



HULL WATER POLLUTION CONTROL FACILITY

July
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 July 2018

- No lost-time incidents for the month of July
- There were 150 effluent samples taken in the month of July. Please see page (8) for details.
- There was one [1] max daily effluent permit exceedance for fecal coliform. The monthly geometric mean average limit was met.
- There was one [1] sanitary system overflow notification reported [SSO] at 10-12 Rockaway Ave. An Environmental One [E-1] lift station that services this residence stopped working. There was a communication issue, where the homeowner was unable to get through to leave a telephone number on the alarm pager. A review of notification procures is underway, as the pager may eventually be phased out.
- The Bioxide system operated throughout the month of July at PS 3. The feed rate was increased to combat rising H₂S levels in the system. This was an expected observation, as the wastewater temperature increases in the warmer months causing for increased biological activity and lowers the oxygen levels in the collection system.
- Asset Management Accounts checkbook for tracking of expenses is ongoing weekly for year #4 [04M]. Review of account status between W&C and Hull Sewer Dept. is on-going.
- The electrical tie-in from the HSD trailer remains, as continued monitoring of the plant's electrical voltage continues. No new findings to date, no interruptions to date. The next step is a scheduled infra-red thermography scan of all plant equipment electrical panels.
- There were 3 grinder pump call outs during the month of July.
- The Underground Storage Tank Removal Project/Above Ground Fuel Storage Tank continues. Working with Comm Tank for UST tank removal planning effort, reviewing wave analysis, and structural design. Siting for future above ground tank being reviewed. Town approved order of conditions for new AST.
- Main [lead] generator heat exchanger replacement – selected vendor to fabricate new heat exchangers. 6-8-week lead time. Mid to late September install date targeted.
- Purchase order for two new replacement pumps at PS 1 issued.

