



HULL WATER POLLUTION CONTROL FACILITY

May
2018

MONTHLY OPERATING REPORT



woodardcurran.com

COMMITMENT & INTEGRITY DRIVE RESULTS

NPDES NO. MA0101231

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1 EXECUTIVE SUMMARY

This Monthly Operating Report provides a summary of the pertinent information and activities that occurred at Hull WPCF during the month of May 2018

- No lost-time incidents for the month of May
- There were **144** effluent samples taken in the month of May. Please see page (11) for details.
- There were two [2] sanitary system overflow notifications reported [SSO]. One SSO at 24 E Street as a result of a blocked sewer line that caused a surcharge in the home. One SSO at 13 Newton Street as a result of a broken sewer pipe/blockage.
- The Bioxide equipment remains on site at PS 3. The 2018 plan has been drafted and a purchase order issued to reuse the existing leased equipment. Anticipate first bulk chemical delivery in mid-June with system start up at that time.
- Asset Management Accounts checkbook for tracking of expenses in ongoing. The weekly review of account status between W&C and Hull Sewer Dept. is on-going and with modifications to the checkbook. Working to close out year 3 [03M] costs.
- Two plant shutdown events where the 120-volt power for all computer/PLC related equipment went down in May, causing for interruption in plant operations. Unknown cause for fluctuating 120-volt power. Temporary power to all PLC's for SCADA set up. Voltage recorders set up to monitor.
- There were 3 grinder pump call outs during the month of May.
- The Underground Storage Tank for fuel oil storage was taken of service in April, and the temporary tank was placed on line. The existing diesel fuel was transferred to the temporary tank, and existing systems decommissioned. Bids for the tank removal were received in. Working with Comm Tank for UST tank removal planning effort.
- Gunrock, Atlantic Ave, & Playground "L" St. CCTV inspection work performed. Force main and gravity sewer inspected near PS 1.
- Main lead generator heat exchanger replacement alternatives being researched.

Woodard & Curran strives to deliver a high-quality operations service and is responsive to our customers concerns. Please feel free to request any modifications to the format or content of this report.

2 FLOWS AND LOADINGS

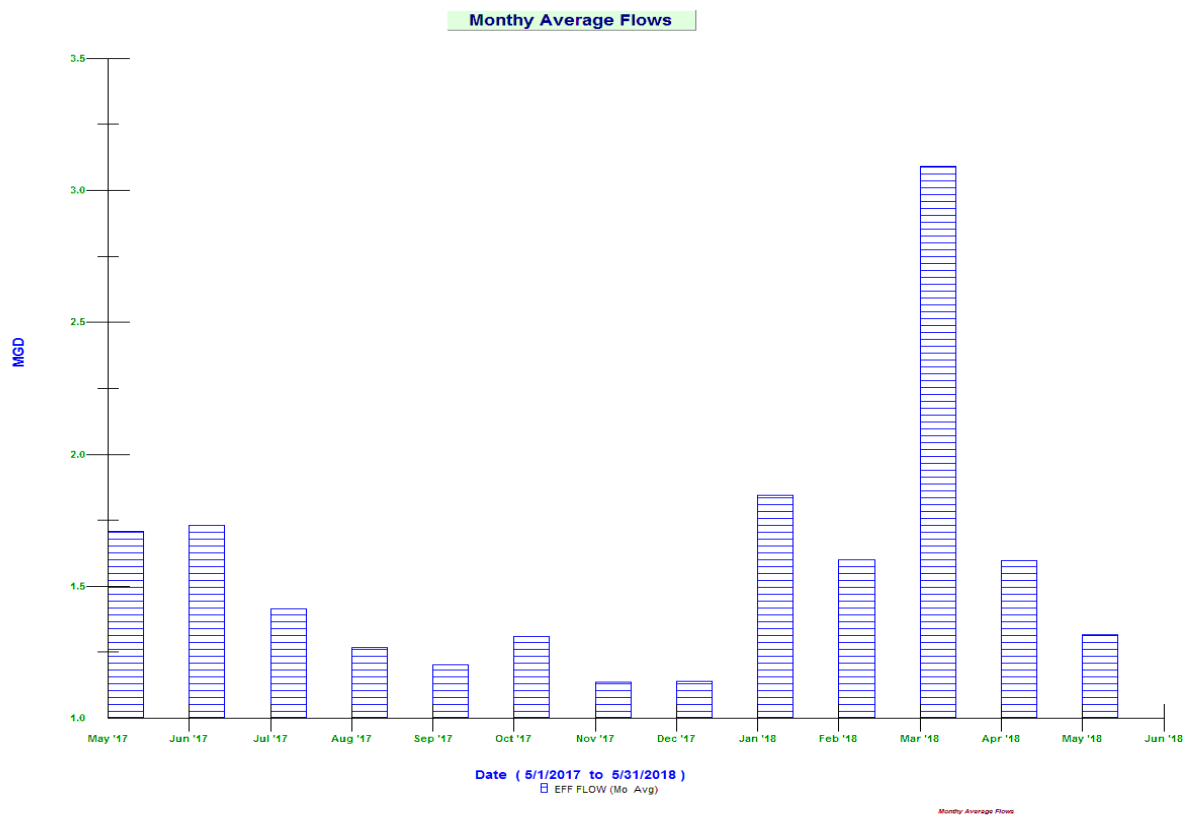
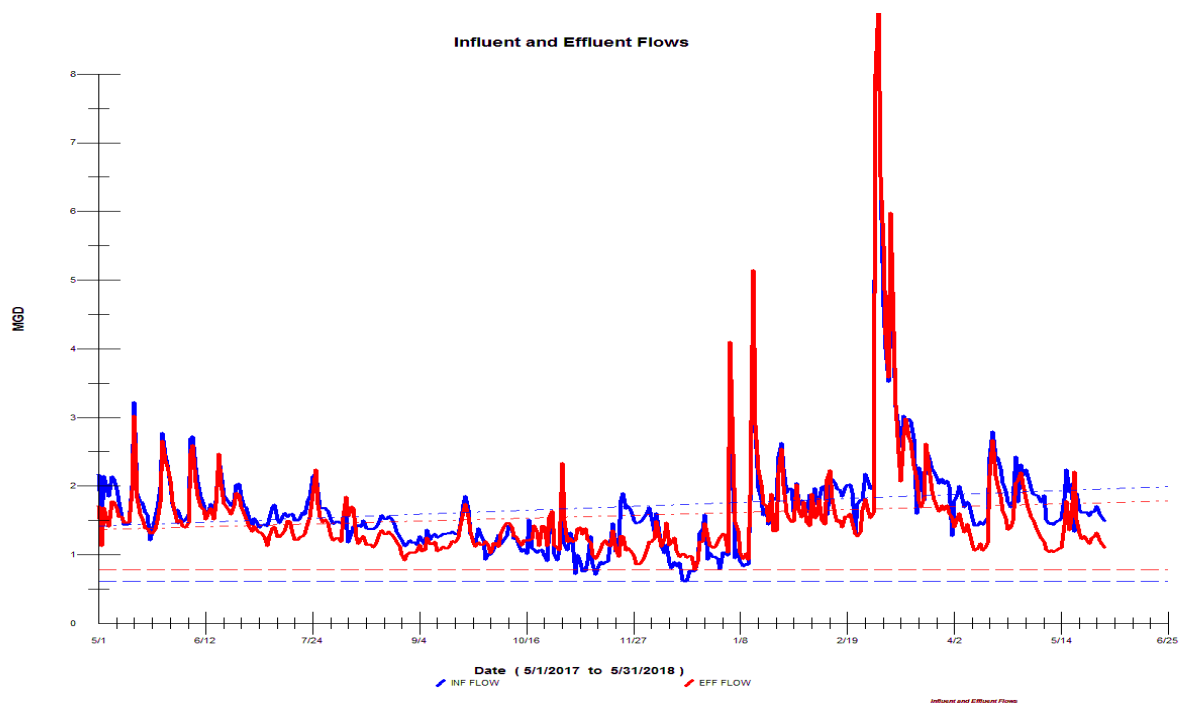


