	0.45	4,390	0.265	0.045	0.061	0.010	0.072
2030	0.45	4,400	0.266	0.045	0.061	0.010	0.072
2031	0.45	4,400	0.266	0.045	0.061	0.010	0.072
2032	0.45	4,400	0.266	0.045	0.061	0.010	0.072
2033	0.45	4,400	0.266	0.045	0.061	0.010	0.072
2034	0.45	4,400	0.266	0.045	0.061	0.010	0.072
2035	0.45	4,400	0.266	0.045	0.061	0.010	0.072
2036	0.45	4,400	0.266	0.045	0.061	0.010	0.072
2037	0.45	4,400	0.266	0.045	0.061	0.010	0.072
2038	0.45	4,400	0.266	0.045	0.061	0.010	0.072
2039	0.45	4,400	0.266	0.045	0.061	0.010	0.072
2040	0.45	4,400	0.266	0.045	0.061	0.010	0.072

*Unaccounted-for data provided for years 2017, 2020, 2030 and 2040; linear interpolation used for intervening years

SOURCE(S): Local Water Supply Planning - North Carolina Division of Water Resources

TOWN OF STAR - POPULATION AND USAGE INFORMATION

Total Contracted Water Supply : 0.113 MGD

2017 GPCD by User

	Type
Residential :	23
Commercial :	13
Industrial :	6
Institutional :	15

LWSP PLANNING PROJECTIONS

	2017	2020	2030	2040	2050	2060
Year-Round Population	875	883	909	937	965	994
Residential	0.020	0.028	0.029	0.030	0.031	0.032
Commercial	0.011	0.011	0.012	0.013	0.014	0.015
Industrial	0.005	0.005	0.005	0.005	0.005	0.005
Institutional	0.013	0.012	0.012	0.012	0.012	0.012
Unaccounted For	0.005	0.006	0.006	0.006	0.006	0.006
Service Area Demand	0.054	0.062	0.064	0.066	0.068	0.070

ENGINEERING REPORT TREND PROJECTIONS

	2017	2020	2030	2040	2050	2060
Year-Round Population	875	883	909	937	965	994
Residential	0.020	0.020	0.021	0.021	0.022	0.023
Commercial	0.011	0.011	0.011	0.012	0.012	0.012
Industrial	0.005	0.005	0.005	0.005	0.006	0.006
Institutional	0.013	0.013	0.014	0.014	0.014	0.015
Unaccounted For	0.005	0.072	0.072	0.072	0.072	0.072
Service Area Demand	0.054	0.121	0.123	0.124	0.126	0.128

FLOW PROJECTION FOR PLANNING PERIOD

Year	Avg. Daily Flow	Population	Residential	Commercial	Industrial	Institutional	*Unaccounted For
2017	0.05	875	0.020	0.011	0.005	0.013	0.005
2018	0.05	878	0.020	0.011	0.005	0.013	0.005
2019	0.05	880	0.020	0.011	0.005	0.013	0.005
2020	0.06	883	0.020	0.011	0.005	0.013	0.006
2021	0.06	883	0.020	0.011	0.005	0.013	0.006
2022	0.06	888	0.020	0.011	0.005	0.013	0.006
2023	0.06	891	0.020	0.011	0.005	0.013	0.006
2024	0.06	893	0.020	0.011	0.005	0.013	0.006
2025	0.06	896	0.020	0.011	0.005	0.013	0.006
2026	0.06	899	0.021	0.011	0.005	0.013	0.006
2027	0.06	901	0.021	0.011	0.005	0.013	0.006
2028	0.06	904	0.021	0.011	0.005	0.013	0.006
2029	0.06	906	0.021	0.011	0.005	0.013	0.006
2030	0.06	909	0.021	0.011	0.005	0.014	0.006
2031	0.06	909	0.021	0.011	0.005	0.014	0.006
2032	0.06	915	0.021	0.011	0.005	0.014	0.006
2033	0.06	917	0.021	0.012	0.005	0.014	0.006
2034	0.06	920	0.021	0.012	0.005	0.014	0.006
2035	0.06	923	0.021	0.012	0.005	0.014	0.006
2036	0.06	926	0.021	0.012	0.005	0.014	0.006
2037	0.06	929	0.021	0.012	0.005	0.014	0.006
2038	0.06	931	0.021	0.012	0.005	0.014	0.006
2039	0.06	934	0.021	0.012	0.005	0.014	0.006
2040	0.06	937	0.021	0.012	0.005	0.014	0.006

*Unaccounted-for data provided for years 2017, 2020, 2030 and 2040; linear interpolation used for intervening years

SOURCE(S): Local Water Supply Planning - North Carolina Division of Water Resources

4.f

Montgomery County

LSWP

Montgomery Co

2012 ▼

The Division of Water Resources (DWR) provides the data contained within this Local Water Supply Plan (LWSP) as a courtesy and service to our customers. DWR staff does not field verify data. Neither DWR, nor any other party involved in the preparation of this LWSP attests that the data is completely free of errors and omissions. Furthermore, data users are cautioned that LWSPs labeled **PROVISIONAL** have yet to be reviewed by DWR staff. Subsequent review may result in significant revision. Questions regarding the accuracy or limitations of usage of this data should be directed to the water system and/or DWR.

1. System Information

Contact Information

Water System Name: **Montgomery Co** PWSID: **03-62-010**
 Mailing Address: **724 Hydro Road** Ownership: **County**
Mount Gilead, NC 27306
 Contact Person: **Matthew H. Morris** Title: **Director of Public Utilities**
 Phone: **910-439-6198** Fax: **910-439-9488**

Complete

Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	6, 16	6.72 %
Ductile Iron	6-24	9.64 %
Polyvinyl Chloride	2-12	83.64 %

What are the estimated total miles of distribution system lines? **470 Miles**
 How many feet of distribution lines were replaced during 2012? **0 Feet**
 How many feet of new water mains were added during 2012? **101,948 Feet**
 How many meters were replaced in 2012? **50**
 How old are the oldest meters in this system? **20 Year(s)**
 How many meters for outdoor water use, such as irrigation, are not billed for sewer services? **0**
 What is this system's finished water storage capacity? **3.9200 Million Gallons**
 Has water pressure been inadequate in any part of the system since last update? **No**

Programs

Does this system have a program to work or flush hydrants? **Yes, As Needed**
 Does this system have a valve exercise program? **Yes, As Needed**
 Does this system have a cross-connection program? **Yes**
 Does this system have a program to replace meters? **Yes**
 Does this system have a plumbing retrofit program? **No**
 Does this system have an active water conservation public education program? **No**
 Does this system have a leak detection program? **No**

Water Conservation

What type of rate structure is used? **Increasing Block**
 How much reclaimed water does this system use? **0.0000 MGD** For how many connections? **0**
 Does this system have an interconnection with another system capable of providing water in an emergency? **No**

Crossing Lake Tillery is a challenge to establishing a connection with our closest neighboring system. System capacity and IBT limits challenge the next closest system. We are working with the third closest system (Seagrove, NC & Asheboro, NC) to study the feasibility of a connection.

2. Water Use Information

Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Yadkin River (18-1)	86 %	Montgomery	100 %
Deep River (02-2)	10 %		
Lumber River (09-1)	3 %		
Uwharrie River (18-3)	1 %		

What was the year-round population served in 2012? 13,743

Has this system acquired another system since last report? No

Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	5,286	0.4620	0	0.0000
Commercial	139	0.2530	0	0.0000
Industrial	0	0.0000	0	0.0000
Institutional	0	0.0000	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? 0.0340 MGD

Water Sales

Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	Contract		Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration			
Carolina Forest	03-62-106	0.0210	365	0.0500	2040	Yes	12	Regular
Town of Biscoe	03-62-035	0.2340	365	0.7850	2045	Yes	16,12	Regular
Town of Candor	03-62-030	0.1160	365	0.1500	2045	Yes	12, 8	Regular
Town of Mt Gilead	03-62-015	0.0910	365	0.1700	2045	Yes	24,20	Regular
Town of Robbins	03-63-015	0.1420	365	0.2500	2013	Yes	10	Regular
Town of Star	03-62-025	0.0760	365	0.1230	2045	Yes	8, 12	Regular
Town of Troy	03-62-020	0.4070	365	0.9030	2045	Yes	20,16	Regular
Wood Run	03-62-107	0.0580	365	0.0500	2040	Yes	12	Regular

Carolina Forest & Wood Run are under one contract with a combined maximum usage of 0.100MGD. Since Carolina Forest and Wood Run do not have plans submitted at the time of this review, the combined maximum usage is divided equally between the two systems for simplicity and to account for demand on the county's system.

The towns of Candor, Star, Biscoe, Troy and Mount Gilead all renewed contracts in 2005 for 40 years. They are not to exceed 60 MG per month.

Montgomery County currently does not have enough water supply for each of the towns mentioned above to purchase 2 MGD a piece.

The contract value of 0.17 MGD is the amount of water Mount Gilead would need to purchase in order not to exceed 80% of supply by 2040.

The contract value of 0.785 MGD is the amount of water Biscoe would need to purchase in order not to exceed 80% of supply by 2040.

The contract value of 0.15 MGD is the amount of water Candor would need to purchase in order not to exceed 80% of supply by 2040.

The contract value of 0.123 MGD is the amount of water Star would need to purchase in order not to exceed 80% of supply by 2040.

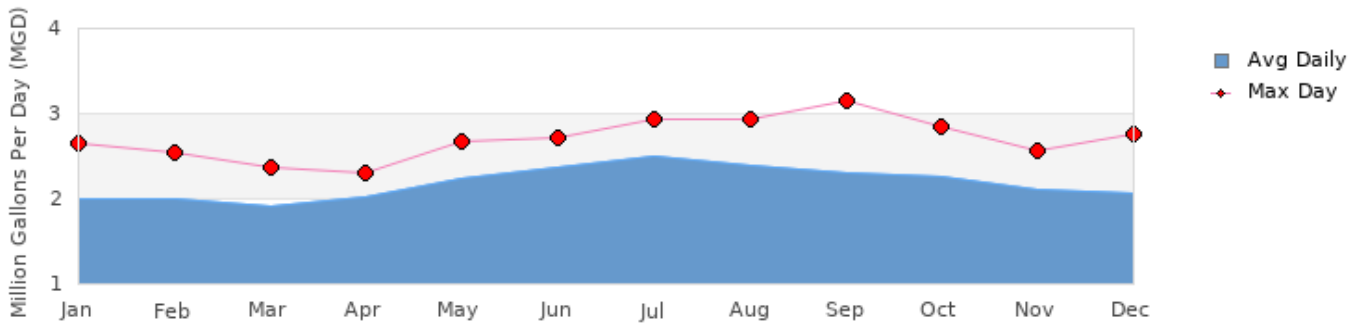
The contract value of 0.903 MGD is the amount of water Troy would need to purchase in order not to exceed 80% of supply by 2040.

3. Water Supply Sources

Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	2.0000	2.6460	May	2.2310	2.6740	Sep	2.2960	3.1480
Feb	2.0000	2.5380	Jun	2.3690	2.7130	Oct	2.2590	2.8390
Mar	1.9010	2.3560	Jul	2.4990	2.9270	Nov	2.1120	2.5640
Apr	2.0170	2.3030	Aug	2.3960	2.9250	Dec	2.0600	2.7670

Montgomery Co's 2012 Monthly Withdrawals & Purchases



Surface Water Sources

Stream	Reservoir	Average Daily Withdrawal		Maximum Day Withdrawal (MGD)	Available Raw Water Supply		Usable On-Stream Raw Water Supply Storage (MG)
		MGD	Days Used		MGD	* Qualifier	
Pee Dee River	Lake Tillery	2.1770	365	3.1480	6.0000	C	774.0000

* Qualifier: C=Contract Amount, SY20=20-year Safe Yield, SY50=50-year Safe Yield, F=20% of 7Q10 or other instream flow requirement, CUA=Capacity Use Area Permit

Surface Water Sources (continued)

Stream	Reservoir	Drainage Area (sq mi)	Metered?	Sub-Basin	County	Year Offline	Use Type
Pee Dee River	Lake Tillery	4,600	Yes	Yadkin River (18-1)	Montgomery		Regular

What is this system's off-stream raw water supply storage capacity? **6 Million gallons**

Are surface water sources monitored? **Yes, Daily**

Are you required to maintain minimum flows downstream of its intake or dam? **No**

Does this system anticipate transferring surface water between river basins? **Yes**

IBT occurs with the following:

- Sale of water to the Town of Robbins NC - Deep River Basin (02-2)
- Sale of water to customers in the Lumber River Basin (09-1)
- Sale of water to customers in the Uwharrie River Basin (18-3)

The available raw water supply value of 6 MGD represents the amount of water allocated by Duke Energy Progress that the county can withdraw.

The raw water storage value of 774 MG was taken from the 2002 LWSP.

Water Purchases From Other Systems

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	MGD	Contract Expiration	Recurring	Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
Town of Troy	03-62-020	0.0000	365		2045	Yes	Yes	8	Regular

This is a buy back scenario of 0.036 MGD. I did not put this number in this program because it will show this as available water supply in the planning section of this report.

Water Treatment Plants

Plant Name	Permitted Capacity (MGD)	Is Raw Water Metered?	Is Finished Water Output Metered?	Source
Montgomery County WTP	6.0000	Yes	Yes	Lake Tillery

Did average daily water production exceed 80% of approved plant capacity for five consecutive days during 2012? **No**

If yes, was any water conservation implemented?

Did average daily water production exceed 90% of approved plant capacity for five consecutive days during 2012? **No**

If yes, was any water conservation implemented?

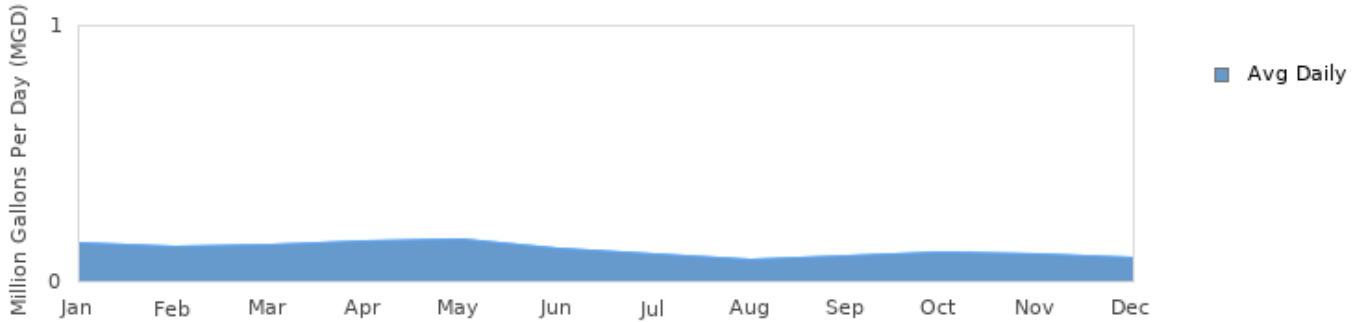
Are peak day demands expected to exceed the water treatment plant capacity in the next 10 years? **No**

4. Wastewater Information

Monthly Discharges

	Average Daily Discharge (MGD)		Average Daily Discharge (MGD)		Average Daily Discharge (MGD)
Jan	0.1500	May	0.1620	Sep	0.1010
Feb	0.1370	Jun	0.1260	Oct	0.1140
Mar	0.1410	Jul	0.1080	Nov	0.1040
Apr	0.1550	Aug	0.0860	Dec	0.0900

Montgomery Co's 2012 Monthly Discharges



How many sewer connections does this system have? 1,700

How many water service connections with septic systems does this system have? 3,725

Are there plans to build or expand wastewater treatment facilities in the next 10 years? Yes

All domestic wastewater collected is treated by local town owned facilities. The County only treats byproduct wastewater from its conventional water treatment facility. Currently, the wastewater treatment facilities at the WTP are undersized and are being upgraded to match the 6 MGD capacity of the WTP.

The average daily discharges above represent the decanted water from the water treatment process and wastewater discharged to local town owned facilities.

Wastewater Permits

Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0080322	0.4700	0.3800	0.0660	0.2940	Unnamed Trib. to Clarks Creek	Yadkin River (18-1)

Wastewater Interconnections

Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)
			MGD	Days Used	
Town of Candor	03-62-030	Discharging	0.0210	365	0.0000
Town of Mt. Gilead	03-62-015	Discharging	0.0330	365	0.0000
Town of Troy	03-62-020	Discharging	0.0030	365	0.0000

5. Planning

Projections

	2012	2020	2030	2040	2050	2060
Year-Round Population	13,743	14,642	15,699	16,885	18,071	18,071
Seasonal Population	0	0	0	0	0	0
Residential	0.4620	0.4900	0.5270	0.5670	0.6100	0.6560
Commercial	0.2530	0.2590	0.2670	0.2610	0.2750	0.2830
Industrial	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Institutional	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

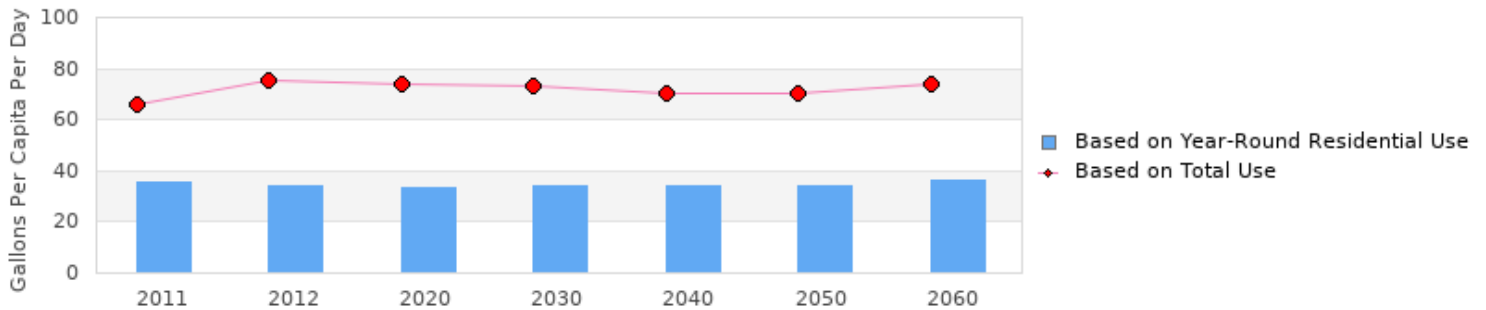
System Process	0.0340	0.0350	0.0360	0.0370	0.0380	0.0390
Unaccounted-for	0.2802	0.2930	0.3100	0.3230	0.3450	0.3660

Residential Growth = 7.5% per 10 years
 Commercial Growth = 3.0% per 10 years

 Demand v/s Percent of Supply

	2012	2020	2030	2040	2050	2060
Surface Water Supply	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Ground Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Purchases	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Future Supplies		0.0000	0.0000	0.0000	0.0000	0.0000
Total Available Supply (MGD)	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Service Area Demand	1.0292	1.0770	1.1400	1.1880	1.2680	1.3440
Sales	1.1419	2.4890	2.4890	2.4890	2.4890	2.4890
Future Sales		0.0000	0.0000	0.0000	0.0000	0.0000
Total Demand (MGD)	2.1711	3.5660	3.6290	3.6770	3.7570	3.8330
Demand as Percent of Supply	36%	59%	60%	61%	63%	64%

Montgomery Co's Projected Gallons Per Capita Per Day (GPCD) Over Time



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is 34 gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here. The county currently has a meter replacement program, and increasing block rate structure for water rates.

Are there other demand management practices you will implement to reduce your future supply needs?

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs?

How does the water system intend to implement the demand management and supply planning components above?

Additional Information

Has this system participated in regional water supply or water use planning? No

What major water supply reports or studies were used for planning?

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues:

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Montgomery Co

2013 ▼

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1. System Information

Contact Information

Water System Name: **Montgomery Co** PWSID: **03-62-010**
 Mailing Address: **724 Hydro Road** Ownership: **County**
Mount Gilead, NC 27306
 Contact Person: **Matthew H. Morris** Title: **Director of Public Utilities**
 Phone: **910-439-6198** Fax: **910-439-9488**

Incomplete

Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	6, 16	6.72 %
Ductile Iron	6-24	9.64 %
Polyvinyl Chloride	2-12	83.64 %

What are the estimated total miles of distribution system lines? **470 Miles**
 How many feet of distribution lines were replaced during 2013? **0 Feet**
 How many feet of new water mains were added during 2013? **0 Feet**
 How many meters were replaced in 2013? **50**
 How old are the oldest meters in this system? **20 Year(s)**
 How many meters for outdoor water use, such as irrigation, are not billed for sewer services? **0**
 What is this system's finished water storage capacity? **3.9200 Million Gallons**
 Has water pressure been inadequate in any part of the system since last update? **No**

Programs

Does this system have a program to work or flush hydrants? **Yes, As Needed**
 Does this system have a valve exercise program? **Yes, As Needed**
 Does this system have a cross-connection program? **Yes**
 Does this system have a program to replace meters? **Yes**
 Does this system have a plumbing retrofit program? **No**
 Does this system have an active water conservation public education program? **No**
 Does this system have a leak detection program? **No**

Water Conservation

What type of rate structure is used? **Increasing Block**
 How much reclaimed water does this system use? **0.0000 MGD** For how many connections? **0**
 Does this system have an interconnection with another system capable of providing water in an emergency? **No**

Crossing Lake Tillery is a challenge to establish a connection with our closest neighboring system. IBT limitations also present challenges for interconnections. Plans are to evaluate several options including: Norwood; Stanly County; Randolph County/Seagrove/Asheboro; Moore County; and Richmond County. Each option feasibility and cost estimates will be evaluated.

2. Water Use Information

Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Yadkin River (18-1)	86 %	Montgomery	100 %
Deep River (02-2)	10 %		
Lumber River (09-1)	3 %		

Uwharrie River (18-3)

1 %

What was the year-round population served in 2013? 14,044

Has this system acquired another system since last report? No

Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	5,401	0.4460	0	0.0000
Commercial	139	0.2770	0	0.0000
Industrial	0	0.0000	0	0.0000
Institutional	0	0.0000	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? 0.0340 MGD

Water Sales

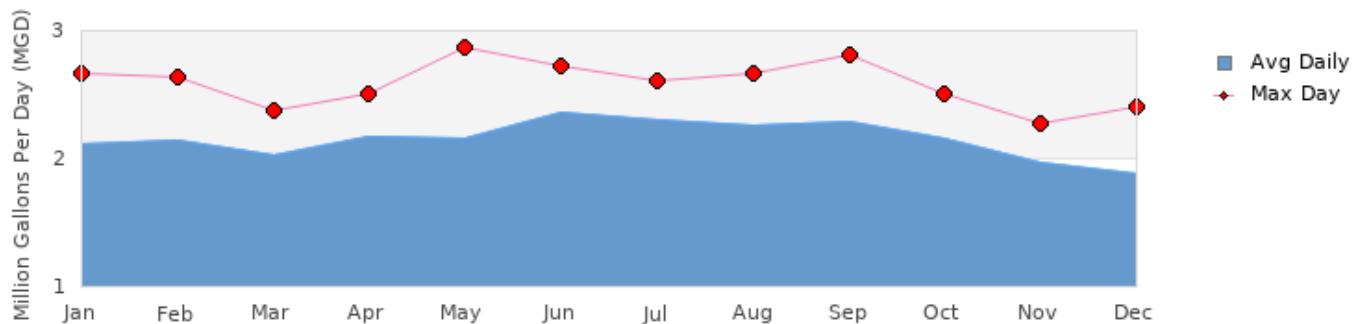
Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	Contract		Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration			
Carolina Forest	03-62-106	0.0200	365	0.0500	2040	Yes	12	Regular
Town of Biscoe	03-62-035	0.2330	365	0.7850	2045	Yes	16,12	Regular
Town of Candor	03-62-030	0.1140	365	0.1500	2045	Yes	12, 8	Regular
Town of Mt Gilead	03-62-015	0.0810	365	0.1700	2045	Yes	24,20	Regular
Town of Robbins	03-63-015	0.1500	365	0.2500	2014	Yes	10	Regular
Town of Star	03-62-025	0.0680	365	0.1230	2045	Yes	8, 12	Regular
Town of Troy	03-62-020	0.4550	365	0.9030	2045	Yes	20,16	Regular
Wood Run	03-62-107	0.0600	365	0.0500	2040	Yes	12	Regular

3. Water Supply Sources

Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	2.1170	2.6590	May	2.1600	2.8710	Sep	2.2930	2.8180
Feb	2.1490	2.6410	Jun	2.3600	2.7240	Oct	2.1530	2.5040
Mar	2.0230	2.3800	Jul	2.3090	2.6110	Nov	1.9660	2.2750
Apr	2.1680	2.5120	Aug	2.2510	2.6690	Dec	1.8830	2.4020

Montgomery Co's 2013 Monthly Withdrawals & Purchases



Surface Water Sources

Stream	Reservoir	Average Daily Withdrawal		Maximum Day Withdrawal (MGD)	Available Raw Water Supply		Usable On-Stream Raw Water Supply Storage (MG)
		MGD	Days Used		MGD	* Qualifier	
Pee Dee River	Lake Tillery	2.1530	365	2.8710	6.0000	C	774.0000

* Qualifier: C=Contract Amount, SY20=20-year Safe Yield, SY50=50-year Safe Yield, F=20% of 7Q10 or other instream flow requirement, CUA=Capacity Use Area Permit

Surface Water Sources (continued)

Stream	Reservoir	Drainage Area (sq mi)	Metered?	Sub-Basin	County	Year Offline	Use Type
Pee Dee River	Lake Tillery	4,600	Yes	Yadkin River (18-1)	Montgomery		Regular

What is this system's off-stream raw water supply storage capacity? **6 Million gallons**

Are surface water sources monitored? **Yes, Daily**

Are you required to maintain minimum flows downstream of its intake or dam? **No**

Does this system anticipate transferring surface water between river basins? **Yes**

IBT occurs with the following:

Sale of water to customers and the Town of Robbins in the Deep River Basin (02-2)

Sale of water to customers in the Lumber River Basin (09-1)

Sale of water to customers in the Uwharrie River Basin (18-3)

Water Purchases From Other Systems

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	MGD	Contract Expiration	Recurring	Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
Town of Troy	03-62-020	0.0000	365	0.0000	2045	Yes	Yes	8, 12	Regular

This is a buy-back scenario of 0.111 MGD. I did not put this number in this program because it will show this as available water supply in the planning section of this report.

Water Treatment Plants

Plant Name	Permitted Capacity (MGD)	Is Raw Water Metered?	Is Finished Water Output Metered?	Source
Montgomery County WTP	6.0000	Yes	Yes	Lake Tillery

Did average daily water production exceed 80% of approved plant capacity for five consecutive days during 2013? **No**

If yes, was any water conservation implemented?

Did average daily water production exceed 90% of approved plant capacity for five consecutive days during 2013? **No**

If yes, was any water conservation implemented?

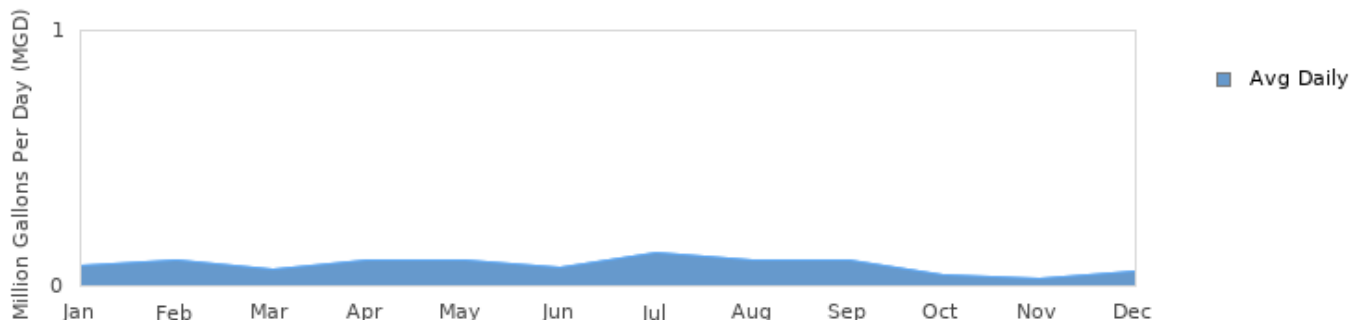
Are peak day demands expected to exceed the water treatment plant capacity in the next 10 years? **No**

4. Wastewater Information

Monthly Discharges

	Average Daily Discharge (MGD)		Average Daily Discharge (MGD)		Average Daily Discharge (MGD)
Jan	0.0740	May	0.0960	Sep	0.1000
Feb	0.0950	Jun	0.0700	Oct	0.0390
Mar	0.0640	Jul	0.1260	Nov	0.0270
Apr	0.0970	Aug	0.0990	Dec	0.0570

Montgomery Co's 2013 Monthly Discharges



How many sewer connections does this system have? **157**

How many water service connections with septic systems does this system have? 4,085

Are there plans to build or expand wastewater treatment facilities in the next 10 years? Yes

Currently, the wastewater treatment facilities at the County's WTP are undersized and are being upgraded to match the 6 MGD capacity of the WTP. The average daily discharges above represent the County's discharge from the wastewater treatment facility at the WTP.

Wastewater Permits

Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0080322	0.4700	0.3800	0.0780	0.2760	Unnamed Trib. to Clarks Creek	Yadkin River (18-1)

Wastewater Interconnections

Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)
			MGD	Days Used	
Town of Candor	03-62-030	Discharging	0.0230	365	0.0000
Town of Troy	03-62-020	Discharging	0.0030	365	0.0000

5. Planning

Projections

	2013	2020	2030	2040	2050	2060
Year-Round Population	14,044	14,642	15,699	16,885	18,071	18,071
Seasonal Population	0	0	0	0	0	0
Residential	0.4460	0.4900	0.5270	0.5670	0.6100	0.6560
Commercial	0.2770	0.2970	0.3260	0.3600	0.3960	0.4350
Industrial	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Institutional	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
System Process	0.0340	0.0350	0.0360	0.0370	0.0380	0.0390
Unaccounted-for	0.2150	0.2330	0.2520	0.2740	0.2970	0.3210

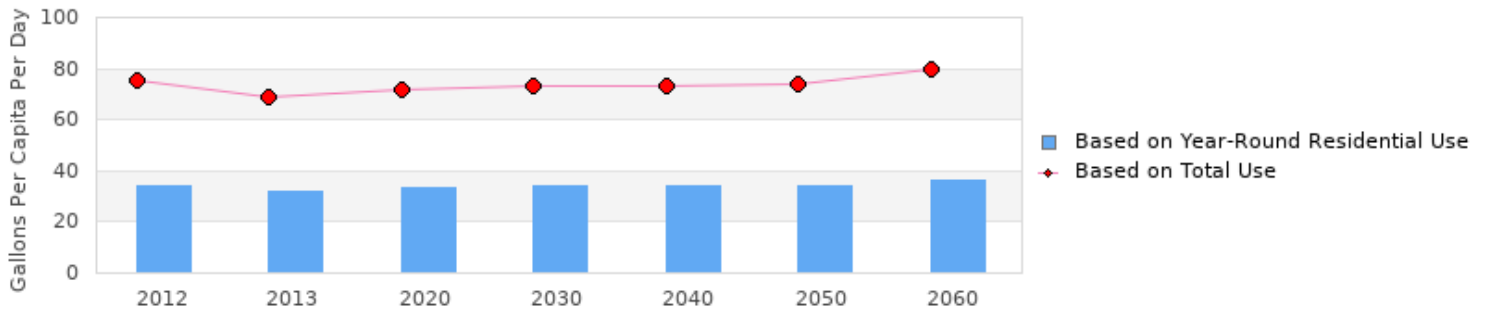
Residential Growth = 7.5% per 10 years

Commercial Growth = 10% per 10 years

Demand v/s Percent of Supply

	2013	2020	2030	2040	2050	2060
Surface Water Supply	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Ground Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Purchases	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Future Supplies		0.0000	0.0000	0.0000	0.0000	0.0000
Total Available Supply (MGD)	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Service Area Demand	0.9720	1.0550	1.1410	1.2380	1.3410	1.4510
Sales	1.1810	2.4910	2.4910	2.4910	2.4910	2.4910
Future Sales		0.0000	0.0000	0.0000	0.0000	0.0000
Total Demand (MGD)	2.1530	3.5460	3.6320	3.7290	3.8320	3.9420
Demand as Percent of Supply	36%	59%	61%	62%	64%	66%

Montgomery Co's Projected Gallons Per Capita Per Day (GPCD) Over Time



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is **32** gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here.

Are there other demand management practices you will implement to reduce your future supply needs?

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs?

How does the water system intend to implement the demand management and supply planning components above?

Additional Information

Has this system participated in regional water supply or water use planning? **No**

What major water supply reports or studies were used for planning?

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues:

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Montgomery Co

2014 ▼

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1. System Information

Contact Information

Water System Name:	Montgomery Co	PWSID:	03-62-010
Mailing Address:	724 Hydro Road Mount Gilead, NC 27306	Ownership:	County
Contact Person:	Matthew H. Morris	Title:	Director of Public Utilities
Phone:	910-439-6198	Fax:	910-439-9488

Complete

Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	6, 16	6.57 %
Ductile Iron	6-24	9.60 %
Polyvinyl Chloride	2-12	83.83 %

What are the estimated total miles of distribution system lines? **472 Miles**
 How many feet of distribution lines were replaced during 2014? **0 Feet**
 How many feet of new water mains were added during 2014? **13,452 Feet**
 How many meters were replaced in 2014? **50**
 How old are the oldest meters in this system? **21 Year(s)**
 How many meters for outdoor water use, such as irrigation, are not billed for sewer services? **0**
 What is this system's finished water storage capacity? **3.9200 Million Gallons**
 Has water pressure been inadequate in any part of the system since last update? **No**

Programs

Does this system have a program to work or flush hydrants? **Yes, As Needed**
 Does this system have a valve exercise program? **Yes, As Needed**
 Does this system have a cross-connection program? **Yes**
 Does this system have a program to replace meters? **Yes**
 Does this system have a plumbing retrofit program? **No**
 Does this system have an active water conservation public education program? **No**
 Does this system have a leak detection program? **No**

Water Conservation

What type of rate structure is used? **Increasing Block**
 How much reclaimed water does this system use? **0.0000 MGD** For how many connections? **0**
 Does this system have an interconnection with another system capable of providing water in an emergency? **No**

Crossing Lake Tillery is a challenge to establish a connection with our closest neighboring system. IBT limitations also present challenges for interconnections. Plans are to evaluate several options including: Norwood; Stanly County; Randolph County/Seagrove/Asheboro; Moore County; and Richmond County. Each option feasibility and cost estimates will be evaluated.

The County does have the ability to buy back water from the Towns giving us access to their storage during emergency situations.

2. Water Use Information

Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Yadkin River (18-1)	86 %	Montgomery	100 %
Deep River (02-2)	10 %		

Lumber River (09-1)	3 %
Uwharrie River (18-3)	1 %

What was the year-round population served in 2014? 14,136

Has this system acquired another system since last report? No

Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	5,437	0.4660	0	0.0000
Commercial	137	0.2790	0	0.0000
Industrial	0	0.0000	0	0.0000
Institutional	0	0.0000	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? 0.0360 MGD

Water Sales

Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	Contract		Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration			
Carolina Forest	03-62-106	0.0240	365	0.0500	2040	Yes	12	Regular
Town of Biscoe	03-62-035	0.2470	365	0.8000	2045	Yes	16,12	Regular
Town of Candor	03-62-030	0.1330	365	0.1470	2045	Yes	12, 8	Regular
Town of Mt Gilead	03-62-015	0.0720	365	0.0900	2045	Yes	24,20	Regular
Town of Robbins	03-63-015	0.1540	365	0.2500	2019	Yes	10	Regular
Town of Star	03-62-025	0.0680	365	0.0980	2045	Yes	8, 12	Regular
Town of Troy	03-62-020	0.4300	365	0.9030	2045	Yes	20,16	Regular
Wood Run	03-62-107	0.0610	365	0.0500	2040	Yes	12	Regular

Carolina Forest and Wood Run are under one contract with a combined maximum usage of 0.100MGD. Since Carolina Forest and Wood Run did not have plans submitted at the time of this review, the combined maximum usage is divided equally between the two systems for simplicity and to account for demand on the county system.

The towns of Candor, Star, Biscoe, Troy and Mount Gilead all renewed contracts in 2005 for 40 years. Collectively they are not to exceed 60 MG per month.

The contract value of 0.090 MGD is the amount of water Mount Gilead would need to purchase in order not to exceed 80% of supply by 2040.

The contract value of 0.800 MGD is the amount of water Biscoe would need to purchase in order not to exceed 80% of supply by 2040.

The contract value of 0.147 MGD is the amount of water Candor would need to purchase in order not to exceed 80% of supply by 2040.

The contract value of 0.098 MGD is the amount of water Star would need to purchase in order not to exceed 80% of supply by 2040.