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

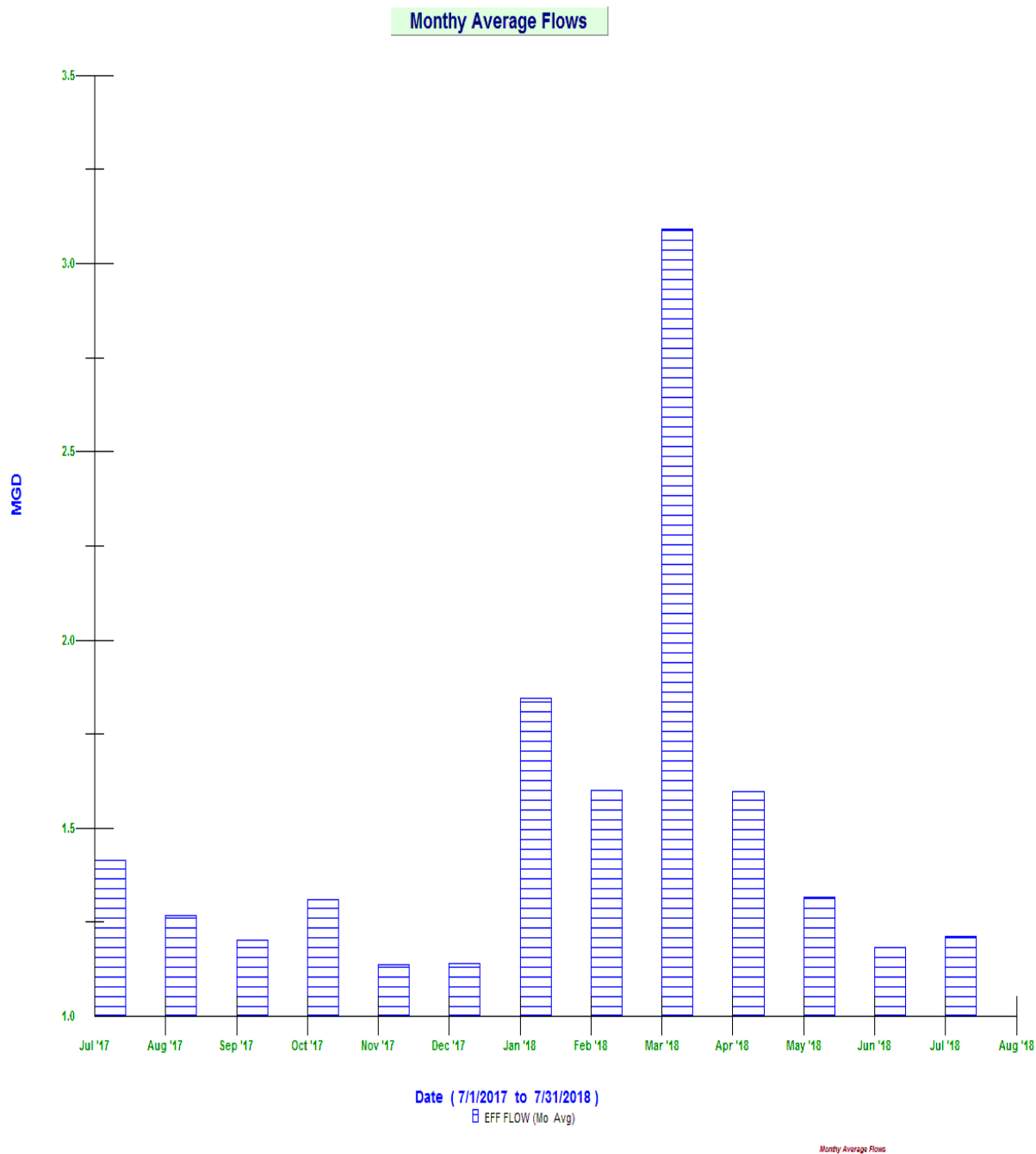


Average Daily Flows and Loadings for the Month:

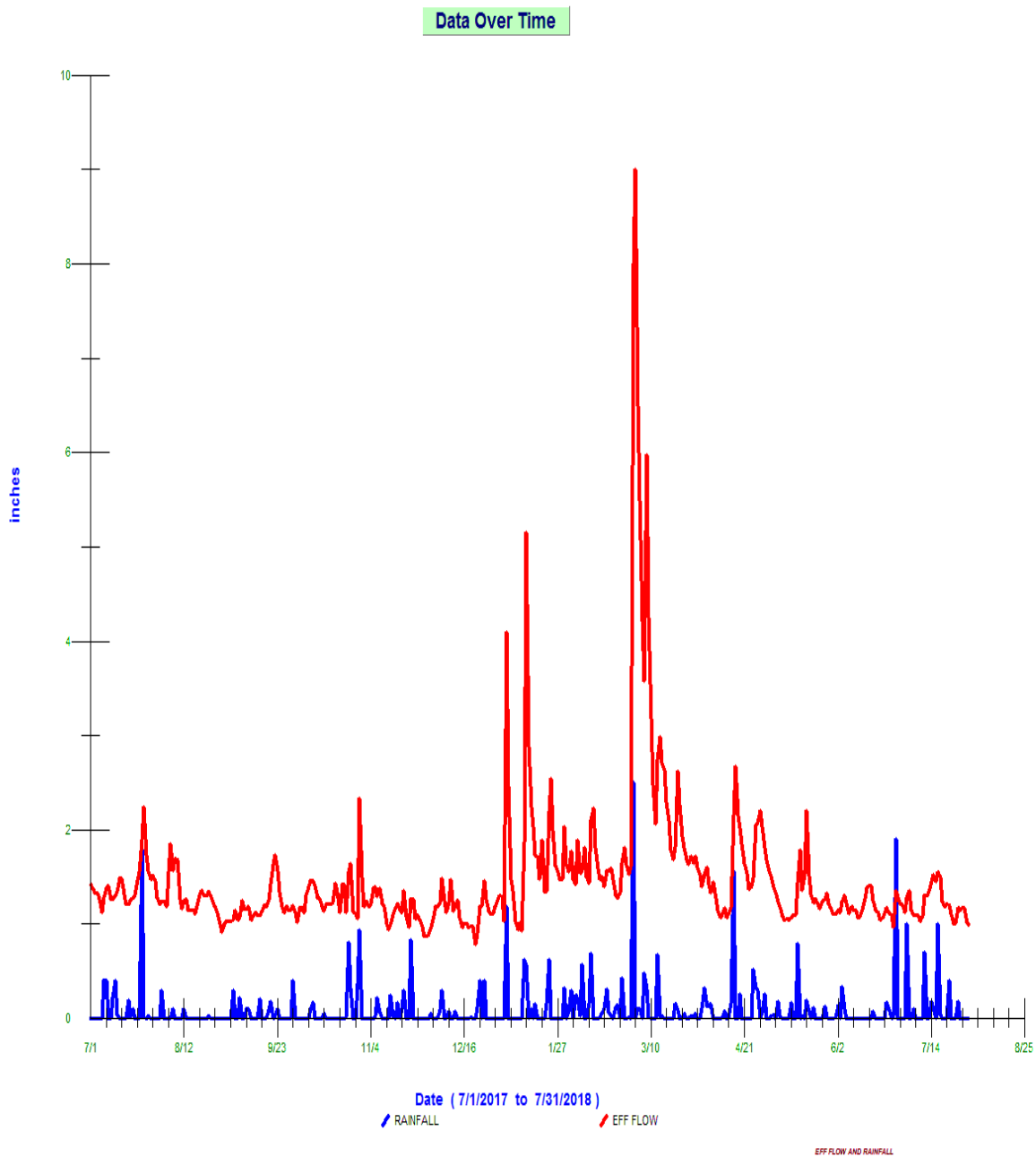
	Eff Flow MGD	Inf Flow MGD	Inf BOD LBS	Inf TSS LBS	Eff BOD LBS	EFF TSS LBS
July 2016	1.281	1.282 *	3058	5291	93	156
July 2017	1.414	1.625 *	4178	4579	188	403
July 2018	1.213	1.877 *	1679	1918	82	165