Average Daily Flows and Loadings for the Month:

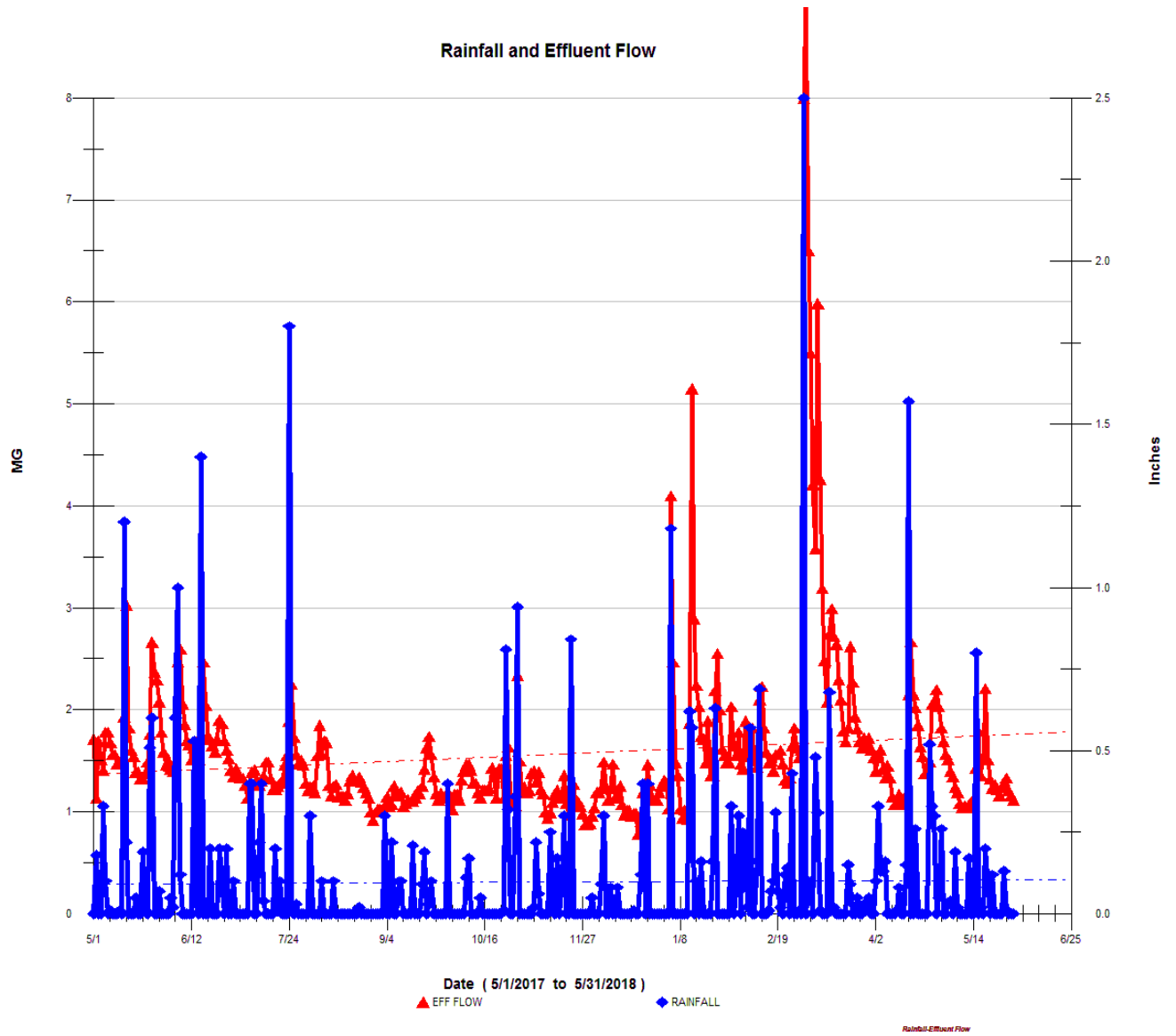
	Eff Flow MGD	Inf Flow MGD	Inf BOD LBS	Inf TSS LBS	Eff BOD LBS	EFF TSS LBS
May 2016	1.355	1.348	1,856	3,424	57	146
May 2017	1.708	1.872	1,792	2,614	56	223
May 2018	1.315	1.700	1,476	2,140	98	179

* Meter drift is getting closer and the numbers more accurate as the staff adjust accordingly.