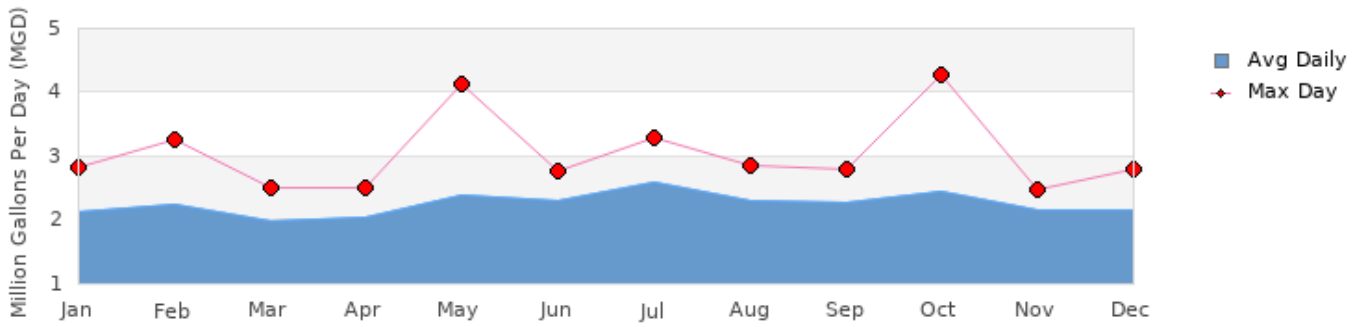
The contract value of 0.903 MGD is the amount of water Troy would need to purchase in order not to exceed 80% of supply by 2040.

3. Water Supply Sources

Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	2.1090	2.8260	May	2.3720	4.1150	Sep	2.2750	2.7990
Feb	2.2420	3.2520	Jun	2.2970	2.7660	Oct	2.4310	4.2620
Mar	1.9880	2.5030	Jul	2.5710	3.2900	Nov	2.1500	2.4760
Apr	2.0340	2.5040	Aug	2.2870	2.8580	Dec	2.1500	2.7880

Montgomery Co's 2014 Monthly Withdrawals & Purchases



Surface Water Sources

Stream	Reservoir	Average Daily Withdrawal		Maximum Day Withdrawal (MGD)	Available Raw Water Supply		Usable On-Stream Raw Water Supply Storage (MG)
		MGD	Days Used		MGD	* Qualifier	
Pee Dee River	Lake Tillery	2.2420	365	4.2620	6.0000	C	774.0000

* Qualifier: C=Contract Amount, SY20=20-year Safe Yield, SY50=50-year Safe Yield, F=20% of 7Q10 or other instream flow requirement, CUA=Capacity Use Area Permit

Surface Water Sources (continued)

Stream	Reservoir	Drainage Area (sq mi)	Metered?	Sub-Basin	County	Year Offline	Use Type
Pee Dee River	Lake Tillery	4,600	Yes	Yadkin River (18-1)	Montgomery		Regular

What is this system's off-stream raw water supply storage capacity? 0 Million gallons

Are surface water sources monitored? Yes, Daily

Are you required to maintain minimum flows downstream of its intake or dam? No

Does this system anticipate transferring surface water between river basins? Yes

IBT occurs with the following:

- Sale of water to customers and the Town of Robbins in the Deep River Basin (02-2)
- Sale of water to customers in the Lumber River Basin (09-1)

Water Purchases From Other Systems

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Town of Troy	03-62-020	0.0000	0	0.0000	2045	Yes	Yes	8, 12	Emergency

This is a buy-back scenario of 0.107 MGD. I did not put this number in the program because it will show as available water supply in the planning section of this report.

Water Treatment Plants

Plant Name	Permitted Capacity (MGD)	Is Raw Water Metered?	Is Finished Water Output Metered?	Source
Montgomery County WTP	6.0000	Yes	Yes	Lake Tillery

Did average daily water production exceed 80% of approved plant capacity for five consecutive days during 2014? No

If yes, was any water conservation implemented?

Did average daily water production exceed 90% of approved plant capacity for five consecutive days during 2014? No

If yes, was any water conservation implemented?

Are peak day demands expected to exceed the water treatment plant capacity in the next 10 years? No

4. Wastewater Information

Monthly Discharges

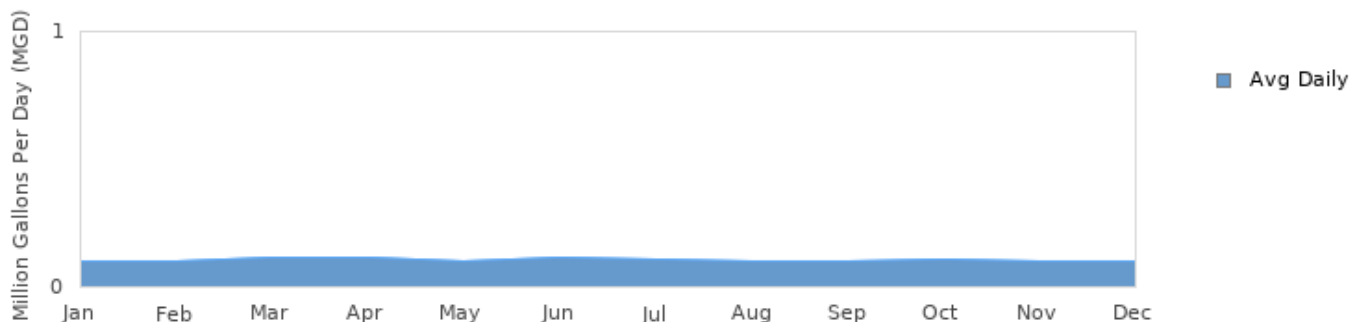
Average Daily

Average Daily

Average Daily

Discharge (MGD)		Discharge (MGD)		Discharge (MGD)	
Jan	0.0990	May	0.1010	Sep	0.1000
Feb	0.1000	Jun	0.1120	Oct	0.1060
Mar	0.1100	Jul	0.1080	Nov	0.0980
Apr	0.1120	Aug	0.1000	Dec	0.1010

Montgomery Co's 2014 Monthly Discharges



How many sewer connections does this system have? 156

How many water service connections with septic systems does this system have? 3,978

Are there plans to build or expand wastewater treatment facilities in the next 10 years? Yes

Capacity Improvements are under construction for our Alum Sludge Treatment system at the WTP. The values above represent the discharges from this system under our NPDES Permit NC0080322. The sewer service connection listed represent two small collection systems owned and operated by the County. However, local municipalities accept and treat the waste water under their respective NPDES Permits.

Wastewater Permits

Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0080322	0.2880	0.3800	0.0760	0.2700	Unnamed Trib. to Clarks Creek	Yadkin River (18-1)

Wastewater Interconnections

Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)
			MGD	Days Used	
Town of Candor	03-62-030	Discharging	0.0250	365	0.0000
Town of Troy	03-62-020	Discharging	0.0030	365	0.0000

5. Planning

Projections

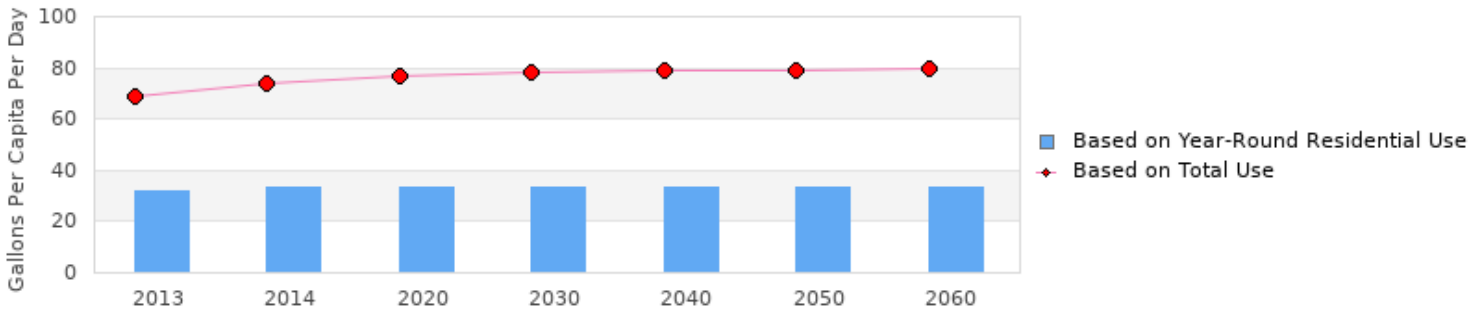
	2014	2020	2030	2040	2050	2060
Year-Round Population	14,136	14,687	15,642	16,659	17,742	18,895
Seasonal Population	0	0	0	0	0	0
Residential	0.4660	0.4840	0.5160	0.5490	0.5850	0.6230
Commercial	0.2790	0.3120	0.3430	0.3770	0.4150	0.4570
Industrial	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Institutional	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
System Process	0.0360	0.0400	0.0420	0.0440	0.0460	0.0480
Unaccounted-for	0.2720	0.2910	0.3140	0.3380	0.3640	0.3930

Residential Customer Growth = 6.5% per 10 years
 Commercial Customer Growth = 10% per 10 years
 An increase in system process water is anticipated as flushing increases and additional data is collected

Demand v/s Percent of Supply

	2014	2020	2030	2040	2050	2060
Surface Water Supply	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Ground Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Purchases	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Future Supplies		0.0000	0.0000	0.0000	0.0000	0.0000
Total Available Supply (MGD)	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Service Area Demand	1.0530	1.1270	1.2150	1.3080	1.4100	1.5210
Sales	1.1890	2.3990	2.3990	2.3990	2.3990	2.3990
Future Sales		0.0000	0.0000	0.0000	0.0000	0.0000
Total Demand (MGD)	2.2420	3.5260	3.6140	3.7070	3.8090	3.9200
Demand as Percent of Supply	37%	59%	60%	62%	63%	65%

Montgomery Co's Projected Gallons Per Capita Per Day (GPCD) Over Time



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is 33 gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here. **Montgomery County has implemented the following practices that could reduce per capita water demand: 1) meter replacement program; 2) increasing block rates.**

Are there other demand management practices you will implement to reduce your future supply needs?

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs? **Possible interconnections with one of the following systems are continually being explored: Randolph County/Asheboro/Segrove; Richmond County; Norwood; Davidson County; Moore County**

How does the water system intend to implement the demand management and supply planning components above?

Additional Information

Has this system participated in regional water supply or water use planning? **No**

What major water supply reports or studies were used for planning?

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues:

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Montgomery Co

2015 ▾

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1. System Information

Contact Information

Water System Name: **Montgomery Co** PWSID: **03-62-010**
 Mailing Address: **724 Hydro Road** Ownership: **County**
Mount Gilead, NC 27306
 Contact Person: **Matthew H. Morris** Title: **Director of Public Utilities**
 Phone: **910-439-6198** Fax: **910-439-9488**

Complete

Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	6, 16	6.57 %
Ductile Iron	6-24	9.60 %
Polyvinyl Chloride	2-12	83.83 %

What are the estimated total miles of distribution system lines? **472 Miles**
 How many feet of distribution lines were replaced during 2015? **0 Feet**
 How many feet of new water mains were added during 2015? **0 Feet**
 How many meters were replaced in 2015? **50**
 How old are the oldest meters in this system? **22 Year(s)**
 How many meters for outdoor water use, such as irrigation, are not billed for sewer services? **0**
 What is this system's finished water storage capacity? **3.9200 Million Gallons**
 Has water pressure been inadequate in any part of the system since last update? **No**

Programs

Does this system have a program to work or flush hydrants? **Yes, As Needed**
 Does this system have a valve exercise program? **Yes, As Needed**
 Does this system have a cross-connection program? **Yes**
 Does this system have a program to replace meters? **Yes**
 Does this system have a plumbing retrofit program? **No**
 Does this system have an active water conservation public education program? **No**
 Does this system have a leak detection program? **No**

Water Conservation

What type of rate structure is used? **Increasing Block**
 How much reclaimed water does this system use? **0.0000 MGD** For how many connections? **0**
 Does this system have an interconnection with another system capable of providing water in an emergency? **No**

Interconnecting with neighboring systems is challenging due to crossing Lake Tillery to the west and IBT issues to the east. Neighbors to the north and south are at significant distances.

2. Water Use Information

Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Yadkin River (18-1)	86 %	Montgomery	100 %
Deep River (02-2)	10 %		
Lumber River (09-1)	3 %		
Uwharrie River (18-3)	1 %		

What was the year-round population served in 2015? 14,432

Has this system acquired another system since last report? No

Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	5,551	0.4810	0	0.0000
Commercial	140	0.2940	0	0.0000
Industrial	0	0.0000	0	0.0000
Institutional	0	0.0000	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? 0.0360 MGD

Water Sales

Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	MGD	Contract Expiration	Recurring	Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
Carolina Forest	03-62-106	0.0500	365	0.0500	2040	Yes	Yes	12	Regular
Town of Biscoe	03-62-035	0.2960	365	0.8000	2045	Yes	Yes	16,12	Regular
Town of Candor	03-62-030	0.1270	365	0.1540	2045	Yes	Yes	12, 8	Regular
Town of Mt Gilead	03-62-015	0.0930	365	0.0900	2045	Yes	Yes	24,20	Regular
Town of Robbins	03-63-015	0.1660	365	0.2500	2019	Yes	Yes	10	Regular
Town of Star	03-62-025	0.0590	365	0.1130	2045	Yes	Yes	8, 12	Regular
Town of Troy	03-62-020	0.4340	365	0.9030	2045	Yes	Yes	20,16	Regular
Wood Run	03-62-107	0.0660	365	0.0500	2040	Yes	Yes	12	Regular

It is our understanding that Carolina Forest battled severe leaks throughout the year, causing their demand to be higher than normal.

The towns of Candor, Star, Biscoe, Troy and Mount Gilead all renewed contracts in 2005 for 40 years. They are not to exceed 60 MG per month.

The contract value of 0.8 MGD is the amount of water Biscoe would need to purchase in order not to exceed 80% of supply by 2040.

The contract value of 0.154 MGD is the amount of water Candor would need to purchase in order not to exceed 80% of supply by 2040.

The contract value of 0.113 MGD is the amount of water Star would need to purchase in order not to exceed 80% of supply by 2040.

The contract value of 0.903 MGD is the amount of water Troy would need to purchase in order not to exceed 80% of supply by 2040.

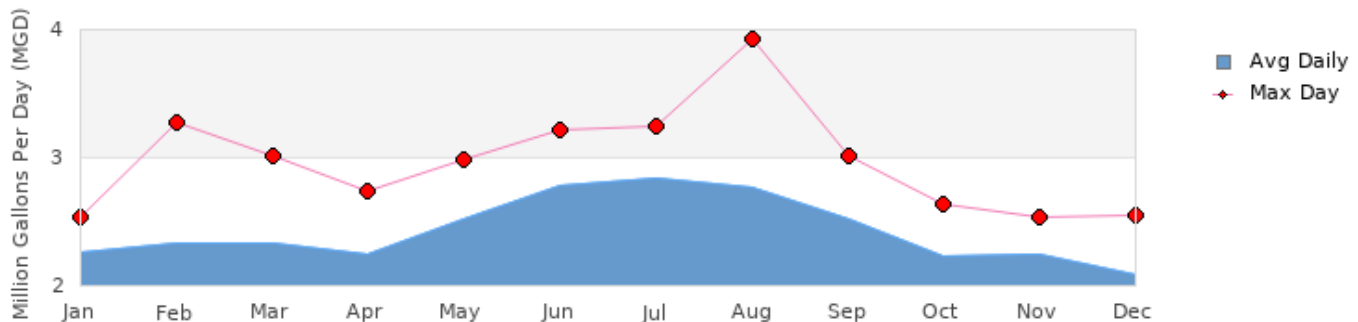
Mount Gilead had not submitted a plan update at the time of this plan review.

3. Water Supply Sources

Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	2.2570	2.5380	May	2.5130	2.9760	Sep	2.5190	3.0180
Feb	2.3340	3.2720	Jun	2.7850	3.2210	Oct	2.2250	2.6350
Mar	2.3220	3.0170	Jul	2.8350	3.2420	Nov	2.2380	2.5270
Apr	2.2470	2.7340	Aug	2.7650	3.9340	Dec	2.0750	2.5390

Montgomery Co's 2015 Monthly Withdrawals & Purchases



Surface Water Sources

Stream	Reservoir	Average Daily Withdrawal		Maximum Day Withdrawal (MGD)	Available Raw Water Supply		Usable On-Stream Raw Water Supply Storage (MG)
		MGD	Days Used		MGD	* Qualifier	
Pee Dee River	Lake Tillery	2.4270	365	3.9350	6.0000	C	774.0000

* Qualifier: C=Contract Amount, SY20=20-year Safe Yield, SY50=50-year Safe Yield, F=20% of 7Q10 or other instream flow requirement, CUA=Capacity Use Area Permit

Surface Water Sources (continued)

Stream	Reservoir	Drainage Area (sq mi)	Metered?	Sub-Basin	County	Year Offline	Use Type
Pee Dee River	Lake Tillery	4,600	Yes	Yadkin River (18-1)	Montgomery		Regular

What is this system's off-stream raw water supply storage capacity? 0 Million gallons

Are surface water sources monitored? Yes, Daily

Are you required to maintain minimum flows downstream of its intake or dam? No

Does this system anticipate transferring surface water between river basins? Yes

IBT occurs with:

Sale of water to the Town of Robbins - Deep River Basin (02-2)

Sale of water to customers in the Lumber River Basin (09-1)

Water Purchases From Other Systems

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	Contract			Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration	Recurring			
Town of Troy	03-62-020	0.0000	0	0.0000	2045	Yes	Yes	8, 12	Regular

This is a buy-back scenario of 0.093 MGD. I did not put this number in the program because it will show as available water supply in the planning section of this report.

Water Treatment Plants

Plant Name	Permitted Capacity (MGD)	Is Raw Water Metered?	Is Finished Water Output Metered?	Source
Montgomery County WTP	6.0000	Yes	Yes	Lake Tillery

Did average daily water production exceed 80% of approved plant capacity for five consecutive days during 2015? No

If yes, was any water conservation implemented?

Did average daily water production exceed 90% of approved plant capacity for five consecutive days during 2015? No

If yes, was any water conservation implemented?

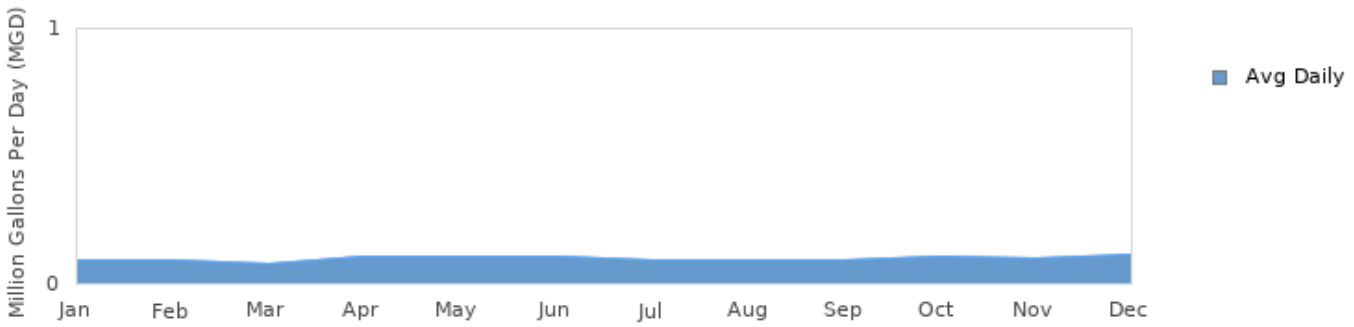
Are peak day demands expected to exceed the water treatment plant capacity in the next 10 years? No

4. Wastewater Information

Monthly Discharges

	Average Daily Discharge (MGD)		Average Daily Discharge (MGD)		Average Daily Discharge (MGD)
Jan	0.0930	May	0.1060	Sep	0.0890
Feb	0.0910	Jun	0.1060	Oct	0.1020
Mar	0.0760	Jul	0.0920	Nov	0.1000
Apr	0.1050	Aug	0.0930	Dec	0.1120

Montgomery Co's 2015 Monthly Discharges



How many sewer connections does this system have? 155

How many water service connections with septic systems does this system have? 4,258

Are there plans to build or expand wastewater treatment facilities in the next 10 years? No

Our discharge is related to NPDES Permit No. 0080322 issued for the Alum Sludge Treatment facility located at the County WTP - not traditional waste water treatment associated with municipal sewer. The sewer service connections listed above are for two small collections systems operated by the County. Local municipalities accept and treat the waste water at their WWTPs.

Wastewater Permits

Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0080322	0.2880	0.3800	0.0710	0.2240	Unnamed Trib. to Clarks Creek	Yadkin River (18-1)

Wastewater Interconnections

Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)
			MGD	Days Used	
Town of Candor	03-62-030	Discharging	0.0230	365	0.0000
Town of Troy	03-62-020	Discharging	0.0030	365	0.0000

5. Planning

Projections

	2015	2020	2030	2040	2050	2060
Year-Round Population	14,432	14,900	15,870	16,900	18,000	19,170
Seasonal Population	0	0	0	0	0	0
Residential	0.4810	0.4970	0.5290	0.5630	0.6000	0.6390
Commercial	0.2940	0.3090	0.3400	0.3740	0.4110	0.4520
Industrial	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Institutional	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
System Process	0.0360	0.0400	0.0420	0.0440	0.0460	0.0480
Unaccounted-for	0.3250	0.3390	0.3650	0.3930	0.4240	0.4560

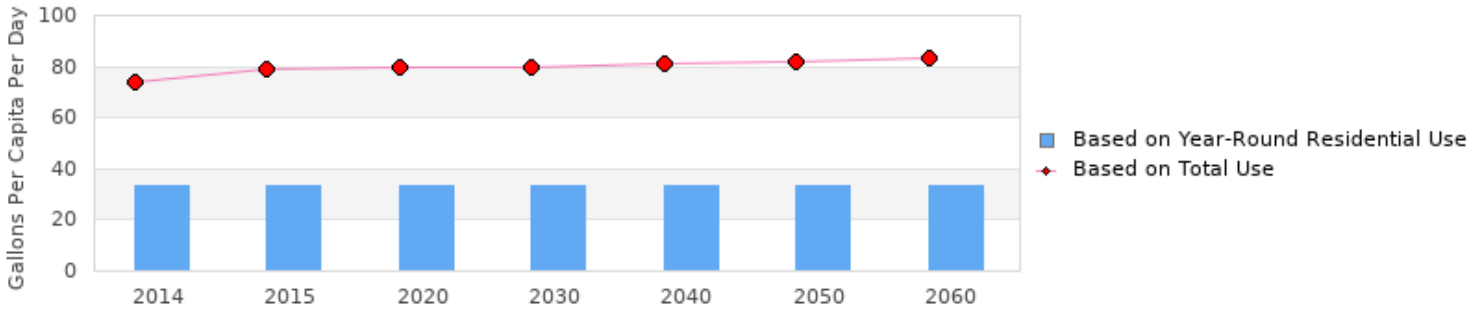
During 2015 the County waived tap fees to encourage connections. Hence the 2.1% growth in population served. However, this is not expected each year. Rather, the following growth rates are used for projections:
 Residential Customer Growth = 6.5% per 10 years
 Commercial Customer Growth = 10% per 10 years

Demand v/s Percent of Supply

	2015	2020	2030	2040	2050	2060
Surface Water Supply	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Ground Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Purchases	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Future Supplies		0.0000	0.0000	0.0000	0.0000	0.0000
Total Available Supply (MGD)	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Service Area Demand	1.1360	1.1850	1.2760	1.3740	1.4810	1.5950
Sales	1.2910	2.4290	2.4290	2.4290	2.4290	2.4290
Future Sales		0.0000	0.0000	0.0000	0.0000	0.0000
Total Demand (MGD)	2.4270	3.6140	3.7050	3.8030	3.9100	4.0240
Demand as Percent of Supply	40%	60%	62%	63%	65%	67%

Montgomery Co's Projected Gallons Per Capita Per Day (GPCD) Over Time



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is 33 gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here. See Section 1 of the plan for practices that could reduce the per capita water demand.

Are there other demand management practices you will implement to reduce your future supply needs?

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs? Post 2015, Montgomery County will begin negotiations with Duke Energy Progress to increase our permitted withdrawal from Lake Tillery.

How does the water system intend to implement the demand management and supply planning components above?

Additional Information

Has this system participated in regional water supply or water use planning? No

What major water supply reports or studies were used for planning?

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues:

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Montgomery Co

2016 ▾

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1. System Information

Contact Information

Water System Name: **Montgomery Co** PWSID: **03-62-010**
 Mailing Address: **724 Hydro Road** Ownership: **County**
Mount Gilead, NC 27306
 Contact Person: **Matthew H. Morris** Title: **Director of Public Utilities**
 Phone: **910-439-6198** Fax: **910-439-9488**

Complete

Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	6, 16	6.57 %
Ductile Iron	6-24	9.60 %
Polyvinyl Chloride	2-12	83.83 %

What are the estimated total miles of distribution system lines? **472 Miles**
 How many feet of distribution lines were replaced during 2016? **19,943 Feet**
 How many feet of new water mains were added during 2016? **0 Feet**
 How many meters were replaced in 2016? **0**
 How old are the oldest meters in this system? **23 Year(s)**
 How many meters for outdoor water use, such as irrigation, are not billed for sewer services? **0**
 What is this system's finished water storage capacity? **3.9200 Million Gallons**
 Has water pressure been inadequate in any part of the system since last update? **No**

Programs

Does this system have a program to work or flush hydrants? **Yes, As Needed**
 Does this system have a valve exercise program? **Yes, As Needed**
 Does this system have a cross-connection program? **Yes**
 Does this system have a program to replace meters? **Yes**
 Does this system have a plumbing retrofit program? **No**
 Does this system have an active water conservation public education program? **No**
 Does this system have a leak detection program? **No**

Water Conservation

What type of rate structure is used? **Increasing Block**
 How much reclaimed water does this system use? **0.0000 MGD** For how many connections? **0**
 Does this system have an interconnection with another system capable of providing water in an emergency? **No**

Interconnecting with neighboring systems is challenging due to crossing Lake Tillery to the west and IBT issues to the east. Neighbors to the north and south are at significant distances.

2. Water Use Information

Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Yadkin River (18-1)	86 %	Montgomery	100 %
Deep River (02-2)	10 %		
Lumber River (09-1)	3 %		
Uwharrie River (18-3)	1 %		

What was the year-round population served in 2016? 14,417

Has this system acquired another system since last report? No

Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	5,574	0.4620	0	0.0000
Commercial	147	0.3000	0	0.0000
Industrial	0	0.0000	0	0.0000
Institutional	0	0.0000	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? 0.0300 MGD

Water Sales

Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	MGD	Contract Expiration	Recurring	Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
Carolina Forest	03-62-106	0.0410	365	0.0500	2040	Yes	Yes	12	Regular
Town of Biscoe	03-62-035	0.3070	365	0.9000	2045	Yes	Yes	16,12	Regular
Town of Candor	03-62-030	0.1160	365	0.1700	2045	Yes	Yes	12, 8	Regular
Town of Mt Gilead	03-62-015	0.1100	365	0.1100	2045	Yes	Yes	24,20	Regular
Town of Robbins	03-63-015	0.1890	365	0.2500	2019	Yes	Yes	10	Regular
Town of Star	03-62-025	0.0600	365	0.1130	2045	Yes	Yes	8, 12	Regular
Town of Troy	03-62-020	0.3910	365	1.0000	2045	Yes	Yes	20,16	Regular
Wood Run	03-62-107	0.0640	365	0.0500	2040	Yes	Yes	12	Regular

The towns of Candor, Star, Biscoe, Troy and Mount Gilead all renewed contracts in 2005 for 40 years. They are not to exceed 60 MG per month.

The contract value of 0.9 MGD is the amount of water Biscoe would need to purchase in order to keep their projected demand below or around 80% of supply. The contract value of 0.17 MGD is the amount of water Candor would need to purchase in order to keep their projected demand below or around 80% of supply.

The town of Star had not submitted their plan update at the time this plan was reviewed.

The contract value of 1.0 MGD is the amount of water Troy would need to purchase in order to keep their projected demand below or around 80% of supply. The contract value of 0.11 MGD is the amount of water Mount Gilead would need to purchase in order to keep their projected demand below or around 80% of supply.

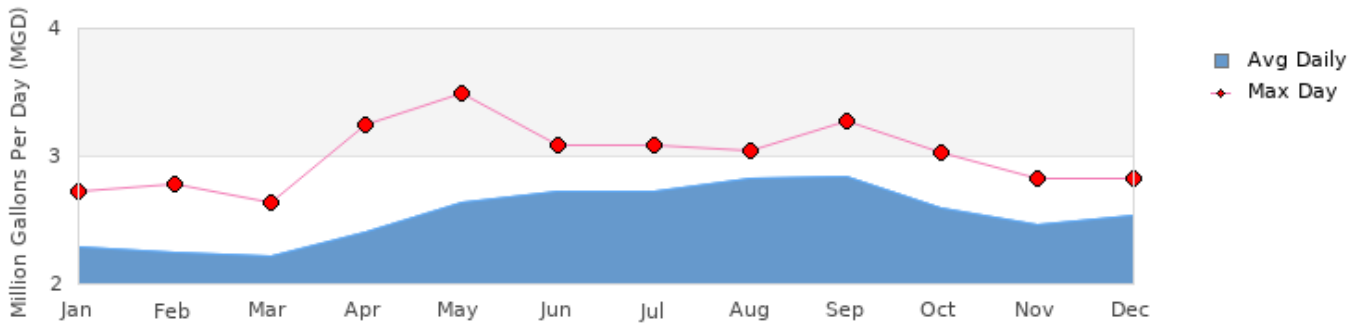
The total amount of contract water sales to the five (5) systems noted above is 2.293 MGD. This is slightly above the combined amount the county has committed to. Adjustments to supply and/or demand will need to be addressed in the future.

3. Water Supply Sources

Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	2.2840	2.7240	May	2.6350	3.4890	Sep	2.8350	3.2740
Feb	2.2450	2.7800	Jun	2.7260	3.0870	Oct	2.5840	3.0230
Mar	2.2120	2.6280	Jul	2.7270	3.0870	Nov	2.4630	2.8180
Apr	2.4060	3.2500	Aug	2.8160	3.0370	Dec	2.5310	2.8260

Montgomery Co's 2016 Monthly Withdrawals & Purchases



Surface Water Sources

Stream	Reservoir	Average Daily Withdrawal		Maximum Day Withdrawal (MGD)	Available Raw Water Supply		Usable On-Stream Raw Water Supply Storage (MG)
		MGD	Days Used		MGD	* Qualifier	
Pee Dee River	Lake Tillery	2.5470	365	0.0000	6.0000	C	774.0000

* Qualifier: C=Contract Amount, SY20=20-year Safe Yield, SY50=50-year Safe Yield, F=20% of 7Q10 or other instream flow requirement, CUA=Capacity Use Area Permit

Surface Water Sources (continued)

Stream	Reservoir	Drainage Area (sq mi)	Metered?	Sub-Basin	County	Year Offline	Use Type
Pee Dee River	Lake Tillery	4,600	Yes	Yadkin River (18-1)	Montgomery		Regular

What is this system's off-stream raw water supply storage capacity? 0 Million gallons

Are surface water sources monitored? Yes, Daily

Are you required to maintain minimum flows downstream of its intake or dam? No

Does this system anticipate transferring surface water between river basins? Yes

IBT occurs with:
 Sale of water to the Town of Robbins - Deep River Basin (02-2)
 Sale of water to the customers in the Lumber River Basin (09-1)

Water Purchases From Other Systems

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	MGD	Contract Expiration	Recurring	Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
Town of Troy	03-62-020	0.0000	0	0.0000	2045	Yes	Yes	8, 12	Regular

This is a buy-back scenario.

Water Treatment Plants

Plant Name	Permitted Capacity (MGD)	Is Raw Water Metered?	Is Finished Water Output Metered?	Source
Montgomery County WTP	6.0000	Yes	Yes	Lake Tillery

Did average daily water production exceed 80% of approved plant capacity for five consecutive days during 2016? No

If yes, was any water conservation implemented?

Did average daily water production exceed 90% of approved plant capacity for five consecutive days during 2016? No

If yes, was any water conservation implemented?

Are peak day demands expected to exceed the water treatment plant capacity in the next 10 years? No

4. Wastewater Information

Monthly Discharges

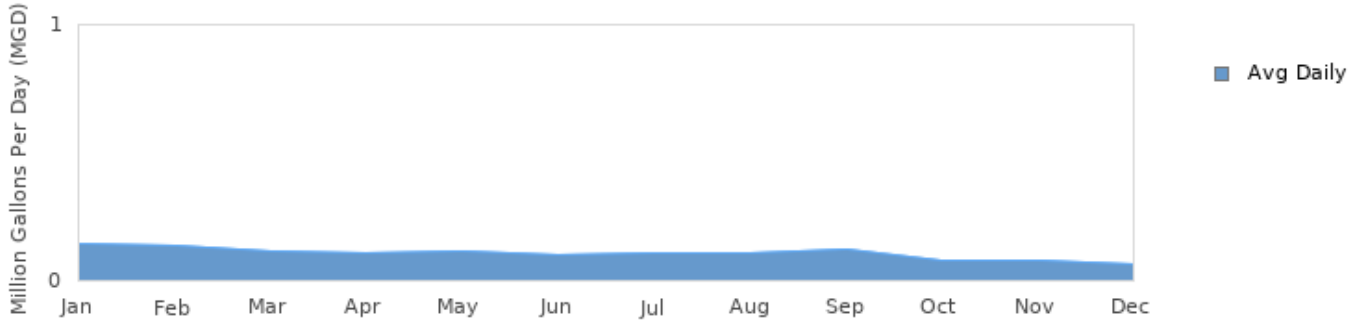
Average Daily Discharge (MGD)

Average Daily Discharge (MGD)

Average Daily Discharge (MGD)

Jan	0.1420	May	0.1140	Sep	0.1170
Feb	0.1340	Jun	0.0990	Oct	0.0750
Mar	0.1130	Jul	0.1050	Nov	0.0740
Apr	0.1050	Aug	0.1090	Dec	0.0650

Montgomery Co's 2016 Monthly Discharges



How many sewer connections does this system have? 155

How many water service connections with septic systems does this system have? 4,258

Are there plans to build or expand wastewater treatment facilities in the next 10 years? No

Wastewater Discharged is related to NPDES permit No. 0080322 issued for Alum Sludge Treatment Facility located at Montgomery County WTP. The sewer service connections listed above are for two small collections systems operated by the County. Local municipalities accept and treat the wastewater at their WWTPs.

Wastewater Permits

Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0080322	0.2880	0.3800	0.0790		Unnamed Trib. to Clarks Creek	Yadkin River (18-1)

Wastewater Interconnections

Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)
			MGD	Days Used	
Town of Candor	03-62-030	Discharging	0.0210	365	0.0000
Town of Troy	03-62-020	Discharging	0.0040	365	0.0000

5. Planning

Projections

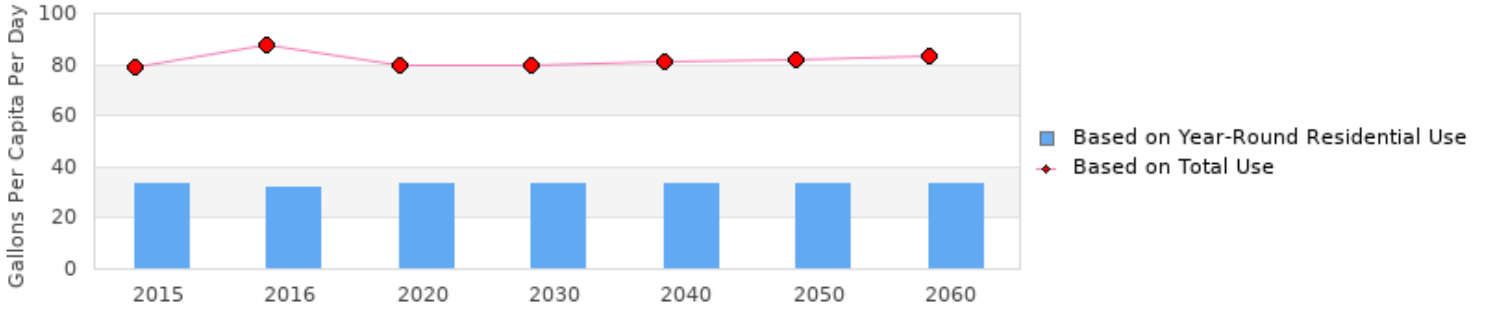
	2016	2020	2030	2040	2050	2060
Year-Round Population	14,417	14,900	15,870	16,900	18,000	19,170
Seasonal Population	0	0	0	0	0	0
Residential	0.4620	0.4970	0.5290	0.5630	0.6000	0.6390
Commercial	0.3000	0.3090	0.3400	0.3740	0.4110	0.4520
Industrial	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Institutional	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
System Process	0.0300	0.0400	0.0420	0.0440	0.0460	0.0480
Unaccounted-for	0.4735	0.3390	0.3650	0.3930	0.4240	0.4560

Demand v/s Percent of Supply

	2016	2020	2030	2040	2050	2060
Surface Water Supply	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Ground Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Purchases	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Future Supplies		0.0000	0.0000	0.0000	0.0000	0.0000
Total Available Supply (MGD)	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Service Area Demand	1.2655	1.1850	1.2760	1.3740	1.4810	1.5950
Sales	1.2745	2.6570	2.6570	2.6570	2.6570	2.6570
Future Sales		0.0000	0.0000	0.0000	0.0000	0.0000
Total Demand (MGD)	2.5400	3.8420	3.9330	4.0310	4.1380	4.2520
Demand as Percent of Supply	42%	64%	66%	67%	69%	71%

Montgomery Co's Projected Gallons Per Capita Per Day (GPCD) Over Time



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is 32 gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here.

Are there other demand management practices you will implement to reduce your future supply needs?

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs?

How does the water system intend to implement the demand management and supply planning components above?

Additional Information

Has this system participated in regional water supply or water use planning? No

What major water supply reports or studies were used for planning?

