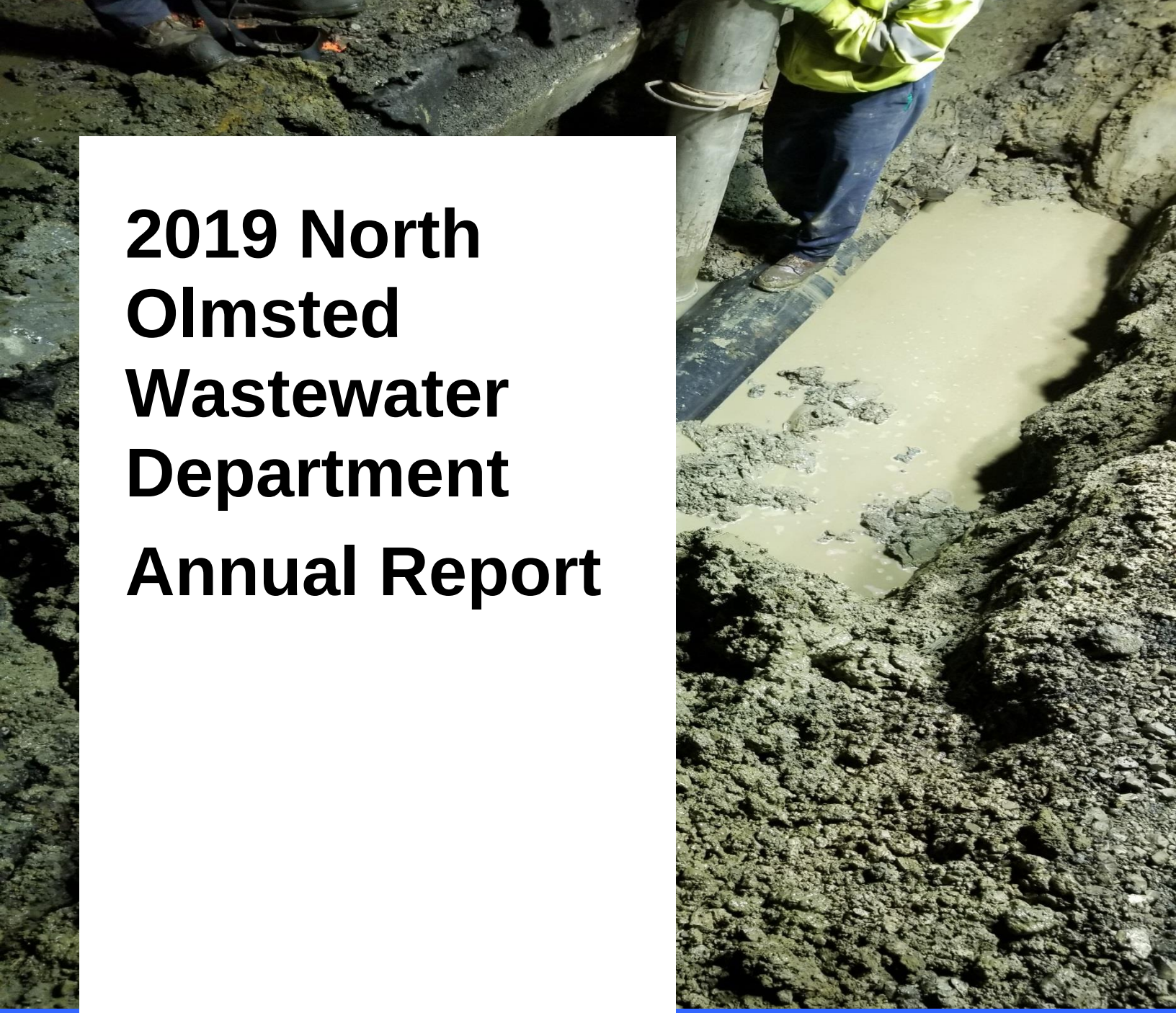

2019 North Olmsted Wastewater Department Annual Report

FEBRUARY 10

NOWWTP
Authored by: Brian Blum

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A Message from the Superintendent

As we look forward to the start of a new decade I wanted to take this time to reflect on some of the changes that have occurred for our department, dating back to 2010.

In 2010 the City of North Olmsted Wastewater Department was in the process of planning major upgrades and improvements to the infrastructure for the sanitary collection system. Plans were also just starting for a major overhaul and renovation for the city's wastewater treatment plant. These Ohio EPA mandated improvements, were in many ways the catalyst needed to start the process of improving and upgraded a system, which at the time was in need of repair and (TLC)upgrades. This process (our mission, to upgrade and maintain) is one that we carried for the rest of the decade and is one that we still carry on today.
In 2010 the upgrades focused on elimination and prevention of Sanitary Sewer Overflows (SSOs), removing surcharge pumps from street corners, and preventing basement flooding. The focus of this phase 1 study was targeted on the northeast and north-central zones, in the City of North Olmsted.

In 2011 the City suffered large scale storms in February, June, and July. Many of these storms were in the range of 3 to 4 inches of rain per hour and resulted in major stress to the system. The City hosted several meetings (in the north-east and north-central zones) to explain, just how these planned improvements would help as we moved forward into the future. By the end of 2011, these plans were nearing completion and by the end of the year, we were breaking ground on a new 1.25 Million Gallon flow equalization tank adjacent to the Lebern Lift Station.

2012 was a major construction year for the collection system and the start of planning for the North Olmsted Wastewater Treatment Plant. By the end of the year, we had finished the overhaul and upgrade of Dover Lift Station and Lebern Lift Station and upgrading storage capacity adjacent to Lebern to 1.5 million gallons. In the treatment division, we finalized our plans for a state of the art Biological Nutrition Removal (BRN) Plant with increased hydraulic capacity.
By the start of 2013 beginning, Great Lakes Construction was selected to begin upgrades at the NOWWTP (starting the most challenging two years the treatment

plant would ever face). Also of note, we bought and then destroyed a house on Dover Road (to make way for a new flow 600,000-gallon equalization tank), and we began to start planning for upgrades to the Broxbourne Lift Station.

2014 brought us a full year of construction at the WWTP, with the first phase centering on the start and end of the treatment process. Many of these challenges were complicated by the need to keep treating wastewater, while parts of the treatment plant were changed, modified, or lost during the upgrade. 2014 also brought us, a historic single day rain event (May 12, 2014), and historic flooding, which had several negative impacts both on our residents and ongoing construction projects. By the end of 2014 construction on a new flow equalization tank adjacent to the Dover Lift Station, was nearing completion and the city negotiated a new NPDES Permit with Ohio EPA (3PD00016*MD).

Construction at the wastewater treatment plant continued with the second phase in 2015, this construction centered on the biological and settling parts of the plant. A new replacement generator was installed at Broxbourne Lift station along with an in-channel rag grinder. By the end of 2015, the major construction at the WWTP was finished, with only upgrades to the communication and SCADA controls left to be completed.

The final upgrades to the treatment plant (communications and controls) allowed 2016 to be a learning and optimization year, where we learned to curb electrical consumption and fine-tune the biology of the WWTP. Out in the collection system, we rebuilt the Moen lift station and began looking and planning for the next major area to improve (where we look heavily at the data from prior storms).

2017 was a year of small projects for the wastewater plant but also saw the start of a major renovation for the WWTP maintenance division (a project that saw an old unused tank converted into a usable building). 2017 was also a year where we finished upgrades to Broxbourne Lift Station, with a final project addressing electrical and communications systems.

2018 was a year in which we focused on infrastructure needs out in the collection system, looked at controls and optimization at the WWTP, did major work in the

collection system with sewer lining, manhole assessment, and rehabilitation, and began studying flow within the south interceptor. (This project focused on areas south of Lorain Road, primarily between Barton Rd and Columbia Rd.) 2018 also saw the start of a second tank to building conversion for the maintenance division, which is located in the center of the NOWWTP.

2019, was a year in which we continued to build on successful programs of the past and looked forward to positive changes for the future. As you will see detailed in the rest of this report we continued with our Manhole Assessment and Rehabilitation Program, continued our Sewer Maintenance Program (Capacity Management Operations and Maintenance Program, which rotates on a 6-year schedule). Started our 5-year overhaul for equipment at the WWTP and marked a new phase of construction and operation as we studied the options and feasibility for various improvements and sanitary flow equalization tank(s), on the south side of town. 2019 also saw the negotiation of a new NPDES permit (3PD00016*ND).

As we move into a new decade it is my hope to continue this trend of maintaining and upgrading the infrastructure in the collection system, and at the treatment plant for benefit of North Olmsted and the surrounding communities (serviced by the treatment plant). It is my intent to make reasonable financial decisions, cost-effective upgrades, and scheduled improvements that provide a clear path forward for ourselves and future residents.

Department Overview

The North Olmsted Wastewater Department is responsible for the collection and treatment of domestic and industrial wastewater generated in the City of North Olmsted and the surrounding service area. Administration, maintenance, operation, monitoring, testing, and prevention are the primary functions of the divisions. These activities are conducted under the National Pollution Discharge Elimination System (NPDES) permit issued by the Ohio EPA (OEPA), under the authority of the United States Environmental Protection Agency (USEPA) and the Clean Water Act. Additionally, the Department strives for beneficial reuse of residual by-products of wastewater treatment, such as waste sludge or biosolids.

The Wastewater Department is separated into five division:

- Wastewater Collection (Includes open-channel stormwater maintenance)
- Wastewater Treatment
- Wastewater Maintenance
- Wastewater Special Services (Pretreatment / Laboratory)
- Wastewater Administration

Annually each division reviews the accomplishments for that year and sets goals to better define the level of service necessary to meet the expectations of the City of North Olmsted and adjoining municipalities, the contributors to the system (the residential, commercial and industrial residents), and the needs of the environment.

This report is intended to cover residents in the City of North Olmsted, City of Fairview Park, and residents of Olmsted Township, serviced by the NOWWTP.

Services provided by the North Olmsted Collection Division apply to North Olmsted Residents only. Residents of Fairview Park and Olmsted Township receive sanitary collection system maintenance from Cuyahoga County. Stormwater service (a combination of the Stormwater Department, Streets Department, and Wastewater Department) likewise applies to North Olmsted Residents only.