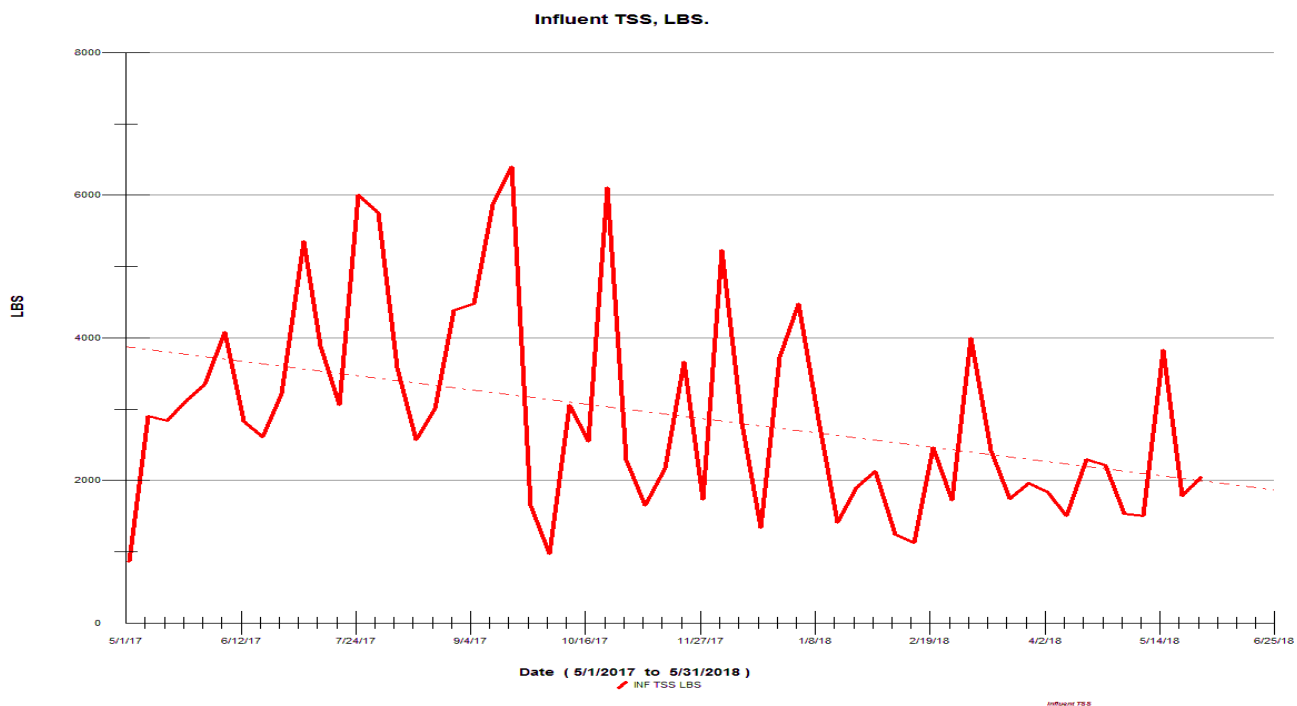
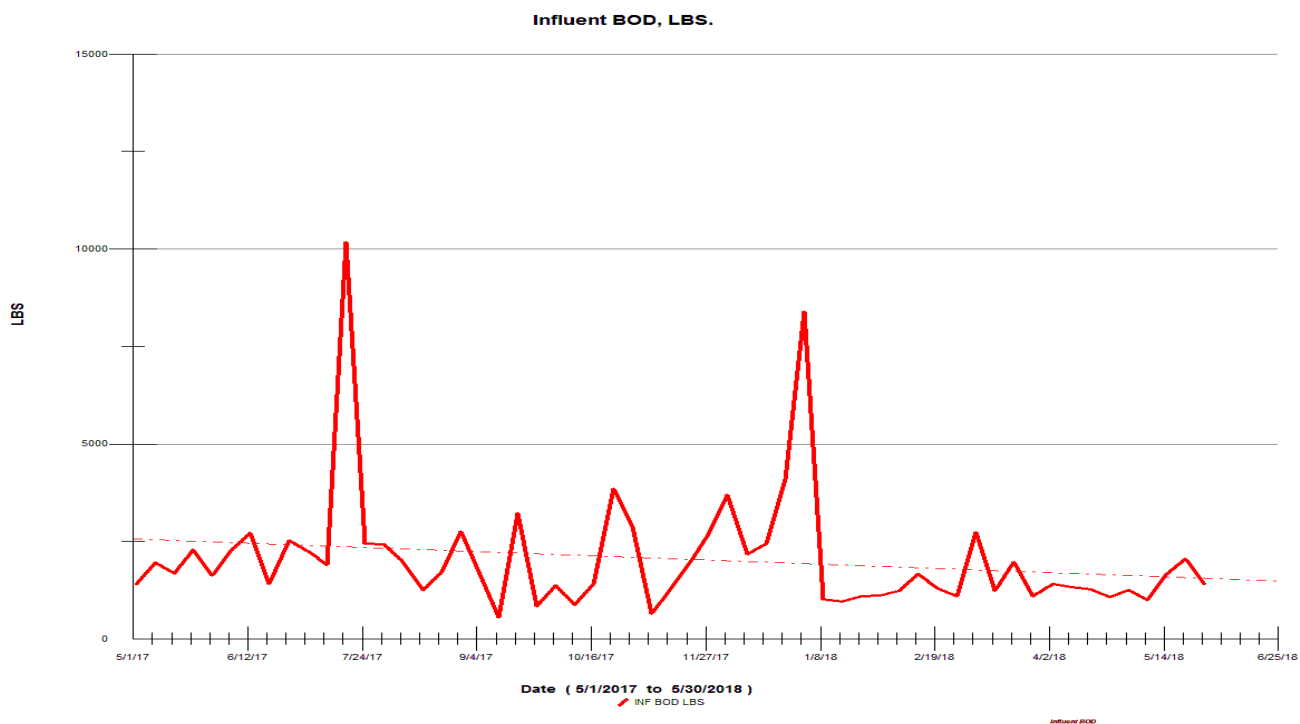
2.1 INFLUENT AND EFFLUENT FLOWS [PEAK FLOW]