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues:

The Division of Water Resources (DWR) provides the data contained within this Local Water Supply Plan (LWSP) as a courtesy and service to our customers. DWR staff does not field verify data. Neither DWR, nor any other party involved in the preparation of this LWSP attests that the data is completely free of errors and omissions. Furthermore, data users are cautioned that LWSPs labeled **PROVISIONAL** have yet to be reviewed by DWR staff. Subsequent review may result in significant revision. Questions regarding the accuracy or limitations of usage of this data should be directed to the water system and/or DWR.

Montgomery Co

2017 ▾

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1. System Information

Contact Information

Water System Name: **Montgomery Co** PWSID: **03-62-010**
 Mailing Address: **724 Hydro Road** Ownership: **County**
Mount Gilead, NC 27306
 Contact Person: **Matthew H. Morris** Title: **Director of Public Utilities**
 Phone: **910-439-6198** Fax: **910-439-9488**

Complete

Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	6, 16	3.86 %
Ductile Iron	6-24	6.13 %
Galvanized Iron	2	0.05 %
Other	UKWN	0.35 %
Polyvinyl Chloride	2-12	89.61 %

What are the estimated total miles of distribution system lines? **365 Miles**
 How many feet of distribution lines were replaced during 2017? **788 Feet**
 How many feet of new water mains were added during 2017? **0 Feet**
 How many meters were replaced in 2017? **0**
 How old are the oldest meters in this system? **23 Year(s)**
 How many meters for outdoor water use, such as irrigation, are not billed for sewer services? **0**
 What is this system's finished water storage capacity? **3.9200 Million Gallons**
 Has water pressure been inadequate in any part of the system since last update? **No**

Programs

Does this system have a program to work or flush hydrants? **Yes, As Needed**
 Does this system have a valve exercise program? **Yes, As Needed**
 Does this system have a cross-connection program? **Yes**
 Does this system have a program to replace meters? **Yes**
 Does this system have a plumbing retrofit program? **No**
 Does this system have an active water conservation public education program? **No**
 Does this system have a leak detection program? **No**

Water Conservation

What type of rate structure is used? **Increasing Block**
 How much reclaimed water does this system use? **0.0000 MGD** For how many connections? **0**
 Does this system have an interconnection with another system capable of providing water in an emergency? **No**

Interconnecting with neighboring systems is challenging due to crossing Lake Tillery to the west and IBT issues to the east. Neighbors to the north and south are at significant distances.

2. Water Use Information

Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Yadkin River (18-1)	86 %	Montgomery	100 %
Deep River (02-2)	10 %		

Lumber River (09-1)	3 %
Uwharrie River (18-3)	1 %

What was the year-round population served in 2017? 14,473

Has this system acquired another system since last report? No

Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	5,610	0.4660	0	0.0000
Commercial	149	0.2820	0	0.0000
Industrial	0	0.0000	0	0.0000
Institutional	0	0.0000	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? 0.0250 MGD

Water Sales

Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	Contract		Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration			
Carolina Forest	03-62-106	0.0500	365	0.0500	2040	Yes	8	Regular
Town of Biscoe	03-62-035	0.3160	365	0.9000	2045	Yes	16,12	Regular
Town of Candor	03-62-030	0.1230	365	0.1700	2045	Yes	12, 8	Regular
Town of Mt Gilead	03-62-015	0.1060	365	0.2000	2045	Yes	24,20	Regular
Town of Robbins	03-63-015	0.1940	365	0.2500	2019	Yes	10	Regular
Town of Star	03-62-025	0.0640	365	0.1130	2045	Yes	8, 12	Regular
Town of Troy	03-62-020	0.4170	365	0.6000	2045	Yes	20,16	Regular
Wood Run	03-62-107	0.0640	365	0.0500	2040	Yes	12	Regular

The towns of Candor, Star, Biscoe, Troy and Mount Gilead all renewed contracts in 2005 for 40 years. They are not to exceed 60 MG per month.

The contract value of 0.9 MGD is the amount of water Biscoe would need to purchase in order to keep their projected demand below or around 80% of supply. The contract value of 0.17 MGD is the amount of water Candor would need to purchase in order to keep their projected demand below or around 80% of supply.

The contract value of 0.113 MGD is the amount of water Star would need to purchase in order to keep their projected demand below or around 80% of supply.

The contract value of 0.6 MGD is the amount of water Troy would need to purchase in order to keep their projected demand below or around 80% of supply.

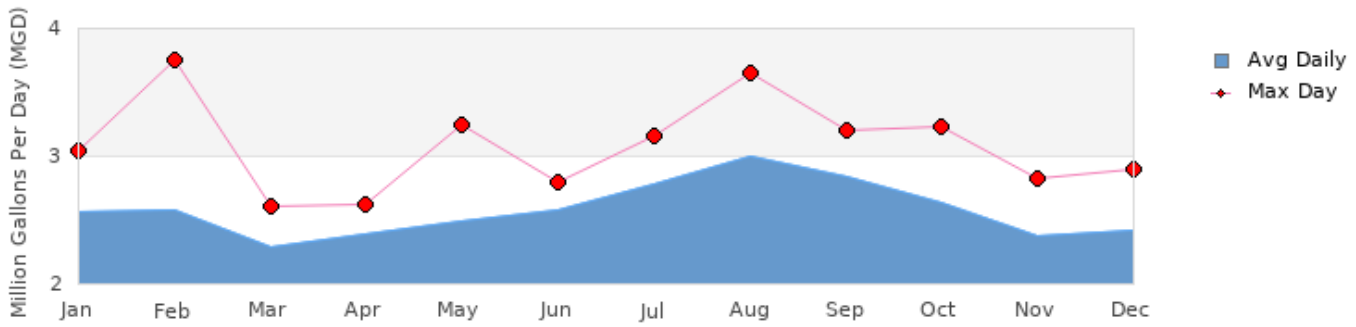
The contract value of 0.2 MGD is the amount of water Mount Gilead would need to purchase in order to keep their projected demand below or around 80% of supply.

3. Water Supply Sources

Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	2.5600	3.0360	May	2.4860	3.2410	Sep	2.8430	3.2000
Feb	2.5700	3.7550	Jun	2.5720	2.7890	Oct	2.6310	3.2220
Mar	2.2780	2.6040	Jul	2.7760	3.1520	Nov	2.3710	2.8270
Apr	2.3810	2.6240	Aug	2.9960	3.6490	Dec	2.4120	2.9010

Montgomery Co's 2017 Monthly Withdrawals & Purchases



Surface Water Sources

Stream	Reservoir	Average Daily Withdrawal		Maximum Day Withdrawal (MGD)	Available Raw Water Supply		Usable On-Stream Raw Water Supply Storage (MG)
		MGD	Days Used		MGD	* Qualifier	
Pee Dee River	Lake Tillery	2.5700	365	3.7550	6.0000	C	774.0000

* Qualifier: C=Contract Amount, SY20=20-year Safe Yield, SY50=50-year Safe Yield, F=20% of 7Q10 or other instream flow requirement, CUA=Capacity Use Area Permit

Surface Water Sources (continued)

Stream	Reservoir	Drainage Area (sq mi)	Metered?	Sub-Basin	County	Year Offline	Use Type
Pee Dee River	Lake Tillery	4,600	Yes	Yadkin River (18-1)	Montgomery		Regular

What is this system's off-stream raw water supply storage capacity? 0 Million gallons

Are surface water sources monitored? Yes, Daily

Are you required to maintain minimum flows downstream of its intake or dam? No

Does this system anticipate transferring surface water between river basins? Yes

IBT:

- Sale of water to the Town of Robbins - Deep River Basin (02-2)
- Sale of water to customers in the Lumber River Basin (09-1)

Water Purchases From Other Systems

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	MGD	Contract Expiration	Recurring	Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
Town of Troy	03-62-020	0.0000	0	0.0000	2045	Yes	Yes	8, 12	Emergency

Town of Troy is buy back scenario.

Water Treatment Plants

Plant Name	Permitted Capacity (MGD)	Is Raw Water Metered?	Is Finished Water Output Metered?	Source
Montgomery County WTP	6.0000	Yes	Yes	Lake Tillery

Did average daily water production exceed 80% of approved plant capacity for five consecutive days during 2017? No

If yes, was any water conservation implemented?

Did average daily water production exceed 90% of approved plant capacity for five consecutive days during 2017? No

If yes, was any water conservation implemented?

Are peak day demands expected to exceed the water treatment plant capacity in the next 10 years? No

4. Wastewater Information

Monthly Discharges

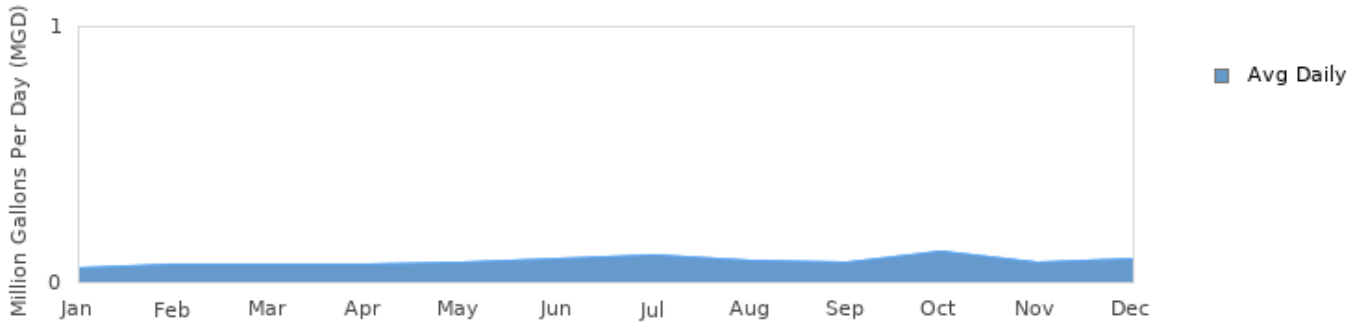
Average Daily Discharge (MGD)

Average Daily Discharge (MGD)

Average Daily Discharge (MGD)

Jan	0.0580	May	0.0750	Sep	0.0750
Feb	0.0680	Jun	0.0900	Oct	0.1180
Mar	0.0660	Jul	0.1050	Nov	0.0800
Apr	0.0670	Aug	0.0860	Dec	0.0890

Montgomery Co's 2017 Monthly Discharges



How many sewer connections does this system have? 158

How many water service connections with septic systems does this system have? 4,258

Are there plans to build or expand wastewater treatment facilities in the next 10 years? No

Wastewater discharge is related to NPDES permit No. 0080322 for alum sludge treatment facility. Sewer connections are MCPU collections systems that send wastewater to local municipalities at their WWTPs.

Wastewater Permits

Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0080322	0.2880	0.3800	0.0628		Unnamed Trib. to Clarks Creek	Yadkin River (18-1)

Wastewater Interconnections

Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)
			MGD	Days Used	
Town of Candor	03-62-030	Discharging	0.0150	365	0.0000
Town of Troy	03-62-020	Discharging	0.0032	365	0.0000

5. Planning

Projections

	2017	2020	2030	2040	2050	2060
Year-Round Population	14,473	14,900	15,870	16,900	18,000	19,170
Seasonal Population	0	0	0	0	0	0
Residential	0.4660	0.4970	0.5290	0.5630	0.6000	0.6390
Commercial	0.2820	0.3090	0.3400	0.3740	0.4110	0.4520
Industrial	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Institutional	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
System Process	0.0250	0.0400	0.0420	0.0440	0.0460	0.0480
Unaccounted-for	0.4630	0.3390	0.3650	0.3930	0.4240	0.4560

Residential: projections based on 6.5% growth every 10 years - more aggressive than the NC Department of Commerce's 3% / 10 years for Montgomery County;
 Commercial: projections based on 10% growth / 10 years - again an aggressive rate to stress this planning exercise

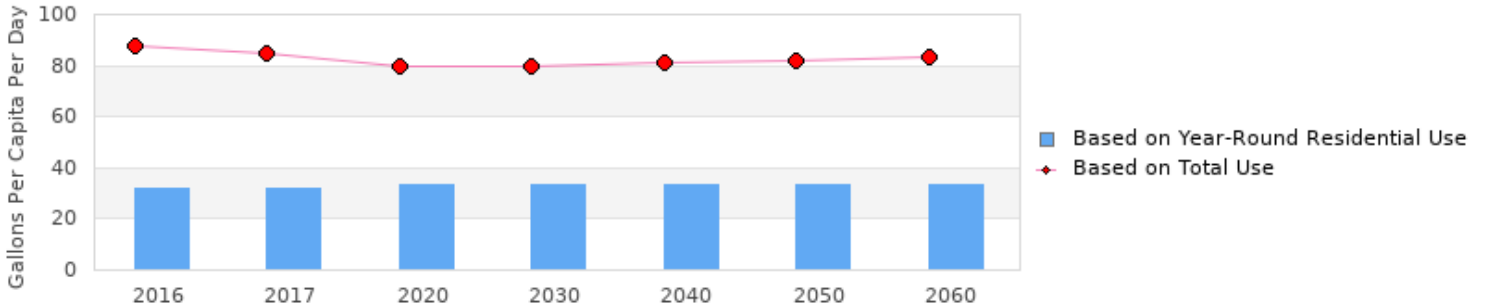
Future Water Sales

Purchaser	PWSID	MGD	Contract Year Begin	Contract Year End	Pipe Size(s) (Inches)	Use Type
Robbins Water System	03-63-015	0.5000	2020			Regular

Demand v/s Percent of Supply

	2017	2020	2030	2040	2050	2060
Surface Water Supply	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Ground Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Purchases	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Future Supplies		0.0000	0.0000	0.0000	0.0000	0.0000
Total Available Supply (MGD)	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Service Area Demand	1.2360	1.1850	1.2760	1.3740	1.4810	1.5950
Sales	1.3340	2.3470	2.3470	2.3470	2.3470	2.3470
Future Sales		0.5000	0.5000	0.5000	0.5000	0.5000
Total Demand (MGD)	2.5700	4.0320	4.1230	4.2210	4.3280	4.4420
Demand as Percent of Supply	43%	67%	69%	70%	72%	74%

Montgomery Co's Projected Gallons Per Capita Per Day (GPCD) Over Time



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is 32 gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here. **See Section 1 of the plan for practices that could reduce the per capita water demand.**

Are there other demand management practices you will implement to reduce your future supply needs?

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs?

How does the water system intend to implement the demand management and supply planning components above?

Additional Information

Has this system participated in regional water supply or water use planning? No

What major water supply reports or studies were used for planning?

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues:

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4.g

Montgomery County
Daily Water Production
Summary

2017 Montgomery County Water Daily Production

*Amount expressed in MGD (Million Gallons/Day)

Day	Month											
	January	February	March	April	May	June	July	August	September	October	November	December
1	2.049	2.673	2.364	2.266	2.506	2.114	2.817	2.938	2.576	2.749	2.500	2.603
2	2.664	2.676	2.047	2.472	2.505	2.739	2.817	3.105	3.060	2.536	2.881	2.586
3	2.632	3.444	2.486	2.618	2.453	2.810	2.543	3.176	3.125	3.209	2.552	2.490
4	2.712	3.860	2.373	2.299	2.391	2.291	2.727	3.276	2.815	3.182	2.637	2.400
5	2.304	2.753	2.148	2.225	2.498	2.394	2.578	2.749	2.879	3.236	2.451	2.404
6	2.665	2.450	2.431	2.279	2.481	2.694	2.818	2.670	2.700	2.850	2.402	2.583
7	2.123	2.569	2.232	2.274	2.124	2.373	2.482	3.147	2.838	2.959	2.775	2.572
8	2.732	2.677	2.579	2.052	2.317	2.365	2.764	2.845	2.600	2.438	2.649	2.646
9	2.233	2.690	2.351	2.370	2.598	2.667	2.462	3.110	3.180	2.853	2.534	2.634
10	2.651	2.553	2.351	2.144	2.823	2.790	2.741	3.060	2.594	2.894	2.263	2.691
11	2.810	2.773	2.070	2.578	3.030	2.801	2.593	2.884	2.424	2.698	2.649	2.198
12	2.832	2.349	2.215	2.521	3.120	2.846	2.733	3.504	2.403	2.832	2.370	2.586
13	2.886	2.482	2.087	2.236	2.307	2.321	2.734	3.745	2.831	2.906	2.582	2.670
14	2.914	2.642	2.620	2.605	2.004	2.739	2.799	2.751	2.527	2.794	2.398	2.515
15	3.135	2.680	2.051	2.699	2.685	2.751	3.060	3.179	2.581	2.723	2.202	2.711
16	2.627	2.764	2.402	2.401	2.357	2.741	3.240	3.336	2.761	2.597	2.668	2.682
17	2.660	2.762	1.923	2.492	3.203	2.837	2.874	3.544	2.394	2.649	2.643	2.691
18	2.549	2.349	2.345	2.604	3.323	2.273	3.179	3.522	3.147	3.270	2.476	2.702
19	2.727	2.431	2.388	2.637	2.474	2.827	3.293	3.243	3.220	2.168	2.409	2.718
20	2.599	2.216	2.068	2.318	2.413	2.857	2.992	2.363	2.961	2.697	2.397	2.705
21	2.613	2.326	2.554	2.357	2.406	2.217	3.178	3.457	3.136	2.936	2.569	2.705
22	2.315	2.601	2.558	2.679	2.200	2.765	2.798	3.133	3.032	2.613	2.607	2.686
23	2.473	2.358	2.278	2.578	2.440	2.330	3.174	3.263	3.118	2.228	2.407	2.629
24	2.663	2.385	2.462	2.638	2.425	2.859	2.902	2.567	2.519	2.968	2.473	2.657
25	2.658	2.732	2.595	2.647	2.727	2.808	2.884	3.063	2.709	2.526	2.409	2.234
26	2.688	2.344	2.293	2.603	2.524	2.812	3.103	2.793	3.112	2.588	2.382	2.127
27	2.733	2.430	2.215	2.327	2.560	2.750	3.191	3.082	2.439	2.648	2.293	2.646
28	2.739	2.426	2.465	2.667	2.466	2.691	3.126	3.027	3.096	2.494	2.670	2.664
29	2.244		2.427	2.411	2.342	2.722	3.118	2.562	2.699	2.591	2.514	2.396
30	2.679		2.291	2.275	2.820	2.727	2.872	3.064	2.921	2.347	2.377	2.695
31	2.660		2.510		2.739		3.241	3.187		2.763		2.295
Monthly Total MGD (Millon Gallons/Day)	80.969	73.395	72.179	73.272	79.261	78.911	89.833	95.345	84.397	84.941	75.139	79.521
Monthly ADF (MGD)	2.612	2.621	2.328	2.442	2.557	2.630	2.898	3.076	2.813	2.740	2.505	2.565
Max Day in Month (MGD)	3.135	3.860	2.620	2.699	3.323	2.859	3.293	3.745	3.220	3.270	2.881	2.718
Min Day in Month (MGD)	2.049	2.216	1.923	2.052	2.004	2.114	2.462	2.363	2.394	2.168	2.202	2.127
								Annual MDF	3.533			

Total Annual MGD (MGD)	967.163
Average Daily (MGD)	2.649
Maximum Daily (MGD)	3.860
Minimum Daily (MGD)	1.923
Peaking Factor (MGD)	1.457

Columns highlighted in **BLUE** for 2017 (Nov, Dec) are 2016 data as it was a rolling 12 month period
 Cells highlighted in **YELLOW** were highest 2 day average.

2018 Montgomery County Water Daily Production

Records provided by Montgomery County

*Amount expressed in MGD (Million Gallons/Day)

Day	Month											
	January	February	March	April	May	June	July	August	September	October	November	December
1	2.580	2.475	2.574	2.180	2.742	2.753	3.125	3.146	3.164	2.749	3.163	2.638
2	2.665	2.567	3.028	3.190	3.094	3.234	3.158	2.626	3.195	2.536	2.632	2.437
3	2.787	2.664	2.690	3.210	2.806	2.332	3.601	2.624	2.379	3.209	2.849	2.394
4	3.114	2.289	2.256	3.058	2.690	2.795	3.047	2.510	3.123	3.182	2.589	2.627
5	2.601	2.307	2.875	2.791	2.660	2.724	3.092	2.649	3.110	3.236	2.141	2.415
6	3.076	2.859	2.881	2.877	2.546	2.940	3.635	2.975	3.080	2.850	2.481	2.589
7	3.110	2.535	2.751	2.195	2.735	2.926	2.696	2.744	3.077	2.959	2.863	2.221
8	3.093	2.565	2.855	2.838	2.582	3.165	2.727	2.643	3.136	2.438	2.781	2.231
9	3.186	2.489	2.256	2.699	2.487	2.852	3.117	3.120	2.556	2.853	2.312	2.153
10	3.348	1.994	2.999	2.812	2.791	2.926	2.892	2.797	3.183	2.894	2.583	2.431
11	3.469	2.574	2.473	2.656	2.795	2.877	2.921	2.918	2.838	2.698	2.356	2.140
12	3.512	2.282	2.694	2.722	3.120	2.992	3.078	3.021	3.158	2.832	2.497	2.764
13	3.531	3.024	2.471	2.829	2.757	2.739	2.773	2.655	3.184	2.906	3.103	2.353
14	3.178	2.997	2.952	2.902	2.793	3.211	3.096	3.303	2.684	2.794	3.130	2.380
15	2.958	2.884	2.907	2.558	3.126	2.685	2.600	3.641	2.921	2.723	2.878	2.395
16	2.649	2.974	2.534	2.759	3.042	2.914	2.961	2.915	2.921	2.597	3.099	2.497
17	3.454	3.160	2.258	2.478	2.546	3.111	3.140	3.051	3.087	2.649	3.111	1.613
18	2.832	3.202	2.808	2.591	2.817	2.757	3.061	3.062	3.079	3.270	2.313	2.644
19	3.056	3.203	2.656	2.297	2.408	3.141	3.058	2.485	3.407	2.168	2.489	2.620
20	3.099	3.284	2.340	2.847	1.960	3.172	3.125	3.303	3.607	2.697	2.330	2.427
21	3.051	2.673	2.867	2.163	2.946	3.489	2.711	2.667	3.674	2.936	2.330	2.576
22	3.145	3.193	2.514	2.636	2.935	3.367	3.053	3.367	2.067	2.613	2.424	2.578
23	3.194	3.220	2.389	2.454	2.869	3.448	2.434	2.871	3.777	2.228	2.708	2.688
24	2.979	3.262	2.393	2.468	2.662	2.987	2.965	3.130	3.723	2.968	2.364	2.376
25	3.354	3.333	2.775	2.309	2.317	3.074	2.282	2.772	3.799	2.526	2.384	1.970
26	2.832	3.248	2.628	2.441	2.494	3.078	3.075	2.765	3.570	2.588	2.257	2.550
27	3.222	3.258	2.791	2.372	2.203	2.816	2.866	2.739	3.169	2.648	2.509	1.920
28	2.655	2.977	2.395	2.265	2.819	2.563	3.016	2.931	3.042	2.494	2.592	2.508
29	2.714		2.672	2.160	2.616	3.158	2.568	2.945	2.796	2.591	2.529	2.475
30	2.592		2.214	2.492	2.771	3.092	2.613	3.219	2.957	2.347	2.646	2.486
31	2.910		2.781		2.544		2.569	3.186		2.763		2.137
Monthly Total MGD (Million Gallons/Day)	93.946	79.492	81.677	78.249	83.673	89.318	91.055	90.780	93.463	84.941	78.443	74.233
Monthly ADF (MGD)	3.031	2.839	2.635	2.608	2.699	2.977	2.937	2.928	3.115	2.740	2.615	2.395
Max Day in Month (MGD)	3.531	3.333	3.028	3.210	3.126	3.489	3.635	3.641	3.799	3.270	3.163	2.764
Min Day in Month (MGD)	2.580	1.994	2.214	2.160	1.960	2.332	2.282	2.485	2.067	2.168	2.141	1.613

Annual MDF 3.761

Total Annual MGD (MGD)	1019.270
Average Daily (MGD)	2.793
Maximum Daily (MGD)	3.799
Minimum Daily (MGD)	1.613
Peaking Factor (MGD)	1.360

Columns highlighted in BLUE for 2018 (Oct, Nov, Dec) are 2017 data as it was a rolling 12 month period when data pulled for state inspection in October
Cells highlighted in YELLOW were highest 2 day average.

APPENDIX 5



MONTGOMERY COUNTY, NORTH CAROLINA

2018 DWSRF

RAW WATER PUMP STATION IMPROVEMENTS PROJECT

APPENDIX 5A

NEPA CATEGORICAL EXCLUSION NARRATIVE

NEPA CATEGORICAL EXCLUSION ENVIRONMENTAL DOCUMENTATION

PREPARED FOR

DRINKING WATER STATE REVOLVING FUND

RAW WATER PUMP STATION IMPROVEMENTS

MONTGOMERY COUNTY, NORTH CAROLINA



TWC PROJECT NO: 3288-K

DWI PROJECT NOS.: H-SRP-D-18-0161 AND WIF1951

Prepared by:



THE WOOTEN COMPANY

5.0 ENVIRONMENTAL INFORMATION DOCUMENT

5.1 PROJECT AREA

Montgomery County is located in the piedmont of North Carolina, with the major transportation corridors being N.C. Rte 731 and the Aberdeen Carolina & Western Railway (ACWR). The County provides drinking water to six (6) local municipalities as their sole source for drinking water. The County's 2017 Asset Management Plan (AMP) required analysis of inventory and condition of system assets to prioritize capital improvement projects. One of the projects identified as critical is the replacement of pumps at the Raw Water Pump Station (RWPS), which was constructed in 1982. The Montgomery County¹ RWPS is situated on the banks of the Pee Dee River on Nash Road, approximately three (3) miles west of the Town of Mt. Gilead, north of the Lake Tillery Dam (also known as Norwood Dam). Water processed at this pump station is transferred to the Water Treatment Plant (WTP) located at 724 Hydro Road. The RWPS is located within the easement corridor along the Pee Dee River, owned by the Duke Energy.

As included in the funding application and depicted on the **Project Vicinity & Location Map (Appendix 5B)**, the \$1.5M project consists of the replacement of two raw water pumps, motors, controls, valves, appurtenances, a generator, the existing SCADA system, and other general site improvements. Project alternatives, as discussed in more detail in the engineering portion of this report, are as follows:

1. No action;
2. Replacement of the two (2) existing 6-MGD pumps with two (2) 6-MGD pumps;
3. Replacement of the two (2) existing 6-MGD pumps with two (2) 4-MGD pumps; or
4. Replacement of the two (2) existing 6-MGD pumps with two (2) 6-MGD pumps, along with installation of Variable Frequency Drives (VFDs).

The general site improvements, which are common to the *action* alternatives, include:

- Installation of a sodium permanganate system to improve water treatment;
- Improved access to the lower level of the station by means of expanding the length of the access hatch;
- Landscaping improvements around the site for bank stabilization and erosion control consisting of approximately 2,000 sf of 1:2 banks;
- Sump pump improvements;

¹ Montgomery County, NC. Public Utilities. <http://www.montgomerycountync.com/departments/public-utilities/operations>



- Relocation of master control center (MCC), the electrical interface for the pumps, to inside the station if possible; and
- Installation of weather heads, conduit repair, and relocation of radio tower to improve SCADA signal.

The majority of work planned is inside the existing building: replacement of the raw water pumps, motors, controls, valves and appurtenances, sump pump improvements, sodium permanganate system installation and access improvements. External improvements include: replacement of the existing generator, relocation of the motor control center, various electrical improvements, and site improvements to address erosion issues.

Alternatives of ground disturbance & construction:

- With the **no action** alternative, the RWPS would remain in its current deficient state. Older and deteriorated components increase the probability of station failure, which would create adverse environmental and health conditions, including lack of drinking water.
- **Rehabilitation** of components is generally a less expensive and viable alternative if existing structural and equipment components and appurtenances are of an age and condition that could support efficient and effective design, and continued facility operations & maintenance. However, in some cases, such as this project, rehabilitation of the equipment is not feasible or practical.
- **Replacement/New construction of equipment/components** within the previously disturbed areas of the existing site is the preferred action. Consideration of either downsizing pumps to 4-MGD or incorporating VFDs are included in alternatives. Either of these downsizing alternatives can increase operational efficiency and energy savings, but VFDs are more expensive. The preferred alternative between these two downsizing choices will be determined upon further investigation and analysis of future data trends of population, demand, flow, etc. The County prefers to be proactive in maintaining optimal facility performance, but does not have the financial resources available needed to undertake a sizeable project without outside funding assistance.

Ground disturbance is estimated to be minimal. However for planning purposes, the total project area is proposed in previously disturbed and developed areas within the RWPS site (up to approximately 1 acre). Final location(s) of new impervious surface(s) are to be determined upon further surveying investigation / engineering design. Equipment rehabilitation/replacement will either involve no ground disturbance, or stay within the existing footprint of existing impervious surface. Wetland delineations and buffers will be



implemented as appropriate. **Maps are included in Appendix 5B. Environmental source documentation is included in Appendix 5C. Agency Consultations are included in Appendix 5D. The Drinking Water State Revolving Fund (DWSRF) “Request for Categorically Exclusion” form is included in 5E.**

5.2 TOPOGRAPHY AND FLOODPLAINS

Topography is generally grassy, surrounded by shrubs/trees, developed areas, with 8-45% slopes. Existing ground cover is grass/gravel/asphalt². The project area has steep slopes that convey stormwater to flow into the adjacent Pee Dee River and Lake Tillery Reservoir, which flows through South Carolina before eventually discharging in the Atlantic Ocean. The project area is located within the FIRM map 3710658300K, effective 09/03/08^{3,4,5}. The FIRM map indicates that the existing pump station site has a slight amount of acreage within 100-year floodplain, which is logical, considering its dependence upon access to the Pee Dee River. The proposed rehabilitation and replacement project activities take place amongst existing structures and developed surface. No new structures are proposed within floodplain/floodway/wetland areas. Soils may be temporarily disturbed during construction. With the exception of the bank restoration, soils will be returned to original conditions after construction is complete.

With typical sedimentation & erosion control best management practices⁶, and compliance with the County’s flood damage prevention ordinance⁷, it is anticipated that the proposed project will not cause any change in the floodplain elevation, as well as preventing adverse downstream sedimentation impacts. In addition, landscape work for bank stabilization will hinder further erosion. Additional topographic and floodplain data is included in **Appendix C**.

5.3 SOILS AND PRIME OR UNIQUE FARMLAND

Prime farmland is best suited to producing food and fiber, with the soil quality, growing season, and moisture supply needed to economically produce sustainable high crop yields. State and locally important farmland are capable of producing crops economically if modern farming methods, including

² United States Department of Agriculture (USDA). Natural Resource Conservation Service (NRCS). Web Soil Survey. <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

³ Federal Emergency Management Agency (FEMA). *Map Service Center*. <https://msc.fema.gov/portal>

⁴ NC Floodplain Mapping Program. <http://www.ncfloodmaps.com/>

⁵ United States Environmental Protection Agency (US EPA). NEPAAssist Mapping Tool. <https://www.epa.gov/nepa/nepassist>

⁶ North Carolina Division of Environmental Quality (NC DEQ). Division of Energy, Mineral, and Land Resources. *Erosion and Sedimentation Control*. <https://deq.nc.gov/about/divisions/energy-mineral-land-resources/erosion-sediment-control>

⁷ Montgomery County, NC. *Code of Ordinances*. https://library.municode.com/nc/montgomery_county/codes/code_of_ordinances



water management, are used. The existing soil types and farmland classifications within the project area property are in the table below^{8, 9, 10}:

Symbol	Description	Farmland Class	Acres	% of Project Area
GoE	Goldston-Badin complex, 15-45% slope	Not Prime Farmland	1.0	77
BeC2	Badin-Tarrus complex, 8-15% slopes, moderately eroded	Farmland of Statewide Importance	0.3	23
Total			1.3	100%

All project activities will take place inside built-up areas within the boundaries of the existing, previously disturbed, station site. Since ground disturbance is estimated to be less than 1 acre and within the fenced perimeter of the RWPS site, it is unlikely that a Sediment and Erosion Control (SEC) permit from the NC DEQ NC Division of Land Quality (DLQ)¹¹ would be needed. DLQ will identify the best management practices to minimize erosion and off-site sedimentation, as needed. Any excavated soils will be used as backfill for replacement construction activities. All non-paved and disturbed areas will be graded, seeded, and mulched to re-establish vegetation immediately following construction. No soil contamination is known to be present, and no soils are anticipated to be contaminated during or after project completion. The project does not provide the opportunity to disturb or develop prime or unique farmland, rangeland, or forestland. Detailed soil data is included in **Appendix C**.

5.4 LAND USE & ZONING

The RWPS is on developed, built-up property with maintained grassy lawn/gravel/asphalt, surrounded by undeveloped woods, adjacent to the Pee Dee River¹². The station is zoned as residential, with easement permissions from Duke Power to operate the station and access the Pee Dee River¹³. Project activities on this pre-existing lot will not change zoning or land use designations. Mitigation for land use and zoning is not necessary, as the intent of the project is rehabilitation and replacement of existing station features and equipment. Tax parcel data is included in **Appendix C**.

⁸ USDA. Official Soil Series Descriptions (OSDs). <https://soilseries.sc.egov.usda.gov/osdname.aspx>

⁹ US EPA. NEPAAssist Mapping Tool. <https://www.epa.gov/nepa/nepassist>

¹⁰ USDA. NRCS. Web Soil Survey. <https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>

¹¹ NC DEQ. Division of Energy, Mineral, and Land Resources. *Erosion and Sedimentation Control*. <https://deq.nc.gov/about/divisions/energy-mineral-land-resources/erosion-sediment-control>

¹² US EPA. NEPAAssist Mapping Tool. <https://www.epa.gov/nepa/nepassist>

¹³ Montgomery County, NC. Planning Department. GIS Website. <https://www.webgis.net/nc/montgomery/>



5.5 FOREST RESOURCES

There are some assorted forest resources in the project vicinity: the urban forests are surrounded by conserving working forestlands. Typical sedimentation and erosion control best management practices will be incorporated as applicable to minimize erosion and off-site sedimentation to sensitive habitat areas. Forestland data is included in **Appendix C**.

5.6 WETLANDS AND STREAMS

Wetlands serve primarily as a flood control area for the surrounding lands as well as providing a natural habitat for wildlife. According to the U.S. Fish and Wildlife Service National Wetlands Inventory (NWI), nationally-classified wetlands are adjacent to the site, and not within the potential ground disturbance corridor. Several wetlands are within 1 mile. Lake Tillery is classified as deepwater habitat L1UBHh (Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Diked/Impounded)^{14,15}. While the project ground disturbance activity is proposed in non-wetland areas of the property, wetland delineations may be needed upon further surveying/ design, and minimum buffer requirements will be followed as applicable. Impacts may include increased suspended solids and nutrients in stormwater runoff resulting from soil disturbance during construction activities. This impact would be temporary and isolated/cleaned up to minimize negative impacts to aquatic flora and fauna. Additional detailed wetland data is included in **Appendix C**.

5.7 WATER RESOURCES, WILD & SCENIC RIVERS

The County provides finished drinking water to six (6) local municipalities as their sole source for drinking water. Montgomery County has a buyback scenario with the Town of Troy for emergency uses¹⁶. The County's existing distribution system includes approx. 400 miles of linework, storage tanks, pumping stations, and a water treatment plant.

The project is located in the Yadkin Pee Dee River Basin, Lake Tillery Subwatershed, (HUC Code 030401040203)^{17,18}. Site surface water generally flows across gravel, impervious surfaces, and vegetation in a SW direction to Lake Tillery / Pee Dee River, which travels through South Carolina before discharging into the Winyah Bay and eventually the Atlantic Ocean. The area generally surrounding Lake

¹⁴ USFWS. National Wetland Inventory (NWI). *Wetlands Mapper*. <https://www.fws.gov/wetlands/data/mapper.html>

¹⁵ USFWS. NWI. *Wetland Classification Codes*. <http://www.fws.gov/wetlands/data/wetland-codes.html>

¹⁶ NC Department of Environmental Quality (DEQ) Division of Water Resources (DWR). Local Water Supply Plans. *Montgomery County 2017*. http://www.ncwater.org/Water_Supply_Planning/Local_Water_Supply_Plan/search.php

¹⁷ NC DEQ DWR. *Basin Planning Branch*. <https://deq.nc.gov/about/divisions/water-resources/planning/basin-planning>

¹⁸ NC DEQ DWR. *Yadkin Pee Dee 2008*. <https://deq.nc.gov/about/divisions/water-resources/planning/basin-planning/water-resource-plans/yadkin-pee-dee-2008>



Tillery Dam is gameland, but not home to any trout fishing waters¹⁹. There are no Wild or Scenic Rivers²⁰ within one mile.

According to the North Carolina Division of Water Quality’s Integrated Reports^{21,22}, Lake Tillery meets all surface water criteria except for fish consumption, and is therefore, classified as impaired (Category 5) on DEQ’s 2014 303(d) list and 2016 303(d) list. The Pee Dee River south of the dam is not impaired, but needs additional data for iron levels. The table below outlines these surface waters descriptions and parameters^{23,24}.

Name	Index #	Desc. Loc.	Class. Desc.	Overall Cat.	Parameter Cat.
Pee De River (including Lake Tillery below normal operating levels)	ID # 13-(1) [on 2016 303(d) list]	From mouth of Uwharrie River to Norwood Dam	WS-IV: Highly developed water supply B: Primary recreation, fresh water CA: Critical Areas	1-Meeting Criteria; 5- Exceeding Criteria (impaired)	1- Meeting Criteria for all parameters of interest <i>except</i> 5- Exceeding Criteria for PCB Fish tissue mercury (Advisory, FC, NC) - Consumption Advisory
Pee De River (from Norwood Dam to Rocky River)	ID # 13-(15.5)a	From Norwood Dam, south towards mouth of Turkey Top Creek	WS-V; Water supply upstream B: Primary recreation, fresh water	1-Meeting Criteria;	1-Meeting Criteria for all parameters of interest <i>except</i> Fish Tissue Mercury (Nar, FC, NC); 3z1- data inconclusive for Iron

Landscaping improvements are proposed around the site for bank stabilization and erosion control. Minimal new impervious surface is planned in non-wetland areas of the RWPS site. Temporary, negative direct impacts to surface waters may result from sedimentation of disturbed soils during construction and runoff of pollutants from construction machinery. It is possible that a permit will be required from U.S.