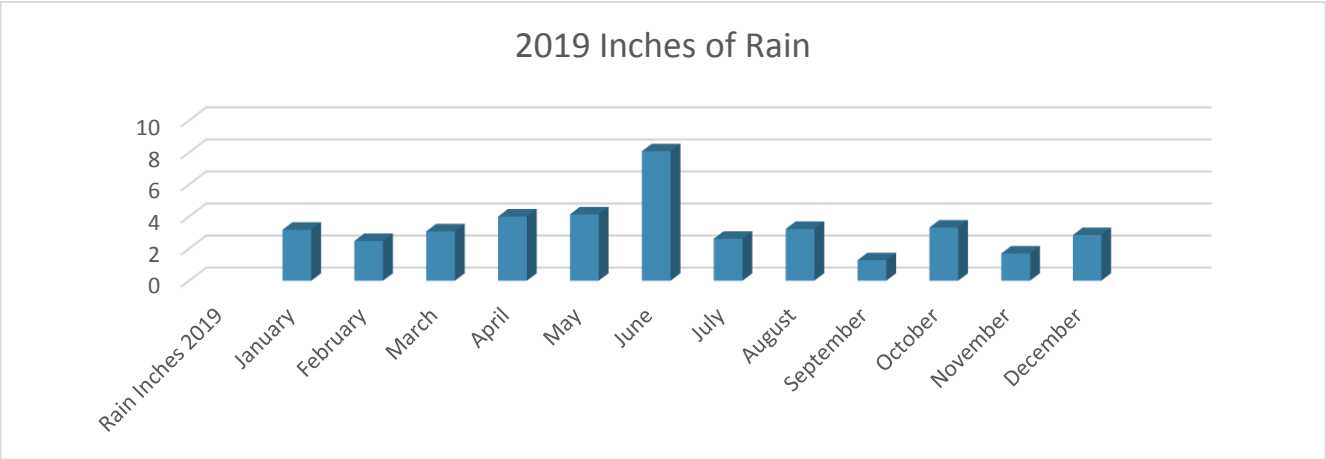
Wet Weather and Water Quality

2019 was a year of two weather patterns. The start of the year was wet with a high degree of ground saturation, by the end of the year we had dried out and plant flows began to return to normal. Weather remains a large factor in our ability to assess, improve, and perform the work necessary to improve infrastructure. Rain along with high levels of groundwater can lead to two conditions that increase the volume of water that travels through pipes and needs to be treated at the Wastewater Treatment Plant. These conditions called Inflow and Infiltration (I and I) are common problems in aging sewer systems. As sewers age or settle, cracks can form in the pipes or manholes and rain or groundwater can seep into them, this can happen on both the public section of the pipes (sewer lines located in the streets or public right of ways) or on the private side (lines that take water from your house and transports it to the street (located on private property)). Different from infiltration is inflow, where downspouts or stormwater pipes or inlets are improperly (directly or indirectly) connected to sanitary sewers. Improperly connected footer tiles or sump-pumps may fall into either of these two Inflow and Infiltration areas. All of this increased flow from Inflow and Infiltration (I & I), must then be transport North Olmsted Wastewater Department and must undergo the treatment process, which then raises our overall cost.

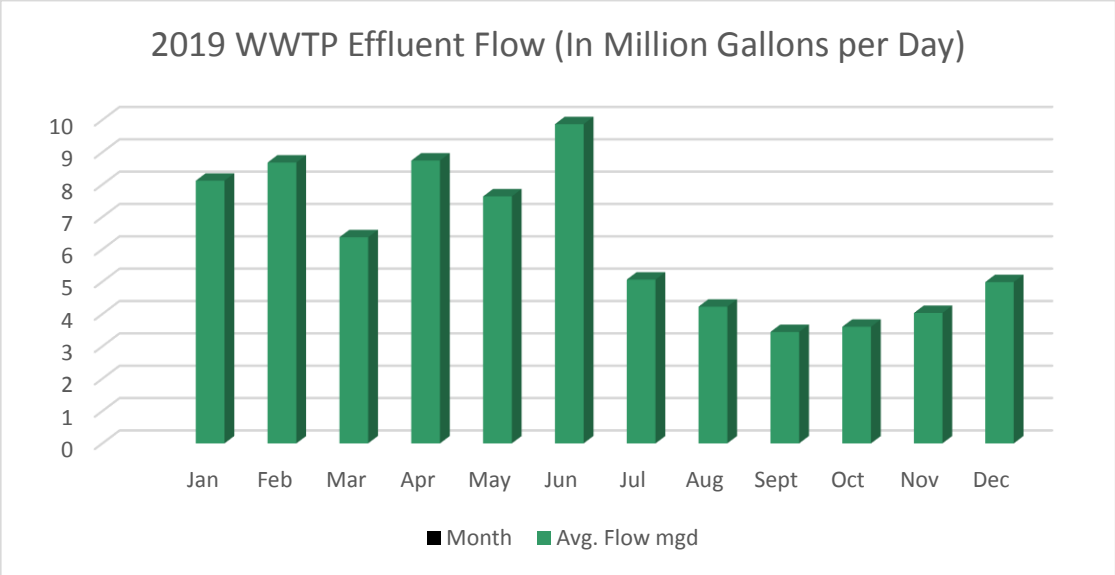
Unfortunately, wet weather adds several challenges beyond just the handling of that extra flow or delays in the work schedule. With each heavy rains, extra staffing is necessary to monitor and adjust the system and extra manpower is necessary for the aftermath to clean and maintain extra equipment that was used to handle the increased flows.

However, while rain might present some hardships it also provides an excellent opportunity to assess the system for water tightness. We often use closed-circuit TV equipment to monitor and view the manholes and line segments during or just after rain events. This method allows us to more accurately find, schedule, and repair leaks in the system, thereby reducing the amount of future flow that needs to be transported and treated.

The monthly rainfall for 2019 (volume in inches) by month is listed in the chart below.

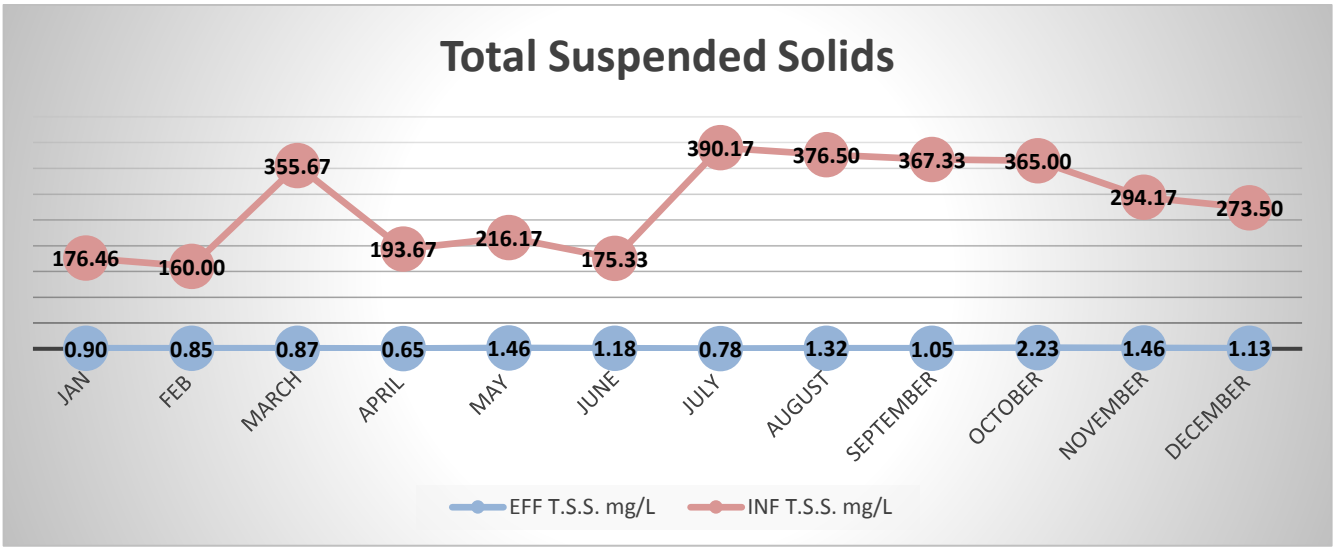


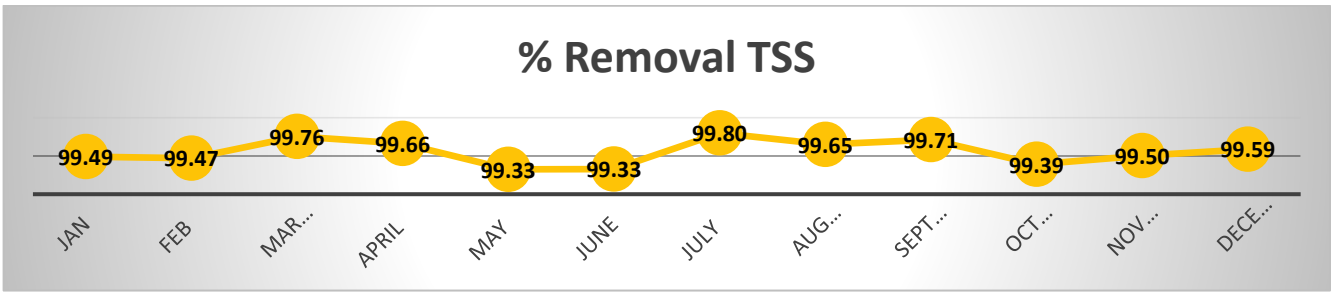
In addition to the amount of rainfall, other factors such as storm intensity, percent groundwater saturation, and the time between major storms all influence the flow coming into the Wastewater Treatment Plant. The chart below shows the monthly average flow at the North Olmsted Treatment Plant.