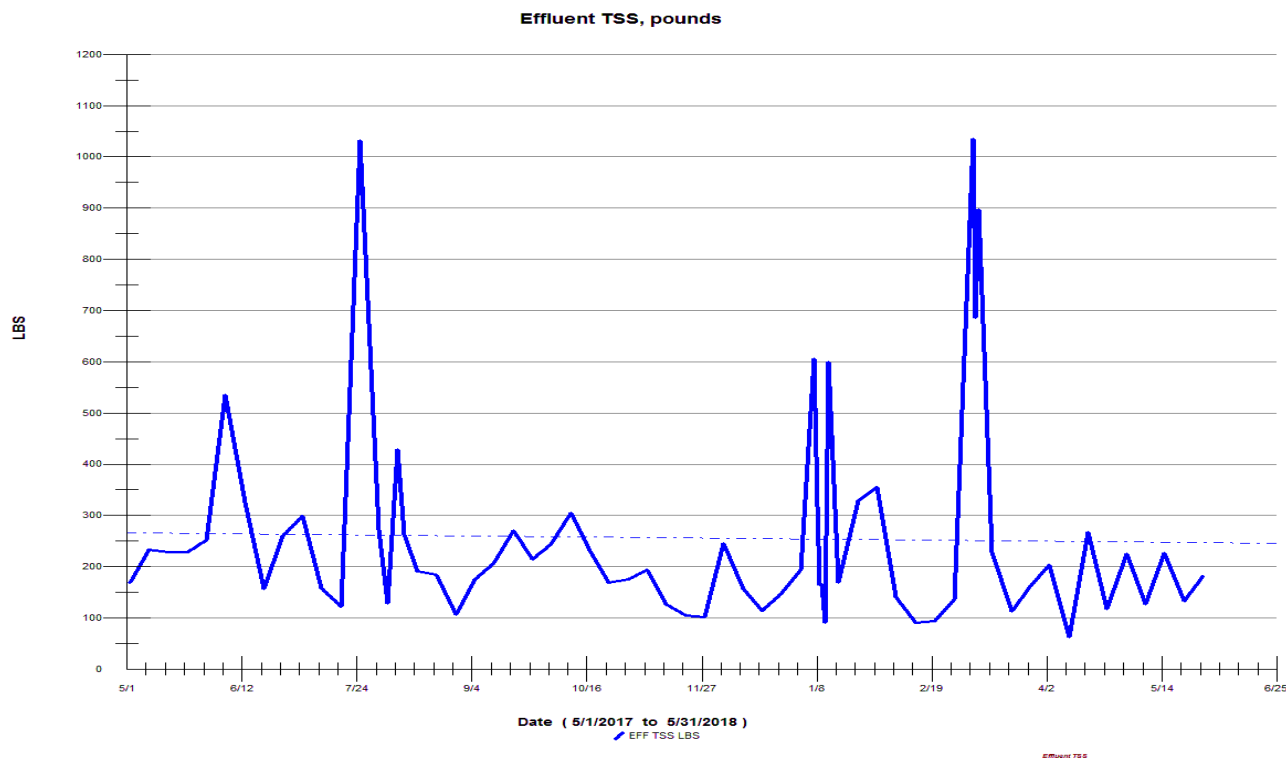
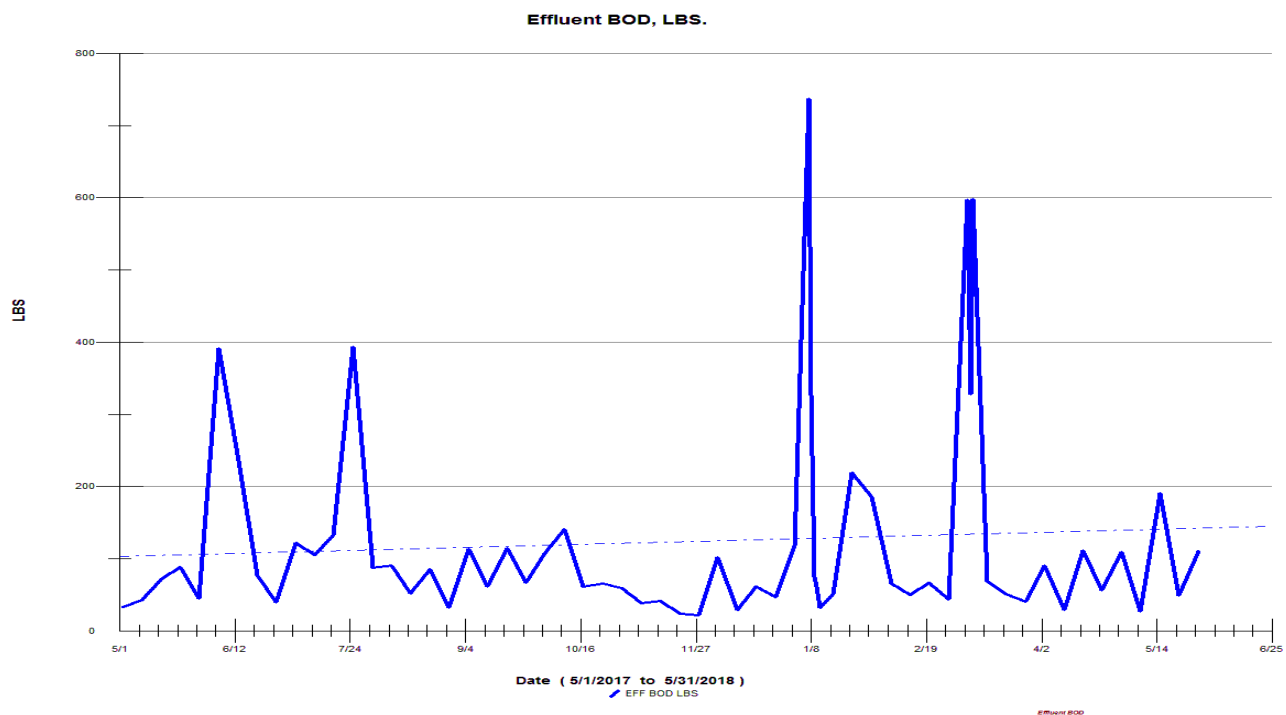
2.2 RAINFALL AND EFFLUENT FLOWS



2.3 INFLUENT BOD AND TSS LOADINGS



2.4 EFFLUENT BOD AND TSS LOADINGS LBS/DAY [MAX MONTHLY 768, MAX WEEKLY 1152]



3 COMPLIANCE



➤ Plant Effluent

- There were no exceedances for the month of May.
- Plant process conditions were good. Still working to control growth and reduce filamentous bacteria growth that creates a dark brown slimy foam and carryover to the secondary clarifier surface. The inefficient RAS removal from the secondary clarifiers is also a major contributing factor. Chlorination of the return activated sludge is on-going.
- A sample of the sludge was sent out on 5/1 for evaluation to an outside vendor, and the microscopic analysis confirmed the predominant filament, *microthrix parvicella* was very common in the Hull system. Corrective action was already implemented, and improving results seen through the remainder of the month.

Updated photos illustrating the effects on the surface of the aeration tank and secondary clarifier:



Aeration Tank #1

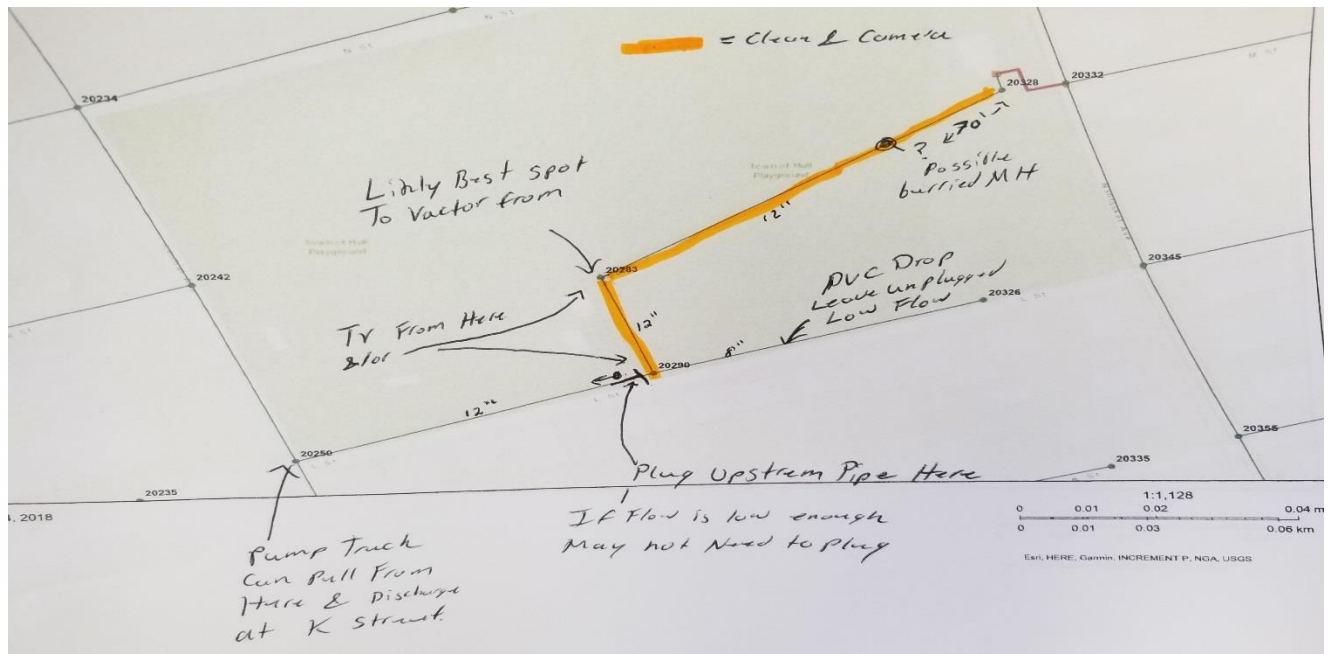


Aeration Tank #3



Secondary Clarifier

- A Copy of the NPDES report for May 2018 was submitted to the DEP and then forwarded to the Hull Sewer Dept. Also, quarterly biotoxicity sampling was conducted. The full toxicity report to follow in June, but no issues reported.
- There were two [2] Sanitary System Overflows [SSO] reported during the month of May.
 - 24 E Street [5/4/18] – sewer line blockage due to debris build-up in 8-inch gravity sewer line that transports sewage from the bay side alphabet streets to pump station #6. The sewer line that runs under the playground was blocked. A portable trash pump was set up to pump the surcharged sewage up to Nantasket Ave while the blocked sewer line was jetted. No release to the environment.



Plan of work to relieve blockage and inspect sewer pipe under "L" Street Playground



Truax jetting line by basketball court toward PS 6



Rosano-Davis – bypass pumping assistance

- 13 Newton Street [5/26/18] – Memorial Day weekend [Saturday] 6-inch gravity sewer line made of vitrified clay pipe was found broken causing a blockage. This caused a release of sewage to the ground surface. The sewer line ran along the side of the road. The line was jetted and repaired by outside contractor [Hub Construction] late in day. Approximately 50-75-gal release reported.



4 KEY PERFORMANCE INDICATORS



4.1 WATER QUALITY

Parameter Info		Permit Requirements					Results				
Parameter	Units	Daily Max	Daily Min	Weekly Avg. Max	Monthly Avg. Max	Freq	Period Avg.	Period Min	Period Max	# of Samples	# of Violations
Eff TSS	MG/L	50		45	30	1 X Week	16.0	13.0	19.0	5	0
Eff TSS	LBS			1152	768	1 X Week	178.6	126.1	226.6		0
% TSS Rem	%		85			1 X Month	91.8				
Eff BOD	MG/L	50		45	30	1 X Week	8.5	3.0	16.0	5	0
Eff BOD	LBS			1152	768	1 X Week	97.6	27.0	190.8		0
% BOD Rem	%		85			1 X Month	93.7				
Eff Chlorine	MG/L	1			0.7	3 X Day	0.23	0.00	0.51	93	0
Eff Fecal	#/100 ML	260			88	1 X Week	<10.0	<10.0	<10.0	5	0
Eff pH	SU	8.5	6.5			1X Daily	7.0	6.8	7.1	31	0
Enterococci	#/100 ML	276			35	1 X Week	<10	<10	<10	5	0

- There were 144 effluent samples taken in the month of May with zero [0] NPDES Permit exceedances.

4.2 GALLONS TREATED VS SLUDGE DISPOSED

Month	Effluent Treated, MG	Sludge Disposed, Gals
May 2016	42.01	90,000
May 2017	52.96	153,000
May 2018	40.77	132100