¹⁹ NC Wildlife Resources Commission (WRC). *Trout Fishing Maps*. <http://www.ncwildlife.org/Fishing/Trout-Fishing-Maps>

²⁰ National Wild & Scenic Rivers System. *North Carolina*. <http://www.rivers.gov/north-carolina.php>

²¹ NC DEQ DWR. *Water Resources Data, Statistics, and Maps*. <https://deq.nc.gov/about/divisions/water-resources/water-resources-science-data> 2014 Integrated Report. 2016 Integrated Report.

²² NC DEQ DWR. *Classifications*. “DWR Surface Water Classifications”. <http://deq.nc.gov/about/divisions/water-resources/planning/classification-standards/classifications>

²³ NC DEQ DWR. *Water Resources Data, Statistics and Maps*. <https://deq.nc.gov/about/divisions/water-resources/water-resources-science-data> DEQ GIS Online. 2014 Integrated Report. 2016 Integrated Report.

²⁴ NC DEQ DWR. *Classifications*. <http://deq.nc.gov/about/divisions/water-resources/water-resources/planning/classification-standards/classifications>



Army Corps of Engineers (USACE) to undertake construction. Best management practices implemented for sedimentation and stormwater control will reduce erosion and nutrient loading. Project activities should have positive impact on groundwater quality and surface water quality. Water resource data is included in **Appendix C**.

5.8 COASTAL RESOURCES

The project takes place in Montgomery County, which is not a coastal county, and does not contain any coastal barrier resources²⁵. Therefore, a federal consistency review in regards to the Coastal Zone Management Act / Coastal Area Management Act (CAMA) / Coastal Barrier Resource System (CBRS) is not required with NC Division of Coastal Management (DCM)²⁶.

5.9 BIOLOGICAL RESOURCES

There are no known shellfish or fishing areas beds within the project area. There are no known closed beds, productive or spawning areas within or adjacent to the project area. While there are federally listed endangered and threatened species in Montgomery County^{27,28}, according to U.S. Fish and Wildlife Service (USFWS) and NC Natural Heritage Program (NHP) data^{29,30}, most of the species of concern indicated in the project's immediate vicinity depend on aquatic/wetland habitat^{31,32,33,34}. The existence of rare and endangered plant and animal species was evaluated within an approx. 2-mile radius from the project and by topographic quad. Other typical wildlife associated within and adjacent to the proposed project area includes deer, small game, and waterfowl. A review of species profiles and custom USFWS report indicate no critical habitats for subject species. In addition, while wetlands might be near project ground disturbance and may have potential habitat for listed threatened and endangered species in the vicinity, all construction activities will generally be confined to areas within the previously disturbed and developed pump station site.

²⁵ USFWS. Coastal Barrier Resources System. *North Carolina*. <http://www.fws.gov/ecological-services/habitat-conservation/cbra/maps/Locator/NC.html>

²⁶ NC DEQ DCM. *Federal Consistency*. <https://deq.nc.gov/about/divisions/coastal-management/coastal-management-permits/federal-consistency>;
<https://files.nc.gov/ncdeq/Coastal%20Management/documents/PDF/Guidance%20subpart%20C%20fact%20sheet.pdf>

²⁷ USFWS. *Endangered and Threatened Species and Species of Concern by County for North Carolina*.
http://www.fws.gov/raleigh/species/cntylist/nc_counties.html

²⁸ USFWS. IPaC Report. <https://ecos.fws.gov/ipac/>

²⁹ NC DEQ NHP. *Species/Community Search*. <http://www.ncnhp.org/web/nhp/database-search>

³⁰ NC DEQ NHP Mapper. <http://ncnhde.natureserve.org/content/map>

³¹ USFWS. ECOS, Species Profile. <https://ecos.fws.gov/ecp/>

³² USFWS. Raleigh Ecological Services Field Office. *Endangered and Threatened Species of North Carolina*.
https://www.fws.gov/raleigh/es_tes.html

³³ USFWS. *Endangered Species. Find Endangered Species*. <https://www.fws.gov/endangered/>

³⁴ NC DEQ NHP. *Definitions of Status Codes and Terms*. <http://www.ncnhp.org/references/definition-of-status-codes-and-terms>



The proposed bank landscaping improvements can also help restore habitat downstream. Sedimentation and erosion from earth disturbing activities into local surface waters have potential to negatively affect fish, shellfish and their habitats. Soil particles cover spawning areas and smother fish eggs, aquatic insects, and oxygen producing plants. Increased turbidity levels increase water temperatures, reduce light penetration and plant growth, and affect the ability of fish to locate and capture prey by greatly reducing visibility. Fish can die from the abrasive, gill clogging effects of suspended sediment, which interferes with their breathing. Construction equipment and associated noise may temporarily divert wildlife from typical movement patterns during daylight hours. Therefore, construction equipment will have mufflers to minimize noise impacts. Mitigative measures proposed to avoid direct impacts include the provision and proper maintenance of sedimentation and erosion control measures (such as silt fence, rock check dams, erosion control matting, sediment traps, and buffers) during construction and afterwards until a sufficient vegetation is present to prevent soil runoff. There are no expected adverse environmental impacts expected regarding threatened or endangered species, critical habitats, wildlife & natural vegetation, shellfish or fish, or biological resources. Agencies will be consulted for concurrence of anticipated no adverse impact. The USFWS County listing³⁵ for all federal and state recognized threatened and endangered species is in **Appendix C**, as well as the USFWS Information for Planning & Consultation (IPaC) Report³⁶, Natural Heritage Program data, and highlighted species profiles.

5.10 PUBLIC LANDS AND SCENIC, RECREATIONAL, AND STATE NATURAL AREAS

In conjunction with a review of species of importance, the NHP also compiles a list of “natural heritage areas” based on the presence of rare plant and animal species, rare or high quality natural communities, and special animal habitats³⁷. The natural areas are ranked based on the quality and value of elements present. The existence of designated natural areas was evaluated within an approx. 2-mile radius from the project area^{38,39} and species element occurrences by topographic quad. The closest Natural Area (very high rating) is on the Pee Dee River, south of the Lake Tillery Dam. The closest conservation easement is southwest of the Lake Tillery Dam. There are no nearby national or state parks within 2 miles. The Uwharrie National Forest is a few miles north of Mt Gilead and touches the Pee Dee River and Badin Lake^{40,41}. The project activities will not increase or decrease access or traffic to these parks, natural areas,

³⁵ USFWS. *Endangered and Threatened Species and Species of Concern by County for North Carolina*. http://www.fws.gov/raleigh/species/cntylist/nc_counties.html

³⁶ USFWS. IPaC Report. <https://ecos.fws.gov/ipac/>

³⁷ NC DEQ NHP. *Species/Community Search*. <http://www.ncnhp.org/web/nhp/database-search>

³⁸ NC DEQ NHP. *Definitions of Status Codes and Terms*. <http://www.ncnhp.org/references/definition-of-status-codes-and-terms>

³⁹ NC DEQ NHP Mapper. <http://ncnhde.natureserve.org/content/map>

⁴⁰ US National Park Service. *Park Listing. North Carolina*. <http://www.nps.gov/state/nc>



and recreational facilities and opportunities. Project construction is not expected to have any adverse environmental impact to formally classified lands, natural areas, or recreational areas. More detailed NHP data is included in **Appendix C**.

5.11 AREAS OF ARCHAEOLOGICAL OR HISTORICAL VALUE

According to NC State Historic Preservation Office (SHPO) data, there are historic elements listed for Montgomery County under the National Register of Historic Places, with the closet being in Mt Gilead⁴². Within 1 mile from the site are two points that were surveyed and/or determined to be eligible as historic. These points of interest are related to the dam crossing and railroad crossing across the Pee Dee River. There are no other known historic properties or visually sensitive zones within 1 mile or adjacent to the proposed project area. The proposed project activities are not expected to have any adverse impact on aesthetic quality of the area. The project will not impact routine operations or access to any historic places. Montgomery County is not a location of interest to the Eastern Band of Cherokee Indians, Tuscarora Nation of New York, or Muscogee (Creek) Indian Nation. Federally-funded activities involving *new* ground disturbance across North Carolina are an interest to the Catawba Indian Nation^{43,44}. Nonetheless, should any Native American artifacts/remains be located during the ground disturbance phase of project, the Catawba Nation will be contacted. In addition, the NC SHPO will be consulted for concurrence of no adverse impact to cultural and historic resources. NC SHPO data is included in **Appendix C**⁴⁵.

5.12 AIR QUALITY

The State is divided into air quality regions to implement the established ambient quality standards^{46,47,48}. Montgomery County is not located in a designated area for ozone, particulates, carbon monoxide, or sulfur dioxide for National Ambient Air Quality Standard (NAAQS)^{49,50}. The proposed project activities

⁴¹ NC Department of Natural and Cultural Resources. Division of Parks and Recreation. *Find a Park*. <http://www.ncparks.gov/find-a-park>

⁴² NC SHPO. *North Carolina Listings in the National Register of Historic Places*. <http://www.hpo.ncdcr.gov/NR-PDFs.html>

⁴³ National Association of Tribal Historical Preservation Officers (NATHPO). <http://nathpo.org/wp/thpos/find-a-thpo/>

⁴⁴ U.S. Department of Housing and Urban Development (HUD). EGIS. Tribal Directory Assessment Tool (TDAT). <https://egis.hud.gov/tdat/>

⁴⁵ NC DEQ NHP Mapper. <http://ncnhde.natureserve.org/content/map>

⁴⁶ NC DEQ Division of Air Quality (DAQ). *Monitoring Data by Site*. <http://deq.nc.gov/about/divisions/air-quality/air-quality-data/current-monitoring-data-by-site>

⁴⁷ NC Administrative Code. Title 15A- Environmental Quality. Chapter 02- Environmental Management.

<http://reports.oah.state.nc.us/ncac.asp?folderName=\Title%2015A%20-%20Environmental%20Quality>

⁴⁸ NC DEQ DAQ. *State Implementation Plans*. <https://deq.nc.gov/about/divisions/air-quality/air-quality-planning/state-implementation-plans>

⁴⁹ NC DEQ DAQ. *Attainment Status of National Ambient Air Quality Standards (NAAQS)*. <http://deq.nc.gov/about/divisions/air-quality/air-quality-planning/attainment>

⁵⁰ US EPA. *Local Air Trends*. <http://www.epa.gov/airtrends/where.html>



not contribute adversely to air quality and do not increase transportation facilities in a non-attainment area. The area has low potential of radon⁵¹. There are no facilities monitored by the EPA for air emissions within 1 mile⁵². Sources of air emissions include particulate matter and carbon dioxide generated during construction and may result in minor nuisance odors. All construction machinery will be operated with proper noise and air quality control devices.

5.13 NOISE LEVELS

The project is not located near noise-producing elements other than equipment operations at the RWPS. The project area is located outside corporate limits, approximately 3 miles away from central Mt. Gilead. Current noise levels in the project area emanate primarily from vehicular traffic. The County's noise ordinance⁵³ generally requires mufflers on construction equipment, which would be temporary. There are no expected potential impairments of any major highways or transportation projects (road, bike, pedestrian, or rail)^{54,55}, railroads^{56,57}, navigable waterways, military airports⁵⁸, or major civil airports^{59,60}. The proposed project does not anticipate overall increase in noise operations.

5.14 TOXIC SUBSTANCES

There are no Superfund (Comprehensive Environmental Response, Compensation, and Liability Information System CERCLIS), Brownfields (Assessment, Cleanup and Redevelopment Exchange System (ACRES), or Radiation (Radiation Info Database) sites within one mile of the project area. The neighboring towns of Norwood and Mt. Gilead have various sites of interest to the EPA, but none are

Normal RWPS operation and maintenance activities involve various chemicals, but proposed improvements are to enhance station operations and efficiency. Operation of construction equipment may have potential to leak fuel, lubricants, and/or additives in small quantities, which if not contained and disposed of properly, could drain towards local surface waters. EPA data is located in **Appendix C**.

⁵¹ US EPA. *EPA Map of Radon Zones including State Radon Information and Contacts*.
<http://www.epa.gov/radon/states/northcarolina.html>

⁵² US EPA. NEPAAssist Mapping Tool. <https://www.epa.gov/nepa/nepassist>

⁵³ Montgomery County, NC. *Code of Ordinances*. https://library.municode.com/nc/montgomery_county/codes/code_of_ordinances

⁵⁴ NC DOT. *High Profile Projects & Studies*. <http://www.ncdot.gov/projects/>

⁵⁵ NC DOT. *Projects- Planning*. Comprehensive Transportation Plans. "Montgomery County".

<https://connect.ncdot.gov/projects/planning/Pages/Comprehensive-Transportation-Plans.aspx>

⁵⁶ NC DOT. *Rail & Rail-Related Maps*. <https://connect.ncdot.gov/resources/Rail-Division-Resources/Pages/Rail-RelatedMaps.aspx>

⁵⁷ NC DOT. *Railroad Crossing Map*. <https://connect.ncdot.gov/business/trucking/Pages/Rail-Crossing-Map.aspx>

⁵⁸ NC Military Bases. <http://militarybases.com/north-carolina/>

⁵⁹ Federal Aviation Administration (FAA). *2017-2021 National Plan of Integrated Airport Systems (NPIAS) Report*.

https://www.faa.gov/airports/planning_capacity/npias/reports/

⁶⁰ NC DOT. *Airport Locations*. <https://www.ncdot.gov/divisions/aviation/Pages/nc-airports.aspx>



5.15 ENVIRONMENTAL JUSTICE ANALYSIS

EPA data (**Appendix C**)^{61,62,63} is derived from ACS 2011-2015 5-year estimates and both illustrate at least 51% of minority and low-income populations of the project area (census block/tract #371239604001). The project intends to provide area-wide benefit to County and will not adversely impact any specific target populations. The demographic profile is not anticipated to change. It is noted that multiple neighboring municipalities depend on water supply from the County. This project will replace essential components of the RWSP to help improve water quality and service.

⁶¹ US EPA. EJSCREEN: Environmental Justice Screening and Mapping Tool. (Uses 2011-2015 American Community Survey 5-year Estimates). <https://www.epa.gov/ejscreen>

⁶² U.S. Census Bureau. American Community Survey (ACS). 2011-2015 5-Year Estimates. *Table DP05: ACS Demographic and Housing Estimates*. <https://factfinder.census.gov/faces/nav/jsf/pages/searchresults.xhtml?refresh=t>

⁶³ U.S. HUD. *FY2017 LMISD (Low and moderate income individuals by place and county subdivision) Local Governments by State, Based on 2006-2010 American Community Survey*. <https://www.hudexchange.info/programs/acs-low-mod-summary-data/acs-low-mod-summary-data-local-government/>



5.16 MITIGATIVE MEASURES

Table 7.18. Mitigative Measures Raw Water Pump Station Improvements Montgomery County				
Resource Category	Potential Direct Impact	Mitigative Measure(s) for Direct Impact	Potential SCI	Mitigative Measures for SCI
Topography & Floodplains	Temporary soil disturbance. New development & replacement of existing structures / equipment	Proper erosion and sedimentation control practices will be followed to prevent downstream impacts from land disturbance. Any new / replaced structures and to be elevated above base flood elevation.	No adverse impact.	N/A
Soils	Temporary soil disturbance. Bank restoration to reduce erosion.	Install and maintain appropriate sedimentation and erosion control devices.	No Impact.	N/A
Prime & Unique Farmland	No Impact. In “built-up” area.	N/A	No Impact.	N/A
Land Use	No Impact. No change in use.	N/A	No Impact.	N/A
Forest Resources	No Impact. No new clearing proposed.	N/A	No Impact.	N/A
Wetlands and Streams	Temporary soil disturbance may increase suspended solids and pollutants from construction machinery in stormwater runoff. No new construction proposed in wetlands. Bank restoration to reduce erosion.	Appropriate sedimentation and erosion control devices. Wetland delineations if needed upon further project surveying/design. Minimum buffer requirements if needed.	No adverse impact. No additional footprint.	Provide routine maintenance on the facility.



Water Resources	Soil disturbance may increase suspended solids and pollutants from construction machinery in stormwater runoff.	Appropriate sedimentation and erosion control devices; immediately contain and cleanup spills from machinery. Minimum buffer requirements if needed.	No adverse impact.	Provide routine maintenance on the facility.
Shellfish, Fish, and their Habitats	Temporary soil disturbance, erosion potential, and increase in turbidity.	Appropriate sedimentation and erosion control devices; immediately contain and cleanup spills from machinery. Minimum buffer requirements if needed.	No adverse impact.	Provide routine maintenance on the facility.
Wildlife and Natural Vegetation	Noise level from construction machinery may temporarily displace wildlife.	Appropriate sedimentation and erosion control devices; immediately contain and cleanup spills from machinery. Minimum buffer requirements if needed. Proper muffling equipment shall be installed on construction equipment.	No adverse impact.	Provide routine maintenance on the facility.
Public Land and Scenic, Recreational, and State Natural Areas	Temporary noise from construction machinery and road closures.	Proper muffling equipment shall be installed on construction equipment and construction activities will be limited to typical weekday business hours.	No adverse impact.	Provide routine maintenance on the facility.
Areas of Archaeological or Historical Value	Temporary noise from construction machinery.	Proper muffling equipment shall be installed on construction equipment.	No adverse impact.	N/A
Air Quality	Emissions from construction machinery.	Use of proper air quality control devices on construction machinery.	No adverse impact.	Provide routine maintenance on the facility.
Noise Levels	Temporary noise from construction machinery.	Proper muffling equipment shall be installed on construction equipment.	No adverse impact.	N/A



Toxic Substances	Potential to leak fuel, lubricants, and/or additives from construction machinery.	Immediate containment and disposal by Contractor.	No adverse impact.	Provide routine maintenance on the facility.
Environmental Justice	Construction activities would impact the local low-income / minority population. The project intends to provide area-wide benefit to Town. No increase in footprint.	Appropriate sedimentation and erosion control devices; construction during daytime; maintain buffers; install air pollution devices.	No adverse impact.	N/A





MONTGOMERY COUNTY, NORTH CAROLINA

2018 DWSRF

RAW WATER PUMP STATION IMPROVEMENTS PROJECT

APPENDIX 5B

MAP

Project Area Vicinity Raw Water Pump Station

Montgomery County, NC

November 2018

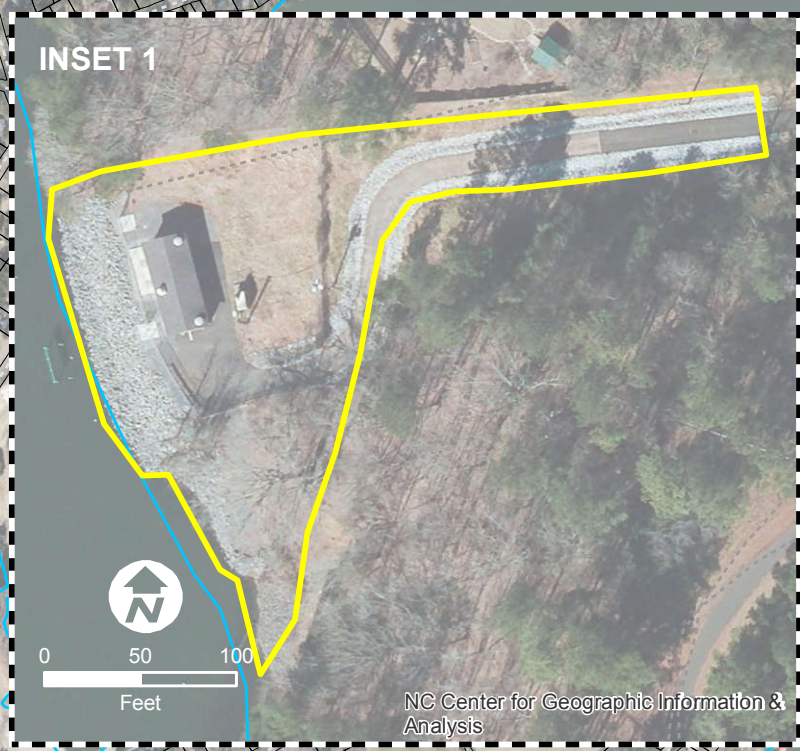
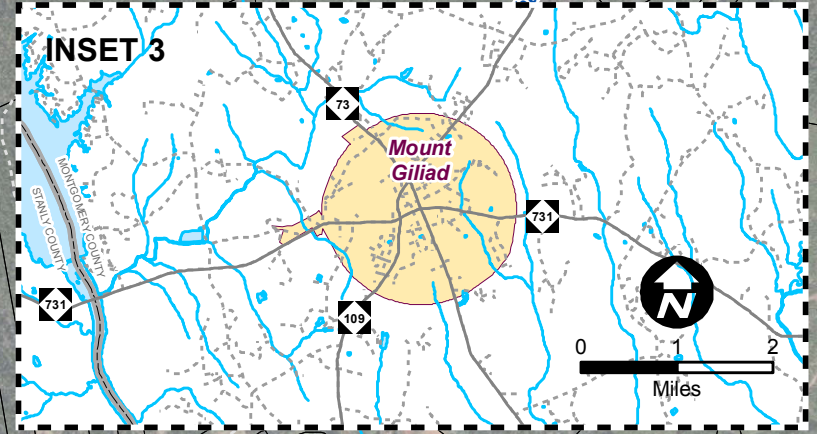
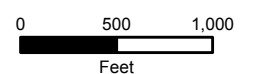
Legend

- Street
- NC Route
- Stream
- River/Lake
- Raw Water Pump Station Project Area
- Parcel
- County Boundary

1 inch = 10,560 feet



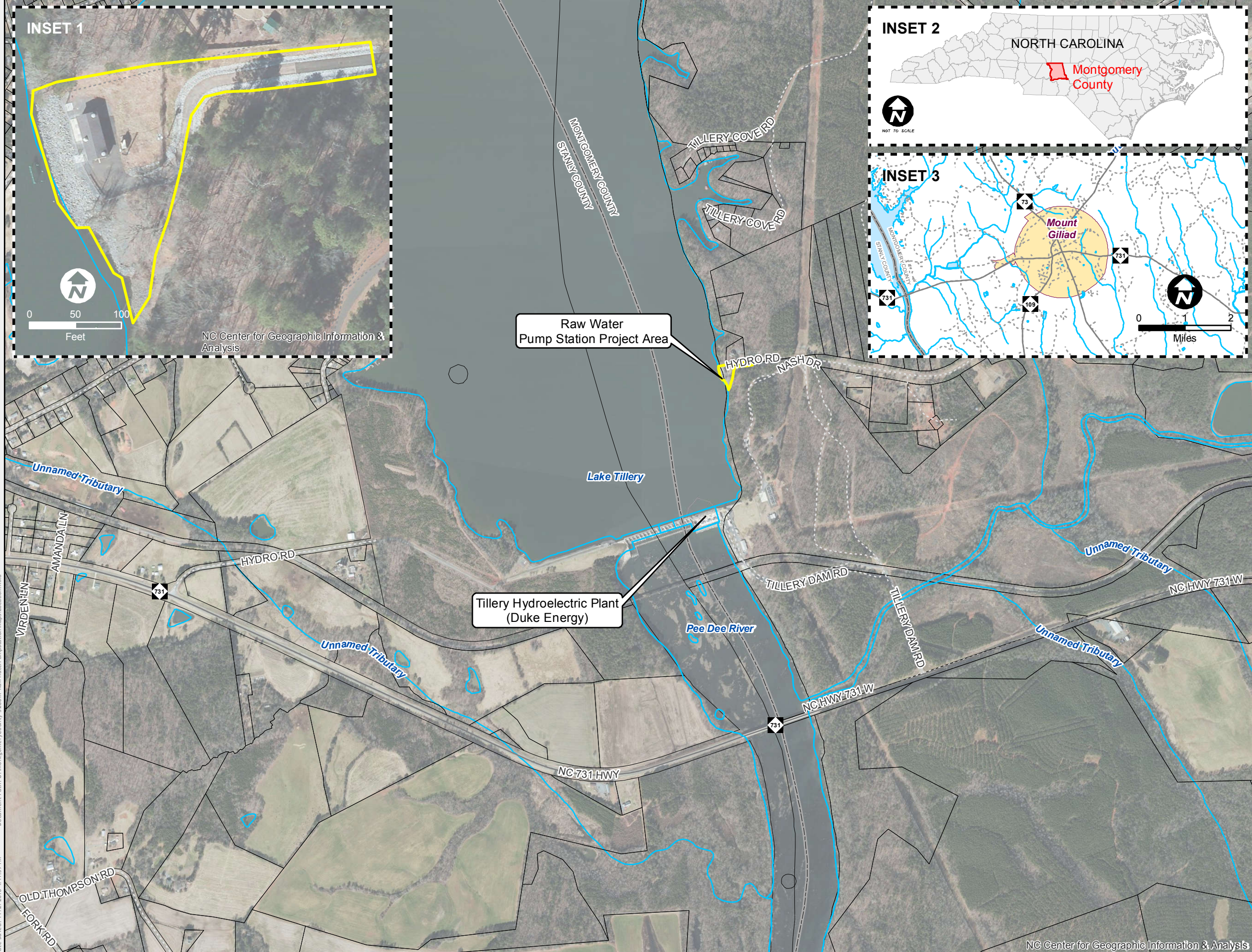
1 inch = 1,000 feet



NC Center for Geographic Information & Analysis

Raw Water Pump Station Project Area

Tillery Hydroelectric Plant (Duke Energy)



THE WOOTEN COMPANY

The Wooten Company makes every effort to produce and publish GIS maps using the most current and accurate information possible, however, the maps are strictly for planning purposes only. The maps are compiled from recorded deeds, plats, and other public and private records and data. Users of the maps are hereby notified that the aforementioned public primary information sources should be consulted for verification of the information on this map. The Wooten Company assumes NO responsibility for the information contained on the maps unless the map is signed and sealed by a licensed Professional Land Surveyor. Please contact the GIS Group at (919) 828-0531 or tcchan@thewootencompany.com for data source information.

Date Saved: 11/27/2018 4:41:59 PM Document Path: U:\Montgomery\county\3288\RawWaterPumpStation\MapLocation.mxd



MONTGOMERY COUNTY, NORTH CAROLINA

2018 DWSRF

RAW WATER PUMP STATION IMPROVEMENTS PROJECT

APPENDIX 5C

ENVIRONMENTAL SOURCE DOCUMENTATION

Contents

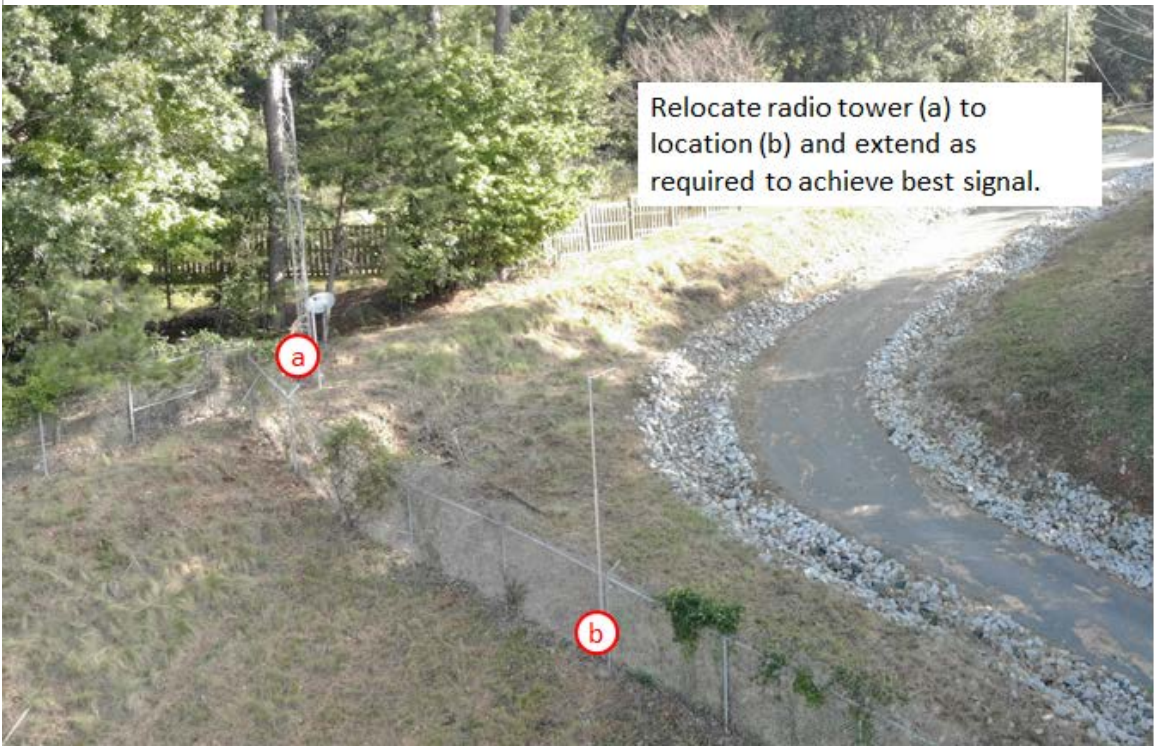
Site Photos.....	2
Topography.....	5
Floodplains	7
Soils & Farmland.....	8
Land Use & Zoning.....	13
Forest Resources	15
Wetlands.....	16
Water Resources	19
Biological Resources	22
Public Lands & Natural Areas	30
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Toxic Substances.....	34
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Site Photos

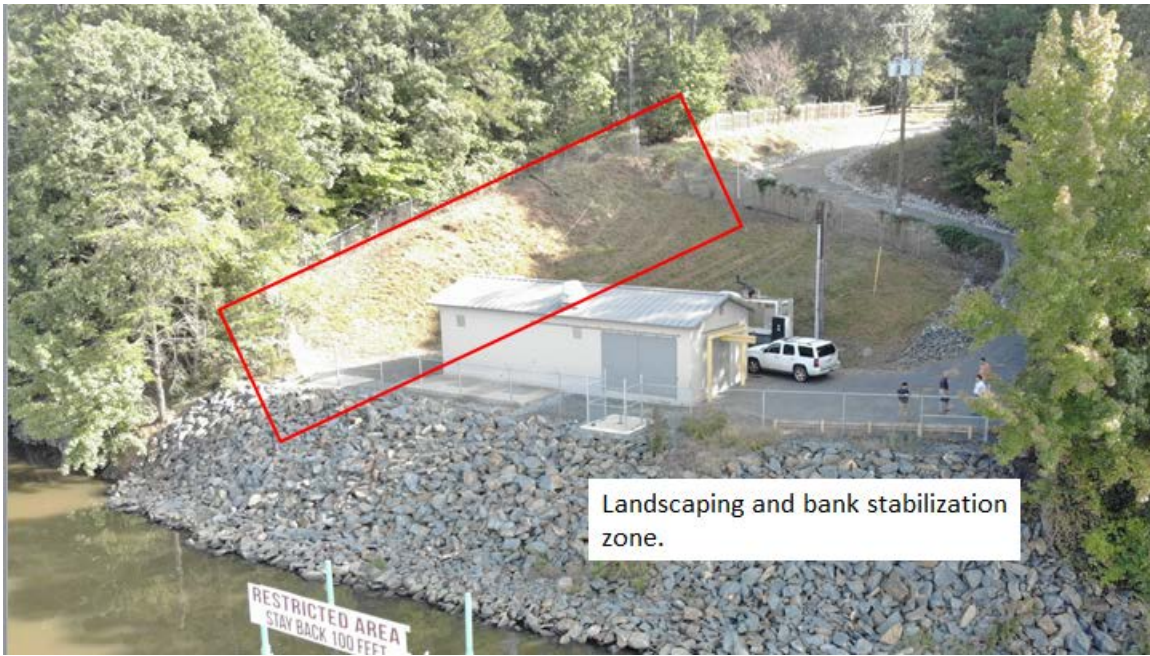




Conduit damaged on top of weather head due to lightning strike. Need to assess damage.



Relocate radio tower (a) to location (b) and extend as required to achieve best signal.



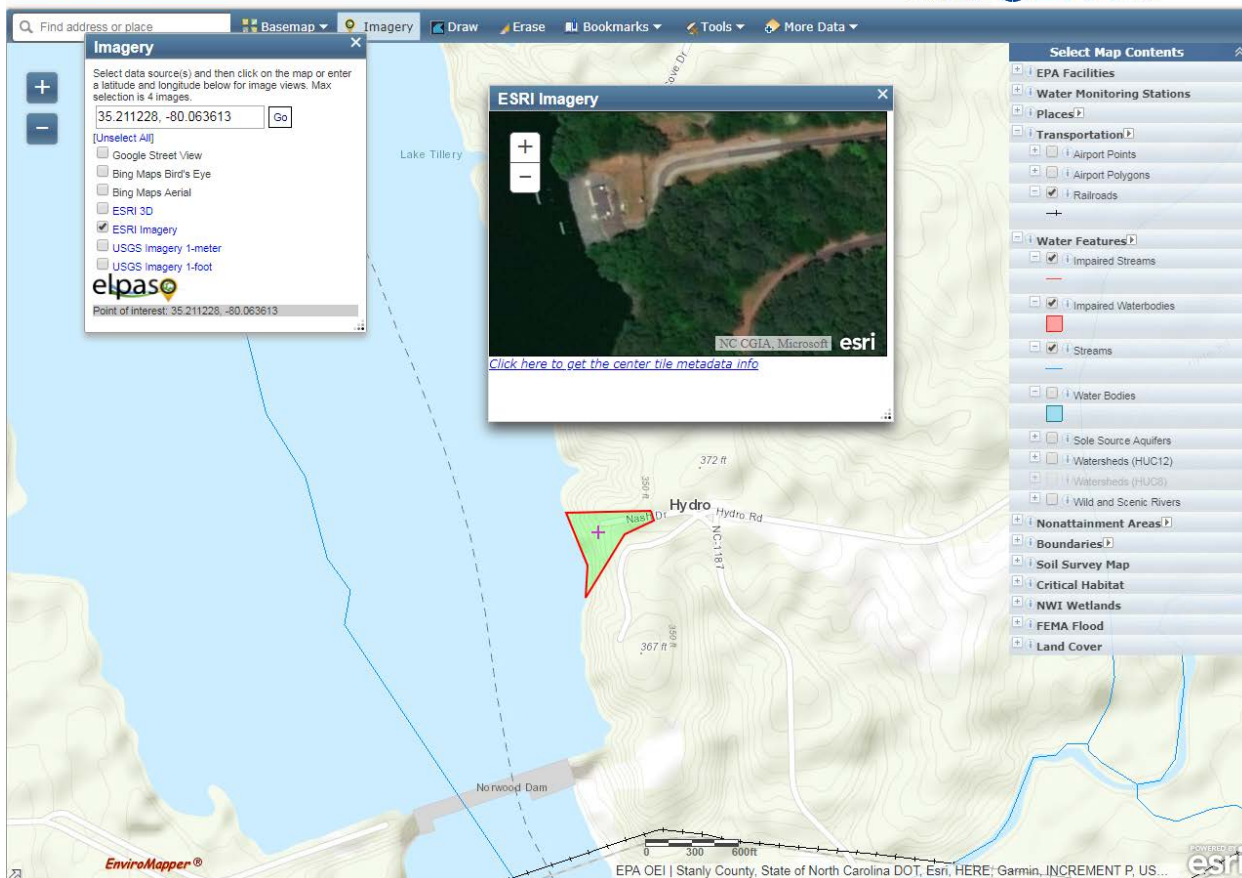
Replace generator in existing location



Topography

US EPA NEPA Assist <https://www.epa.gov/nepa/nepassist>

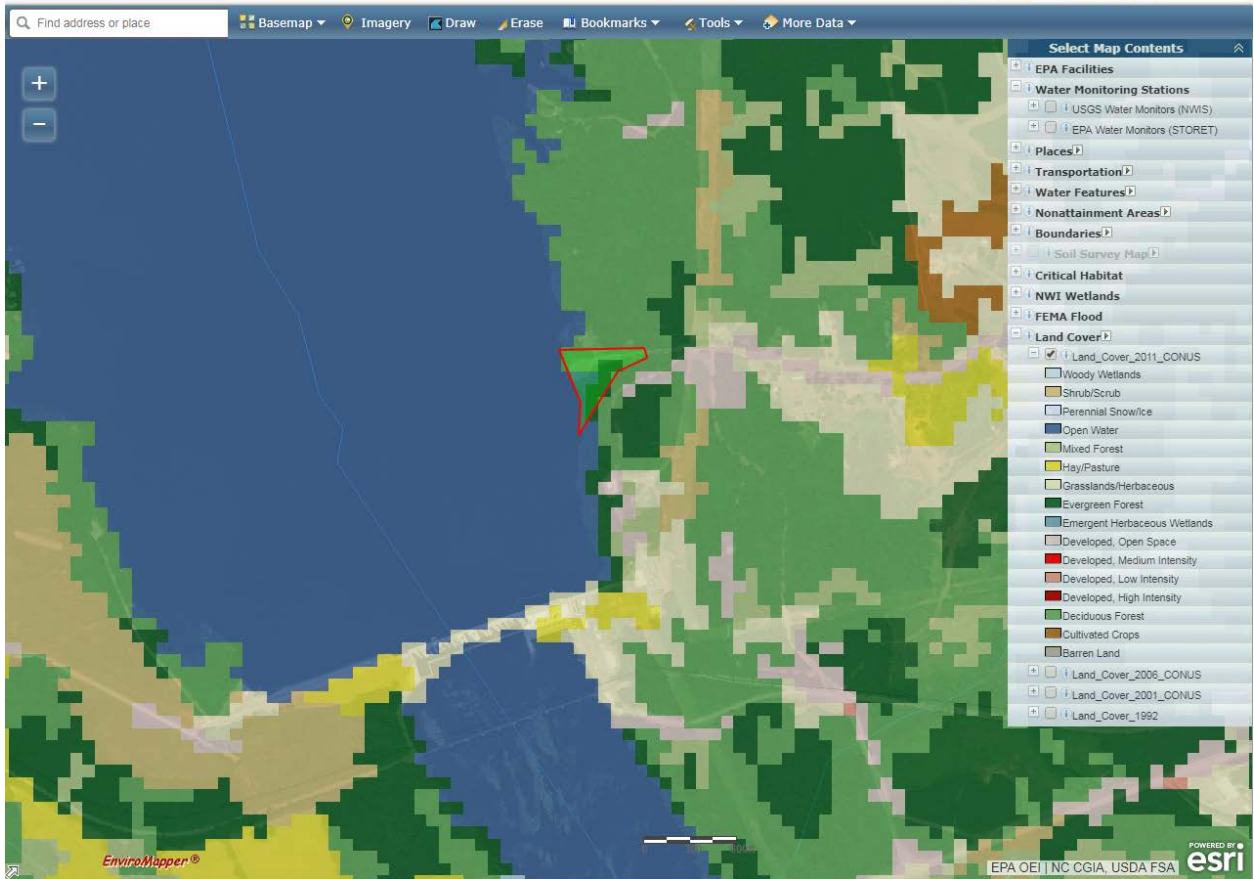
NEPAssist



The screenshot displays the NEPAssist web application interface. At the top, there is a search bar with the text "Find address or place" and a "Basemap" dropdown menu. The main map area shows a topographic map of a region including Lake Tillery, Norwood Dam, and Hydro Rd. A red polygon highlights a specific area on the map. An "Imagery" window is open on the left, showing a list of data sources with "ESRI Imagery" selected. An "ESRI Imagery" window is also open, displaying a zoomed-in aerial view of the highlighted area. On the right side, a "Select Map Contents" panel is visible, listing various map layers such as "EPA Facilities", "Water Monitoring Stations", "Transportation", "Water Features", and "Land Cover". The bottom of the map includes a scale bar and the text "EPA OEI | Stanly County, State of North Carolina DOT, Esri, HERE, Garmin, INCREMENT P, US...".