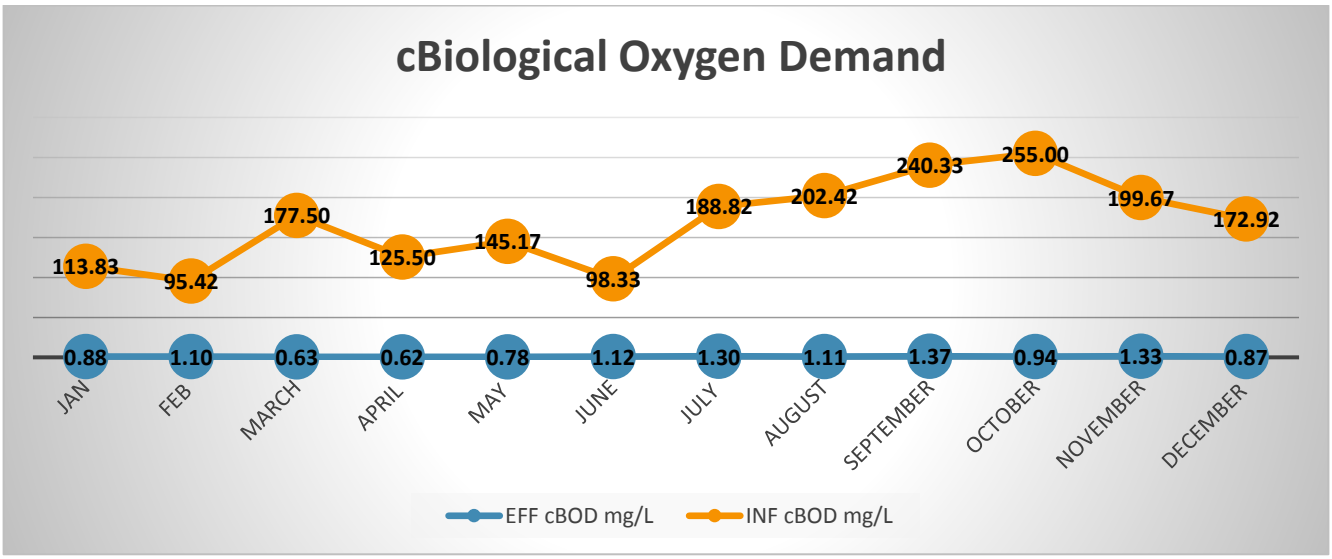


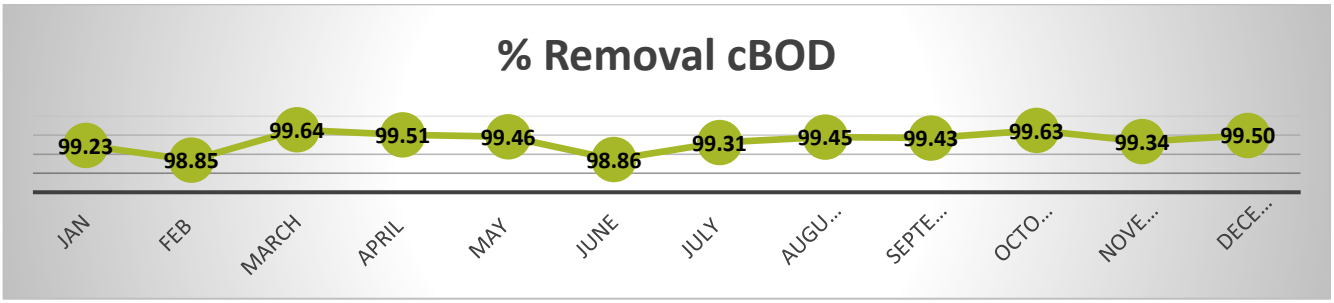
Despite a variable flow to the wastewater treatment plant, we are responsible for treating and cleaning the water, to the highest degree possible, before its eventual release to the Rocky River. In order to complete this mission the department relies on numerous high trained, state-certified, and specialized employees and a state of the art, wastewater treatment plant which is designed to remove both conventional pollutants such as total suspended solids and biochemical oxygen demand, as well as, advanced nutrients such as nitrogen and phosphorus.

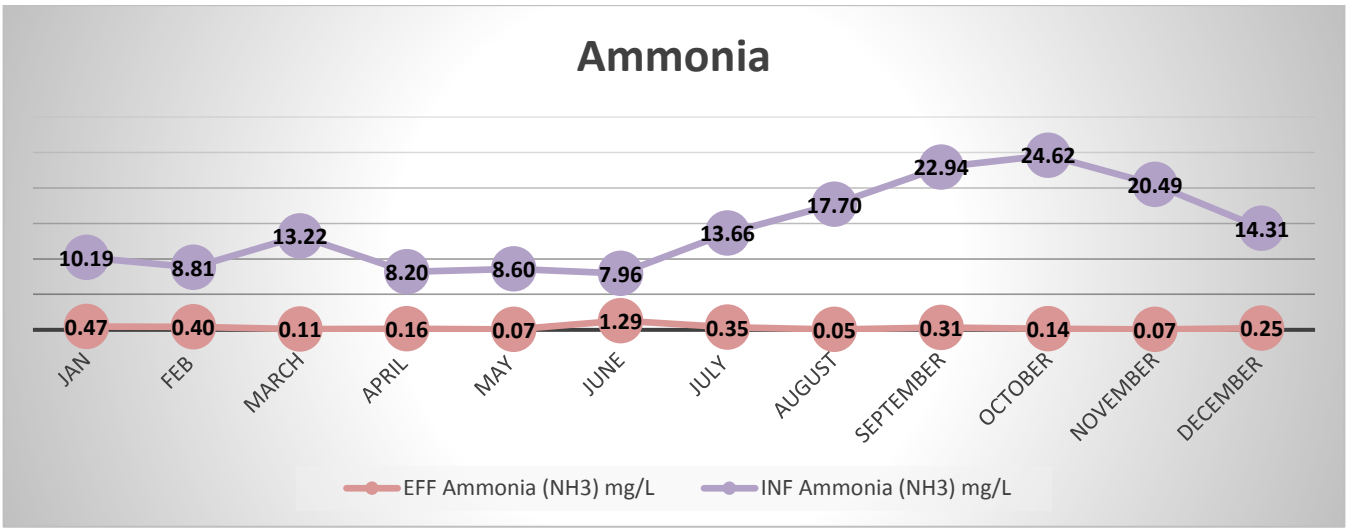
Below are snapshot tables and graphs that summarize the performance of the NOWWTP for the year 2019.

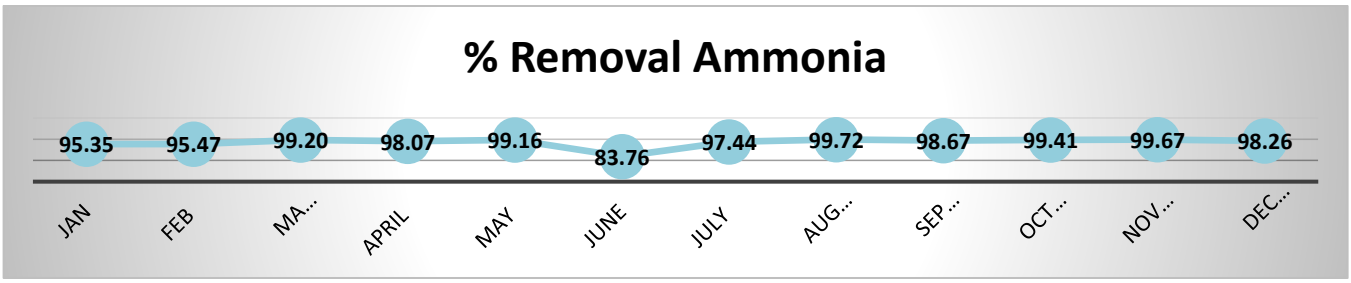


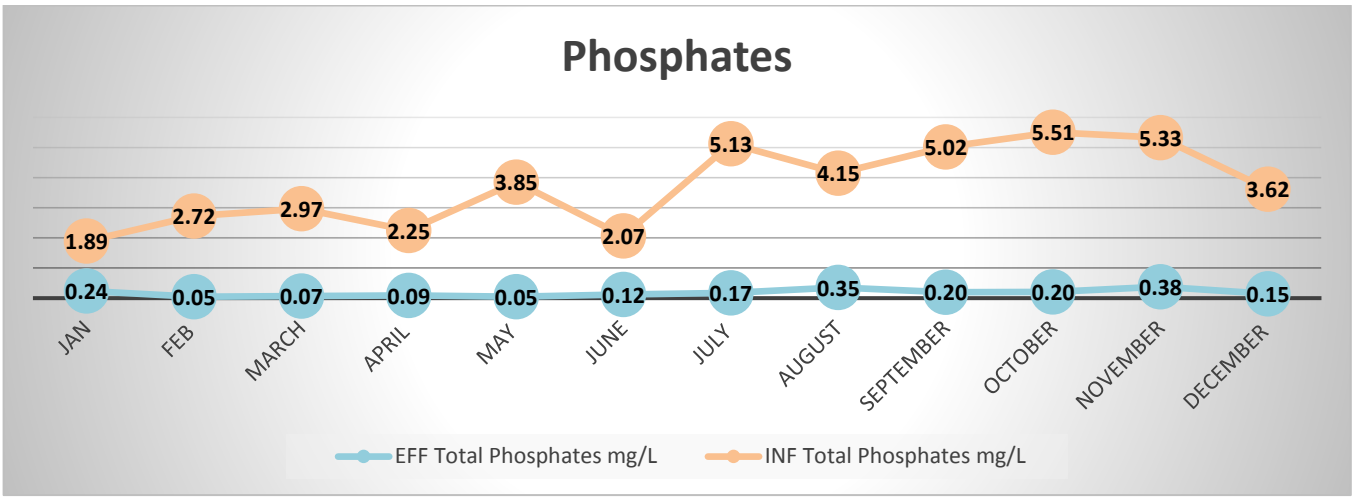


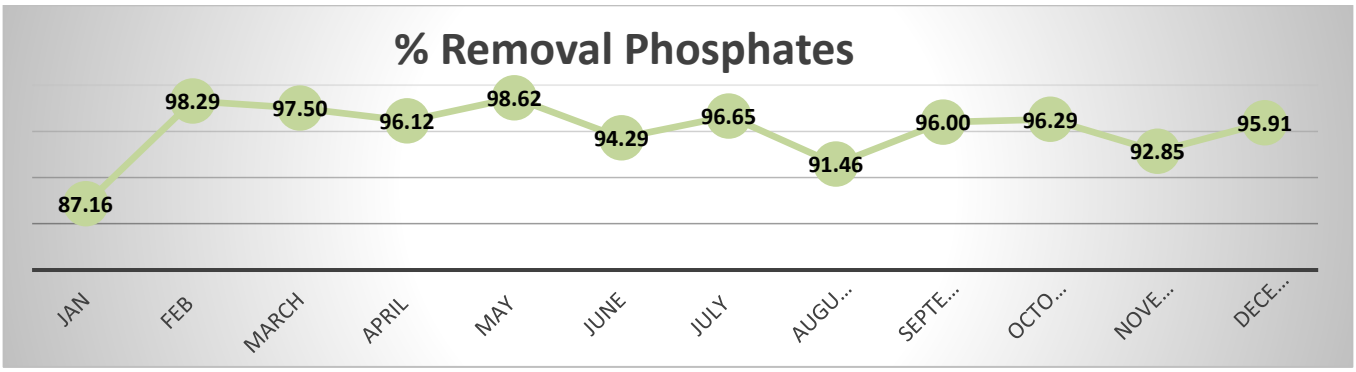

cBiological Oxygen Demand
113.83
95.42
177.50
125.50
145.17
98.33
188.82
202.42
240.33
255.00
199.67
172.92
0.88
1.10
0.63
0.62
0.78
1.12
1.30
1.11
1.37
0.94
1.33
0.87
JAN
FEB
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
EFF cBOD mg/L
INF cBOD mg/L


% Removal cBOD
99.23
98.85
99.64
99.51
99.46
98.86
99.31
99.45
99.43
99.63
99.34
99.50
JAN
FEB
MARCH
APRIL
MAY
JUNE
JULY
AUGU...
SEPTE...
OCTO...
NOVE...
DECE...