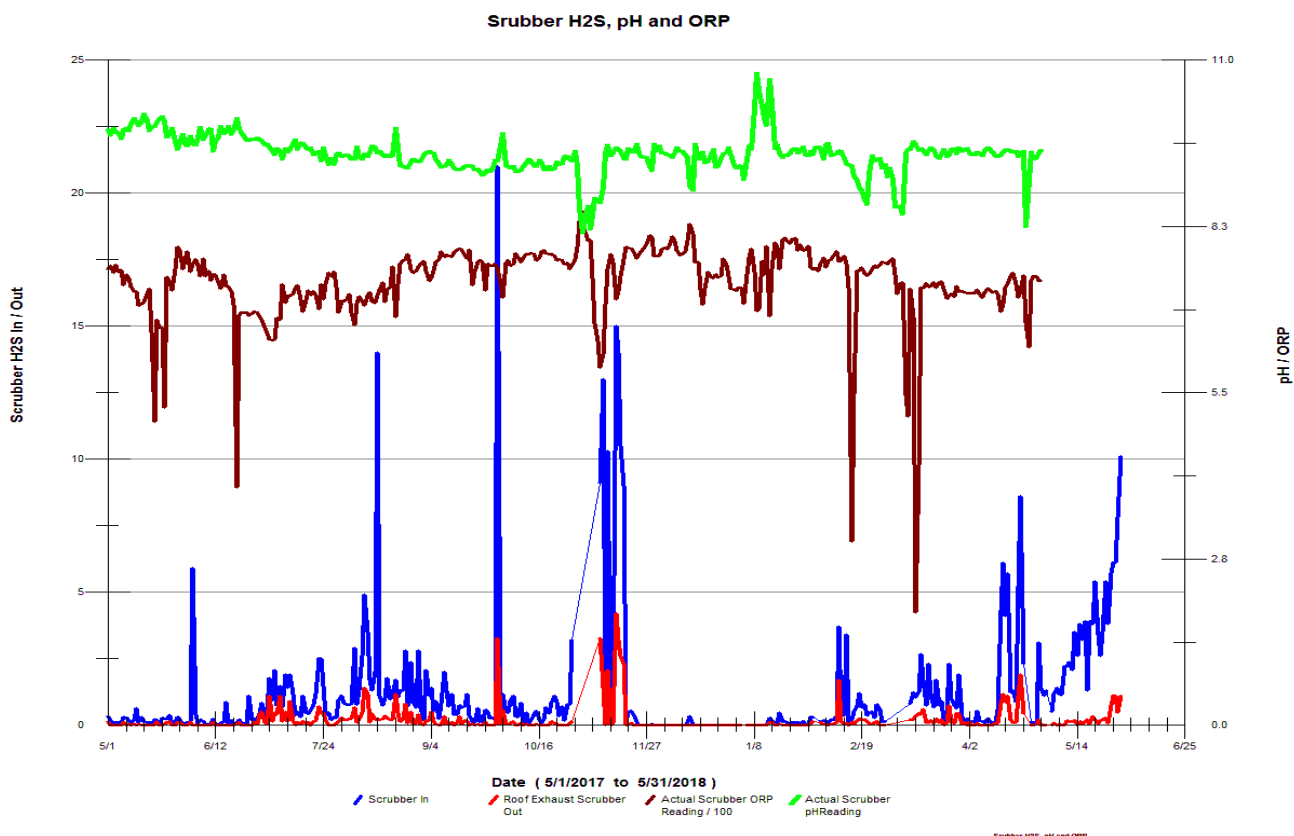
5 ODOR CONTROL

There were two odor complaints in May.

- a) The first one was reported at "X" Street on the ocean side on 5/16/18. Odor was apparent in the evening. Staff was dispatched out to X Street in the morning on 5/17 during low tide period and no smell or H₂S picked up on the H₂S reader. The odor was significantly different then when I went by last night (also low tide). It was unclear where the odors were coming from and why they were intermittent. Ongoing investigation at random times throughout the upcoming days / week until source identified. Updates to Town conservation agent.
- b) The second one was reported on Newton Street on 5/26. The odor was a result of the leak in the sewer line, where sewage was coming up to the ground surface,

The gravity thickener was still on line with no unusual odors, and gradually being phased off line for the summer months. Wasting of primary sludge was routed to the aeration tank on 5/31, so that the phase out of the GT could begin. The waste activated sludge was re-directed to sludge holding tank #2, and the sludge will then be pumped from there for further thickening using the rotary sludge thickener.

The odor scrubber system was on line for the entire month. As noted last month, the recovery from the cleaning was fair, and media removal and replacement is being researched at this time. The system pH and ORP probes were checked.



- “In-Pipe” bacteria addition continued with all 24 dosing stations operational. No additional actions taken for headworks sulfide reduction plan proposed by “In-Pipe. Since the dosing stations were visited in late March, on 3/28 & 3/29, the April inspection/replacement with full bottles took place at the beginning of May, 5/1/18 and again on 5/30.
- Started the bi-weekly change outs of the bacteria bottles at three lift stations Microbe Dosing Stations (MDU's) with installation just in front of the three largest pump stations [in the wet wells or manhole just prior to the station. [PS 3, PS 5, PS 9] The plan is to reload twice per month, and this will deliver an additional 5.4 liters per month in total (1.8 liters x 3 locations). The goal is to see if we get a step change and reduce odors, while at the same time potentially reducing sludge. This change will be monitored closely over the summer months, for pump stations and at the plant.
- On-going – frequent pumping of the secondary scum wells; taking tanks off line, when not needed and cleaning out.
- Revised/updated proposal from Evoqua [Bioxide] was received to resume chemical addition at PS 3 for 2018 summer months through the end of October. The process chemical addition would begin in June.
- Mixing systems/aerators all functional at the pump stations, except for pump station #3. New Medora Gridbee mixing system for PS 3 was received, but not installed yet.
- Vetting ideas/discuss options for headworks area to reduce corrosion and odors.
 - Rubber mats to cover all channels
 - Tarp with a constructed frame to cover the aerated grit chamber
 - New “ducting/pipes” to connect channels to scrubber ductwork – to pull air from the room into the channel and then into the scrubber – i.e., to not let odorous air into the room ... capture it in the channel and send directly into the scrubber – channel will be under a slightly negative air pressure
 - Possibly add hydroxyl radical ozone unit to air in above ground sludge tank ...
 - Seal all pipe penetrations entering/leaking the headworks
 - Remove all unused pipes
 - Possibly control/reduce air flow to the aerated grit chamber

6 MAINTENANCE SUMMARY



- Monthly work order summary for May compiled and a report summary can be found on page 23.
- Two major electrical events [5/16 & 5/19] occurred in May that affected all plant operations. The fluctuating 120-volt power load that feeds all of the programmable logic controllers [PLC's], and SCADA computers through plant back-up power supply units [UPS], drained the UPS's, which led to a shutdown of all operations. An alarm callout was triggered, and plant response was immediate to get the influent and effluent pumps running to avoid major problems.

Plant assistance from W&C SCADA Group, Boston Water & Sewer, Pioneer Electric, and EESCO was solicited to try and find the source of the fluctuating power. Power monitors were set up, electrical components checked, and UPS's replaced with the objective to get to the root of the problem. The 120-volt power loop was re-directed to feed off the HSD trailer after the second event on May

W&C Engineering, Zach Platt in Coordination with Bill Boornazian, discussing power issue with controls and UPS units at Hull WWTP. Review information on the incidents, coordinate with other colleagues, and to advise on power monitoring and thermal imaging on transformer and panel LDP. W&C SCADA assistance from Dave Krauss & Steve Rose on 5/16-17 & on-going phone calls and support 5/18-21. Remote in and program alarms for Influent and Effluent Back-up float control engaged

Delivery of replacement UPS units, Setup of APC software on HMI computers for event tracking implemented.

Review of influent and effluent pump backup PLC's and changed programs to ignore state of primary control and command upon toggle of high-high float switch. Tested OK.

Run diagnostic on SCADA1 and repair communication to Blower PLC. Fix reports and update missing data

- Plant water basket strainer still investigating replacement units with same, or different unit. Also, where effluent water drawn into the system, size of suction piping, considering other suction location for system to improve water quality – utilizing water from effluent wet well versus drawing from bottom of a manhole just after the secondary clarifiers. Minor issues during the month with low system pressure
- Still On hold – needs further review - the sluice gate supports for the inlet gates to primary clarifiers at the D-box. As noted, the supports have lifted away from the concrete and there is also cracked concrete under the supports. Quotes for the repair will be solicited, once a repair plan is finalized.

- There were four grinder pump call outs during the month of May.