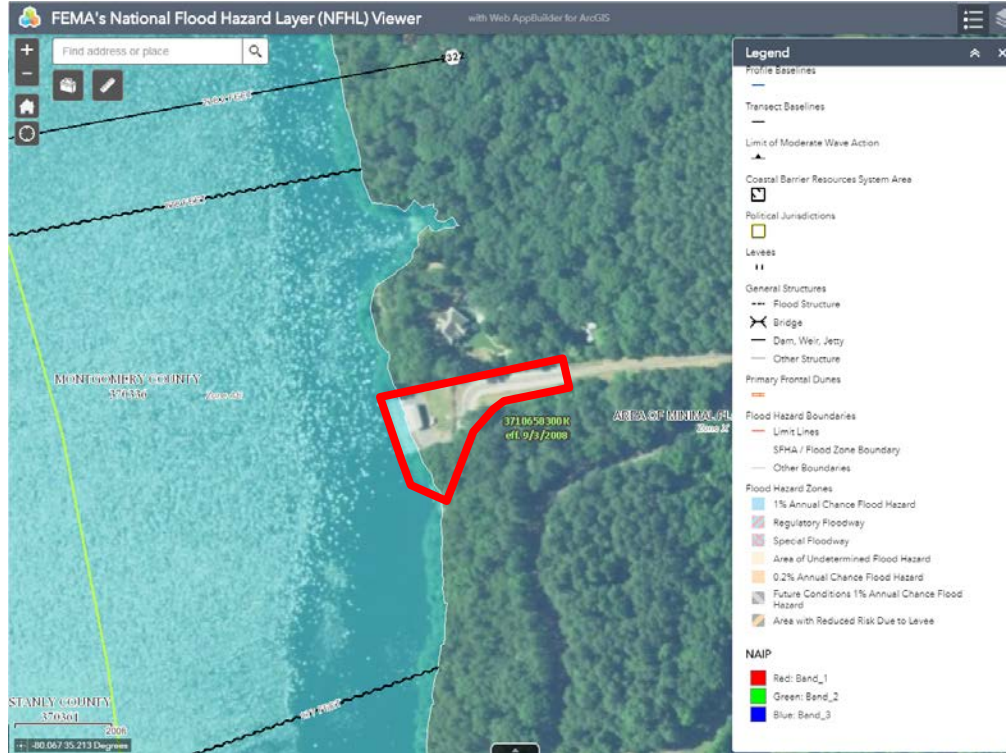
Land Cover- Project area is woody/forested, adjacent to water

NEPAssist

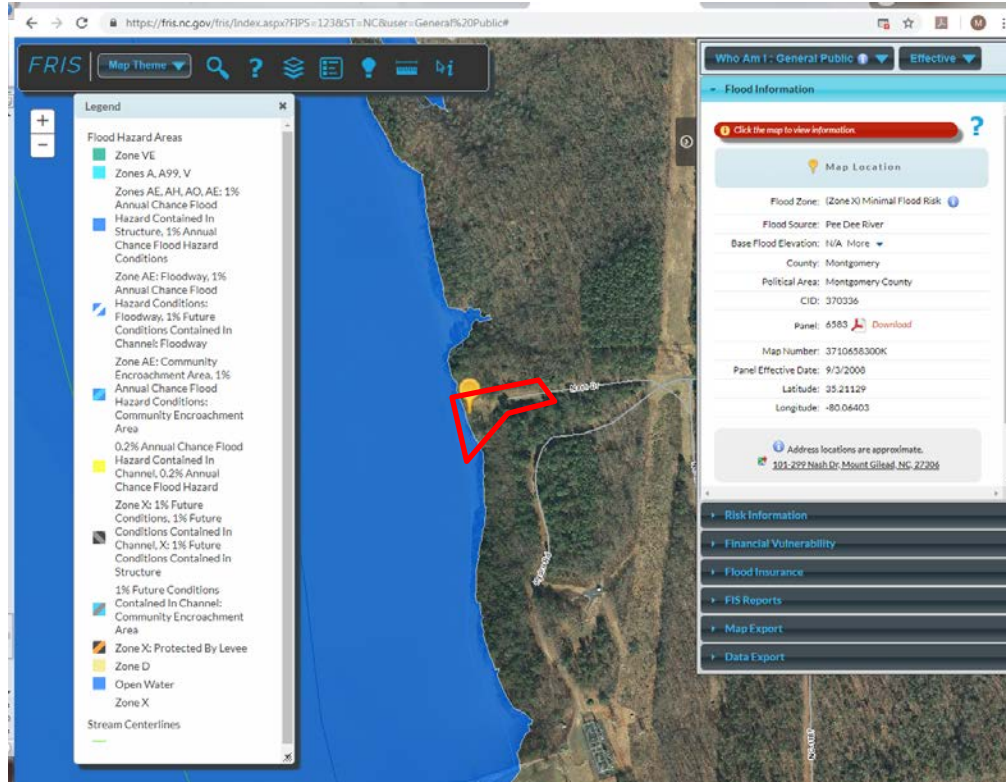


Floodplains

FEMA Map Service Center <http://msc.fema.gov/portal>



NC Floodplain Mapping <http://fris.nc.gov/fris/Home.aspx?ST=NC>



Soils & Farmland

USDA Web Soil Survey <http://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm>



6

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
BeC2	Badin-Tarrus complex, 8 to 15 percent slopes, moderately eroded	0.3	21.3%
GoE	Goldston-Badin complex, 15 to 45 percent slopes	1.0	74.0%
W	Water	0.1	4.7%
Totals for Area of Interest		1.4	100.0%

BeC2—Badin-Tarrus complex, 8 to 15 percent slopes, moderately eroded

Map Unit Setting

National map unit symbol: 2dz66

Elevation: 200 to 650 feet

Mean annual precipitation: 37 to 60 inches

Mean annual air temperature: 59 to 66 degrees F

Frost-free period: 200 to 240 days

Farmland classification: Farmland of statewide importance

Map Unit Composition

Badin, moderately eroded, and similar soils: 60 percent

Tarrus, moderately eroded, and similar soils: 35 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Badin, Moderately Eroded

Setting

Landform: Hillslopes on ridges

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Residuum weathered from metavolcanics and/or argillite

Typical profile

Ap - 0 to 8 inches: silty clay loam

Bt - 8 to 27 inches: clay

BC - 27 to 37 inches: silty clay loam

Cr - 37 to 80 inches: weathered bedrock

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 20 to 40 inches to paralithic bedrock

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 6.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: C

Hydric soil rating: No

Description of Tarrus, Moderately Eroded

Setting

Landform: Hillslopes on ridges

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Residuum weathered from metavolcanics and/or argillite

Typical profile

Ap - 0 to 10 inches: silty clay loam

Bt - 10 to 32 inches: silty clay

BC - 32 to 47 inches: silt loam

Cr - 47 to 80 inches: weathered bedrock

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: 40 to 60 inches to paralithic bedrock

Natural drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Moderate (about 7.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 3e

Hydrologic Soil Group: B

Hydric soil rating: No

Minor Components

Goldston, moderately eroded

Percent of map unit: 5 percent

Landform: Hillslopes on ridges

Landform position (two-dimensional): Shoulder, backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Hydric soil rating: No

GoE—Goldston-Badin complex, 15 to 45 percent slopes

Map Unit Setting

National map unit symbol: 2dz6x

Elevation: 200 to 650 feet

Mean annual precipitation: 37 to 60 inches

Mean annual air temperature: 59 to 66 degrees F

Frost-free period: 200 to 240 days

Farmland classification: Not prime farmland

Map Unit Composition

Goldston and similar soils: 55 percent

Badin and similar soils: 30 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Goldston

Setting

Landform: Hillslopes on ridges

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Residuum weathered from metavolcanics and/or argillite

Typical profile

A - 0 to 7 inches: very channery silt loam

Bw - 7 to 11 inches: very channery silt loam

Cr - 11 to 23 inches: weathered bedrock

R - 23 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent

Depth to restrictive feature: 10 to 20 inches to paralithic bedrock; 20 to 40 inches to lithic bedrock

Natural drainage class: Well drained

Runoff class: High

Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water storage in profile: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7s

Hydrologic Soil Group: D

Hydric soil rating: No

Description of Badin

Setting

Landform: Hillslopes on ridges

Landform position (two-dimensional): Backslope

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Convex

Parent material: Residuum weathered from metavolcanics and/or argillite

Typical profile

A - 0 to 2 inches: channery silt loam
E - 2 to 9 inches: channery silt loam
Bt1 - 9 to 21 inches: channery silty clay loam
Bt2 - 21 to 36 inches: silty clay
Cr - 36 to 45 inches: weathered bedrock
R - 45 to 80 inches: unweathered bedrock

Properties and qualities

Slope: 15 to 45 percent
Depth to restrictive feature: 20 to 40 inches to paralithic bedrock; 40 to 80 inches to lithic bedrock
Natural drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low to high (0.00 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 6.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Hydric soil rating: No

Minor Components**Tarrus**

Percent of map unit: 5 percent
Landform: Hillslopes on ridges
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Convex
Hydric soil rating: No

Land Use & Zoning

Montgomery County NC GIS website <https://www.webgis.net/nc/montgomery/>

The screenshot shows a web browser window displaying the Montgomery County NC GIS website. The browser's address bar shows the URL <https://www.webgis.net/nc/montgomery/>. The website interface includes a navigation menu on the left with options like 'About', 'Layers', and 'Legend'. A 'Table of Contents' is visible, listing various map layers such as 'Planimetrics', 'Overlays', and 'Zoning'. The main map area shows an aerial view of a rural area with a river and several parcels outlined in black. One parcel is highlighted with a red circle. A 'Details' panel is open over the highlighted parcel, displaying the following information:

Parcel No: 6583 00 51 2568
Parcel Address: 179 TILLERY DAM RD
Owner: DUKE ENERGY PROGRESS INC
560 S TRYON ST
CHARLOTTE NC 28202
Tax District: COUNTY ONLY
Township: MT. GILEAD
Voi Fire: FIRE DS GILMONT-MT G RUR
Neighborhood: MT. GILEAD
Legal 1: PUBLIC UTILITY
Legal 2: HYDRO DAM
Legal 3: PUBLIC UTILITY
Deed Reference: Blk 69 Pg. 565
Transfer Date: 19190918
Land Area: 0 acres
Sale Instr: UNK
QuitCode: Z
Appr Code: 09
Appr Desc: TYPICAL OFFICE
Class Code: 7
Class Desc: COMMERCIAL
Year Built: 2000
Grade: B
Finished Area: 5000
Num Baths: 0.9

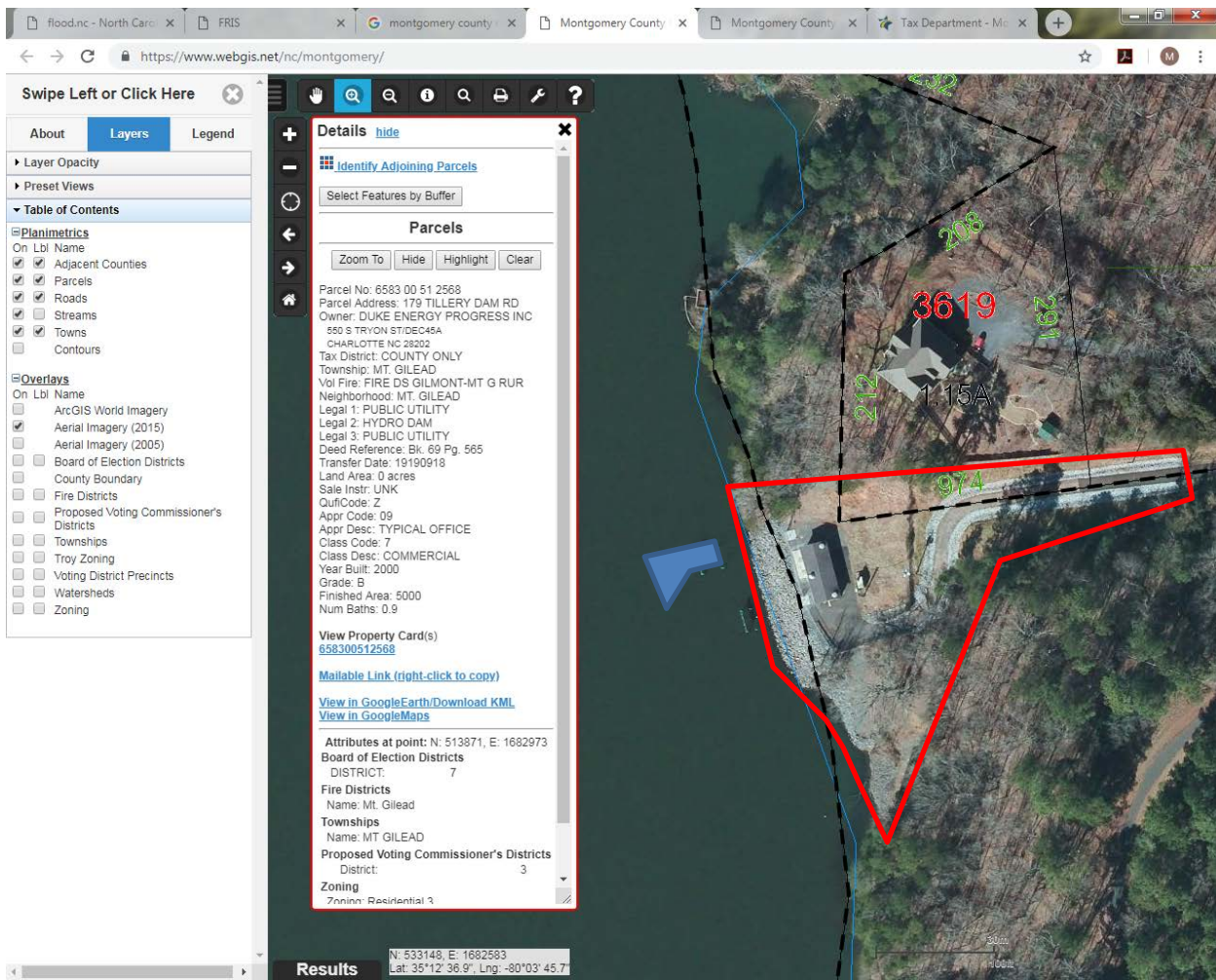
View Property Card(s)
[658300512568](#)

Available Link (right-click to copy)

[View in Google Earth/Download KML](#)
[View in Google Maps](#)

Attributes at point: N: 513871, E: 1682973
Board of Election Districts
DISTRICT: 7
Fire Districts
Name: Mt. Gilead
Townships
Name: MT GILEAD
Proposed Voting Commissioner's Districts
District: 3
Zoning
Zoning: Residential 3

At the bottom of the map, the coordinates are displayed: N: 530697, E: 1677445, Lat: 35°12' 12.1", Lng: -80°04' 47.3".



Adjacent to Parcel No 6583 00 23 3619 at 111 NASH DR

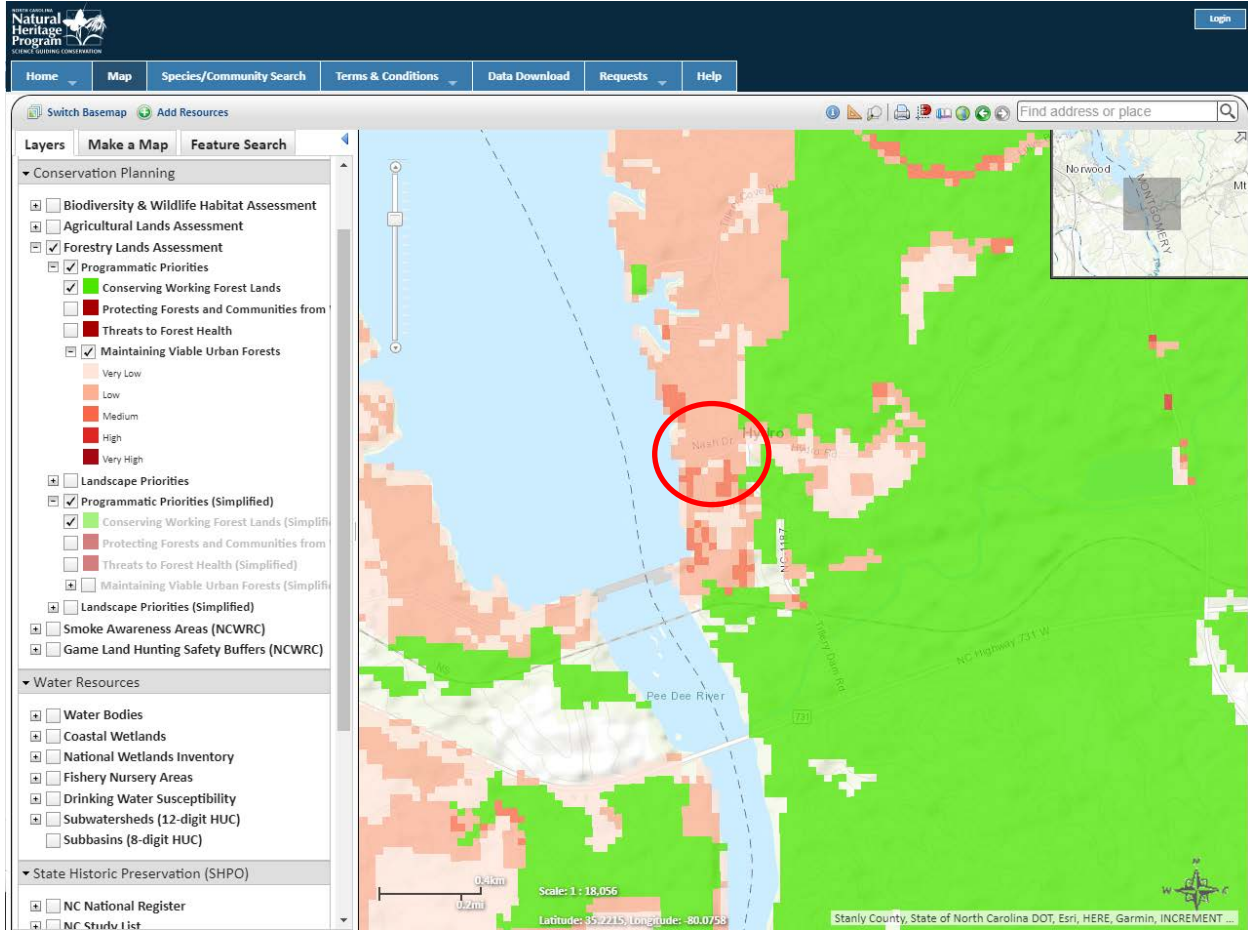
Montgomery County Public Utilities Department

<http://www.montgomerycountync.com/departments/public-utilities/operations>

WTP located at 724 Hydro Road, Mount Gilead, NC 27306

Forest Resources

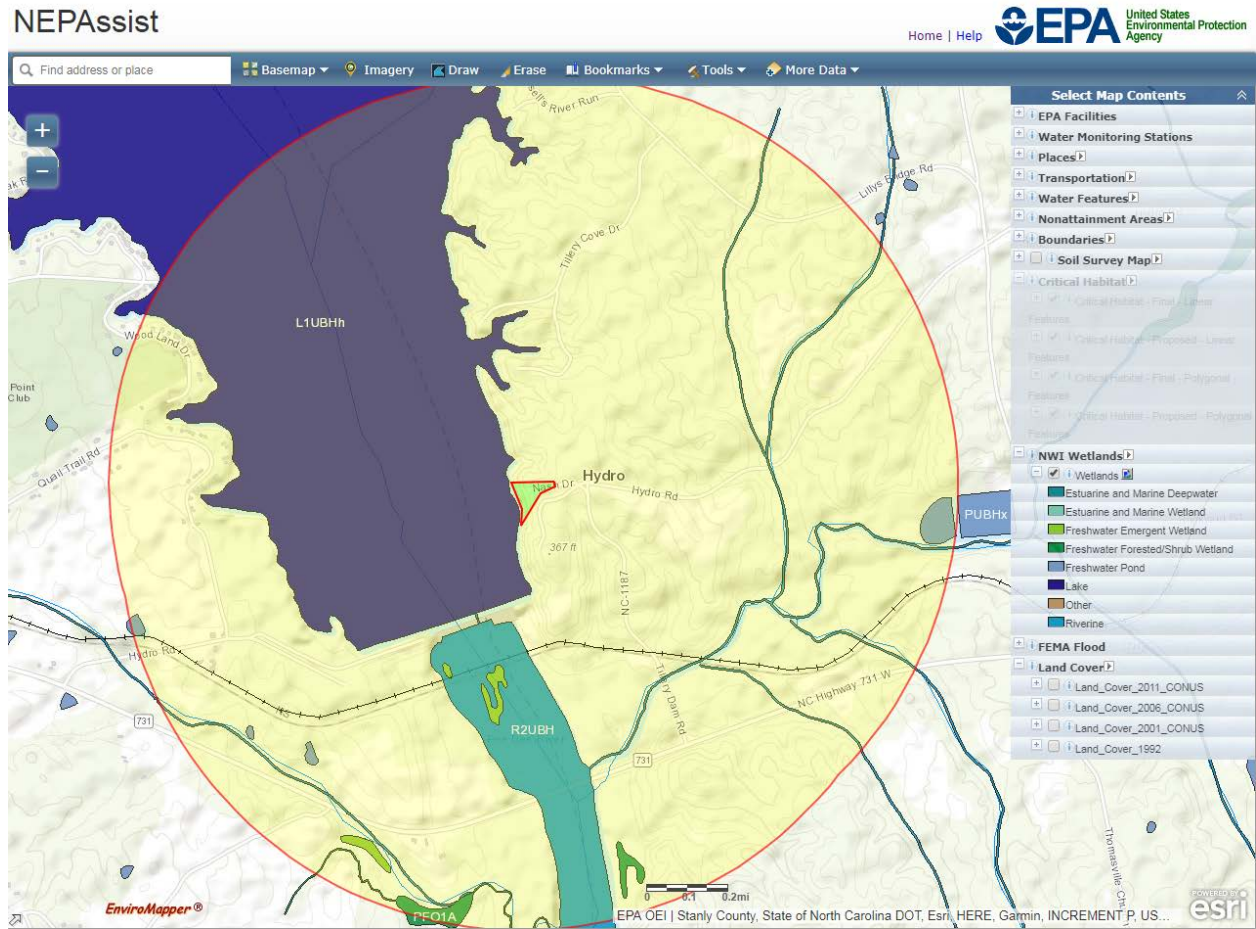
NC NHP Mapper “Forestry Lands” <http://ncnhde.natureserve.org/content/map>

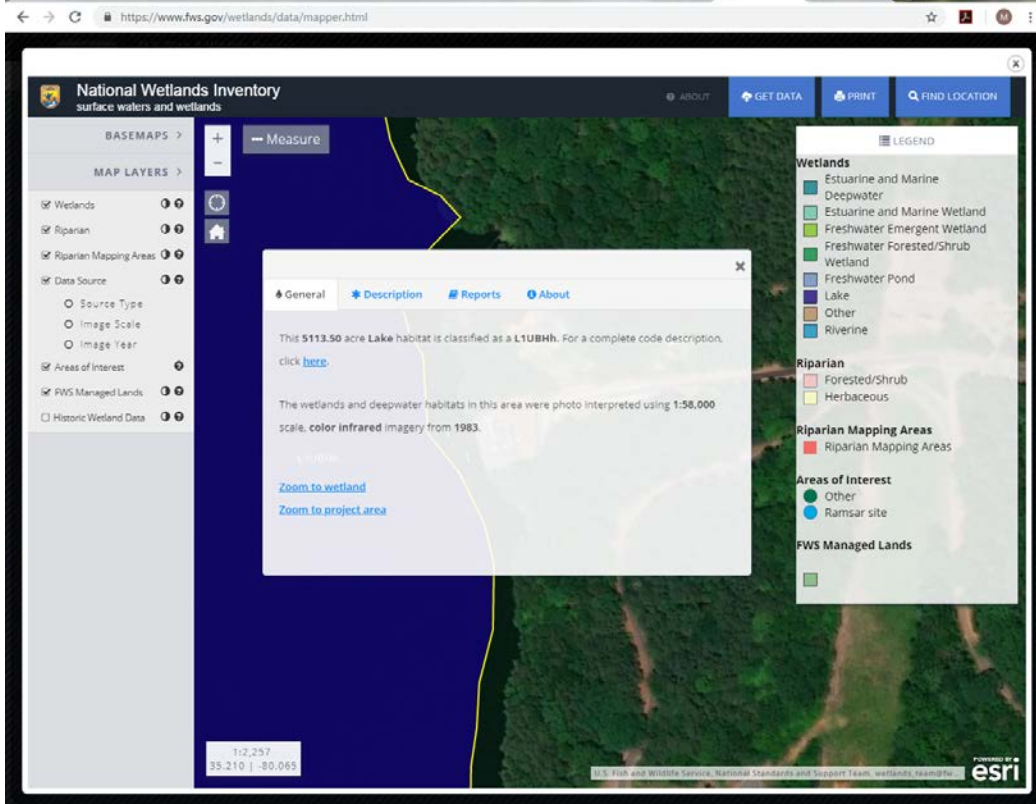
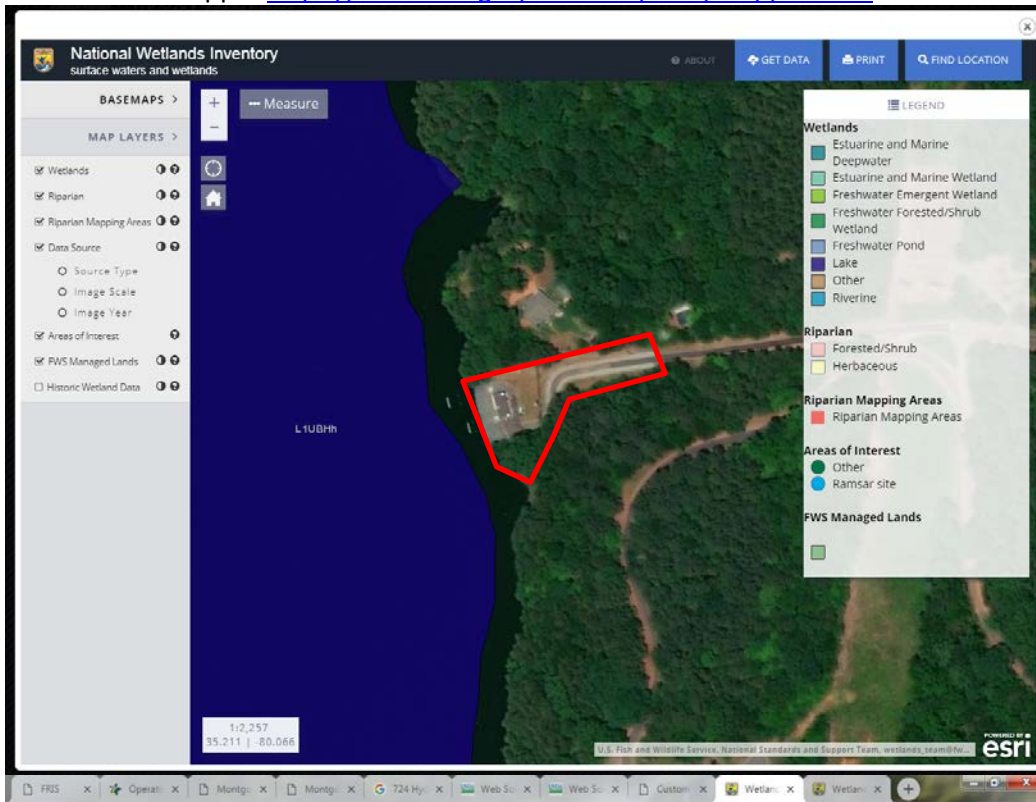


Wetlands

US EPA NEPA Assist <https://www.epa.gov/nepa/nepassist>

~1 Mile buffer of approximate project area, topographic base layer, wetland, critical habitat, water features-
Several NWI areas within 1 mile of project area, and no critical habitats





NWI Wetland Classification Codes <http://www.fws.gov/wetlands/data/wetland-codes.html>

USFWS NWI <https://fwsprimary.wim.usgs.gov/decoders/wetlands.aspx>

Classification code: L1UBHh

- System **Lacustrine (L)** : The Lacustrine System includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, and emergent mosses or lichens with 30 percent or greater areal coverage; and (3) total area of at least 8 hectares (ha) (20 acres). Similar wetlands and deepwater habitats totaling less than 8 ha are also included in the Lacustrine System if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin equals or exceeds 2.5 m (8.2 ft) at low water. Lacustrine waters may be tidal or nontidal, but ocean-derived salinity is always less than 0.5 ppt.
- Subsystem **Limnetic (1)** : This Subsystem includes all deepwater habitats (i.e., areas > 2.5 m [8.2 ft] deep below low water) in the Lacustrine System. Many small Lacustrine Systems have no Limnetic Subsystem.
- Class **Unconsolidated Bottom (UB)** : Includes all wetlands and deepwater habitats with at least 25% cover of particles smaller than stones (less than 6-7 cm), and a vegetative cover less than 30%.
- Water Regime **Permanently Flooded (H)** : Water covers the substrate throughout the year in all years.
- Special Modifier **Diked/Impounded (h)** : These wetlands have been created or modified by a man-made barrier or dam that obstructs the inflow or outflow of water.

Water Resources

Yadkin – Pee Dee River Basin Plan HUC 03040104

NC DEQ DWR. *Water Resources Data, Statistics and Maps. Integrated Report Files .*

<https://deq.nc.gov/about/divisions/water-resources/planning/modeling-assessment/water-quality-data-assessment/integrated-report-files>

Water Quality Assessment Information based on 2016 NC Water Quality Assessment. The data window for this assessment was calendar years 2010-2014.

- Blue**—All assessments are meeting criteria (except for Mercury in Fish Tissue).
- Gray**—There are only data inconclusive assessments or at least one pathogen assessment is data inconclusive (except for Mercury in Fish Tissue).
- Pink**—There is at least one category 4 assessment and no category 5 assessments (except for Mercury in Fish Tissue).
- Red**—There is at least one category 5 assessment (except for Mercury in Fish Tissue). These waters are also referred to as the North Carolina 2016 303(d) List.

Note that all NC waters are in Category 4 for Mercury in Fish Tissue. These are not displayed on this map.

OK

2016 Integrated Report

Instruction Manual Coming Soon

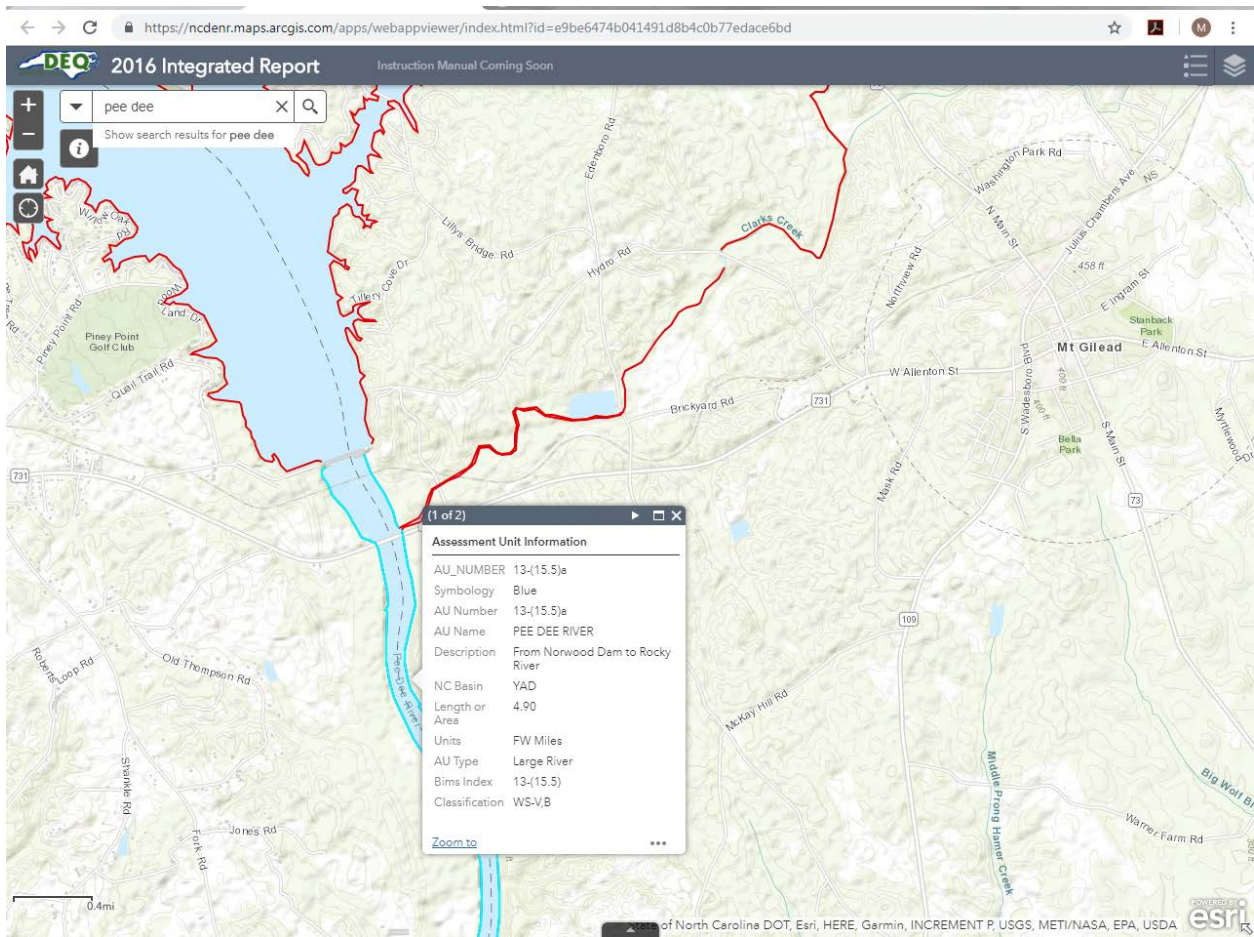
mt gilead, nc

Show search results for mt gile...

(1 of 2)

Assessment Unit Information	
AU_NUMBER	13-(1)
Symbology	Red
AU Number	13-(1)
AU Name	PEE DEE RIVER (including Lake Tillery below normal operating levels)
Description	From mouth of Uwharrie River to Norwood Dam
NC Basin	YAD
Length or Area	4,845.50
Units	FW Acres
AU Type	Large River Impoundment
Bims Index	13-(1)
Classification	WS-IVB:CA
Zoom to	***

https://deq.nc.gov



Local Water Supply Plan

http://www.ncwater.org/Water_Supply_Planning/Local_Water_Supply_Plan/search.php

Montgomery Co

2017 ▾

The Division of Water Resources (DWR) provides the data contained within this Local Water Supply Plan (LWSP) as a courtesy and service to our customers. DWR staff does not field verify data. Neither DWR, nor any other party involved in the preparation of this LWSP attests that the data is completely free of errors and omissions. Furthermore, data users are cautioned that LWSPs labeled **PROVISIONAL** have yet to be reviewed by DWR staff. Subsequent review may result in significant revision. Questions regarding the accuracy or limitations of usage of this data should be directed to the water system and/or DWR.