Ammonia
10.19
8.81
13.22
8.20
8.60
7.96
13.66
17.70
22.94
24.62
20.49
14.31
0.47
0.40
0.11
0.16
0.07
1.29
0.35
0.05
0.31
0.14
0.07
0.25
JAN
FEB
MARCH
APRIL
MAY
JUNE
JULY
AUGUST
SEPTEMBER
OCTOBER
NOVEMBER
DECEMBER
EFF Ammonia (NH3) mg/L
INF Ammonia (NH3) mg/L


% Removal Ammonia
95.35
95.47
99.20
98.07
99.16
83.76
97.44
99.72
98.67
99.41
99.67
98.26
JAN
FEB
MA...
APRIL
MAY
JUNE
JULY
AUG...
SEP...
OCT...
NOV...
DEC...





Listed below is a quick comparison chart between our NPDES permit and the water quality data produced by the North Olmsted Wastewater Treatment Plant (these numbers reflect an annual average). Included as a reference are the analytical test results from sampling upstream of the NOWWTP.

2019 Annual Average Vs. NPDES discharge limit	Column1	Column2	Column3
	Yearly Ave	NPDES Limit (monthly)	Rock River Upstream
Temp °C	17.24		15
D.O. mg/L	7.96	6.00	9.44
pH, Max	7.58	9.00	8.4
ph, Min	7.43	6.50	7.4
Ammonia (NH3) mg/L	0.30	1.60	0.1047
cBOD mg/L	1.00	10.00	
Total Phosphates mg/L	0.17	1.00	0.9264

E.coli	2.48	126.00	1829.8
Total Nitrogen mg/L	3.53	12.00	3.43
TKN mg/L	1.21		0.918
NO2/NO3 mg/L	2.44		2.51

Numbers better than the NPDES permit 3PD00016 are listed in green.

Typically the water conveyed through the collection system and entering the wastewater treatment plant is 20 to 100 times more polluted than the water flowing in the Rocky River (based on seasonal water conditions and dilution due to rainfall). In addition, the incoming wastewater contains bacteria and pathogens that are too numerous to count using standard methods. The wastewater treatment plant cleans the water, removes pollution, and eliminates harmful bacteria and pathogens. The quality of water released from the NOWWTP is generally close to or below (cleaner) the water quality levels found in the natural environment. The 2019 overall treatment efficiency for an individual pollutant parameter, was in the range of 95 to 99% removal, which is the operational goal of the facility. Treatment efficiency for the treatment plant for all pollutant parameters combined was greater than 99%, for total removal.

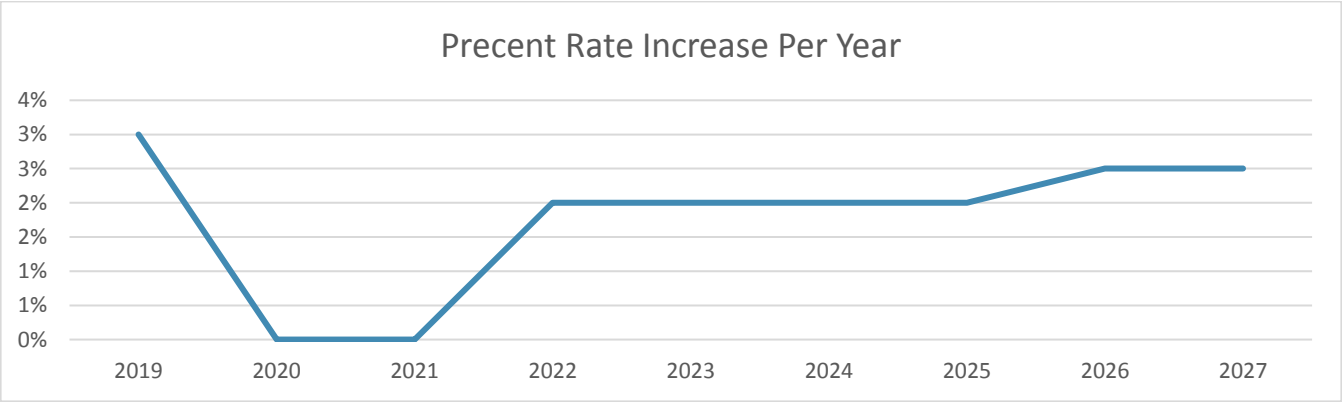
Wastewater Department Financial Summary

The North Olmsted Wastewater Department remains a non-profit, tax-exempt organization. The funding for the wastewater department is kept separate from the general fund, with all revenue held in a separate enterprise fund. Annually the wastewater budget is developed based on projected revenue from sewer usage fees (the sewer portion of your water bill). The sewer usage rates and by proxy the budget for the North Olmsted Wastewater Department is derived from a recently completed rate study conducted by Hazen and Sawyer, which developed rates from 2019 through the end of the year 2027. This is the second consecutive cycle when Hazen and Sawyer were selected to conduct the sewer rate study.

During the prior rate study, started in 2009 the main driver was a need to increase rates due to Ohio EPA mandated improvements. These improvements, both in the collection system and treatment plant, totaled nearly 50 million dollars and were a large driver for the past (larger) rate increases. Today, with the improvements completed, the projects are represented as the debt portion of our annual budget.

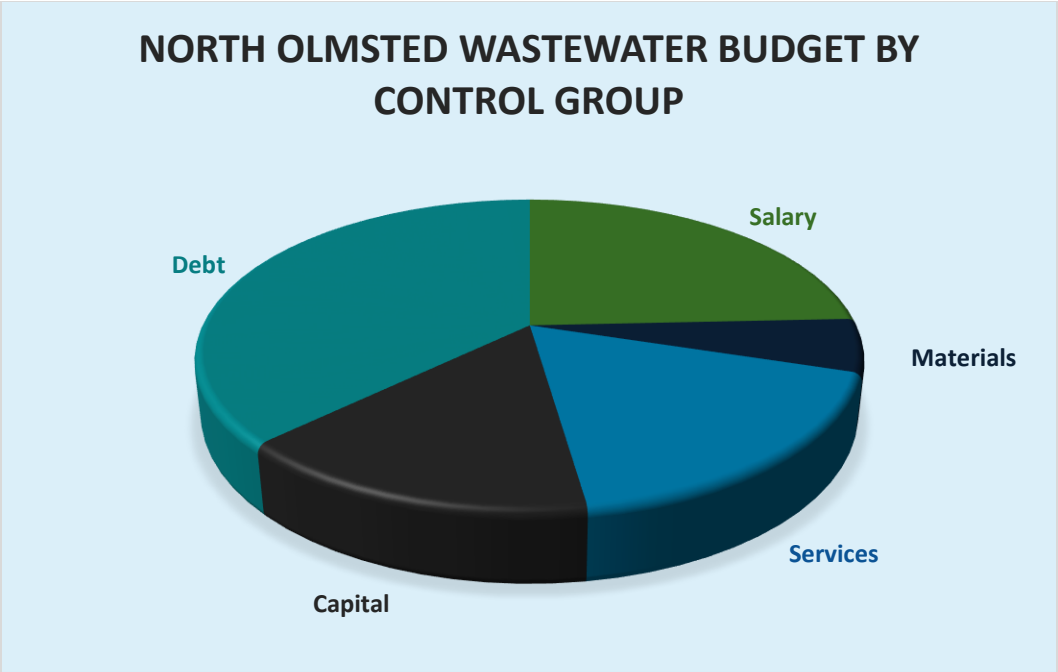
Moving forward into the future the projected rate increases are more moderate and are designed to allow us to, pay off debt, maintain and improve existing equipment and infrastructure, and keep pace with inflation.

The table below shows the future rate increases per year:



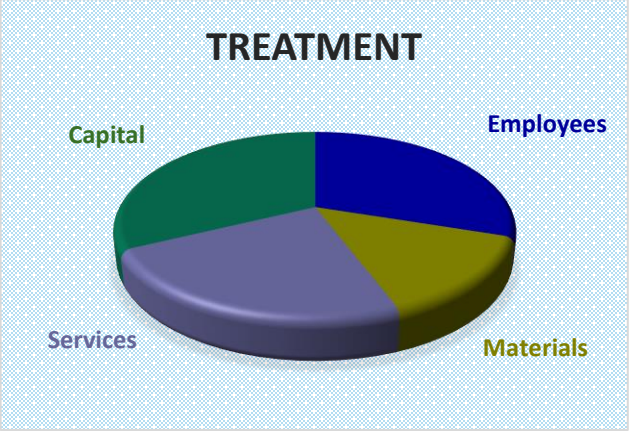
In 2019 our annual budget was just under eleven million dollars with just under 4 million going towards debt. The remaining funds are divided into four categories: Salary, Materials, Services, and Capital. The salary category includes employee wages and benefits. The materials category contains items necessary to keep the plant and collection system in a good state of repair and includes items such as UV disinfection bulbs, polymer, and hypochlorite, this category also includes stock items such as plumbing and electrical supplies and fuel/oil. The services category is dominated by the utilities necessary to keep the wastewater plant and collection system in operation but also includes items such as engineering, accounting, and sludge removal/tipping fees. The capital category generally contains larger cost items such as vehicles, pumps, motors, equipment, and land and building improvements. This category does not normally include capital improvements of over one million dollars. Items over one million dollars have been historically funded through bonds or low-interest loans through the State of Ohio

The 2019 expenses by the control group are listed in the chart below.