- 97 Rockaway
 - 218 N. Truro
 - 104 N. Truro
 - 14 Montana
- Continued working with Industrial Pump of RI for best solution on the repair of the sludge transfer pump, since additional parts needed to repair the pump.
 - On-going Dig-Safe mark outs completed, due to emergencies, gas company work, and responded various rattling manhole covers, broken manhole covers/rims, sunken manholes covers/rims, as a result of snowplows, street clearing of storm debris, other. All work that W&C completed is documented on the monthly Work Order Report.
 - Pump Station 4 – Structural assessment calls for mid-level concrete work is necessary. Site safety area coordinator visited this station in March. The planned isolation valves replacement work still on hold. The structural issues at the station are currently being discussed and have delayed the work. The confined space work plan and JSA are in progress. Requesting quotes are on hold. Safety inspection of station mid-level floor/slab made to determine if temporary repairs possible.
 - Purchase Order for plant generator heat exchanger cleaning/service planned, due to poor coolant water temperature drop with both generators. Highland Power to perform the requested service.
 - Grit chamber – waiting to schedule the tank clean out with WindRiver. The grit removed would then be disposed of at the landfill. After the tank cleaning is completed, the system operation would be resumed, with regular daily removal of grit using the grit pump and classifier.
 - Pump Station #1 – Replaced motor on pump #2; derag pump #1 [bound up with rags].
 - RAS piping manifold modifications made. Replaced abandoned drainage piping and valve and install new 4-way cross and new plug valve. Able to reduce suction head on RAS pump and improve pumping efficiency. Looking at RAS pump repair/replacement quotes for pumps #2 & #3.

- Continued looking into pump replacement options at PS 1, dry pit submersible vs what is there currently, since both pumps pumping at approximately less than 70% capacity when clean.
- ISCO Influent composite sample refrigerator failed – contacted ISCO local rep and new replacement condensing/refrigeration unit installed.
- Working with HSD to identify MH structures in need of repairs, as a result of the winter storms and snow plowing.
- Replaced effluent wet well level transducer. Existing transducer failed causing erratic pump operation.
- On-going issues with polymer feed system for the RST. Remove mixing chamber and clean unit out, install new pressure gauges, and add addition water hook up for town water feed in the event that plant water is not available.
- On-going deragging of pump at PS 6. Looking at possible options for a “de-rag” control to plan for scheduled reverse rotation of the pumps to spin out accumulated debris. Working with vendor to get the specific details and costs.
- Highland Power cleaned and re-installed heat exchanger for the 520KW generator [#2]. Unit had to be taken to repair shop for chemical soak and cleaning. An attempt to clean the #1 generator [750 KW] unit on 5/31 ran into some unexpected issues. The support piping was very corroded, and pieces cracked during the disassembly. The heat exchangers were not removed due to excessive clogging, corrosion, and suspicion that the units could not be effectively cleaned. A new plan for these units to be discussed.



Gen #1 internal blockage and corroded tubes



Gen #2 heat exchanger end cap

7 SAFETY



It is Woodard & Curran's policy to maintain a safe and healthy work environment for every employee and to comply with applicable occupational health and safety regulations.

- No lost-time incidents for the month of May.
- Daily safety briefing meetings, review site safety policies with sub-contractors, safety tailgate topics.
- Confined Space Non-entry rescue – Annual Staff Practical with safety retrieval equipment
- Safety Stand-down Meeting 5/2/18 – Vehicle Safety
- Tick Avoidance Practices & Safety
- Scrubber cleaning SOP updated.
- Drafted JSA for potassium permanganate use, since facility had 7 pails of product on site.
- Monthly staff safety meetings conducted on 5/30/18
 - Scrubber acid cleaning SOP review
 - Tool box topic – Coping with stress”
 - Tool box topic – “Heat exhaustion/Sunstroke”
- April 2018 Lessons learned discussed.

8 STAFF DEVELOPMENT

Training is an important part of any operation to ensure employee health and safety is assured, quality standards are maintained, staff skills are improved, career opportunities become available, and higher productivity is achieved.

Listed is a general outline of training that the staff received over the course of the month:

- Monthly staff Safety training – completed – site training for Confined Space Rescue.
- Operational updates and process control discussions, especially with recent electrical issues and plant shut-downs, pump station operations, odor issues, dig-safes, etc.
- W&C “near-miss” incidents at all projects for April discussed.
- Bill B attended W&C Manager’s Meeting in St. Louis MO, May 8-10 & presented one of the technical sessions – “Identify & Manage Utility Hazards & Risks”
- New hire on-boarding training for Cody P – various areas – plant rounds, station checks, review of various SOP’s.

Staffing related items:

- Vacant O&M technician 1 position was filled with full-time hiring of Cody Piepenbrink. He started full-time on May 19th. Continued supplementing staff with additional O&M support up until staffing was back to full regular staff – Jim Gagliard and Jody St. George. Additional weekend coverage is also provided by Roger Boltrushek and Jim Gagliard.
- MA Maritime winter intern Brett Aguiar – full-time internship completed. Working some weekends during month of May. Employment with W&C concluded in May.
- New summer intern selected from MA Maritime, Hull resident Michael Anderson’s internship to start on June 17, 2018.
- Continue involvement with Mass Maritime internship program/career fair for future interns. Screening possible candidates for fall and winter 2018-2019.
- Sunday rotation schedule planned out for next several months through early September with Jim Gagliard working every other Sunday, and remaining weekends being filled by Roger B., and Bill B. When Bill is not scheduled for a Sunday, he will be on a Monday-Friday schedule.

9 COLLECTION SYSTEM

9.1 WET WELL CLEANING

The actual schedule for wet well cleaning: May 2018 to April 2019:

(X-Cleaned) - (Orange – Inspected) - (Green – See notes) - (blank – no work done)

Frequency of cleaning	Pump Station							
	A	1	3	4	5	6	9	D
May, 2018		X			*1	*!		
June, 2018								
July, 2018								
Aug., 2018								
Sept. 2018								
Oct., 2018								
Nov, 2018								
Dec., 2018								
Jan., 2019								
Feb., 2019								
March 2019								
April 2019								

All pump stations except for Pump Station 3 and Station D have an aerator/mixer in the wet wells

***1 Inspected and needs to be cleaned in June**

10 PROJECT MANAGEMENT & ADMINISTRATION



10.1 ON-GOING PROJECTS AND SUPPORT ITEMS

- Asset management checkbook for improved tracking of expenses. A weekly review of account status between W&C and Hull Sewer Dept. is on-going with modifications and improvements to the checkbook. Additional items added for planned/proposed work and the estimated costs to determine priority and if feasible to consider in current contract year [#3].
- March 29th – last HFMP meeting – no additional updates.
- On-going work with Truax Corporation - CCTV work in Gunrock area, Nantasket Ave. Oversight by Peter Lyons.
- On-going UST/AST work.
 - a) Review of wave analysis for future fuel tank design
 - b) Planning upcoming work for the UST removal
 - c) Reviewing design scope options for the future fuel tank
 - d) Move trash dumpster to new location on the plant site, remove stockade fencing, clean area
- Deragger – still evaluating software program that would allow for automatic reversal of pump rotation to spin out accumulated rags and debris to minimize the need to shut down a pump so that cleaning can be performed. Possible use at PS 3 and PS 6.