1. System Information

Contact Information

Water System Name: **Montgomery Co** PWSID: **03-62-010**
 Mailing Address: **724 Hydro Road** Ownership: **County**
Mount Gilead, NC 27306
 Contact Person: **Matthew H. Morris** Title: **Director of Public Utilities**
 Phone: **910-439-6198** Fax: **910-439-9488**

Complete

Distribution System

Line Type	Size Range (Inches)	Estimated % of lines
Asbestos Cement	6, 16	3.86 %
Ductile Iron	6-24	6.13 %
Galvanized Iron	2	0.05 %
Other	UKWN	0.35 %
Polyvinyl Chloride	2-12	89.61 %

What are the estimated total miles of distribution system lines? **365 Miles**
 How many feet of distribution lines were replaced during 2017? **788 Feet**
 How many feet of new water mains were added during 2017? **0 Feet**
 How many meters were replaced in 2017? **0**
 How old are the oldest meters in this system? **23 Year(s)**
 How many meters for outdoor water use, such as irrigation, are not billed for sewer services? **0**
 What is this system's finished water storage capacity? **3.9200 Million Gallons**
 Has water pressure been inadequate in any part of the system since last update? **No**

Programs

Does this system have a program to work or flush hydrants? **Yes, As Needed**
 Does this system have a valve exercise program? **Yes, As Needed**
 Does this system have a cross-connection program? **Yes**
 Does this system have a program to replace meters? **Yes**
 Does this system have a plumbing retrofit program? **No**
 Does this system have an active water conservation public education program? **No**
 Does this system have a leak detection program? **No**

Water Conservation

What type of rate structure is used? **Increasing Block**
 How much reclaimed water does this system use? **0.0000 MGD** For how many connections? **0**
 Does this system have an interconnection with another system capable of providing water in an emergency? **No**

Interconnecting with neighboring systems is challenging due to crossing Lake Tillery to the west and IBT issues to the east. Neighbors to the north and south are at significant distances.

2. Water Use Information

Service Area

Sub-Basin(s)	% of Service Population	County(s)	% of Service Population
Yadkin River (18-1)	86 %	Montgomery	100 %
Deep River (02-2)	10 %		

Lumber River (09-1)	3 %
Uwharrie River (18-3)	1 %

What was the year-round population served in 2017? 14,473

Has this system acquired another system since last report? No

Water Use by Type

Type of Use	Metered Connections	Metered Average Use (MGD)	Non-Metered Connections	Non-Metered Estimated Use (MGD)
Residential	5,610	0.4660	0	0.0000
Commercial	149	0.2820	0	0.0000
Industrial	0	0.0000	0	0.0000
Institutional	0	0.0000	0	0.0000

How much water was used for system processes (backwash, line cleaning, flushing, etc.)? 0.0250 MGD

Water Sales

Purchaser	PWSID	Average Daily Sold (MGD)	Days Used	Contract		Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
				MGD	Expiration			
Carolina Forest	03-62-106	0.0500	365	0.0500	2040	Yes	8	Regular
Town of Biscoe	03-62-035	0.3160	365	0.9000	2045	Yes	16,12	Regular
Town of Candor	03-62-030	0.1230	365	0.1700	2045	Yes	12, 8	Regular
Town of Mt Gilead	03-62-015	0.1060	365	0.2000	2045	Yes	24,20	Regular
Town of Robbins	03-63-015	0.1940	365	0.2500	2019	Yes	10	Regular
Town of Star	03-62-025	0.0640	365	0.1130	2045	Yes	8, 12	Regular
Town of Troy	03-62-020	0.4170	365	0.6000	2045	Yes	20,16	Regular
Wood Run	03-62-107	0.0640	365	0.0500	2040	Yes	12	Regular

The towns of Candor, Star, Biscoe, Troy and Mount Gilead all renewed contracts in 2005 for 40 years. They are not to exceed 60 MG per month.

The contract value of 0.9 MGD is the amount of water Biscoe would need to purchase in order to keep their projected demand below or around 80% of supply. The contract value of 0.17 MGD is the amount of water Candor would need to purchase in order to keep their projected demand below or around 80% of supply.

The contract value of 0.113 MGD is the amount of water Star would need to purchase in order to keep their projected demand below or around 80% of supply.

The contract value of 0.6 MGD is the amount of water Troy would need to purchase in order to keep their projected demand below or around 80% of supply.

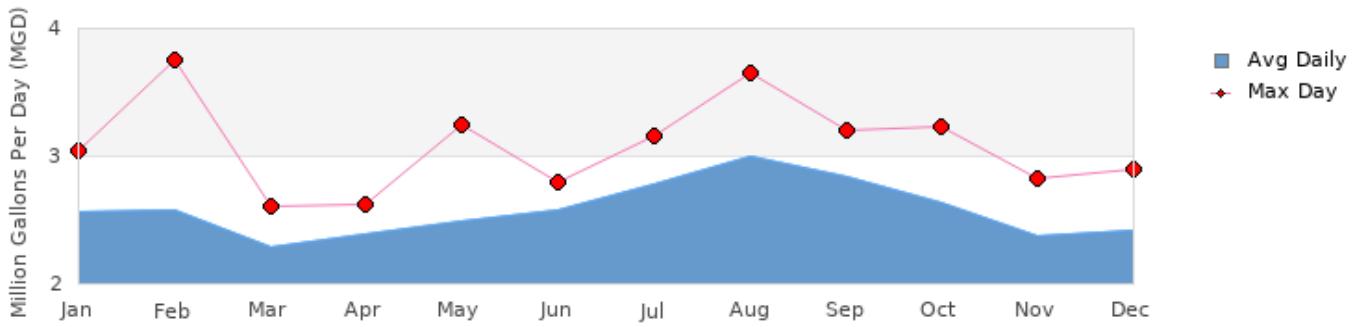
The contract value of 0.2 MGD is the amount of water Mount Gilead would need to purchase in order to keep their projected demand below or around 80% of supply.

3. Water Supply Sources

Monthly Withdrawals & Purchases

	Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)		Average Daily Use (MGD)	Max Day Use (MGD)
Jan	2.5600	3.0360	May	2.4860	3.2410	Sep	2.8430	3.2000
Feb	2.5700	3.7550	Jun	2.5720	2.7890	Oct	2.6310	3.2220
Mar	2.2780	2.6040	Jul	2.7760	3.1520	Nov	2.3710	2.8270
Apr	2.3810	2.6240	Aug	2.9960	3.6490	Dec	2.4120	2.9010

Montgomery Co's 2017 Monthly Withdrawals & Purchases



Surface Water Sources

Stream	Reservoir	Average Daily Withdrawal		Maximum Day Withdrawal (MGD)	Available Raw Water Supply		Usable On-Stream Raw Water Supply Storage (MG)
		MGD	Days Used		MGD	* Qualifier	
Pee Dee River	Lake Tillery	2.5700	365	3.7550	6.0000	C	774.0000

* Qualifier: C=Contract Amount, SY20=20-year Safe Yield, SY50=50-year Safe Yield, F=20% of 7Q10 or other instream flow requirement, CUA=Capacity Use Area Permit

Surface Water Sources (continued)

Stream	Reservoir	Drainage Area (sq mi)	Metered?	Sub-Basin	County	Year Offline	Use Type
Pee Dee River	Lake Tillery	4,600	Yes	Yadkin River (18-1)	Montgomery		Regular

What is this system's off-stream raw water supply storage capacity? 0 Million gallons

Are surface water sources monitored? Yes, Daily

Are you required to maintain minimum flows downstream of its intake or dam? No

Does this system anticipate transferring surface water between river basins? Yes

IBT:

- Sale of water to the Town of Robbins - Deep River Basin (02-2)
- Sale of water to customers in the Lumber River Basin (09-1)

Water Purchases From Other Systems

Seller	PWSID	Average Daily Purchased (MGD)	Days Used	MGD	Contract Expiration	Recurring	Required to comply with water use restrictions?	Pipe Size(s) (Inches)	Use Type
Town of Troy	03-62-020	0.0000	0	0.0000	2045	Yes	Yes	8, 12	Emergency

Town of Troy is buy back scenario.

Water Treatment Plants

Plant Name	Permitted Capacity (MGD)	Is Raw Water Metered?	Is Finished Water Output Metered?	Source
Montgomery County WTP	6.0000	Yes	Yes	Lake Tillery

Did average daily water production exceed 80% of approved plant capacity for five consecutive days during 2017? No

If yes, was any water conservation implemented?

Did average daily water production exceed 90% of approved plant capacity for five consecutive days during 2017? No

If yes, was any water conservation implemented?

Are peak day demands expected to exceed the water treatment plant capacity in the next 10 years? No

4. Wastewater Information

Monthly Discharges

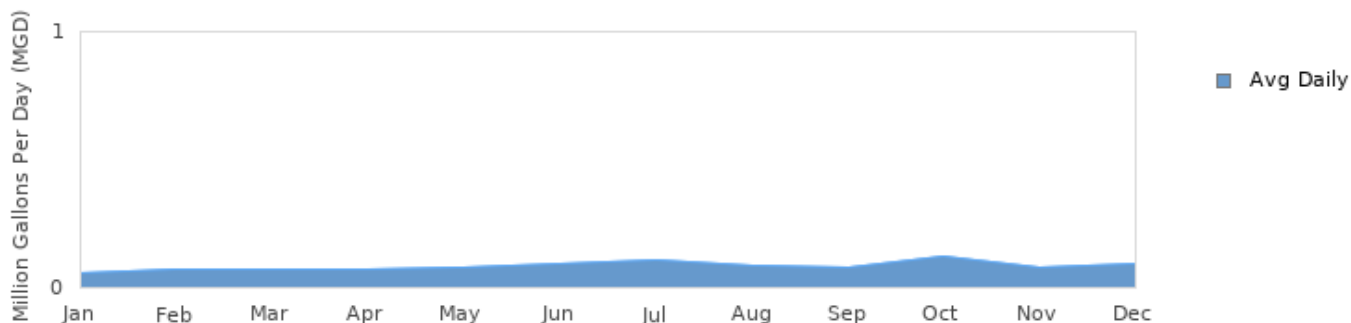
Average Daily Discharge (MGD)

Average Daily Discharge (MGD)

Average Daily Discharge (MGD)

Jan	0.0580	May	0.0750	Sep	0.0750
Feb	0.0680	Jun	0.0900	Oct	0.1180
Mar	0.0660	Jul	0.1050	Nov	0.0800
Apr	0.0670	Aug	0.0860	Dec	0.0890

Montgomery Co's 2017 Monthly Discharges



How many sewer connections does this system have? 158

How many water service connections with septic systems does this system have? 4,258

Are there plans to build or expand wastewater treatment facilities in the next 10 years? No

Wastewater discharge is related to NPDES permit No. 0080322 for alum sludge treatment facility. Sewer connections are MCPU collections systems that send wastewater to local municipalities at their WWTPs.

Wastewater Permits

Permit Number	Permitted Capacity (MGD)	Design Capacity (MGD)	Average Annual Daily Discharge (MGD)	Maximum Day Discharge (MGD)	Receiving Stream	Receiving Basin
NC0080322	0.2880	0.3800	0.0628		Unnamed Trib. to Clarks Creek	Yadkin River (18-1)

Wastewater Interconnections

Water System	PWSID	Type	Average Daily Amount		Contract Maximum (MGD)
			MGD	Days Used	
Town of Candor	03-62-030	Discharging	0.0150	365	0.0000
Town of Troy	03-62-020	Discharging	0.0032	365	0.0000

5. Planning

Projections

	2017	2020	2030	2040	2050	2060
Year-Round Population	14,473	14,900	15,870	16,900	18,000	19,170
Seasonal Population	0	0	0	0	0	0
Residential	0.4660	0.4970	0.5290	0.5630	0.6000	0.6390
Commercial	0.2820	0.3090	0.3400	0.3740	0.4110	0.4520
Industrial	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Institutional	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
System Process	0.0250	0.0400	0.0420	0.0440	0.0460	0.0480
Unaccounted-for	0.4630	0.3390	0.3650	0.3930	0.4240	0.4560

Residential: projections based on 6.5% growth every 10 years - more aggressive than the NC Department of Commerce's 3% / 10 years for Montgomery County;
 Commercial: projections based on 10% growth / 10 years - again an aggressive rate to stress this planning exercise

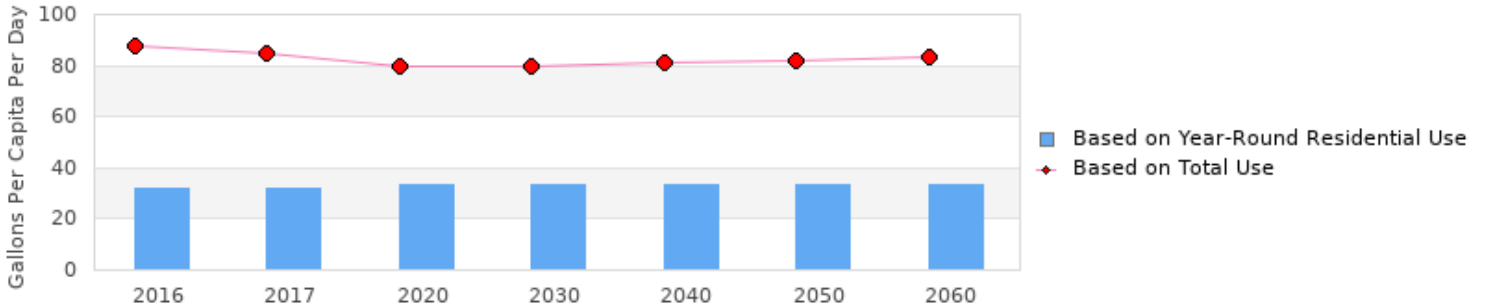
Future Water Sales

Purchaser	PWSID	MGD	Contract Year Begin	Contract Year End	Pipe Size(s) (Inches)	Use Type
Robbins Water System	03-63-015	0.5000	2020			Regular

Demand v/s Percent of Supply

	2017	2020	2030	2040	2050	2060
Surface Water Supply	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Ground Water Supply	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Purchases	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Future Supplies		0.0000	0.0000	0.0000	0.0000	0.0000
Total Available Supply (MGD)	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Service Area Demand	1.2360	1.1850	1.2760	1.3740	1.4810	1.5950
Sales	1.3340	2.3470	2.3470	2.3470	2.3470	2.3470
Future Sales		0.5000	0.5000	0.5000	0.5000	0.5000
Total Demand (MGD)	2.5700	4.0320	4.1230	4.2210	4.3280	4.4420
Demand as Percent of Supply	43%	67%	69%	70%	72%	74%

Montgomery Co's Projected Gallons Per Capita Per Day (GPCD) Over Time



The purpose of the above chart is to show a general indication of how the long-term per capita water demand changes over time. The per capita water demand may actually be different than indicated due to seasonal populations and the accuracy of data submitted. Water systems that have calculated long-term per capita water demand based on a methodology that produces different results may submit their information in the notes field.

Your long-term water demand is 32 gallons per capita per day. What demand management practices do you plan to implement to reduce the per capita water demand (i.e. conduct regular water audits, implement a plumbing retrofit program, employ practices such as rainwater harvesting or reclaimed water)? If these practices are covered elsewhere in your plan, indicate where the practices are discussed here. **See Section 1 of the plan for practices that could reduce the per capita water demand.**

Are there other demand management practices you will implement to reduce your future supply needs?

What supplies other than the ones listed in future supplies are being considered to meet your future supply needs?

How does the water system intend to implement the demand management and supply planning components above?

Additional Information

Has this system participated in regional water supply or water use planning? No

What major water supply reports or studies were used for planning?

Please describe any other needs or issues regarding your water supply sources, any water system deficiencies or needed improvements (storage, treatment, etc.) or your ability to meet present and future water needs. Include both quantity and quality considerations, as well as financial, technical, managerial, permitting, and compliance issues:

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Biological Resources

USFWSF County Listing http://www.fws.gov/raleigh/species/cntylist/nc_counties.html

U.S. Fish & Wildlife Service

Endangered Species, Threatened Species, Federal Species of Concern, and Candidate Species,

Montgomery County, North Carolina



Updated: 03-28-2018

Common Name	Scientific name	Federal Status	Record Status
Vertebrate:			
Bald eagle	<i>Haliaeetus leucocephalus</i>	BGPA	Current
Cape Fear shiner Range by Basin	<i>Notropis mekistocholas</i>	E	Current
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	Current
Invertebrate:			
Atlantic pigtoe Range by Basin	<i>Fusconaia masoni</i>	ARS	Current
Brook floater	<i>Alasmidonta varicosa</i>	ARS	Current
Savannah lilliput	<i>Toxolasma pullus</i>	ARS	Current
Vascular Plant:			
Bog spicebush	<i>Lindera subcoriacea</i>	ARS	Current
Georgia aster	<i>Symphotrichum georgianum</i>	C	Current
Schweinitz's sunflower	<i>Helianthus schweinitzii</i>	E	Current
Smooth coneflower	<i>Echinacea laevigata</i>	E	Historic
Yadkin River goldenrod	<i>Solidago plumosa</i>	C	Current
Nonvascular Plant:			
Lichen:			

Definitions of Federal Status Codes:

E = endangered. A taxon "in danger of extinction throughout all or a significant portion of its range."

T = threatened. A taxon "likely to become endangered within the foreseeable future throughout all or a significant portion of its range."

C = candidate. A taxon under consideration for official listing for which there is sufficient information to support listing. (Formerly "C1" candidate species.)

BGPA = Bald and Golden Eagle Protection Act. See below.

ARS = [At Risk Species](#). Species that are Petitioned, Candidates or Proposed for Listing under the Endangered Species Act. Consultation under Section 7(a)(2) of the ESA is not required for Candidate or Proposed species; although a Conference, as described under Section 7(a)(4) of the ESA is recommended for actions affecting

species proposed for listing.

FSC=Federal Species of Concern. FSC is an informal term. It is not defined in the federal Endangered Species Act. In North Carolina, the Asheville and Raleigh Field Offices of the US Fish and Wildlife Service (Service) define Federal Species of Concern as those species that appear to be in decline or otherwise in need of conservation and are under consideration for listing or for which there is insufficient information to support listing at this time. Subsumed under the term "FSC" are all species petitioned by outside parties and other selected focal species identified in Service strategic plans, State Wildlife Action Plans, or Natural Heritage Program Lists.

T(S/A) = threatened due to similarity of appearance. A taxon that is threatened due to similarity of appearance with another listed species and is listed for its protection. Taxa listed as T(S/A) are not biologically endangered or threatened and are not subject to Section 7 consultation. See below.

EXP = experimental population. A taxon listed as experimental (either essential or nonessential). Experimental, nonessential populations of endangered species (e.g., red wolf) are treated as threatened species on public land, for consultation purposes, and as species proposed for listing on private land.

P = proposed. Taxa proposed for official listing as endangered or threatened will be noted as "PE" or "PT", respectively.

Bald and Golden Eagle Protection Act (BGPA):

In the July 9, 2007 Federal Register(72:37346-37372), the bald eagle was declared recovered, and removed (delisted) from the Federal List of Threatened and Endangered wildlife. This delisting took effect August 8, 2007. After delisting, the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668-668d) becomes the primary law protecting bald eagles. The Eagle Act prohibits take of bald and golden eagles and provides a statutory definition of "take" that includes "disturb". The USFWS has developed National Bald Eagle Management Guidelines to provide guidance to land managers, landowners, and others as to how to avoid disturbing bald eagles. For mor information, visit <http://www.fws.gov/migratorybirds/baldeagle.htm>

Threatened due to similarity of appearance(T(S/A)):

In the November 4, 1997 Federal Register (55822-55825), the northern population of the bog turtle (from New York south to Maryland) was listed as T (threatened), and the southern population (from Virginia south to Georgia) was listed as T(S/A) (threatened due to similarity of appearance). The T(S/A) designation bans the collection and interstate and international commercial trade of bog turtles from the southern population. The T(S/A) designation has no effect on land management activities by private landowners in North Carolina, part of the southern population of the species. In addition to its official status as T(S/A), the U.S. Fish and Wildlife Service considers the southern population of the bog turtle as a Federal species of concern due to habitat loss.

Definitions of Record Status:

Current - the species has been observed in the county within the last 50 years.

Historic - the species was last observed in the county more than 50 years ago.

Obscure - the date and/or location of observation is uncertain.

Incidental/migrant - the species was observed outside of its normal range or habitat.

Probable/potential - the species is considered likely to occur in this county based on the proximity of known records (in adjacent counties), the presence of potentially suitable habitat, or both.

USFWS IPaC Report <https://ecos.fws.gov/ipac/>

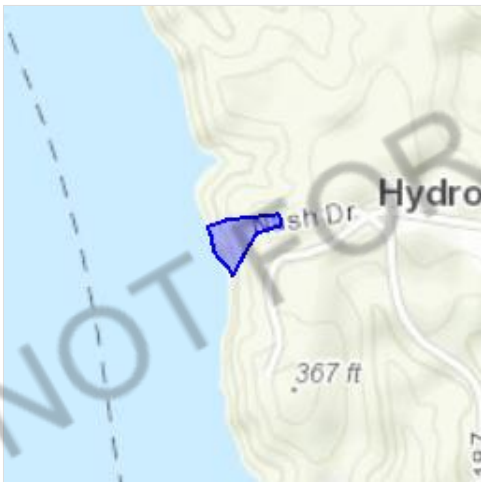
IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

Location

Montgomery County, North Carolina



Local office

Raleigh Ecological Services Field Office

☎ (919) 856-4520

📠 (919) 856-4556

MAILING ADDRESS

Post Office Box 33726
Raleigh, NC 27636-3726

PHYSICAL ADDRESS

551 Pylon Drive, Suite F

Raleigh, NC 27606-1487

NOT FOR CONSULTATION

Endangered species

This resource list is for informational purposes only and does not constitute an analysis of project level impacts.

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species¹ and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries²).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.
2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

Birds

NAME

STATUS

Red-cockaded Woodpecker *Picoides borealis* Endangered
 No critical habitat has been designated for this species.
<https://ecos.fws.gov/ecp/species/7614>

Flowering Plants

NAME	STATUS
Schweinitz's Sunflower <i>Helianthus schweinitzii</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3849	Endangered
Smooth Coneflower <i>Echinacea laevigata</i> No critical habitat has been designated for this species. https://ecos.fws.gov/ecp/species/3473	Endangered

Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the [FAQ below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME	BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED, WHICH IS A VERY LIBERAL ESTIMATE OF THE DATES INSIDE WHICH THE BIRD BREEDS ACROSS ITS ENTIRE RANGE. "BREEDS ELSEWHERE" INDICATES THAT THE BIRD DOES NOT LIKELY BREED IN YOUR PROJECT AREA.)
<p>Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626</p>	<p>Breeds Sep 1 to Jul 31</p>
<p>Prairie Warbler <i>Dendroica discolor</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	<p>Breeds May 1 to Jul 31</p>
<p>Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.</p>	<p>Breeds May 10 to Sep 10</p>

Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is $0.25/0.25 = 1$; at week 20 it is $0.05/0.25 = 0.2$.
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

To see a bar's survey effort range, simply hover your mouse cursor over the bar.

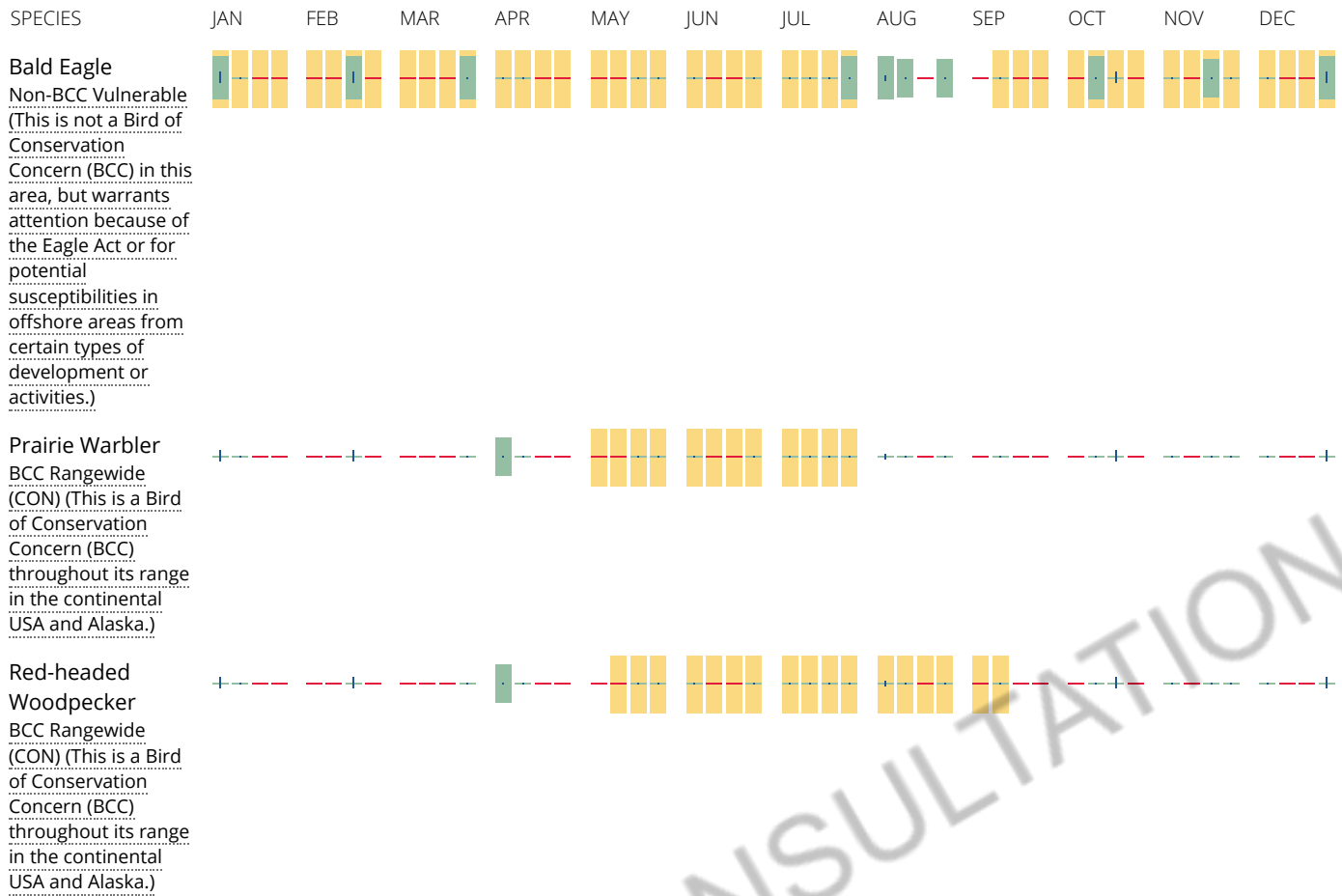
No Data (—)

A week is marked as having no data if there were no survey events for that week.

Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.

■ probability of presence ■ breeding season | survey effort — no data



Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the migratory birds potentially occurring in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [E-bird Explore Data Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Facilities

Wildlife refuges and fish hatcheries

REFUGE AND FISH HATCHERY INFORMATION IS NOT AVAILABLE AT THIS TIME

Wetlands in the National Wetlands Inventory

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

WETLAND INFORMATION IS NOT AVAILABLE AT THIS TIME

This can happen when the National Wetlands Inventory (NWI) map service is unavailable, or for very large projects that intersect many wetland areas. Try again, or visit the [NWI map](#) to view wetlands at this location.

Data limitations

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.


Data exclusions

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

Data precautions

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.

Red-cockaded Woodpecker (*Picoides borealis*) <https://ecos.fws.gov/ecp0/profile/speciesProfile?sid=7614>
https://www.fws.gov/raleigh/species/es_red-cockaded_woodpecker.html

	<p>STATUS: Endangered; A species in danger of extinction throughout all or a significant portion of its range.</p>
	<p>DESCRIPTION: 22 cm. Rather small black-and-white woodpecker with longish bill. Above black barred white. Below white with black spots on flanks. Black crown, nape and moustachial stripe border white cheeks and side of neck. Male has small red mark on the side of nape. Juvenile browner with variable extent of red on crown.</p>
	<p>RANGE: The species historical range included Alabama, Arkansas, Florida, Georgia, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Texas, Virginia.</p>
	<p>HABITAT: forests with trees old enough for roosting, generally at least 60-120 years old, depending on species of pine. The most prominent adaptation of RCWs is their use of living pines for cavity excavation.</p>
	<p>CRITICAL HABITAT: NO critical habitat has been designated for this species THREATS: Loss of suitable habitat, especially longleaf pine</p>

Current Listing Status Summary

Status	Date Listed	Lead Region	Where Listed
Endangered	10/13/1970	Southeast Region (Region 4)	Wherever found Additional species information

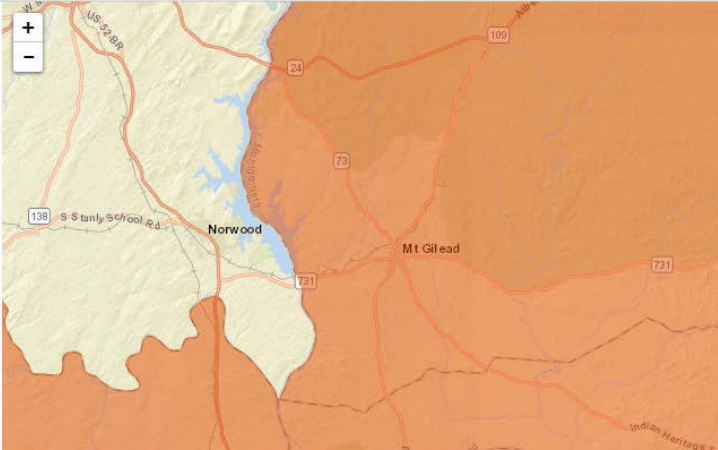
» Range Information

Current Range

Wherever found

Zoom in! Some species' locations may be small and hard to see from a wide perspective. To narrow-in on locations, check the state and county lists (below) and then use the zoom tool.

Want the FWS's current range for all species? Click [here](#) to download a zip file containing all individual shapefiles and metadata for all species.



Schweinitz's Sunflower (*Helianthus schweinitzii*) <https://ecos.fws.gov/ecp0/profile/speciesProfile?sid=3849>
https://www.fws.gov/raleigh/species/es_schweinitz_sunflower.html



Schweinitz's Sunflower.
Credit: Dale Suiter.

STATUS: Endangered; A species in danger of extinction throughout all or a significant portion of its range.

DESCRIPTION: Perennial that regularly grows approx. 6.5 feet (ft) to occasionally 16 ft (4.8 m). Thickened roots are used to store starch. Stem is purplish in color, and upper third bears secondary branches at 45-degree angles. Leaves arranged in pairs on lower part of the stem but usually occur singly (or alternate) on upper parts. Leaves attached to stem at right angles, and tips of leaves tend to droop. Leaves are thick and stiff, with a rough upper surface. Produces small yellow flowers from late August until frost. Species is able to colonize through dispersal of seeds that readily germinate without a dormant period.

RANGE: Found in the central Piedmont region of NC & SC. Best Search Time: late August through October

HABITAT: Occurs in full to partial sun and is found in areas with poor soils, such as thin clays that vary from wet to dry. It is believed that this species once occurred in natural forest openings or grasslands. Many of the remaining populations occur along roadsides.

CRITICAL HABITAT: NO critical habitat has been designated for this species

THREATS: Habitat destruction, fire suppression, alteration of native habitat, roadside and utility right of way maintenance, industrial development, mining, encroachment by exotic species, and highway construction and improvement have all contributed to the decline. This species occurs in many rapidly developing areas within the piedmont region. As these areas develop, habitat is destroyed.

Current Listing Status Summary

Status	Date Listed	Lead Region	Where Listed
Endangered	05/07/1991	Southeast Region (Region 4)	Wherever found

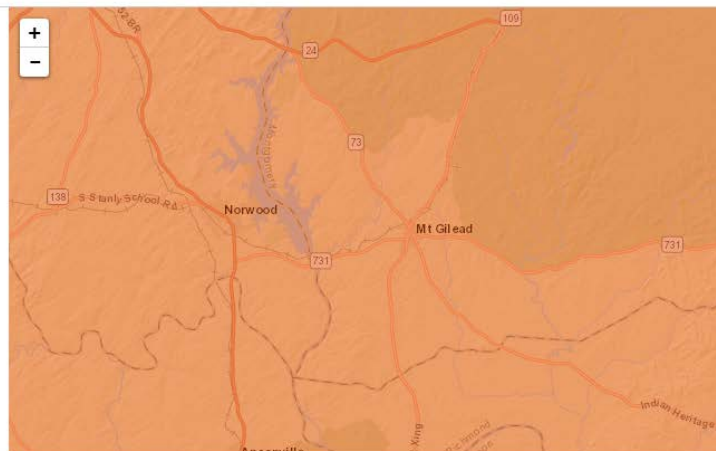
» Range Information

Current Range

Wherever found

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Smooth Coneflower (*Echinacea laevigata*) <https://ecos.fws.gov/ecp0/profile/speciesProfile?slid=3473>
https://www.fws.gov/raleigh/species/es_smooth_coneflower.html



Smooth Coneflower

STATUS: Endangered; A species in danger of extinction throughout all or a significant portion of its range.

DESCRIPTION: Perennial herb in the Aster family (*Asteraceae*) that grows up to 3.3 feet (ft) tall from vertical root stock. Large elliptical to broadly lanceolate basal leaves may reach 8” in length, 3” in width, taper into long petioles toward the base, and are smooth to slightly rough in texture. Stems are smooth with few leaves. Mid-stem leaves are smaller than the basal leaves. Flower heads are usually solitary. Rays of the flowers (petal-like structures) are light pink to purplish in color, usually drooping, and 2 – 3.2” long. Flowering occurs from late May through mid-July. Fruits develop from late June to Sept. Fruiting structures often persist through the fall. Reproduction is accomplished both sexually (by seed) and asexually (by rhizome).

RANGE: Currently occurs in Virginia, North Carolina, South Carolina, and Georgia. Best Search Time: late May through October

HABITAT: Typically found in open woods, glades, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and power line rights-of-way, usually on magnesium and calcium rich soils associated with amphibolite, dolomite or limestone (in VA), gabbro (in NC & VA), diabase (in NC & SC), and marble (in SC & GA). Occurs in plant communities that have been described as xeric hardpan forests, diabase glades or dolomite woodlands. Optimal sites characterized by abundant sunlight and little competition in the herbaceous layer. Natural fires & large herbivores historically influenced the vegetation in this species' range. Many herbs associated with Smooth coneflower are also sun-loving species that depend on periodic disturbances to reduce the shade and competition of woody plants.

CRITICAL HABITAT: NO critical habitat has been designated for this species

THREATS: Fire suppression and habitat destruction resulting from highway construction, residential and commercial development as well as maintenance activities in roadside and utility rights of way. Collection from the wild for horticultural and medicinal uses could also threaten .

Current Listing Status Summary

Status	Date Listed	Lead Region	Where Listed
Endangered	10/08/1992	Southeast Region (Region 4)	Wherever found

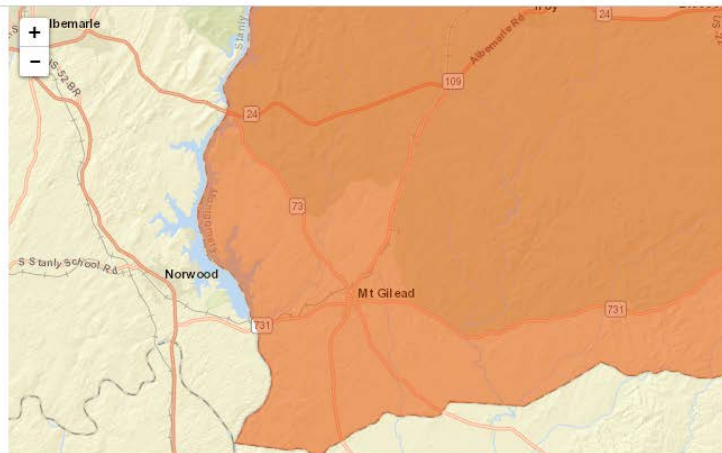
» Range Information

Current Range

Wherever found

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East of project area Basin

Cape Fear Shiner (*Notropis mekistocholas*) <https://ecos.fws.gov/ecp0/profile/speciesProfile?sid=6063>

https://www.fws.gov/raleigh/species/es_cape_fear_shiner.html

	<p>STATUS: Endangered</p>
	<p>DESCRIPTION: It is a small (approx. 2" long), yellowish minnow with a black band along the sides of its body. Fins are yellow and somewhat pointed. It has a black upper lip, and the lower lip bears a thin black bar along its margin. Known to consume plant and animal material. However, unlike most other minnows in the genus <i>Notropis</i>, the Cape Fear shiner's digestive tract is modified primarily for a plant diet by having an elongated, convoluted intestine.</p>
	<p>RANGE: Endemic to the upper Cape Fear River Basin in the Central Piedmont of NC. The species is known from tributaries and mainstems of the Deep River, Haw River, Rocky River and Cape Fear River in Chatham, Harnett, Lee, Moore and Randolph counties.</p>
	<p>HABITAT: Generally associated with gravel, cobble, and boulder substrates, and has been observed in slow pools, riffles, and slow runs. These areas occasionally support water willow, which may be used as cover or protection from predators (e.g. flathead catfish, bass, and crappie). Can be found swimming in schools of other minnow species but is never the most abundant species. During spawning season, May - July, adults move to slower flowing pools to lay eggs on the rocky substrate. Juveniles are often found in slack water, among large rock outcrops of the midstream, and in flooded side channels and pools. Are sexually mature after their first year, and are known to live up to 6 years in captivity.</p>
	<p>CRITICAL HABITAT: Wherever Found</p>
<p>THREATS: Habitat loss and degradation. The species' habitat becomes unsuitable when flow or water levels change from dams or other stream alterations. These isolate shiners into small pockets of suitable habitat, thus making them vulnerable to extirpation.</p>	

Current Listing Status Summary

Status	Date Listed	Lead Region	Where Listed
Endangered	09/25/1987	Southeast Region (Region 4)	Wherever found

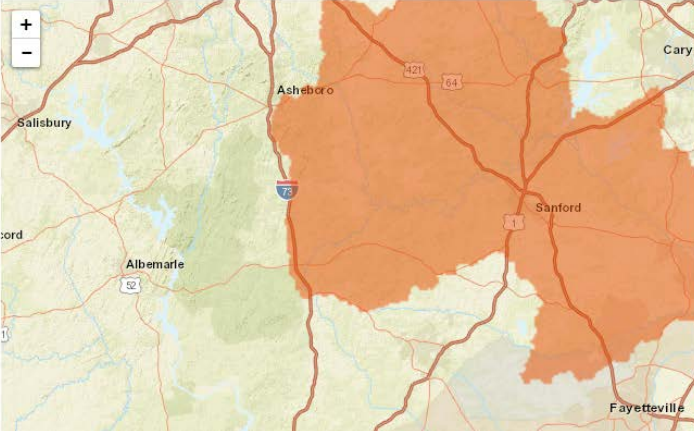
» Range Information

Current Range

Wherever found

Zoom in! Some species' locations may be small and hard to see from a wide perspective. To narrow-in on locations, check the state and county lists (below) and then use the zoom tool.