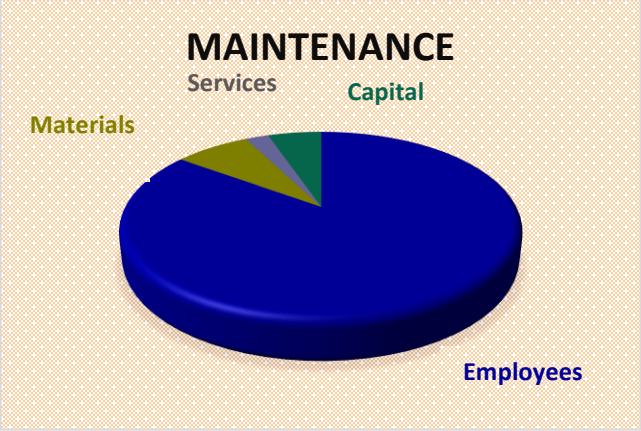


In 2019 we started with an original budget of 10.9 million dollars, at the time of this report, the total amount spent (expenses and encumbrances) show a projected finish to the 2019 year, slightly under 95.3%, of the original budget. Funds not spent in 2019 are held in reserve for future projects or emergency repairs and kept separate from the City of North Olmsted's general fund. Divisional break downs per control category are listed below:
(Charts represent the amount spent and encumbered as of 1-9-20)

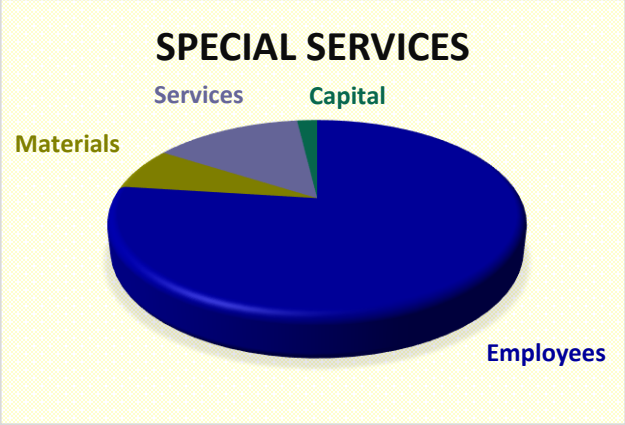
Treatment 2.807 million dollars



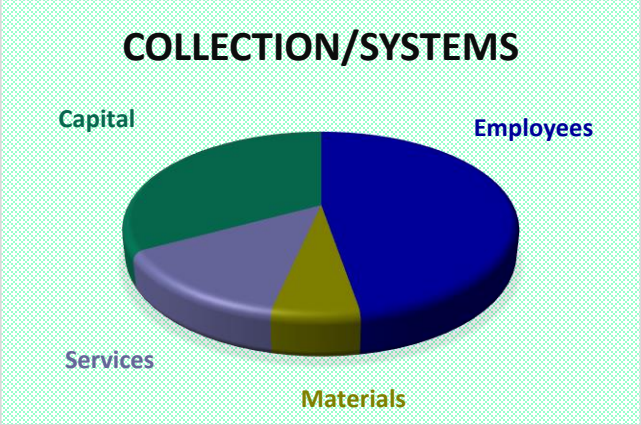
Maintenance 0.51 million dollars



Lab/permits 0.243 million dollars



Collections 1.947 million dollars



2019 Pie Chart brief explanation:

Employees: Wastewater Treatment, Maintenance, Special Services (lab and pretreatment), and Collection System Maintenance are at their core a service provided by individual employees. As such we strive daily to provide an excellent level of service, staffing each shift in line with state guidance and as needed to keep the systems in good operational condition. The services performed in each division are conducted by professional certified and trained operators or technicians. The employee portion of the annual budget accounts for this high level of service. This portion of the pie chart is also influenced by our departmental goal of doing as much work, as possible, in-house and minimizing the "Services" portion of the budget. Without our current staffing, necessary work would still need to be performed, but now by outside contractors, this would increase the service portion of each pie wedge but would shrink the employee wedge.

Materials: This area is fairly stable from year to year. The collection system is inspected on a 5 to 6-year cycle and while repairs are always necessary the staff has worked hard for the last 20 years to make repairs on a regular basis so the year to year expenses are expected to remain fairly constant. Likewise, the treatment plant relies heavily on predictive maintenance which allows for a fairly constant year to year expenses.

Services: Due to a heavy reliance on internal staffing in the treatment plant and collection system, this portion of the budget has decreased historically, However, this area is strongly influenced by the cost from other utilities (mainly electricity), which is the largest cost for both the treatment plant and in the collection system. With the lab (special services) division, the largest costs come from outside labs that specialize in monthly or semi-annual state-required testing.

Capital: For 2019 the capital category was dominated by the purchase of 2 large vehicles: the 2019 Vac-truck purchase for the collection division and the 2019 Hook-truck purchase for the treatment plant. Additional information about the 2019 divisional purchases are available below:

Individual Divisional Reports, Milestones, and Major Purchases for 2019

Sanitary Sewer System Operations (Collections):

(Pictured is the newly purchased 2019 Gap-Vac Truck with Hydro-excavation package)

The Collections Division of the North Olmsted Wastewater Department provides sanitary sewer service to the City of North Olmsted residents. This division maintains all sanitary sewers within the public right-of-way, along with manhole and lift station maintenance. Daily activities include inspecting pumps and grinders, inspecting manholes and line segments for blockages or grease buildup, monitoring flow in the system, inspecting the integrity of public and private pipes or line segments(lateral launch), and providing utility location services.

While this division does not provide service outside the City of North Olmsted, they do ensure that carrying capacity is maintained for tributary communities. This division also assists with the seasonal maintenance of the City's waterways (open streams and creeks) and assists other departments within the City on an as-needed basis.

Along with normalized duties found in the Sewer Master Plan; as well as, specialized service during rain events, the collection crews completed all of the following, in 2019:

- Responded to 249 sewer service requests – a 9% increase from the previous year, (increase partly due to new online request system).
- Performed numerous preventative improvements and inspections including:
    - Televised 21.1 miles of sanitary sewer mains.
    - Lateral Launched and televised 89 sanitary laterals, with the mainline launch system.
    - Televised 43 sanitary laterals with See Snake inspection system.
    - Cleaned 23.9 miles of sanitary mains - sewer jet-truck.
    - Chimney sealed 87 sanitary manholes (for I and I)
    - 53 Manholes replaced, rebuilt, or sealed top to bottom.
    - Trenchless Sewer Main Pipe Patch Repairs - 30.
    - Lined 103 feet of sanitary sewers, with Cure In Place Pipe (CIP)
- Cleaned and inspected 50.6 miles of stormwater conveyance.
- Complete CIP sewer lining along Birch Lane with the assistance of Pipevision Products, Inc.
- Tested and used new technology to repair 5 lateral connections, at the point where a residential lateral enters the sanitary sewer main (top-hat liners), with the assistance of Pipevision Products, Inc.
- Completed a major flow study along the South Interceptor with engineering and consultation provided by CT Consultants and Bowen and Associates.
- Participated in the City's sidewalk replacement program, replacing multiple sections of the sidewalk, at 12 locations. (removed and replaced sidewalk slabs that are adjacent to or contain a sanitary manhole lid)
- Purchased new sewer jet truck with upgraded hydro-excavation capabilities, through the state bid purchase system.

- Cleaned and removed, large sections of concrete (assumed to be from a contractors washout) embedded within the South Interceptor (near Windsor and Forest Ridge). This repaired required the fabrication of a specially designed impact skid, which was developed by staff in the NOWWTP maintenance department. The only other known alternative to removing this concrete would be to use a diamond tip drill taking weeks if not months to complete. The estimated volume of concrete removed was 750 lbs.
- Replaced the top drop along Stafford Drive.
- Corrected cross connects along Grace Road.
- Completed a lighting (LED) upgrade at Dover Pump Station
- Assisted with the rebuild of the Lebern Pump Station in-line channel grinders.
- Added HVAC Cooling to Bradley Lift Station.
- Cleaned and inspected flow EQ tanks at Clague Park and Dover lift stations after each use.
- Cleaned the discharge splitter box for the Broxbourne lift station, located on Lorain Rd.
- Added 249 entries into the asset management program “I-Worqs”.
- Checked each critical stormwater location, during 18 significant rain event, to maintain and ensure water conveyance. Stormwater Key locations including Alexander, Sharon, Tree Lane, Clague, Delmere, Gessner, Canterbury, Topps Retention Basin, Dover, Pine School Detention Basin, Edgepark, North Park, Whitehaven, Wellesley, Lorain, Christ the King, Christman, Sterns Plaza, Spruce School, Windsor, Mackenzie, Cypress, Louis, Clinton, Bellevue, Great Northern Friends Church, Westside Marina, Danbury, Davis, Ester, MacBeth, and Virginia.
- Limited Sanitary Sewer System Overflows to 4 (included force main break)
- Repaired Force main break, discharge from Lebern Lift Station (16” Ductile Iron Pipe) replaced 10 feet of pipe, excavated 100 feet of ground cover to locate the location, maintained traffic patterns in one direction during repairs and restored two-lane traffic in less than 24 hours. Sewer Crews worked through the night to complete emergency repairs.

A note on sewer repairs: repairs less than 4 feet in length are repaired by the City of North Olmsted Collection System employees. These small point repairs address cracks, offsets, and breaks, which are identified by our CCTV crews. All point Cure in Place (CIP) repairs are done in-house with our trenchless technology patching equipment. Sewer repairs over 4 feet, with minor to major damage, are done by multiple patches or by lining the sewer from manhole to manhole. Sewers to damaged or unable to be repaired with CIP patches or lining or are replaced with traditional methods (digging) or other trenchless technologies.

Grace Road **(cross connect) repairs**

Lebern force main repair (night)

Manhole rebuild (showing stacked rings, concrete pour, and finish on Stearns Road (mid-day, July 2019)

Special Services Division (Lab and Pretreatment) 2019 individual project summary

Laboratory Division

The Laboratory Division for the North Wastewater Treatment Plant provides the analytical data to properly run the treatment plant. Sample collection and analytical testing are the two primary responsibilities for this Division along with providing defensible data for reporting to Ohio EPA. The Division also collects, processes, preserves, and ships monthly samples, for outside labs. Outside labs have machines that are cost-prohibitive for our lab to purchase and maintain.

For 2019 all reports were prepared and submitted on time to the Ohio EPA as mandated under our state-issued permits:

- Completed Priority Pollutant Scan including enforcement of local industrial user limitations to prevent the introduction of pollutants into the WWTP which will interfere with the operation of the WWTP, pass-through the WWTP, or limit sludge application.
- Completed the USEPA Thirty Day DMRQA Study – USEPA determined that the City's Laboratory performance was accurate for all tested parameters.
- Submitted in a timely manner all monthly EDMRs and noncompliance follow-up reports, pretreatment quarterly and annual reports, stormwater pollution prevention quarterly and annual reports, and the annual collection system report and any follow-up collection system reports (as needed).