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

2.1 AVERAGE EFFLUENT MONTHLY FLOWS – ONE YEAR COMPARISON



2.2 MONTHLY SUMMARY OF RAINFALL AND ITS INFLUENCE ON EFFLUENT FLOWS



This graph provides a good indication of the influence that rainfall has on the effluent flows. Inflow and Infiltration out in the collection system is noted with the increased effluent flow values when it rains.

3 COMPLIANCE



➤ Plant Effluent

- There was one exceedance in the month of July. Max daily for fecal coliform exceeded.

Fecal Coliform Daily Max Permit limit = 260 CFU/100ml

7/11/18 fecal coliform daily result = 445 CFU/100ml

The exceedance was reported on 7/13/18 to the MA DEP, and the cause at that time was most likely a partially clogged injection quill for the sodium hypochlorite addition for disinfection and a cracked PVC isolation ball valve for this same injector. Other contributing factors found and being addressed – cleaning of the chlorine contact tanks, chlorination of the plant water system, for which the carrier water for the sodium bisulfite uses the plant water.

- Plant process conditions were good & maintaining well. On plan with control of filamentous bacteria growth that creates a dark brown slimy foam and carryover to the secondary clarifier surfaces. Clarifier surfaces are very clean. Continued the chlorination of the return activated sludge.
- On-going repairs to the diffused aeration system that had an air pipe break on 6/11/18 [in aeration tank #1].
- A Copy of the NPDES report for July 2018 was submitted to the DEP and then forwarded to the Hull Sewer Dept.
- Preliminary results for the EPA's quality control/quality assurance study all came back "passed" for the analytical work that the Hull lab is required to perform.
- Working with corporate team for planning and rollout of company process control plan template.

- There was one [1] Sanitary System Overflows [SSO] reported during the month of July.
 - 10-12 Rockaway Ave. E-1 Grinder pump failure reported on 7/30/18 [Monday]. Upon arrival, pump chamber was full and overflowing from property to the road surface toward nearby catch basin. Pump truck contacted to stop spill/leak and clean up area. Pump chamber was cleaned out, a lot of debris in it. E-1 pump was replaced. Homeowner had tried to reach pager on previous Saturday, but pages did not transmit through.



4 KEY PERFORMANCE INDICATORS



4.1 WATER QUALITY - JULY

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	16.4	12.0	22.0	5	0
Eff TSS	LBS			1152	768	1 X Week	165.4	108.1	284.4		0
% TSS Rem	%		85			1 X Month	91.1				
Eff BOD	MG/L	50		45	30	1 X Week	7.9	3.0	12.0	5	0
Eff BOD	LBS			1152	768	1 X Week	82.2	24.8	155.1		0
% BOD Rem	%		85			1 X Month	95.3				
Eff Chlorine	MG/L	1			0.7	3 X Day	0.09	0.01	0.46	93	0
Eff Fecal	#/100 ML	260			88	1 X Week	23	10	445	7	1
Eff pH	SU	8.5	6.5			1X Daily	7.4	7.2	7.6	31	0
Enterococci	#/100 ML	276			35	1 X Week	31	10	200	9	0

- There were 150 effluent samples taken in the month of July with one [1] NPDES Permit exceedances. There was one [1] max daily effluent permit exceedance for fecal coliform.