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Species NHP Table <https://www.ncnhp.org/data/species-community-search>

TAXONOMIC GROUP	SCIENTIFIC NAME	COMMON NAME	NC STATUS	US STATUS	HABITAT COMMENT	TOPO MAP	TOPO MAP STATUS
Vascular Plant	<i>Helianthus schweinitzii</i>	Schweinitz's Sunflower	E	E	open woods, roadsides, and other rights-of-way	Mt Gilead W	Current
Freshwater Bivalve	<i>Lampsilis cariosa</i>	Yellow Lampmussel	E		Chowan, Roanoke, Neuse, Tar, Cape Fear, Lumber, Yadkin-Pee Dee drainages	Mt Gilead W	Current
Freshwater Bivalve	<i>Villosa vaughaniana</i>	Carolina Creekshell	E		Cape Fear, Yadkin-Pee Dee, and Catawba drainages (endemic to North Carolina and adjacent South Carolina)	Mt Gilead W	Current
Amphibian	<i>Ambystoma talpoideum</i>	Mole Salamander	SC		breeds in fish-free semipermanent woodland ponds; forages in adjacent woodlands	Mt Gilead W	Historical
Freshwater Bivalve	<i>Elliptio folliculata</i>	Pod Lance	SC		Cape Fear, Lumber, and Yadkin-Pee Dee drainages	Mt Gilead W	Current
Freshwater Bivalve	<i>Elliptio roanokensis</i> (syn. <i>Elliptio judithae</i>)	Roanoke Slabshell	SC		Roanoke, Tar, Neuse, White Oak, Cape Fear, Lumber, and Yadkin-Pee Dee drainages	Mt Gilead W	Current
Freshwater Fish	<i>Carpoides</i> sp. cf. <i>cyprinus</i>	Carolina Quillback	SR		Yadkin-Pee Dee, Catawba, Broad, and Roanoke drainages	Mt Gilead W	Current
Dragonfly or Damselfly	<i>Gomphurus fraternus</i> (syn. <i>Gomphus fraternus</i>)	Midland Clubtail	SR		rocky rivers	Mt Gilead W	Current
Dragonfly or Damselfly	<i>Gomphurus septima</i> (syn. <i>Gomphus septima</i>)	Septima's Clubtail	SR		rocky rivers	Mt Gilead W	Current
Freshwater Fish	<i>Ictiobus bubalus</i>	Smallmouth Buffalo	SR		French Broad drainage [populations in Atlantic Slope are not tracked]	Mt Gilead W	Current
Reptile	<i>Masticophis flagellum</i>	Coachwhip	SR		dry and sandy woods, mainly in pine/oak sandhills	Mt Gilead W	Historical
Dragonfly or Damselfly	<i>Somatochlora georgiana</i>	Coppery Emerald	SR		creeks and other slow-moving acidic streams, in forested areas	Mt Gilead W	Historical
Freshwater Bivalve	<i>Villosa delumbis</i>	Eastern Creekshell	SR		Cape Fear, Lumber, Yadkin-Pee Dee, and Catawba drainages	Mt Gilead W	Current
Bird	<i>Haliaeetus leucocephalus</i>	Bald Eagle	T	BGPA	mature forests near large bodies of water (nesting); rivers, lakes, and sounds (foraging) [breeding evidence only]	Mt Gilead W	Current
Freshwater Bivalve	<i>Anodonta implicata</i>	Alewife Floater	T		Chowan, Roanoke, Cape Fear, and Pee Dee drainages	Mt Gilead W	Current

Freshwater Bivalve	Lampsilis radiata	Eastern Lampmussel	T		Chowan, Roanoke, Tar, Neuse, Cape Fear, Yadkin-Pee Dee drainages	Mt Gilead W	Current
Freshwater Bivalve	Ligumia nasuta	Eastern Pondmussel	T		Chowan, Roanoke, Neuse, Tar, Cape Fear, and Yadkin-Pee Dee drainages	Mt Gilead W	Current
Freshwater Bivalve	Strophitus undulatus	Creeper	T		Roanoke, Tar, Neuse, Cape Fear, Yadkin-Pee Dee, Catawba, Broad, and French Broad drainages	Mt Gilead W	Current
Natural Community	Piedmont Alluvial Forest					Mt Gilead W	Current
Natural Community	Piedmont Levee Forest (Typic Subtype)					Mt Gilead W	Obscure
Natural Community	Piedmont/Mountain Semipermanent Impoundment (Open Water Subtype)					Mt Gilead W	Current
Natural Community	Piedmont/Mountain Semipermanent Impoundment (Piedmont Marsh Subtype)					Mt Gilead W	Current
Natural Community	Piedmont/Mountain Semipermanent Impoundment (Shrub Subtype)					Mt Gilead W	Current
Natural Community	Upland Depression Swamp Forest					Mt Gilead W	Current
Animal Assemblage	Waterbird Colony					Mt Gilead W	Current

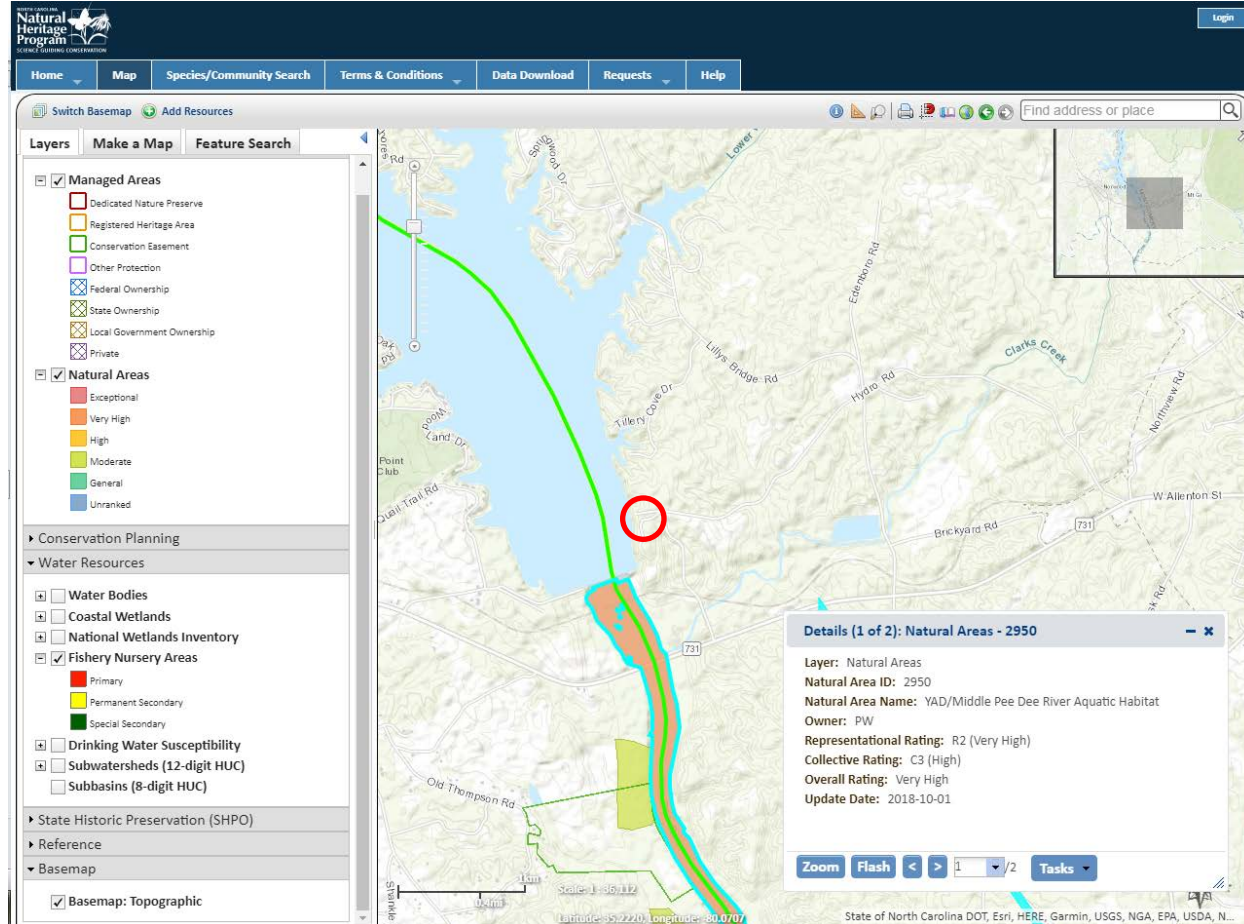
Public Lands & Natural Areas

Managed Areas, Natural Areas, Fish Nursery Areas

NC NHP Mapper <http://ncnhde.natureserve.org/content/map>

There are no fish nursery areas nearby

Closest Natural Area (very high rating) is on the Pee Dee River, south of the Tillery Dam



Closest Conservation Easement is SW of the Lake Tillery Dam

The screenshot displays the North Carolina Natural Heritage Program web application interface. The top navigation bar includes links for Home, Map, Species/Community Search, Terms & Conditions, Data Download, Requests, and Help. The main content area features a map of the Lake Tillery area in Stanly County, North Carolina. A red circle on the map highlights a specific location near the 'Nash' area, with a '307 ft' elevation marker. The map shows various land management layers, including Managed Areas and Natural Areas. Two information panels are open:

- Details (1 of 2): Managed Areas - 2226**
 - Layer: Managed Areas
 - Managed Area Name: Land Trust for Central North Carolina Easement
 - Managed Area ID: 2226
 - Owner: Land Trust for Central North Carolina
 - Category: Easement
 - Owner Type: Private
 - Acreeage: 15259.92
 - Date Source Date: 2014-07
 - GAP Status: 2 - managed for biodiversity - disturbance events suppressed
 - Update Date: 2018-10-01
- Identify**
 - Select a resource and click on map to identify
 - Identify Visible Resources
 - Identify On: Visible Layers in Resource
 - Identify By: Point
 - Use Buffer: 1 Miles
 - Show Identify Graphic

The map includes a scale bar (0.4 km / 0.2 mi), a scale of 1:18,056, and coordinates (Latitude: 35.2043, Longitude: -80.0727). The map also shows roads like Hydra Rd and Tillery Dam Rd, and a north arrow.

Trout Fishing / Gamelands- NC Wildlife Resource Commission Mapper

<https://www.ncpaws.org/wrcmapbook/FishingAreas.aspx>

NCWRC - North Carolina Fishing Areas

[Get License](#) [Directions](#) [Print Map](#) [Change Basemap](#)

[Filter](#) [Zoom to Location](#) [Legend](#)

Legend

Fishing Areas

- Sponsored by WRC
- Provided in Partnership with WRC
- Non-WRC affiliated

2017-2018 Public Mountain Trout Waters
Click waters (stream lines and lakes) within map to view more information.

- Catch and Release/ Artificial Flies Only (CRAFO)
- Catch and Release/ Artificial Lures Only (CRALO)
- Delayed Harvest
- Hatchery Supported
- Special Regulations
- Wild Trout Waters
- Wild Trout/ Natural Bait Waters

Show Only:
All Trout Waters

Mountain Heritage Trout Cities
show hide

Joint and Coastal Waters

- Joint Waters
- Coastal Waters

WRC Gamelands
County Boundaries

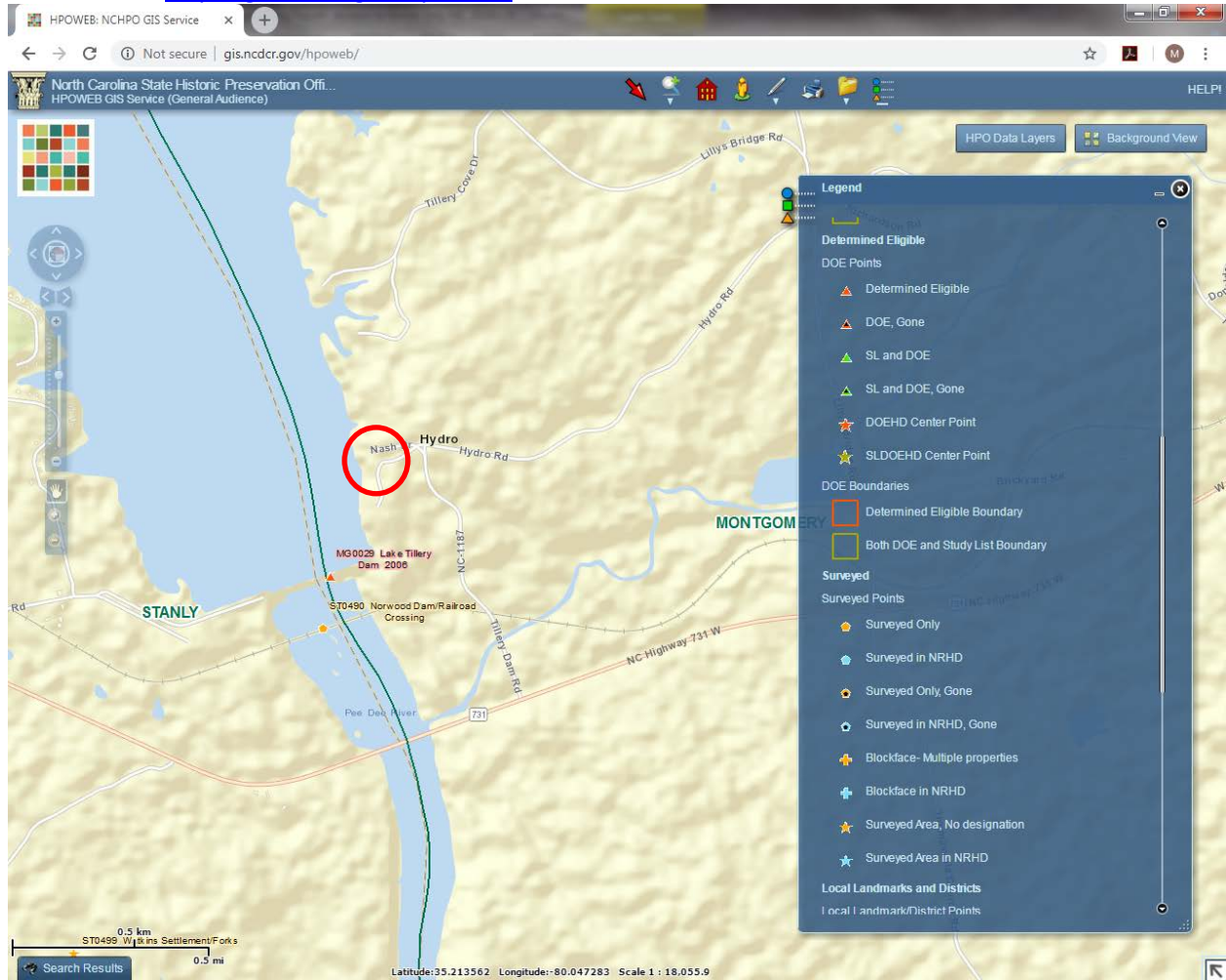
[Find a different location](#)

The map displays a topographic view of a region in North Carolina, featuring a large lake (Lake Tillery) and several streams. A red circle highlights a specific location on a stream. The map includes various roads, such as Emery Rd, Sprucewood Dr, Lower Richland Cr., Emery Rd, Hydro Rd, Lullys Dethle Rd, Tillery Cove Dr, Brckyard Rd, Thomasville Church Rd, McKay Hill Rd, Old Thompson Rd, Richland Loop Rd, Piney Point Rd, Quail Trail Rd, and Wagon Oak Rd. The map also shows the PINEY POINT GOLF CLUB. The legend on the left provides information about fishing areas, including sponsored areas, partnership areas, and non-WRC affiliated areas. It also lists regulations for 2017-2018 Public Mountain Trout Waters, such as Catch and Release/ Artificial Flies Only (CRAFO), Catch and Release/ Artificial Lures Only (CRALO), Delayed Harvest, Hatchery Supported, Special Regulations, Wild Trout Waters, and Wild Trout/ Natural Bait Waters. The legend also includes Mountain Heritage Trout Cities, Joint and Coastal Waters, WRC Gamelands, and County Boundaries.

Historic Resources

NC SHPO National Register <http://www.hpo.ncdcr.gov/NR-PDFs.html>

NC SHPO GIS <http://gis.ncdcr.gov/hpoweb/>




Toxic Substances

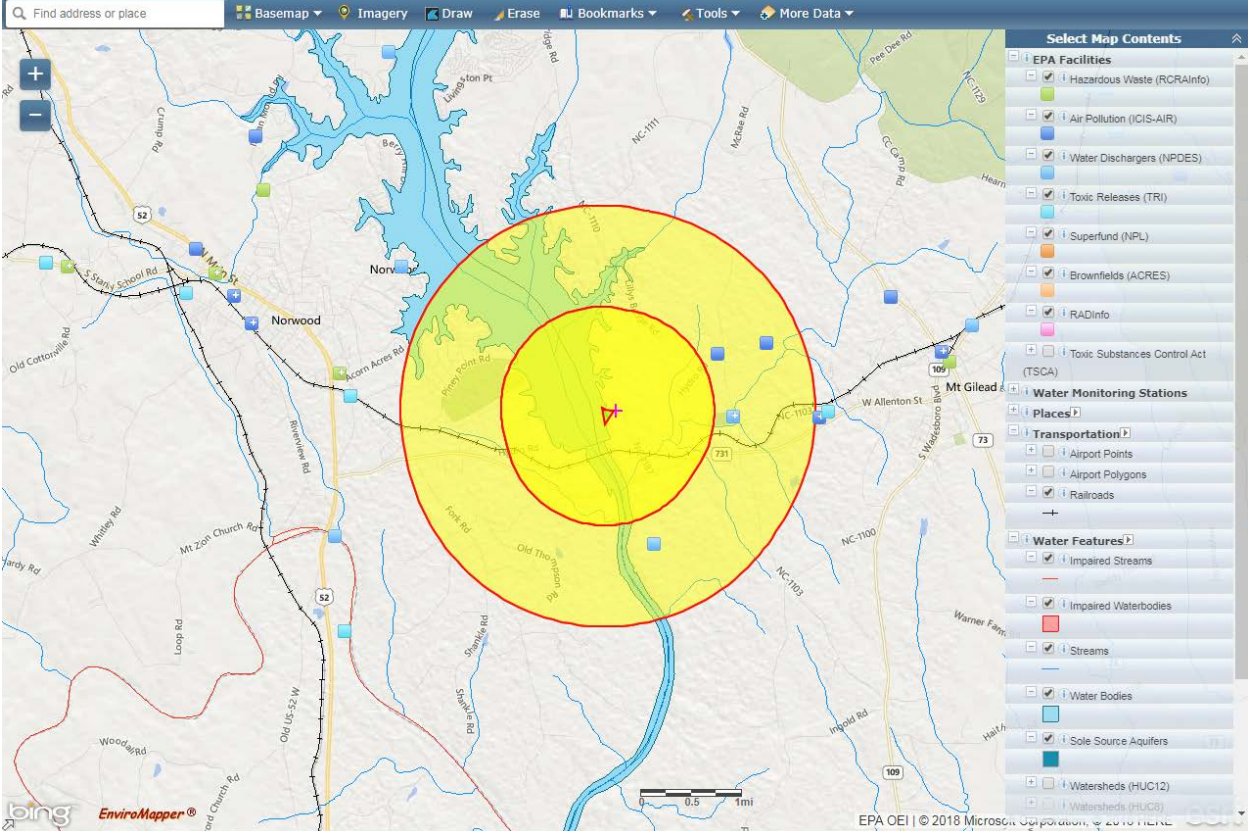
US EPA NEPAassist <https://www.epa.gov/nepa/nepassist>

No EPA Facilities within 1 mile

← → ↻ <https://nepassisttool.epa.gov/nepassist/nepamap.aspx?wherestr=Nash+Drive%2C+Mount+Gilead%2C+NC> ☆ [A] [M] [⋮]

NEPAassist Home | Help  United States Environmental Protection Agency

Find address or place Basemap Imagery Draw Erase Bookmarks Tools More Data



bing EnviroMapper® EPA OEI | © 2018 Microsoft Corporation, © 2018 HERE

EPA Enforcement and Compliance History Online (ECHO) <http://echo.epa.gov/>

EPA EnviroFacts <http://www3.epa.gov/enviro/>

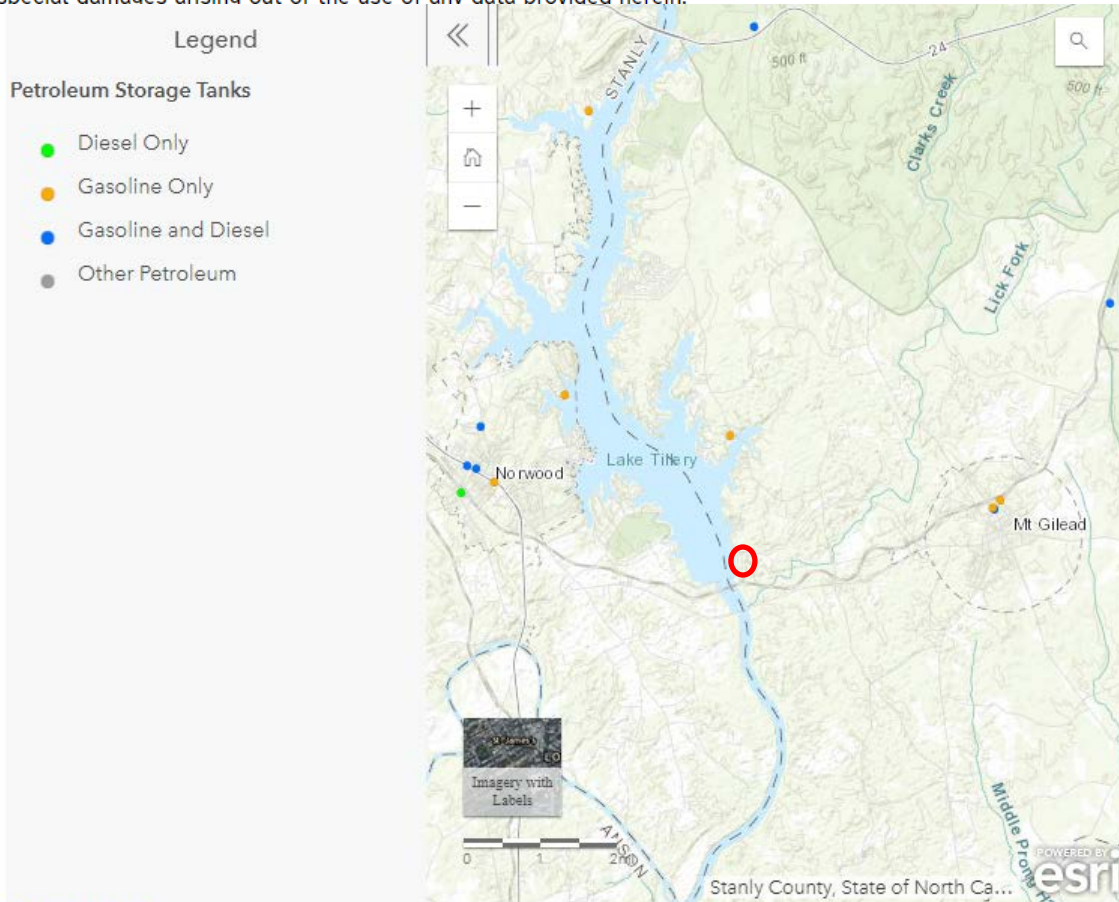
EPA Cleanups in My Community (CIMC) <https://www.epa.gov/cleanups/cleanups-my-community>

EPA Facility Registry Service (FRS) Detail Report <http://www.epa.gov/enviro/facility-registry-service-frs>

- Hazardous Waste Sites- Resource Conservation and Recovery Act Info (RCRA)
- Air Emissions Integrated Compliance Information System (ICIS-AIR)
- Water Dischargers Permit Compliance System (PCS/NPDES)
- [Toxics Release Inventory \(TRI\)](#)
- Superfund (Comprehensive Environmental Response, Compensation, & Liability Info System CERCLIS)
- Brownfields ([Assessment, Cleanup and Redevelopment Exchange System \(ACRES\)](#))
- Radiation (Radiation Info Database)
- [Toxic Substances Control Act \(TSCA\)](#)

UST Registered Tanks Map

Disclaimer: NC DEQ staff have compiled this dataset to the best of their abilities using the resources available to them. NC DEQ neither verifies nor guarantees the accuracy, reliability, or completeness of any data provided. NC DEQ provides this data without warranty of any kind whatsoever, either express or implied, and shall not be liable for incidental, consequential, or special damages arising out of the use of any data provided herein.



Environmental Justice

EPA NEPAAssist Mapping Tool <https://www.epa.gov/nepa/nepassist>

Add Demographics

2011-2015 ACS

2011-2015 ACS | 2010 Census | 2000 Census

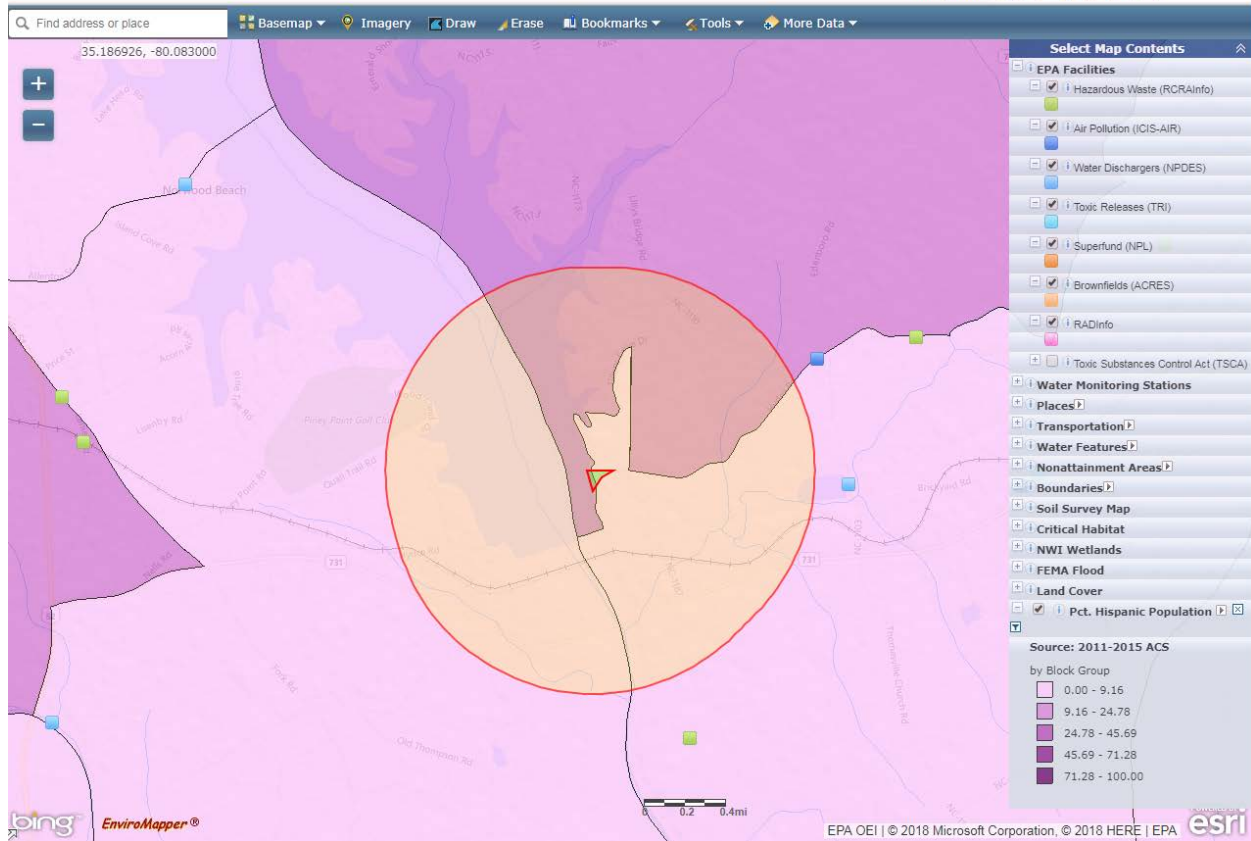
Category: Population
Variable: Pct. Hispanic Population
Method: Natural Breaks
Breaks: 5
Colors: [Color palette]
Transparency: [Slider from 1.0 to 0.0]
Border: 1

2011-2015 ACS demographics are a set of variables derived based on a subset of 2011-2015 American Community Survey data.

Add to Map

NEPAAssist

Home | Help  United States Environmental Protection Agency



Add Demographics

2011-2015 ACS

2011-2015 ACS 2010 Census 2000 Census

Category: **Income/Poverty**

Variable: **Pct. Population Below Poverty Level**

Method: **Natural Breaks**

Breaks: **5**

Colors:

Transparency:

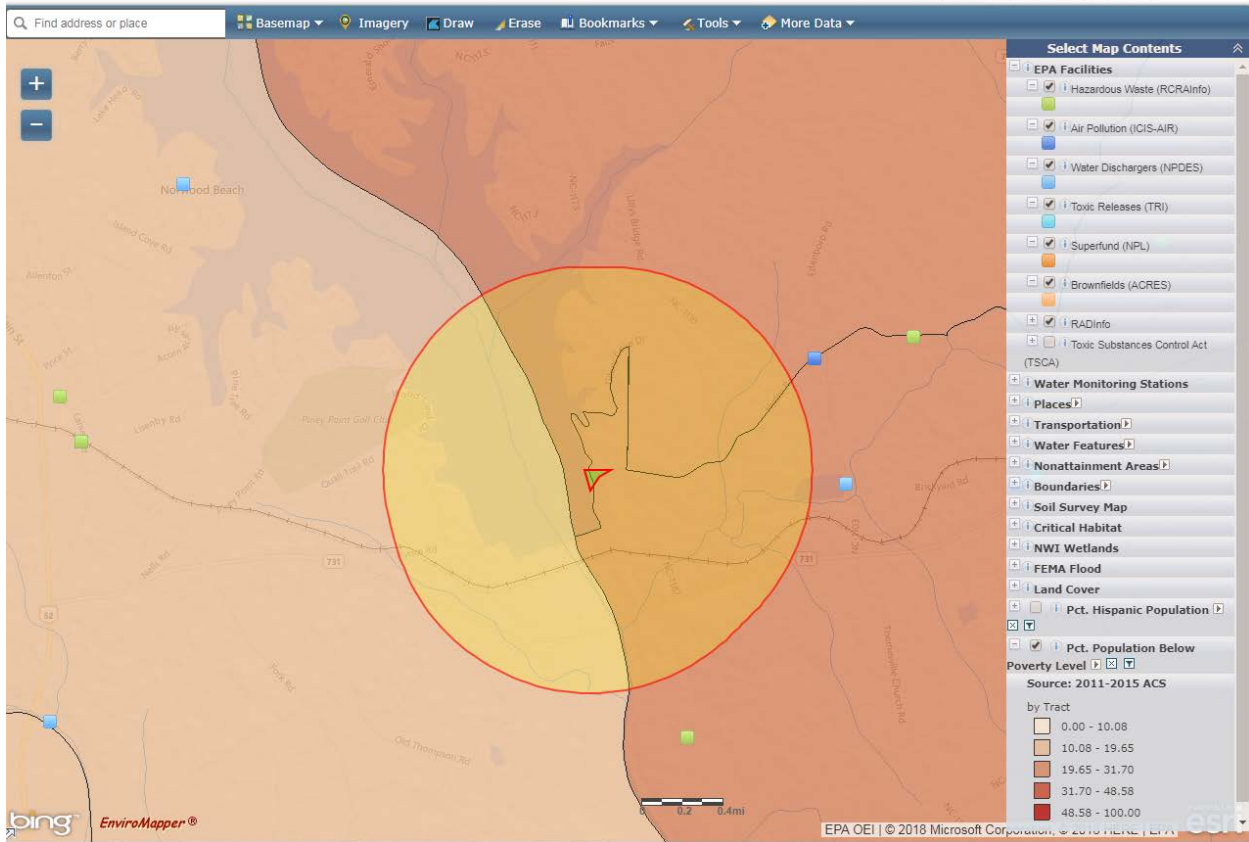
Border: **1**

Add to Map

2011-2015 ACS demographics are a set of variables derived based on a subset of 2011-2015 American Community Survey data.

NEPAssist

Home | Help



Add Demographics

2011-2015 ACS

2011-2015 ACS

2010 Census

2000 Census

Category: **Income/Poverty**

Variable: **Per Capita Income**

Method: **Natural Breaks**

Breaks: **5**

Colors:

Transparency:

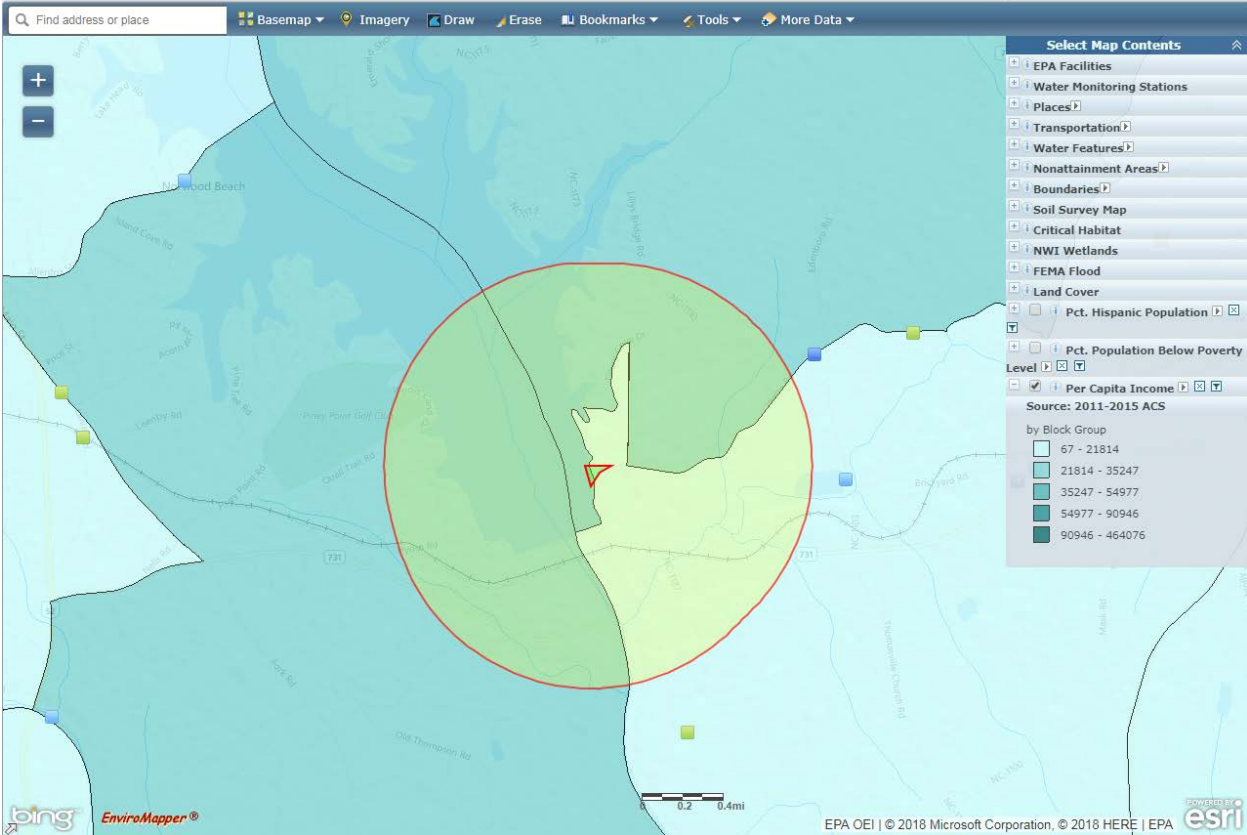
Border: **1**

Add to Map

2011-2015 ACS demographics are a set of variables derived based on a subset of 2011-2015 American Community Survey data.