A standardized QC/QA study was completed to generate defensible data.

Performed Chronic and Acute Toxicity tests to determine compliance with OEPA WET testing.

Updated laboratory SOPs to stay current with OEPA requirements (total and ortho-phosphates).

Performed a comprehensive review of the draft and final NPDES permits to determine what testing would change (type, frequency, and intervals) and what is necessary to maintain compliance with Federal and State discharge programs.

Updated aging or broken equipment:

- **Replaced old reagent refrigerator with new reagent fridge**
- **Replaced old oversized desiccator's with new smaller ones to free up lab counter space**

Worked with other departments to provide accurate on-time analytical results to help in the optimization of equipment and unit processes. This information is then used to help with electrical and maintenance savings and to extend the life of the equipment at the NOWWTP.

Pretreatment Division

Shown in the picture is a manhole blocked with Fat, Oils, and Grease (FOG)

The Pretreatment Division for the North Olmsted Wastewater Treatment Plant provides inspection, data collection, and regulatory assistance to all Industrial Users (IUs) in the service area of the NOWWTP. The service area includes North Olmsted, Olmsted Township, and Fairview Park. The types of businesses that the department assists range from federally regulated categorical industries to state-identified commercial groups of interest such as dental or automotive facilities.

During an average year, the division works to inspect 1/3 of all commercial business of concern, assist with compliance, and address any Notice of Violations (NOVs). The division then works with businesses or residents to assist them with compliance and lowering pollutant levels/concentrations in their discharge.

The lead picture in this section is from the manhole on Lorain Road, Fats, Oils, and Grease are a common problem with restaurants but seems to be more problematic for food services establishments that focus on delivery and carryout. (Current interceptor sizing requirements are influenced by seating capacity.)

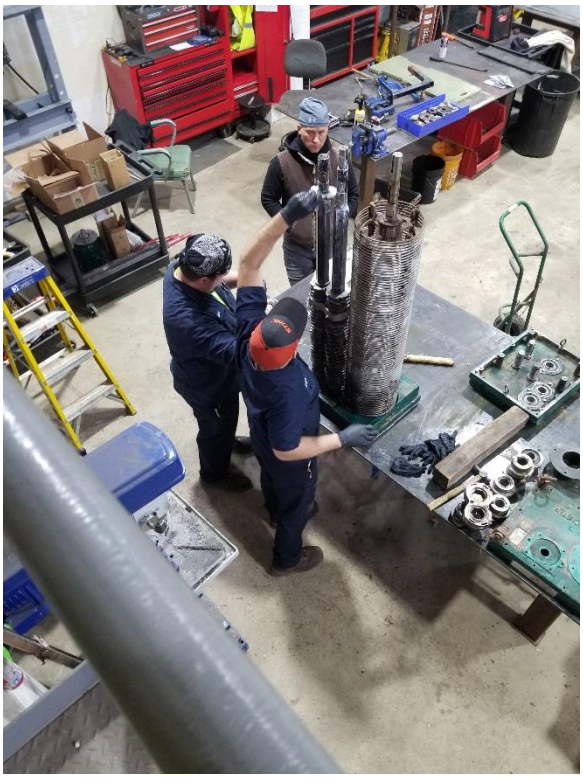
During the year 2019, the division identified and corrected the following compliance-related issues in the City of North Olmsted Municipal Industrial Pretreatment Program (MIPP), service area: six Significant Non-compliance (SNC) and zero Administrative Orders (AOs). Compliance orders were issued to American Wire and Cable, Red Robin, Georgio's Pizza, Little Caesar's Pizza, and Café Stratos.

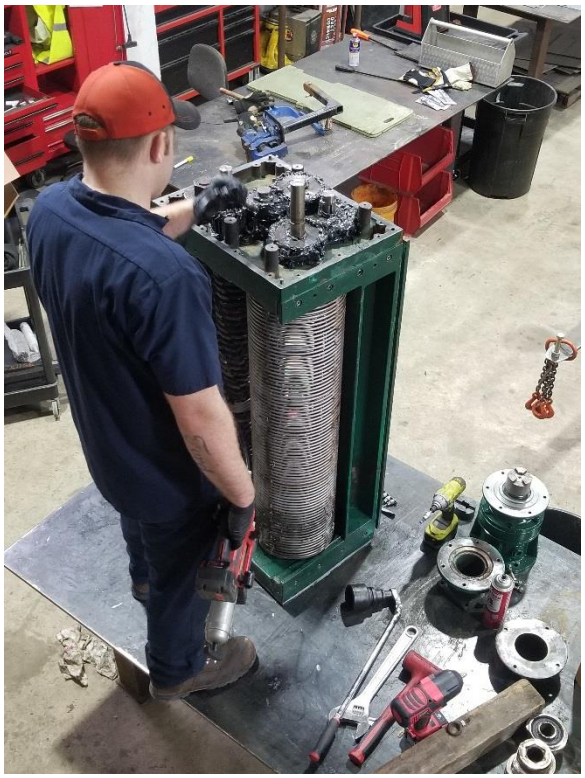
In addition to SIU, CIU, and NSCIUs the pretreatment program also inspects and occasionally samples various Industrial Users (IUs) within certain control groups. For 2019 these groups included:

- 69 Foodservice industries
- 17 dental facilities

The Pretreatment Division also assists the Collection/Stormwater Division with autumn leaf inspections, waste dumping inspections, notice of volitions letters, and follow up tracking, for the fall of 2019. During the year 2019, 11 Notice of Violations letters were issued for stream/stormwater/dumping issues.

Maintenance Division 2019 individual project summary





The picture shows the rebuilding of the grinders that shred material at the Dover Lift Station

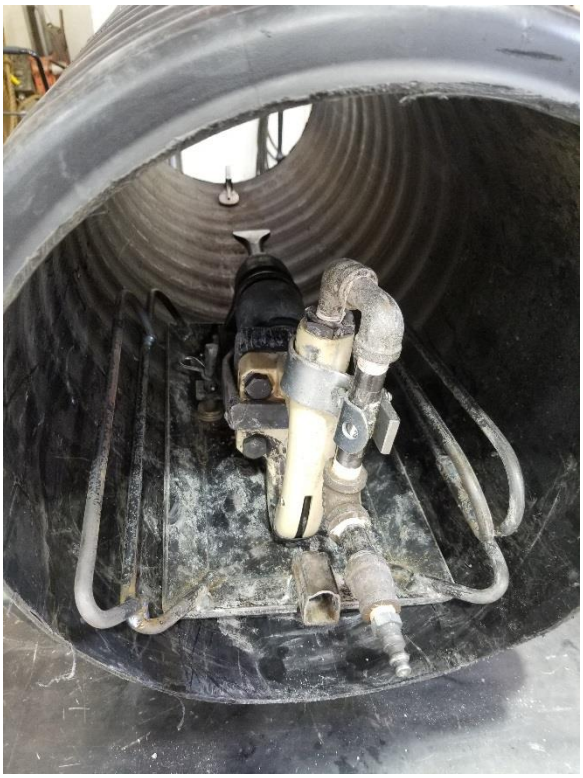
The Maintenance Division for the North Olmsted Wastewater Plant provides electrical, mechanical, fabrication, and inspection services to all divisions of the wastewater department and on occasion assists with technical advice or assistance to other city departments. The division focuses on preventative maintenance and scheduling in advance whenever possible but also performs reactive/emergency maintenance when necessary.

The overall goal of the North Olmsted Maintenance Division is to perform quality preventative maintenance in a predictive manner. Equipment and processes are scheduled predictively, whenever possible, to extend the life expectancy of the equipment and achieve the lowest operational cost. Below are some of the projects completed in-house by the Maintenance Staff during the 2019 year.

- Fabrication site-specific pneumatic impact skid for removal of hardened material within active sewer lines (used on the south interceptor to remove concrete washout from the Windsor Culvert Replacement Project)

- Rebuild Andritz perforated plate screens #1 and #2. ¼ -inch plate screens located at the NOWWTP Preliminary Treatment Facility (PTF).
- Rebuild Grinders at the Lebern Lift station.
- Rebuild Grinders at the Dover Lift Station (pictured above).
- Finished Installation of L.E.D. Lighting on all north facing exterior buildings at the WWTP, included low profile 10% angled lighting to minimize light impacts on surrounding neighbors.
- Performed major service and recalibration of the plants dewatering centrifuge (10,000-hour service).
- Moved all parts storage out of the basement of the maintenance building and from various other rooms in the WWTP to the new East maintenance building (allows for better inventory and parts management).
- Rebuild/refurbish 2 sludge feed pumps (402 and 404)
- Replaced control and drain valves on the flow equalization tank.
- Replaced gear drives on VLR tanks 304 and 308

Maintenance of the PTF plate screens



Hydraulic hammer designed/built by our Maint. Div.

Treatment Division 2019 individual project summary

Shown in the picture is the scroll and bowl to the plant's centrifuge this machine was disassembled and inspected as part of its 10,000-hour preventative maintenance plan.

The Treatment Division of the North Olmsted Wastewater Treatment Plant is responsible for treating wastewater, removing pollution, and returning a vital resource to the environment in the best and most responsible way. Each operator is trained to inspect, identify, correct plant processes, and optimize performance with the goal of exceeding the state-issued NPDES permit.

Wastewater treatment plant highlights for 2019 include:

- Average daily flow of 6.474 million gallons per day.
- Total flow treated 2.266 billion gallons.
- Peak (24-hour) flow 26.33 million gallons (June 20th).

- Ester Meter annual flow of 147.41 million gallons.
- 983.93 dry tons (4981.46 wet tons) of biosolids hauled.
- 200.23 wet tons of rags and grit removed.
- 331.87 wet tons of street sweeps and catch basins screening hauled.

In 2019 the North Olmsted also started/received a new NPDES permit 3PD00016*ND which took effect December 1, 2019.

During the year 2019, the Wastewater Treatment Plant made the following improvements or investments to assist them with the operation and maintenance:

- Awarded a new biosolids disposal contracts to Quasar (beneficial reuse) and Republic (landfill).
- Supervised the final construction and closeout of the East Maintenance Building and assisted with stocking.
- Handled the transportation and disposal of waste material from the Lebern force main break
- Cleaned, inspected and serviced VLR tanks 2-2, 2-3, & 2-4.
- Purchased a new roll-off truck for the transportation of biosolids.
- Purchase of new forklift
- Replaced UV disinfections bulbs in UV-Channel # 2
- Replaced valve operators for the RAS storage tank.
- Selected and installed a new retractable wire system, for sludge holding tanks #1 & #2.
- Replaced 2 sludge hoppers.
- Assisted with centrifuge major service (10,000 hours)
- Added electrical shunt-breakers to existing emergency generators (3-units)
- EMP testing for all 480 transforms and gear.
- Began process to upgrade and replace essential hardware for the plants SCADA system.
- Assisted with plant entrance relocation (sign removal & landscape).