- Still pending: take down of Aeration Tank #1 for tank inspection and evaluation of the return sludge [RAS] line that runs through the tank [has a leak]. A plan to take aeration tank #1 out of service is scheduled to be drafted. A temporary RAS line from the secondary gallery back to the aeration tanks will need to be set up. Inspection of the RAS line to aeration tank #3 will need to be inspected and prepare a quote to replace the RAS piping in the #3 aeration tank. Targeting June 1 2018.
- Still to be done: meetings with WINDRIVER, National Water Main, and maybe other collection system vendors - to review our Contract Collection System Quota work, as well as our experience in Hull so far, to try to better provide collection system subcontractor support moving forward.
- Research YSI process sensors that may be applicable for use in facility that were part of the decommissioning at another project. Mfr Rep here for walkthrough in April to look at ORP, pH, DO & other for possible use. Jim G working on this project.
- Andy M – Pioneer Electrical and Jesse M – W&C Scada work on final tie-in for influent and effluent back-up control panels. Test out sequencing and float test. Working on written SOP for the systems.
- Continued to work on project 03Z – incorporating all March storm related costs for the facility and DPW assistance.
- Received quote for replacement of the control room mini-split AC unit. Work pending until larger HVAC plan for the Ops building reviewed.
- Working with Horizon Energy Solutions on the energy grant proposals in various areas: Block heater for the #1 generator, air blower piping for grit chamber and sludge holding tank [tie into larger supply piping and blowers], HVAC options for Ops building.
- Utility Cloud planning and implementation moving along. Received new tablets [IPads]. Areas being considered for initial use:
 - a. MH Inspections - doFORMS Replacement: NASCO and Generic Inspection forms are available right now.
 - b. In-Pipe Bacteria Unit Inspections - doFORMS replacement: Yes or no questions for: Unit Changed Out? Installed Unit? Inoculated? Unit Status (Failed/Running)?
 - c. Grinder Pump Alarms - doFORMS replacement is available: Grinder Pump Replaced (Yes/no), Serial #in, Serial #out
 - d. Backup / Blockage & Mark outs - Could easily create a new workflow to start
- Assisted the HSD with planning for upcoming Town Meeting and sewer department articles, and meetings attendance. Also worked on preparation for appeal of various MEMA-FEMA grants.
- On-going electrical support for plant electrical issues related to the 120-volt circuits [see MAINT section]

11 WORK ORDER SUMMARY



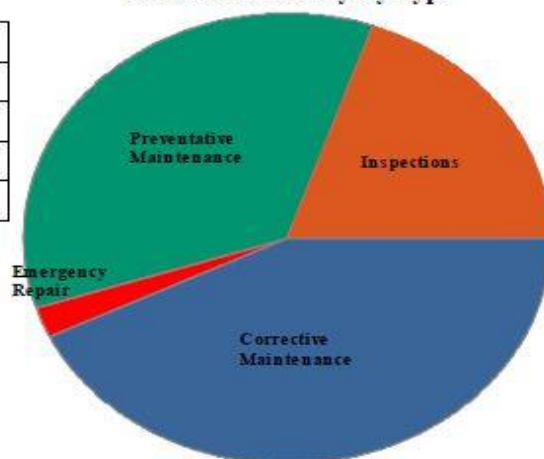
Maintenance History Report Hull Wastewater

Start Date: 5/1/2018

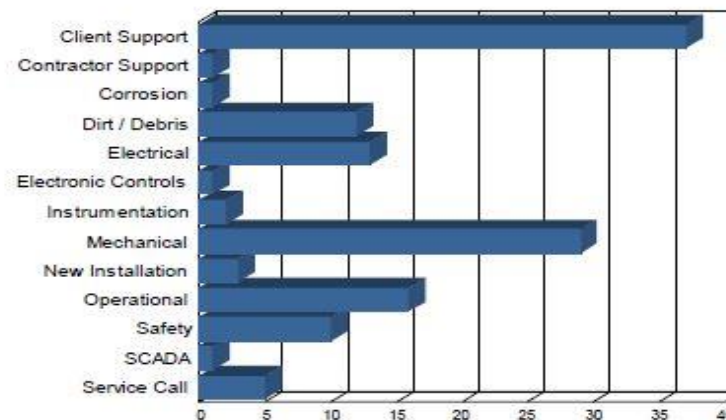
End Date: 5/31/2018

Corrective Maintenance	56
Emergency Repair	3
Inspections	26
Preventative Maintenance	46
Total Work Orders	131

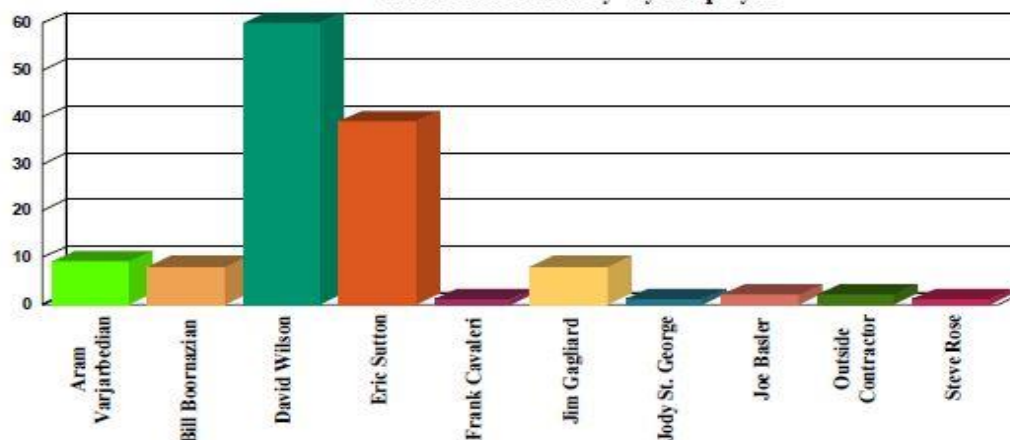
Work Order History By Type



Work Order History by Reason



Work Order History By Employee



Employee	WO Count	Labor Hours
Aram Varjarbedian	9	15
Bill Boornazian	8	12
David Wilson	60	60
Eric Sutton	39	85
Frank Cavaleri	1	0
Jim Gagliard	8	4
Jody St. George	1	1
Joe Basler	2	2
Outside Contractor	2	5
Steve Rose	1	6