NEPAssist

Home | Help





MONTGOMERY COUNTY, NORTH CAROLINA

2018 DWSRF

RAW WATER PUMP STATION IMPROVEMENTS PROJECT

APPENDIX 5D

AGENCY CONSULTATIONS

1. LIST OF AGENCIES CONSULTED
2. STATE HISTORIC PRESERVATION OFFICE (NC SHPO)
3. U.S. FISH AND WILDLIFE SERVICE (USFWS)
4. U.S. ARMY CORPS OF ENGINEERS (USACE)

Agencies Consulted

Renee Shearin
Renee Gledhill-Earley
State Historic Preservation Office
North Carolina Department of Natural and Cultural
Resources
109 East Jones Street (27601)
4617 Mail Service Center (27699-4617)
Raleigh NC
PH: 919-807-6584
renee.shearin@ncdcr.gov
Environmental.Review@ncdcr.gov
(email & CD in mail)

John Ellis
U.S. Fish and Wildlife Service
Raleigh Field Office
551F Pylon Drive
PO Box 33726
Raleigh, NC 27606
PH: 919-856-4520
john_ellis@fws.gov
https://www.fws.gov/raleigh/contact_us.html
(email & CD in mail)

Ross Sullivan
Reg. Specialist-Montgomery County
U.S. Army Corps of Engineers
Raleigh Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587
PH: 919-554-4884 ext 25
FX: 919-562-0421
roscoe.l.sullivan@usace.army.mil
<http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Contact/>
<http://www.saw.usace.army.mil/Missions/Regulatory-Permit-Program/Contact/County-Locator/>
(email & CD in mail)



November 13, 2018

Renee Gledhill-Earley
Environmental Review Technician
State Historic Preservation Office
North Carolina Department of Natural and Cultural Resources
Physical/Delivery: 109 East Jones Street, Room 258 (27601)
USPS/Mailing: 4617 Mail Service Center (27699-4617)
Raleigh, NC

Re: Montgomery County – Raw Water Pump Station Improvements Project
FY18 NC Drinking Water State Revolving Fund (DWSRF) /
State Reserve Program (DWSRP)
Project # H-SRP-D-18-0161 and WIF-1951
NEPA Environmental Review

Dear Ms. Gledhill-Earley:

On behalf of Montgomery County, please find the enclosed *Categorically Excluded NEPA Environmental Review* for the subject project for your review and comment. The County is in the process of submitting an engineering report to the North Carolina Department of Environmental Quality (DEQ) Division of Waster Infrastructure (DWI) – Drinking Water State Revolving Fund (DWSRF)¹/ Drinking Water State Reserve Program (DWSRP) to secure funding in the total estimated project cost of approximately \$1.5M. Under U.S. Environmental Protection Agency (EPA), DWI, and *15A NCAC 01C .0408* requirements, the County is responsible for compiling the environmental documentation, including consultation related to historic properties. Historic properties include archeological sites, burial grounds, sacred landscapes or features, ceremonial areas, traditional cultural places and landscapes, plant and animal communities, and buildings and structures with significant tribal association.

The County is conducting a review of this project to comply with Section 106 of the National Historic Preservation Act and its implementing regulations 36 CFR Part 800. We would like to invite you to be a consulting party in this review to help identify historic properties in the project areas that may have archaeological significance or historic value, and if such properties exist, to help assess how the project might affect them. If the project activities might have an adverse effect, we would like to discuss possible ways to avoid, minimize or mitigate potential adverse effects.

Consistent with local plans, the proposed project is to make critical improvements at the County's Raw Water Pump Station (RWPS), located at the end of Nash Road, on the banks of the Pee Dee River, north of the Lake Tillery Dam, approx. 3 miles west of Mt. Gilead. The majority of work planned is inside the existing building: replacement of the existing 6 MGD raw water pumps, motors, controls, valves and appurtenances; sump

120 North Boylan Avenue
Raleigh, NC 27603

919.828.0531
Fax 919.834.3589

¹ <http://portal.ncdenr.org/web/wi/dwsrf>



pump improvements; sodium permanganate system installation to enhance treatment processes; and lower level access improvements. External site improvements include: replacement of the existing generator, relocation of the motor control center, various electrical improvements, and landscaping restoration improvements to address erosion issues.

As the RWPS was constructed in 1982 and pumps have reached the end of useful life, the *no action* alternative could result in station failure, creating public health hazards and lack of drinking water to several municipalities. Rehabilitation of the aging and deteriorating pumps and equipment is not feasible. Replacement of pumps is the preferred alternative. Detailed alternatives proposed are described in the enclosed environmental documentation.

Within 1 mile from the site are two points of interest that were surveyed and/or determined to be eligible as historic, related to the dam crossing and railroad crossing across the Pee Dee River. There are no other known historic properties or visually sensitive zones within 1 mile or adjacent to the proposed project area, and the proposed project activities are not expected to have any adverse impact on aesthetic quality of the area.

While there are federally listed endangered and threatened species in Montgomery County, according to U.S. Fish and Wildlife Service (USFWS), and within approx. 2 miles according to NC Natural Heritage Program (NHP) data, most of the species of concern indicated in the project's immediate vicinity depend on aquatic/wetland habitat. While the project site is adjacent to the Pee Dee River and contains a small portion of 100-year floodplain, ground disturbance is estimated to be minimal and to not take place in floodplain/wetland corridors.

For planning purposes, the total project area is proposed within previously disturbed & developed, existing, fenced perimeter of the RWPS site (up to approx. 1 acre). All proposed construction will take place within the same footprint of previously-disturbed areas & impervious surface. No new structures are proposed in floodplain, wetland, or farmland soil areas. Proper wetland delineations, buffers, permits, and sedimentation/erosion control requirements will be followed as applicable to protect species and wetlands in the vicinity.

Based on analysis of documentation gathered thus far, it is anticipated that no significant adverse effect on the environment will take place. However, regulatory agencies are being contacted for concurrence. **Therefore, the enclosed document is for scoping.** This letter is a formal request to determine what effect(s) the proposed project activities may have on operations, services, and resources provided and/or managed by your agency. If you determine the project might have an adverse effect, we would like to discuss possible ways to avoid, minimize, or mitigate potential adverse effects.

The Wooten Company is contracted to assist with the preparation of this environmental analysis. After completing your review, please return your response within 15-30 days to my attention at The Wooten Company, 120 N. Boylan Avenue, Raleigh, NC 27603 or by email at mchevalier@thewootencompany.com. You can alternatively contact:

120 North Boylan Avenue
Raleigh, NC 27603

919.828.0531
Fax 919.834.3589



Chris Hildreth
Dir. of Development & Infrastructure
Montgomery County
724 Hydro Road
Mt. Gilead, NC 27306
PH: 910-576-4221
chris.hildreth@montgomerycountync.com
<http://www.montgomerycountync.com/departments/public-utilities>

Vincent Tomaino, PE
DWSRF Branch Head
NC DEQ- DWI
Physical: 512 N. Salisbury St, 27604
Mailing: 1633 Mail Service Center, 27699-1633
Raleigh, NC
PH: 919-707-9058
vincent.tomaino@ncdenr.gov

We value your assistance and look forward to consulting further on this project. Thank you for your comments regarding this project. If you have questions, please do not hesitate to contact me.

Sincerely,

Monica Chevalier
Community Development Specialist

Cc: Chris Hildreth
Vincent Tomaino
Courtney Gamble, PE, The Wooten Company, cgamble@thewotenccompany.com

Enclosures

120 North Boylan Avenue
Raleigh, NC 27603

919.828.0531
Fax 919.834.3589

From: [Monica Chevalier](mailto:Monica.Chevalier@ncdcr.gov)
To: ["Environmental.Review@ncdcr.gov"](mailto:Environmental.Review@ncdcr.gov)
Cc: [Courtney Gamble](#); [Kevin Wienhold](#)
Subject: Montgomery County Raw Water PS DWSRF Project
Date: Tuesday, November 13, 2018 5:20:00 PM
Attachments: [Appx D 04a- NCSHPO 20181113.pdf](#)
[Montgomery County RWPS CE Enviro 20181113.pdf](#)

Good Afternoon Renee- I hope you are well!!

I am contacting you on behalf of Montgomery County for a Raw Water Pump Station (RWPS) Improvements Project.

The County is in the process of finalizing an engineering report to secure approx. \$1.5M of federal loan funds. The County is conducting a categorically excluded NEPA environmental review of the project to comply with EPA regulations, and your review is needed for historical compliance for Section 106 of the National Historic Preservation Act and its implementing regulations 36 CFR Part 800. The project consists of critical improvements at the County's RWPS, located along the Pee Dee River near Lake Tillery Dam.

- Improvements inside the existing building include: replacement of the existing 6 MGD raw water pumps, motors, controls, valves and appurtenances; sump pump improvements; sodium permanganate system installation to enhance treatment processes; and lower level access improvements.
- External site improvements include: replacement of the existing generator, relocation of the motor control center, various electrical improvements, and landscaping restoration improvements to address erosion issues.

For planning purposes, potential ground disturbance is up to approx. 1 acre, within the previously disturbed and developed RWPS site, and within the fenced perimeter. While some areas are located in floodplain areas/farmland soils, and adjacent to wetland, there is no proposed filling, modification, or permanent disturbance to these areas. All proposed construction will take place within the same footprint of previously-disturbed built-up areas and/or impervious surface. Within 1 mile from the site are two points of interest that were surveyed and/or determined to be eligible as historic, related to the dam crossing and railroad crossing across the Pee Dee River. Based on the NC SHPO GIS mapper, there are no other known historic properties or visually sensitive zones within 1 mile or adjacent to the proposed project area.

This is notification of the County's decision-making process in evaluating project alternatives and anticipated environmental impacts, which are described in the attached environmental documentation. A hardcopy is forthcoming in the mail if you have any issues.

Based on analysis of documentation gathered thus far, it is anticipated that no adverse effect will take place with the project. However, this is a formal request to determine what effect(s) the proposed project activities may have on operations, services, and resources provided and/or managed by your agency. If you determine the project might have an adverse effect, we would like to discuss possible ways to avoid, minimize, or mitigate potential adverse effects.

The Wooten Company is contracted to assist with the environmental review of this project. After completing your review, if at all possible, please return your response within 15-30 days to my attention or respond to this email. You can alternatively contact (see attached letter):

Chris Hildreth
Dir. of Development & Infrastructure
Montgomery County
724 Hydro Road
Mt. Gilead, NC 27306
PH: 910-576-4221
chris.hildreth@montgomerycountync.com
<http://www.montgomerycountync.com/departments/public-utilities>

Vincent Tomaino, PE
DWSRF Branch Head
NC DEQ- DWI
Physical: 512 N. Salisbury St,
27604
Mailing: 1633 Mail Service
Center, 27699-1633
Raleigh, NC
PH: 919-707-9058
vincent.tomaino@ncdenr.gov

If you have any questions or need any additional information, please don't hesitate to contact me.

Thank you and have a great day!
Monica

Monica Chevalier
Community Development Specialist
The Wooten Company
120 North Boylan Avenue
Raleigh, NC 27603
P: 919.828.0531
F: 919.834.3589
www.thewootencompany.com





November 13, 2018

John Ellis
U.S. Fish and Wildlife Service
Raleigh Field Office
551F Pylon Drive
PO Box 33726
Raleigh, NC 27606

Re: Montgomery County – Raw Water Pump Station Improvements Project
FY18 NC Drinking Water State Revolving Fund (DWSRF) /
State Reserve Program (DWSRP)
Project # H-SRP-D-18-0161 and WIF-1951
NEPA Environmental Review

Dear Mr. Ellis:

On behalf of Montgomery County, please find the enclosed *Categorically Excluded* NEPA Environmental Review for the subject project for your review and comment. The County is in the process of submitting an engineering report to the North Carolina Department of Environmental Quality (DEQ) Division of Waster Infrastructure (DWI) – Drinking Water State Revolving Fund (DWSRF)¹/ Drinking Water State Reserve Program (DWSRP) to secure funding in the total estimated project cost of approximately \$1.5M. Under U.S. Environmental Protection Agency (EPA), DWI, and *15A NCAC 01C .0408* requirements, the County is responsible for compiling the environmental documentation, including consultations with local agencies.

Consistent with local plans, the proposed project is to make critical improvements at the County's Raw Water Pump Station (RWPS), located at the end of Nash Road, on the banks of the Pee Dee River, north of the Lake Tillery Dam, approx. 3 miles west of Mt. Gilead. The majority of work planned is inside the existing building: replacement of the existing 6 MGD raw water pumps, motors, controls, valves and appurtenances; sump pump improvements; sodium permanganate system installation to enhance treatment processes; and lower level access improvements. External site improvements include: replacement of the existing generator, relocation of the motor control center, various electrical improvements, and landscaping restoration improvements to address erosion issues.

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¹ <http://portal.ncdenr.org/web/wi/dwsrf>

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For planning purposes, the total project area is proposed within previously disturbed & developed, existing, fenced perimeter of the RWPS site (up to approx. 1 acre). All proposed construction will take place within the same footprint of previously-disturbed areas & impervious surface. No new structures are proposed in floodplain, wetland, or farmland soil areas. Proper wetland delineations, buffers, permits, and sedimentation/erosion control requirements will be followed as applicable to protect species and wetlands in the vicinity.

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Chris Hildreth
Dir. of Development & Infrastructure
Montgomery County
724 Hydro Road
Mt. Gilead, NC 27306
PH: 910-576-4221
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<http://www.montgomerycountync.com/departments/public-utilities>

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Vincent Tomaino, PE
DWSRF Branch Head
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Physical: 512 N. Salisbury St, 27604
Mailing: 1633 Mail Service Center, 27699-1633
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PH: 919-707-9058
vincent.tomaino@ncdenr.gov

We value your assistance and look forward to consulting further on this project. Thank you for your comments regarding this project. If you have questions, please do not hesitate to contact me.

Sincerely,

Monica Chevalier
Community Development Specialist

Cc: Chris Hildreth
Vincent Tomaino
Courtney Gamble, PE, The Wooten Company, cgamble@thewootencompany.com

Enclosures

120 North Boylan Avenue
Raleigh, NC 27603

919.828.0531
Fax 919.834.3589

From: [Monica Chevalier](#)
To: ["Ellis, John"](#)
Cc: [Courtney Gamble](#); [Kevin Wienhold](#)
Subject: Montgomery County Raw Water PS DWSRF Project
Date: Tuesday, November 13, 2018 5:20:00 PM
Attachments: [Appx D 05a- USFWS Ellis 20181113.pdf](#)
[Montgomery County RWPS CE Enviro 20181113.pdf](#)

Good Afternoon John!

I am contacting you on behalf of Montgomery County for a Raw Water Pump Station (RWPS) Improvements Project.

The County is in the process of finalizing an engineering report to secure approx. \$1.5M of federal loan funds. The County is conducting a categorically excluded NEPA environmental review of the project to comply with EPA regulations, and your review is needed for compliance. The project consists of critical improvements at the County's RWPS, located along the Pee Dee River near Lake Tillery Dam.

- Improvements inside the existing building include: replacement of the existing 6 MGD raw water pumps, motors, controls, valves and appurtenances; sump pump improvements; sodium permanganate system installation to enhance treatment processes; and lower level access improvements.
- External site improvements include: replacement of the existing generator, relocation of the motor control center, various electrical improvements, and landscaping restoration improvements to address erosion issues.

For planning purposes, potential ground disturbance is up to approx. 1 acre, within the previously disturbed and developed RWPS site, and within the fenced perimeter. While some areas are located in floodplain areas/farmland soils, and adjacent to wetland, there is no proposed filling, modification, or permanent disturbance to these areas. All proposed construction will take place within the same footprint of previously-disturbed built-up areas and/or impervious surface.

This is notification of the County's decision-making process in evaluating project alternatives and anticipated environmental impacts, which are described in the attached environmental documentation. A hardcopy is forthcoming in the mail if you have any issues.

Based on analysis of documentation gathered thus far, it is anticipated that no adverse effect will take place with the project. However, this is a formal request to determine what effect(s) the proposed project activities may have on operations, services, and resources provided and/or managed by your agency. If you determine the project might have an adverse effect, we would like to discuss possible ways to avoid, minimize, or mitigate potential adverse effects.

The Wooten Company is contracted to assist with the environmental review of this project. After completing your review, if at all possible, please return your response within 15-30 days to my attention or respond to this email. You can alternatively contact (see attached letter):

Chris Hildreth
Dir. of Development & Infrastructure
Montgomery County
724 Hydro Road
Mt. Gilead, NC 27306
PH: 910-576-4221
chris.hildreth@montgomerycountync.com
<http://www.montgomerycountync.com/departments/public-utilities>

Vincent Tomaino, PE
DWSRF Branch Head
NC DEQ- DWI
Physical: 512 N. Salisbury St,
27604
Mailing: 1633 Mail Service
Center, 27699-1633
Raleigh, NC
PH: 919-707-9058
vincent.tomaino@ncdenr.gov

If you have any questions or need any additional information, please don't hesitate to contact me.

Thank you and have a great day!
Monica

Monica Chevalier
Community Development Specialist
The Wooten Company
120 North Boylan Avenue
Raleigh, NC 27603
P: 919.828.0531
F: 919.834.3589
www.thewootencompany.com





November 13, 2018

Ross Sullivan
Reg. Specialist-Montgomery County
U.S. Army Corps of Engineers
Raleigh Office
3331 Heritage Trade Drive, Suite 105
Wake Forest, North Carolina 27587

Re: Montgomery County – Raw Water Pump Station Improvements Project
FY18 NC Drinking Water State Revolving Fund (DWSRF) /
State Reserve Program (DWSRP)
Project # H-SRP-D-18-0161 and WIF-1951
NEPA Environmental Review

Dear Mr. Sullivan:

On behalf of Montgomery County, please find the enclosed *Categorically Excluded NEPA Environmental Review* for the subject project for your review and comment. The County is in the process of submitting an engineering report to the North Carolina Department of Environmental Quality (DEQ) Division of Waster Infrastructure (DWI) – Drinking Water State Revolving Fund (DWSRF)¹/ Drinking Water State Reserve Program (DWSRP) to secure funding in the total estimated project cost of approximately \$1.5M. Under U.S. Environmental Protection Agency (EPA), DWI, and *15A NCAC 01C .0408* requirements, the County is responsible for compiling the environmental documentation, including consultations with local agencies.

Consistent with local plans, the proposed project is to make critical improvements at the County's Raw Water Pump Station (RWPS), located at the end of Nash Road, on the banks of the Pee Dee River, north of the Lake Tillery Dam, approx. 3 miles west of Mt. Gilead. The majority of work planned is inside the existing building: replacement of the existing 6 MGD raw water pumps, motors, controls, valves and appurtenances; sump pump improvements; sodium permanganate system installation to enhance treatment processes; and lower level access improvements. External site improvements include: replacement of the existing generator, relocation of the motor control center, various electrical improvements, and landscaping restoration improvements to address erosion issues.

As the RWPS was constructed in 1982 and pumps have reached the end of useful life, the *no action* alternative could result in station failure, creating public health hazards and lack of drinking water to several municipalities. Rehabilitation of the aging and deteriorating pumps and equipment is not feasible. Replacement of pumps is the preferred alternative. Detailed alternatives proposed are described in the enclosed environmental documentation.

¹ <http://portal.ncdenr.org/web/wi/dwsrf>

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Within 1 mile from the site are two points of interest that were surveyed and/or determined to be eligible as historic, related to the dam crossing and railroad crossing across the Pee Dee River. There are no other known historic properties or visually sensitive zones within 1 mile or adjacent to the proposed project area, and the proposed project activities are not expected to have any adverse impact on aesthetic quality of the area.

While there are federally listed endangered and threatened species in Montgomery County, according to U.S. Fish and Wildlife Service (USFWS), and within approx. 2 miles according to NC Natural Heritage Program (NHP) data, most of the species of concern indicated in the project's immediate vicinity depend on aquatic/wetland habitat. While the project site is adjacent to the Pee Dee River and contains a small portion of 100-year floodplain, ground disturbance is estimated to be minimal and to not take place in floodplain/wetland corridors.

For planning purposes, the total project area is proposed within previously disturbed & developed, existing, fenced perimeter of the RWPS site (up to approx. 1 acre). All proposed construction will take place within the same footprint of previously-disturbed areas & impervious surface. No new structures are proposed in floodplain, wetland, or farmland soil areas. Proper wetland delineations, buffers, permits, and sedimentation/erosion control requirements will be followed as applicable to protect species and wetlands in the vicinity.

Based on analysis of documentation gathered thus far, it is anticipated that no significant adverse effect on the environment will take place. However, regulatory agencies are being contacted for concurrence. **Therefore, the enclosed document is for scoping.** This letter is a formal request to determine what effect(s) the proposed project activities may have on operations, services, and resources provided and/or managed by your agency. If you determine the project might have an adverse effect, we would like to discuss possible ways to avoid, minimize, or mitigate potential adverse effects.

The Wooten Company is contracted to assist with the preparation of this environmental analysis. After completing your review, please return your response within 15-30 days to my attention at The Wooten Company, 120 N. Boylan Avenue, Raleigh, NC 27603 or by email at mchevalier@thewootencompany.com. You can alternatively contact:

Chris Hildreth
Dir. of Development & Infrastructure
Montgomery County
724 Hydro Road
Mt. Gilead, NC 27306
PH: 910-576-4221
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Vincent Tomaino, PE
DWSRF Branch Head
NC DEQ- DWI
Physical: 512 N. Salisbury St, 27604
Mailing: 1633 Mail Service Center, 27699-1633
Raleigh, NC
PH: 919-707-9058
vincent.tomaino@ncdenr.gov

We value your assistance and look forward to consulting further on this project. Thank you for your comments regarding this project. If you have questions, please do not hesitate to contact me.

Sincerely,

Monica Chevalier
Community Development Specialist

Cc: Chris Hildreth
Vincent Tomaino
Courtney Gamble, PE, The Wooten Company, cgamble@thewootencompany.com

Enclosures

120 North Boylan Avenue
Raleigh, NC 27603

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Fax 919.834.3589

From: [Monica Chevalier](mailto:Monica.Chevalier@usace.army.mil)
To: ["roscoe.l.sullivan@usace.army.mil"](mailto:roscoe.l.sullivan@usace.army.mil)
Cc: [Courtney Gamble](#); [Kevin Wienhold](#)
Subject: Montgomery County Raw Water PS DWSRF Project
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If you have any questions or need any additional information, please don't hesitate to contact me.

Thank you and have a great day!
Monica

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MONTGOMERY COUNTY, NORTH CAROLINA

2018 DWSRF

RAW WATER PUMP STATION IMPROVEMENTS PROJECT

APPENDIX 5E

DWSRF CATEGORICAL EXCLUSION REQUEST FORM

Request for Categorical Exclusion from Substantive Environmental Review (CE)

Instructions:

1. Provide the WIF number for the project for which you are requesting consideration.
2. Fill out the Applicant's formal name. For a county authority, please specify which county. "County Water District VII" is not a complete name; "ABC County Water District VII" is a complete name.
3. Check all applicable exclusions. Failure to check an applicable exclusion will result in the rejection of your request.
4. Either the "authorized representative" or the Professional Engineer must sign the form. If the Professional Engineer signs the form, the Professional Engineer must seal the form.
5. Submit as part of the ER/EID, following the "**Factsheet: Instructions for Applicants Seeking a Federal Categorical Exclusion**" available under this webpage: <http://portal.ncdenr.org/web/wi/planning>.

WIF No.: 1951
Applicant: Montgomery County
Project Name: Raw Water Pump Station Improvements

Project Description

Replacement of 2 – 6 MGD raw water pump including motors, controls, piping, and appurtenances, replacement of a 300kW onsite generator, replacement and relocation of the station MCC inside the existing building, replacement of the sump pump and floats, installation of a sodium permanganate system, improve access to lower level of station, stabilize a steep bank at the station site, and various SCADA and electrical improvements at the existing facility.

I certify that the project described in the application for state-supplied financial assistance meets all of the applicable general criteria listed in 15A NCAC 01C .0408 (1), and consists solely of activities exempted under the specific criteria of 15A NCAC 01C .0408 (2) checked below:

Please check all the exclusion(s) that apply:

- Potable water systems including the construction or rehabilitation of wells for water supply purposes with associated groundwater withdrawals of less than 1,000,000 gallons per day where such withdrawals are not expected to cause alterations in established land use patterns, or degradation of groundwater or surface water quality.
[15A NCAC 01C .0408 (2)(c)].

Other potable water systems including the following:

- Improvements to water treatment plants that involve less than 1,000,000 gallons per day added capacity and total design withdrawal less than one-fifth of the 7-day, 10-year low flow of the contributing stream;
[15A NCAC 01C .0408 (2)(b)(i)]
- Improvements not intended to add capacity to the facility; [15A NCAC 01C .0408 (2)(b)(ii)]
- Installation of waterlines and appurtenances in existing rights-of-way for streets or utilities, or water lines and appurtenances less than five miles in length and having only directional bore stream crossings or no stream crossings; [NCGS. § 113A-12(1) & 15A NCAC 01C .0408 (2)(b)(iii)]
- Construction of water tanks, or booster pumping or secondary or remote disinfection stations;
[15A NCAC 01C .0408 (2)(b)(iv)]
- Dams less than 25 feet in height and having less than 50 acre-feet or storage capacity [15A NCAC 01C .0408 (2)(h)] (Notes: #1 Dam projects are ineligible for federally recognized CE. #2 Only off-stream raw water reservoirs for pre-treatment purposes are eligible for SRF funding.)

I further certify that the project does not have a significant direct, indirect, cumulative or secondary adverse environmental impact as described in 15A NCAC 01C .0306, and that none of the following descriptions apply to the project:

- the proposed activity may have a potential for significant adverse effects on wetlands; surface waters such as rivers, streams and estuaries; parklands; game lands; prime agricultural or forest lands; or areas of local, state or federally recognized scenic, recreational, archaeological, ecological, scientific research or historical value, including secondary impacts; or would threaten a species identified on the Department of Interior's or the state's threatened and endangered species lists; [15A NCAC 01C .0306 (1)] or
- the proposed activity could cause changes in industrial, commercial, residential, agricultural, or silvicultural land use concentrations or distributions which would be expected to create adverse water quality, instream flow, air quality, or ground water impacts; or affect long-term recreational benefits, fish, wildlife, or their natural habitats; [15A NCAC 01C .0306 (2)] or
- the proposed activity has secondary impacts, or is part of cumulative impacts, not generally covered in the approval process for the state action, and that may result in a potential risk to human health or the environment; [15A NCAC 01C .0306 (3)].

Therefore, I believe our project is eligible for consideration for a CE from the State's environmental assessment review processes and request that the North Carolina Department of Environment and Natural Resources (DENR) concur with this determination.

I understand that DENR may determine that the proposed activity is of such an unusual nature or has such widespread implications that a concern for its environmental effects has been identified by DENR or expressed to DENR. I understand that, in this case, the activity may be ineligible for CE under 15A NCAC 01C .0306 (4).

- We are applying for a Drinking Water State Revolving Fund (DWSRF) loan and include the required comment letters. **OR**
- We are not applying for the DWSRF.

Courtney M. Gamble

Authorized Representative or Engineer Printed Name

Courtney M. Gamble 11/29/18

Authorized Representative or Engineer Signature & Date

Project Engineer

Authorized Representative or Engineer Title

State Use Only (Review)

Reviewed by: _____

Date: _____

Departmental Approval: _____

Date: _____

APPENDIX 6



MONTGOMERY COUNTY PUBLIC UTILITIES

724 Hydro Road, Mt. Gilead, NC 27306

910.439.6197

444 North Main Street, Troy, NC 27371

910.572.1221

www.montgomerycountync.com



WATER & SEWER RATE SCHEDULE (eff. 07-01-2016)

TYPE OF SERVICE	USAGE (gal.)	RATE	TYPE OF RATE
Water - Residential			
base charge	0-10	\$12.00	minimum bill
flat charge	11 - 1000	\$5.00	flat rate
low usage	1,001 - 2,000	\$4.00	per 1,000 gallons
medium usage	2,001 - 4,000	\$6.00	per 1,000 gallons
high usage	> 4,000	\$8.00	per 1,000 gallons
Water - Commercial			
base charge	0	\$38.00	flat rate
low usage	0 - 1,000,000	\$7.40	per 1,000 gallons
high usage	> 1,000,000	\$2.99	per 1,000 gallons
Water - Bulk			
governmental base charge ¹	3,900,000	\$11,661.00	flat rate
governmental	0 - 60,000,000	\$2.99	per 1,000 gallons
non-governmental	0 - 3,000,000	\$3.19	per 1,000 gallons
Sewer - Candor Area			
base charge	0 - 2,000	\$32.00	flat rate
usage	> 2,000	\$2.50	per 1,000 gallons
Sewer - Troy Area			
base charge	0 - 2,000	\$11.50	flat rate
usage	> 2,000	\$5.10	per 1,000 gallons
Sewer - Town of Mt. Gilead²			
in-town - base charge	0 - 2,000	\$5.80	flat rate
in-town - usage	> 2,000	\$7.31	per 1,000 gallons
out-of-town - base charge	0 - 2,000	\$25.00	flat rate
out-of-town - usage	> 2,000	\$7.50	per 1,000 gallons

1. governmental base charge is only applicable to out-of-county governmental purchasers

2. Mt. Gilead sewer rates are set by the Town. MCPU bills on behalf of the Town of Mt. Gilead

Note: Red type indicates a change from last fiscal year's rate schedule

APPENDIX 7

PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COST
Montgomery County - Raw Water Pump Station Improvements
Preferred Alternative - Alternative 1 - RWPS Improvements with 6 MGD Replacement Pumps

THE WOOTEN COMPANY

11/29/2018

ITEM NO.	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT COST	EXTENDED COST ⁽¹⁾
1	Mobilization (3% of Construction Cost)	LS	1	\$ 30,200	\$ 30,200
2	6 MGD Pump Replacement	EA	2	\$ 90,000	\$ 180,000
3	Piping, Valves, and Appurtenances	LS	1	\$ 115,000	\$ 115,000
4	300kW Generator and ATS Replacement	EA	1	\$ 150,000	\$ 150,000
5	MCC Replacement	EA	1	\$ 175,000	\$ 175,000
6	SCADA Improvements	LS	1	\$ 75,000	\$ 75,000
7	Sump Pump and Float Replacement	LS	1	\$ 5,000	\$ 5,000
8	Sodium Permanganate System	LS	1	\$ 75,000	\$ 75,000
9	Landscape Bank Stabilization	LS	1	\$ 50,000	\$ 50,000
10	Lower Level Access Hatch	LS	1	\$ 20,000	\$ 20,000
11	Electrical Improvements	LS	1	\$ 100,000	\$ 100,000
12	Bypass Pumping ⁽²⁾	LS	1	\$ 45,000	\$ 45,000
13	Erosion Control	LS	1	\$ 15,000	\$ 15,000

CONSTRUCTION COST OPINION = \$ 1,035,200

CONTINGENCY (10%) = \$ 103,500

ER/EID = \$ 15,000

DESIGN SERVICES = \$ 99,500

PERMITTING = \$ 5,000

BIDDING & NEGOTIATION = \$ 5,500

CONSTRUCTION ADMINISTRATION ⁽³⁾ = \$ 36,000

CONSTRUCTION OBSERVATION ⁽⁴⁾ = \$ 48,000

GRANT ADMINISTRATION = \$ 10,000

ALTERNATIVE 1 - OPINION OF PROBABLE COSTS = \$ 1,357,700

GRANT FEE (1.5%) = \$ 2,400

LOAN CLOSING COST (2%) = \$ 24,000

Alternative 1 - Estimated Funding Breakdown

Grant Share = \$ 157,650

Principal Forgiveness = \$ 521,200

Loan Share = \$ 678,850

Local Funds = \$ 26,400

Notes:

- (1) Rounded to the nearest \$100
- (2) Bypassing pumping estimated for 1 month
- (3) Assumes 180-Day Contract Period of Performance
- (4) Assumes 180-Day Contract Period of Performance with Part-Time Construction Observation

PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COST
Montgomery County - Raw Water Pump Station Improvements
Alternative 2 - RWPS Improvements with 4 MGD Replacement Pumps

THE WOOTEN COMPANY

11/29/2018

ITEM NO.	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT COST	EXTENDED COST ⁽¹⁾
1	Mobilization (3% of Construction Cost)	LS	1	\$ 29,700	\$ 29,700
2	4 MGD Pump Replacement	EA	2	\$ 82,000	\$ 164,000
3	Piping, Valves, and Appurtenances	LS	1	\$ 115,000	\$ 115,000
4	300kW Generator and ATS Replacement	EA	1	\$ 150,000	\$ 150,000
5	MCC Replacement	EA	1	\$ 175,000	\$ 175,000
6	SCADA Improvements	LS	1	\$ 75,000	\$ 75,000
7	Sump Pump and Float Replacement	LS	1	\$ 5,000	\$ 5,000
8	Sodium Permanganate System	LS	1	\$ 75,000	\$ 75,000
9	Landscape Bank Stabilization	LS	1	\$ 50,000	\$ 50,000
10	Lower Level Access Hatch	LS	1	\$ 20,000	\$ 20,000
11	Electrical Improvements	LS	1	\$ 100,000	\$ 100,000
12	Bypass Pumping ⁽²⁾	LS	1	\$ 45,000	\$ 45,000
13	Erosion Control	LS	1	\$ 15,000	\$ 15,000

CONSTRUCTION COST OPINION = \$ 1,018,700

CONTINGENCY (10%) = \$ 101,900

ER/EID = \$ 15,000

DESIGN SERVICES = \$ 99,500

PERMITTING = \$ 5,000

BIDDING & NEGOTIATION = \$ 5,500

CONSTRUCTION ADMINISTRATION ⁽³⁾ = \$ 36,000

CONSTRUCTION OBSERVATION ⁽⁴⁾ = \$ 48,000

GRANT ADMINISTRATION = \$ 10,000

ALTERNATIVE 2 - OPINION OF PROBABLE COSTS = \$ 1,339,600

GRANT FEE (1.5%) = \$ 2,400

LOAN CLOSING COST (2%) = \$ 23,600

Alternative 2 - Estimated Funding Breakdown

Grant Share = \$ 157,650

Principal Forgiveness = \$ 512,150

Loan Share = \$ 669,800

Local Funds = \$ 26,000

Notes:

- (1) Rounded to the nearest \$100
- (2) Bypassing pumping estimated for 1 month
- (3) Assumes 180-Day Contract Period of Performance
- (4) Assumes 180-Day Contract Period of Performance with Part-Time Construction Observation

PRELIMINARY OPINION OF PROBABLE CONSTRUCTION COST
Montgomery County - Raw Water Pump Station Improvements
Alternative 3 - RWPS Improvements with 6 MGD Replacement Pumps and VFDs

THE WOOTEN COMPANY

11/29/2018

ITEM NO.	DESCRIPTION	UNITS	TOTAL QUANTITY	UNIT COST	EXTENDED COST ⁽¹⁾
1	Mobilization (3% of Construction Cost)	LS	1	\$ 33,600	\$ 33,600
2	6 MGD Pump Replacement	EA	2	\$ 90,000	\$ 180,000
3	Variable Frequency Drives	EA	2	\$ 51,000	\$ 102,000
4	Piping, Valves, and Appurtenances	LS	1	\$ 115,000	\$ 115,000
5	300kW Generator and ATS Replacement	EA	1	\$ 150,000	\$ 150,000
6	MCC Replacement	EA	1	\$ 175,000	\$ 175,000
7	SCADA Improvements	LS	1	\$ 75,000	\$ 75,000
8	Sump Pump and Float Replacement	LS	1	\$ 5,000	\$ 5,000
9	Sodium Permanganate System	LS	1	\$ 75,000	\$ 75,000
10	Landscape Bank Stabilization	LS	1	\$ 50,000	\$ 50,000
11	Lower Level Access Hatch	LS	1	\$ 20,000	\$ 20,000
12	5 Ton HVAC System	EA	1	\$ 10,000	\$ 10,000
13	Electrical Improvements	LS	1	\$ 100,000	\$ 100,000
14	Bypass Pumping ⁽²⁾	LS	1	\$ 45,000	\$ 45,000
15	Erosion Control	LS	1	\$ 15,000	\$ 15,000

CONSTRUCTION COST OPINION = \$ 1,150,600

CONTINGENCY (10%) = \$ 115,100

ER/EID = \$ 15,000

DESIGN SERVICES = \$ 99,500

PERMITTING = \$ 5,000

BIDDING & NEGOTIATION = \$ 5,500

CONSTRUCTION ADMINISTRATION ⁽³⁾ = \$ 36,000

CONSTRUCTION OBSERVATION ⁽⁴⁾ = \$ 48,000

GRANT ADMINISTRATION = \$ 10,000

ALTERNATIVE 3 - OPINION OF PROBABLE COSTS = \$ 1,484,700

GRANT FEE (1.5%) = \$ 2,400

LOAN CLOSING COST (2%) = \$ 26,500

Alternative 3 - Estimated Funding Breakdown

Grant Share = \$ 157,650

Principal Forgiveness = \$ 584,700

Loan Share = \$ 742,350

Local Funds = \$ 28,900

Notes:

- (1) Rounded to the nearest \$100
- (2) Bypassing pumping estimated for 1 month
- (3) Assumes 180-Day Contract Period of Performance
- (4) Assumes 180-Day Contract Period of Performance with Part-Time Construction Observation