Additional pictures from the 10000-hour centrifuge service

Cleaning the rag discharge chute **before and after (treatment basin) tank cleaning**

City of North Olmsted Wastewater Treatment Department Staffing 2019-2020

All staffing for the Wastewater Department is overseen by the Superintendent, with the help from division managers and one administrative assistant. Supporting these managers are numerous full-time, part-time, and seasonal employees.

There was no increase in staff members for 2019 and there are no anticipated changes to staffing levels for 2020, although the department does anticipate replacing select key members who are retirement eligible.

Staffing Sanitary Sewer System/Collections

There were two employees that resigned in 2019, the division replaced these positions with internal staffing from the Service and Recreations Department. We would like to welcome back Nick Hoffman and Alec Roudeau to the staff. Both Nick and Alec worked as a seasonal employee for the wastewater department, before full-time placement in other departments within North Olmsted. We are not expecting to replace any employee in 2020 for this division. Current staffing for this division is 1 Manager, 1 Supervisor, and 3 Maintenance Technicians, and 5 Collection System Operators. 4 to 5 seasonal employees are also supervised by the division during the months of April through September.

Staffing NOWWTP Lab

Staffing remained constant for the Laboratory Division in 2019. The staffing for this division is projected to remain the same in 2020. The current staffing for this division is 1 Chemist/Manager and 1 Laboratory Technician.

Staffing Pretreatment/Biosolids/Inspections

At the end of the 2019 pretreatment season, the WWTP hired a new Pretreatment /Biosolids Coordinator, Renee Golick. Renee will oversee the inspection of restaurants, automotive, and car wash facilities in 2020 along with our larger industries. Current staffing for this division is 1 part-time seasonal inspector (collections/stormwater) and 1 part-time pretreatment/biosolids technical assistant.

Staffing NOWWTP Treatment

Staffing remained constant for the Treatment Division in 2019. The staffing for 2020 is projected to remain the same as prior years. The current staffing for this division is 1 Manager, 1 Operations Laborer, and 6 Certified Operators. 1 additional seasonal employee is shared between treatment and maintenance divisions during the months of April through September.

Staffing NOWWTP Maintenance

Staffing remained constant for the maintenance division in 2019. The staffing for 2020 is projected to remain the same as prior years. Staffing for this division is 1 Manager and 4 Maintenance Mechanics.

City of North Olmsted Wastewater Treatment Department Goals and Objectives.

Each year the City of North Olmsted Wastewater Department compiles both a list of accomplishments and desired goals for the upcoming year. The list below outlines both our general goals and specific yearly goals for the year 2020.

General Goals & Objectives: Wastewater Treatment 2020

Plant Operations Optimization goals:

- Work with the Lab Test Results, the Plant Operations Staff to operate and optimize all the equipment and processes. Examples are turning off unneeded equipment, running equipment at a rate that is needed (not at a pre-set or pre-programmed rate), turning off of lights in unoccupied buildings, operating the plant in a manner to achieve complete Biological Nutrient Removal (BNR) instead of adding chemicals.
- Continued to test operational configurations of the B.N.R. process by alternating conditions, flow paths, and oxygen requirements (blows and mixers). With the goals of phosphorus removal without feeding sodium aluminate, achieve ammonia removal while reducing electricity usage, Closely monitor O.R.P. values, including the regular cleaning and calibrating of O.R.P. sensors, and achieving proper oil and grease removal through biological integration/consumption of fatty acids.
- Monthly cleaning and rotating of secondary clarifiers (assist with preventative maintenance)
- Maximize the use of a single secondary clarifier to aid in storm flow retention and electrical savings.
- Calibrated and adjusted the set point on flow meters for the tertiary filter bypass, this optimization avoids 605 bypasses and allows high flow levels into the tertiary filters during high flow.
- U.V. System optimization with the goals reducing electricity usage and maximizing E.coli kill, accomplished by running the minimum number of banks necessary for ultra-low bacteria counts, keeping T.S.S. low to allow the U.V. transmittance to be as efficient as possible, making operational adjustments to the activated sludge aimed at keeping turbidity and sludge carryover low.

- Sludge thickening optimization with the goal of reducing odors, reducing the amount of electricity used, reducing the total amount of material needed to be run through the centrifuge, raise the % solids in the feed sludge to aide centrifuge operation, accomplished by alternating decant start times, speeds, and lengths, with an aim of not producing extra odors, and running blowers at the minimum speed needed to reduce odors and achieve aerobic digestion.
- Centrifuge operation and optimization, with the goals of reducing run time, increasing sludge dewatering, reduction of odors and reduction of polymer usage this is accomplished by pre-thickening the sludge being fed to the centrifuge, properly adjusting and operating the polymer makeup unit, and continually running boxes / no idle time between boxes.
- Vactor Unloading Station optimization with the goal of no odors, no tracking out of the dump pit, and the most efficient dewatering of debris. This is accomplished by routine cleaning to avoid odors, end of the day always clean, routine hauling, to avoid odors and overweight boxes, weighing of all hauled boxes, no over or underweight boxes, tarping processed loads, to avoid mixing with rainwater and minimize odors.
- Odor Control Systems, it is our goal to have "0" odor complaints, the items listed below are practices done to reduce or remove odor: properly monitoring and operating the Odor control systems, monitoring chemical performance of timely preventive maintenance, prompt investigation of odor complaints, including visiting the site whenever possible, hauling all sludge as produced with minimal onsite storage, clean sludge boxes after each use, inside and out, keep any full boxes tarped and indoors, when possible, keeping doors/garage doors closed whenever possible, cleaning of any and all empty tanks, and servicing/flushing static tanks in a timely manner.
- Continue the process of hauling all dewatered biosolids, street sweepings, grit, and rags in-house. Biosolids were hauled to Quasar Energy's, sits at Three Creeks or Collinwood, when available, or to Lorain County Landfill. Rags, Wastewater screenings, street sweep material, and catch basin debris were hauled to Lorain County Landfill.
- Comply at all times with the requirements of the NPDES permit.
- Exceed the water quality requirements in the discharge permit, for all parameters.

- Assist with preventive maintenance to all treatment facility equipment.
- Provide around the clock staffing for the treatment facility, 24/7/365.
- Involve all treatment staff in process control, maintenance, and improvements made to the facility.
- Implemented new technologies for improved water quality and maintenance management as they become available.
- Provide educational outreach for the treatment facilities to area schools and other interested citizens.

General Goals & Objectives: Wastewater Pretreatment/Laboratory 2020

- Perform permit required in-house sampling and analysis, while exceeding the professional industry standard.
- Assist outside serviced with sampling and analysis, when required.
- Prepare NPDES monthly reports and assist with other quarterly/annual reports.
- Perform maintenance and calibration of lab and plant process equipment.
- Maintain a QA/QC (quality assurance/quality control) program to ensure analytical accuracy and defensible data.
- Research new equipment and methods.
- Support the wastewater treatment process control with accurate sampling and analysis.
- Comply with Environmental Protection Agency mandates as they relate to the pretreatment of wastes accepted at the wastewater facilities.
- Prevent interference with treatment, operations, pass through, and contamination of sludge through
    - Maintaining legal authority and an enforcement response plan
    - Annually review local limits
    - Prepare annual pretreatment and sludge reports
    - Identify, permit, monitor, and inspect all Significant Industrial Users
    - Develop programs to monitor critical Industrial Users (IU)
- Work with other City departments concerning identifying SIU and IU.
- Investigate reported issues concerning SIUs, IUs, overflows, and dumping.
- Sample sectors of the collection system to identify localized conditions.

- Provide sampling, inspection, and support as necessary to monitor SIUs.
- Maintain and update the City's web page for the Wastewater Department.

General Goals & Objectives: Wastewater Collections 2020

• Maintain clean and free-flowing conditions in all sanitary sewer mains at all times.
• Inspect (CCTV) and or Clean (Jet) all sewer mains every 6 years.
• Administer root control via cutting or chemical application to sewers, as needed.
• Minimize Inflow and Infiltration (I & I) of groundwater/stormwater into all publicly owned sewer lines, to minimize unnecessary hydraulic flows to the treatment facility and prevent sewer surcharging.
• Repair (sewer patch) or replace compromised sewers mains as part of the effort to minimize I & I and maximize flow.
• Rehabilitate and seal manholes for both I & I reduction and maintenance of the City of North Olmsted's infrastructure.
• Implement new, proven technologies for improvement of the system as they become available.
• Identify large projects and assist the Engineering Department in planning and implementing programs to increase the transportation and treatment to the wastewater plant.
• Provide around the clock emergency response to all sewer emergency calls.

General Goals & Objectives: Wastewater Administration 2020

• Provide oversight supervision and direction for the entire Wastewater Department.
• Provide clear directives for the safe operation of all departmental processes.
• Identity, plan and oversee improvement projects, including evaluations of alternative treatment strategies or technologies.
• Provide training opportunities for all staff, emphasizing communication, teamwork, leadership, management, and safety.
• Provide employees with the correct information to make informed decisions.

- Participate with Federal & State EPA bodies, and provide feedback and input with regards to future changes to NPDES permits (examples include: Total Maximum Daily Load, anti-degradation, and development of local limits).
- Participate with local and regional environmental organizations such as OWEA, WEF, NOACA, OUPS, Cuyahoga County Soil and Water Conservation District, Cuyahoga County Board of Health, Cleveland Water, and other public utilities.
- Implement new NPDES permit requirements in accordance with compliance schedules as mandated by each new permit cycle.

City of North Olmsted Wastewater Treatment Department 5 year plan

As part of the annual report and budgeting for futures years, the City of North Olmsted wastewater department prepares goals and purchases for the following years. Our 5-year plan is re-evaluated each year and adjusted on an as-need basis. The current 5-year plan details the projected major purchases for 2020 as well as the projected purchase through 2025. The majority of these purchases will fall into a capital purchase group (55) or into other groups with some larger repeated purchases [service (54) and material (53)] spelled out in detail.