4.2 GALLONS TREATED VS SLUDGE DISPOSED

Month	Effluent Treated, MG	Sludge Disposed, Gals
July 2016	39.72	90,000
July 2017	43.83	107,000
July 2018	37.60	105,500

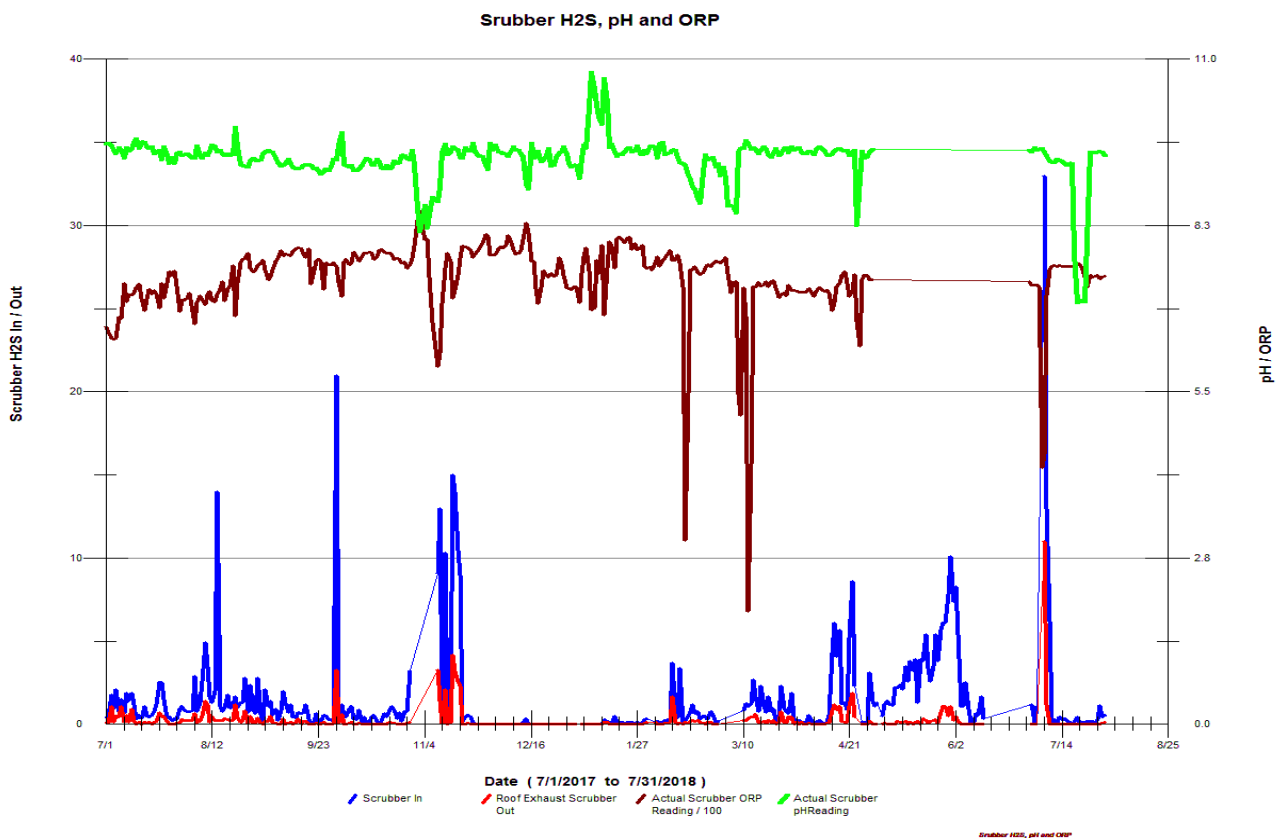
5 ODOR CONTROL

There were two odor complaints in July. These were the result of high sulfide levels in the underground sludge holding tank. We suspect that insufficient air mixing was the cause. Additional air for oxygen and mixing was introduced. Also, potassium permanganate [an oxidizing agent] was added directly to the sludge holding tank to reduce the hydrogen sulfide levels. The Bioxide feed at PS 3 was increased, and the ferric chloride was turned on at PS 6 to combat the elevated levels of hydrogen sulfide

The gravity thickener and primary clarifier remained off line. All influent sewage flow directed to the aeration tanks. The waste activated sludge currently is being pumped to the underground sludge holding tank #2, via the blend box. Aeration tank troughs are being flushed, to minimize build-up of odors.

Plant's Jerome H2S portable meter – loaner was received, while the facility's meter is being serviced.