5-year plan for 2020

Item Description	Estimated Capital Cost	Estimated Non-Capital Cost
Replace van #47 with F 450 (4500)	$ 55,000.00	
Radial Drill Press (4 or 5 foot radius)	$ 25,000.00	
Generator replacement Bradley	$ 35,000.00	
Dover LS Spare pump	$ 25,000.00	
Emergency Dig Jobs	$ 55,000.00	
Rebuilding/coating manholes	$ 45,000.00	
HVAC mods to Lebern, Dover, Clague Park (post study) (item not depreciated)	$ 90,000.00	
South Interceptor Tank design (item not depreciated, no carry)	$ 200,000.00	
U.V. Lamps (1/3) [Not Capital, 53]		$ 35,000.00
Kruger Filter **Panels** (1st, 1/3) [Not Capital, 53]		$ 150,000.00
L.E.D. Lighting upgrade	$ 10,000.00	
Electrical Service 13,200 Voltage, main feed and transformers (includes 3 units)	$ 18,300.00	
Andritz Perf Plate Drive Chain (1 unit)	$ 25,000.00	
Grit Hoppers and Rags Hopper sand and re-plate or purchase new	$ 15,000.00	
R.A.S. Pump Rebuild 1 pump	$ 25,000.00	
Kubota replacement w/ trade-in	$ 25,000.00	
T.W.A.S Tanks Demo	$ 50,000.00	
Asbestos abatement	$ 10,000.00	
New/replace maintenance vehicle with multi-use (all purpose) mobile service vehicle	$ 130,000.00	
Compliance sampler 24 hour hold (refrigerated unit)	$ 7,500.00	
Root Control Application [Not Capital, 54]		$ 10,000.00
Manhole sealing (in house, supplies) (Line item group 6854465)		$ 35,000.00

5-year plan for 2021

Item Description	Estimated Capital Cost	Estimated Non-Capital Cost
Grinder Moen (if needed)	$ 45,000.00	
Grinder Rebuild Broxbourne	$ 25,000.00	
Emergency Dig Jobs	$ 50,000.00	
Rebuilding/coating manholes	$ 45,000.00	
Remove existing gen building at Lebern LS	$ 10,000.00	
Replace standby pump at Lebern (inc VFD)	$ 25,000.00	
Replace Generator at Lebern LS (include sound enclosure)	$ 45,000.00	
Replace roof sludge load out	$ 75,000.00	
L.E.D. Lighting upgrade	$ 10,000.00	
Grit Pump Rebuild, 1 Pump (25K)	$ 25,000.00	
R.A.S. Pump Rebuild 1 pump	$ 25,000.00	
Asbestos abatement (for lab roof)	$ 10,000.00	
Seal Blacktop	$ 15,000.00	
Andritz perf plate chain (second unit)	$ 25,000.00	
PLC spare parts (bulk purchase)	$ 40,000.00	
Gate actuators	$ 40,000.00	
Purchase 1 bank UV lights (35k) [Not Capital, 53]		$ 35,000.00
Manlift	$ 10,000.00	
HVAC Spare parts	$ 30,000.00	
Front gate Replacement	$ 25,000.00	
Lab Remodel ½ of lab (includes fume hood)	$ 85,000.00	
Root Control Application [Not Capital, 54]		$ 10,000.00
Manhole sealing		$ 40,000.00
Full size Manhole rehab [Not Capital, 54]		$ 45,000.00

5-year plan for 2022

Item Description	Estimated Capital Cost	Estimated Non-Capital Cost
Replace CCTV truck (assumes trade in/ reuse of CCTV eq)	$ 150,000.00	
Replace system's truck F 350 or 3500	$ 35,000.00	
Grinder Rebuild Bradley	$ 25,000.00	
Emergency Dig Jobs	$ 50,000.00	
Rebuilding/coating manholes	$ 45,000.00	
Andritz Perf Plate Chain, discharge chutes	$ 25,000.00	
Kruger Filter **Panels** (2nd,1/3) [Not Capital, 53]		$ 150,000.00
L.E.D. Lighting upgrade	$ 15,000.00	
R.A.S. Pump Rebuild pump	$ 25,000.00	
Roof SO 2 Building	$ 75,000.00	
Grit Pump Rebuild,1, pump	$ 25,000.00	
Rebuild Sludge Decant Pumps 2	$ 30,000.00	
Spare PLC parts	$ 25,000.00	
Purchase 1 bank UV lights [Not Capital, 53]		$ 35,000.00
Versa Star Meter replacement	$ 6,000.00	
Root Control Application [Not Capital, 54]		$ 10,000.00
Manhole sealing		$ 40,000.00
Full size Manhole rehab (outside service)		$ 45,000.00

5-year plan for 2023

Item Description	Estimated Capital Cost	Estimated Non-Capital Cost
Replace system truck	$ 35,000.00	
Grinder Rebuild Lebern	$ 25,000.00	
Emergency Dig Jobs	$ 55,000.00	
Replace one 4" pump Clague Park	$ 12,000.00	
Replace one 6" pump Clague Park	$ 18,000.00	
Replace carbon unit (air handler) at Dover	$ 15,000.00	
UV Channel gate accurators	$ 55,000.00	
New sludge hopper	$ 12,000.00	
Seal parking lot (inc Dover LS)	$ 15,000.00	
L.E.D. Lighting upgrade	$ 10,000.00	
2 R.A.S. Pump Rebuild pump	$ 50,000.00	
Purchase 1 bank UV lights [Not Capital, 53]		$ 40,000.00
Aerzen blower major service (6 units)	$ 40,000.00	
Womens Lockroom remodel	$ 50,000.00	
Plant drain pump replacement	$ 50,000.00	
Replace Current Flat-bed Maintenance Crane Truck	$ 60,000.00	
Replace DI/RO water system	$ 15,000.00	
Root Control Application [Not Capital, 54]		$ 10,000.00
Manhole sealing (Line item group 6844655)		$ 40,000.00
Full-size Manhole rehab (outside service)		$ 45,000.00
Line influent junction box	$ 150,000.00	

5-year plan for 2024

Item Description	Estimated Capital Cost	Estimated Non-Capital Cost
Replace dump truck	$ 55,000.00	
Grinder Rebuild Dover	$ 25,000.00	
Emergency Dig Jobs	$ 55,000.00	
Replace backhoe (asssumes transfer to fleet)	$ 100,000.00	
GIS software and system modeling	$ 80,000.00	
Kruger Filter Panels (3rd, 1/3) [Not Capital, 53]		$ 150,000.00
Kruger Filter Chain and Drives [Not Capital, 53]		$ 50,000.00
Centrifuge bowl major service	$ 55,000.00	
Purchase VFD replacement for centrifuge	$ 20,000.00	
Purchase VFD replacement for RAS replacement	$ 20,000.00	
Purchase complete VLR rotation assembly	$ 75,000.00	
Screw Air compressor (centrifuge supply)	$ 50,000.00	
Purchase 1 bank UV lights [Not Capital, 53]		$ 40,000.00
Purchase Clarifier Gear Box	$ 30,000.00	
Replace desiccation oven	$ 20,000.00	
Root Control Application [Not Capital, 54]		$ 10,000.00
Manhole sealing		$ 40,000.00
Full size Manhole rehab (outside service)		$ 45,000.00

5-year plan for 2025

Item Description	Estimated Cost Capital	Estimated Non-Capital Cost
Replace Truck # 56	$ 35,000.00	
Grinder Rebuild Broxbourne	$ 30,000.00	
Emergency Dig Jobs	$ 50,000.00	
Rebuilding/coating manholes	$ 45,000.00	
Manhole rebuild top to bottom	$ 40,000.00	
Seal Coat Driveways all lift stations	$ 15,000.00	
Kruger Filter Bearing and sprockets [Not Capital, 53]		$ 50,000.00
Rebuild Blowers 4 units (25k each)	$ 100,000.00	
Stablization of shepards lane (influent manholes)	$ 50,000.00	
Men's room remodel and asbestos abatement	$ 75,000.00	
Gate Actuators (VLR tanks)	$ 75,000.00	
Clarifier Drain pump and add on to RAS basement tee 6	$ 40,000.00	
Purchase VFD replacement for RAS replacement x2	$ 40,000.00	
Purchase 1 Sludge hopper or screening hopper (10K)	$ 10,000.00	
Seal parking lot (inc Bradly LS)	$ 15,000.00	
Major hardware and Software, upgrade or replacement (SCADA system)	$ 75,000.00	
Andritz Screen Wear Part replacement [Not Capital, 53]		$ 20,000.00
Root Control Application [Not Capital, 54]		$ 10,000.00
Manhole sealing (Line item group 6844655)		$ 40,000.00
Full size Manhole rehab (outside service)		$ 45,000.00
Replace microscope and display monitor	$ 20,000.00	

In addition to the following capital purchases, the North Olmsted Wastewater Department has defined the following Capital Improvement Projects, as areas of concern for the next 10-20 years. Capital Improvement Projects are projects that are researched by our own experts, with outside assistance, typically from professional engineering firms.

Improvement project 1: improvements to the south interceptor to address surcharging/high volume: status currently underway ***(w/poss. future second tank)***

Improvement project 2: Assessment to influent manholes Mastick Road to WWTP (The Mastick Road Influent Junction Chamber and drop manholes)

Improvement project 3: Assessment of over/under sewers: central interceptor.

:SANITARY SEWER 10 YEAR AVERAGES:

SANITARY SEWER MAINS CLEANED W/JET

2010: 25.6 Miles	2013: 22.3 Miles	2016: 26.6 Miles	
2011: 33.1 Miles	2014: 26.7 Miles	2017: 34.6 Miles	2019: 23.9 Miles
2012: 39.4 Miles	2015: 25.9 Miles	2018: 22.8 Miles	

SANITARY SEWER SERVICE CALLS

2010: 191	2013: 177	2016: 172	
2011: 162	2014: 268	2017: 201	2019: 249
2012: 174	2015: 216	2018: 226	

SANITARY SEWER HOUSE LATERALS T.V.ed

2010: 91	2013: 127	2016: 71	
2011: 62	2014: 193	2017: 158	2019: 132
2012: 57	2015: 138	2018: 122	

SANITARY SEWER MAINS TELEVISED

2010: 11.3 Miles	2013: 7.9 Miles	2016: 23.9 Miles	
2011: 10.1 Miles	2014: 9.8 Miles	2017: 26.6 Miles	2019: 21.2 Miles
2012: 12.7 Miles	2015: 19.7 Miles	2018: 20.1 Miles	

SANITARY MANHOLES SEALED FOR I&I

2015: 36	2018: 127
2016: 96	2019: 87
2017: 148	

SANITARY MANHOLES REPAIRED / REBUILT

2016: 17	2019: 53
2017: 27	
2018: 46	