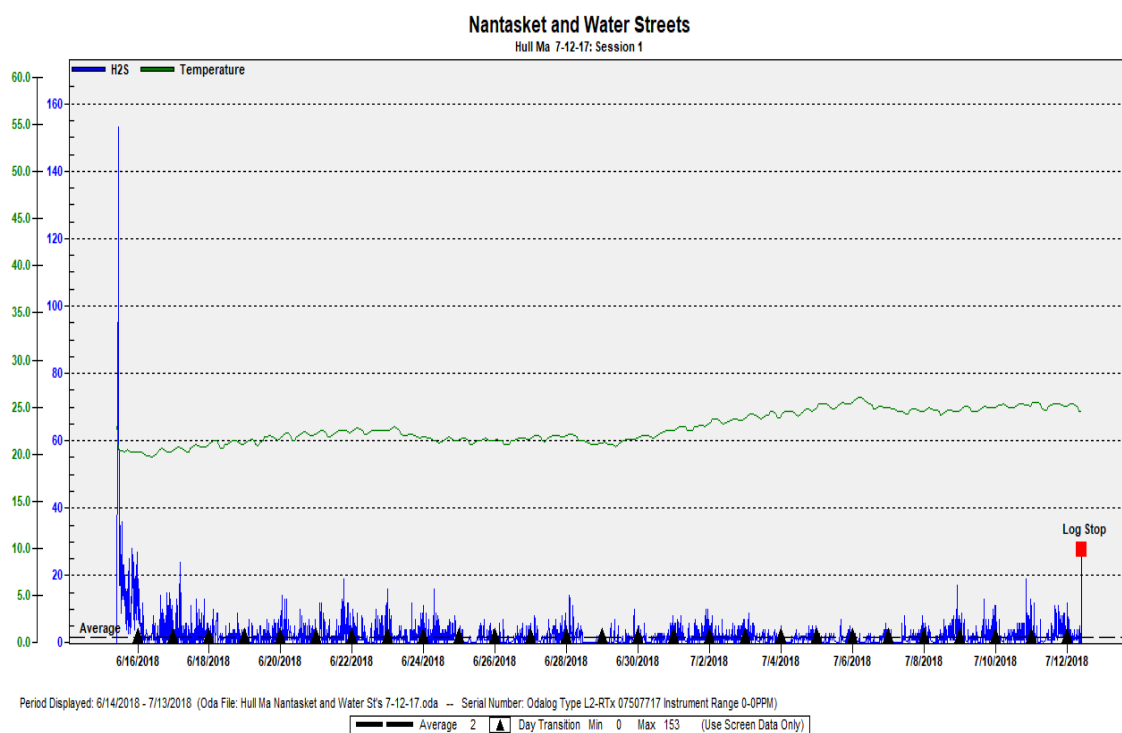
The odor scrubber system was on line for the entire month. As noted last month, the recovery from the cleaning was fair, and media removal and replacement is being researched at this time. The system pH and ORP probes were checked and pH probe replaced. Scrubber operation is good.



- “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 June inspection/replacement with full bottles took place on 6/27/18, the July replacements took place in the first week of August [8/3/18].

- Continued 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 re-load plan is delivering 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 is being monitored closely over the summer months, for pump stations and at the plant.
- On-going – frequent pumping of the secondary scum wells; quickly taking tanks off line, when not needed and cleaning out immediately.
- Evoqua [Bioxide] product was being pumped into the system daily. The initial feed rate of approx. 170 gpd, was increased to almost 200 GPD in early part of July. The sulfides are being controlled at the Nantasket Intersection. PS #4 sulfide is most likely what is seen on the graph. Nitrate residual is reaching “A - Street” which is similar to what was seen last year. Manhole H2S data-loggers are set up at various manholes.

Below Are the results of the recent sampling rounds and Odialog data



Onsite Sampling

Total 200.0 gpd total

- MH #20125**
Nitrate 0 Sulfide 0 Mg/l PH 7.6 Temp 19.8 C Time 9am
- MH "A" Street**
Nitrate 20 Sulfide 0 Mg/l PH 7.6 Temp 21.7 C Time 9:30am
- Nantasket Intersection MH**
Nitrate 20 Sulfide 0 PH 7.7 Temp 22.7 C Time 9:45am

- 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.
- Still under consideration - Vetting of 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 July compiled and a report summary can be found on page 24.
- Evaluated grit pumps and grit system and found blockage in 4-inch discharge line. Remove lower pipe elbow and clear blockage. Install "Tee" with blanking plate for future access to clean. System now operational and operating daily.



Grit deposited from classifier into rag/screening cart

- Aeration basin #1 repairs on-going. The tank was fully cleaned out, and all of the support hardware was inspected. Much of the diffuser support hardware needed replacement, due to corrosion and broken PVC diffuser sections [two 9 ft sections] replaced. There was a delay in getting the replacement hardware from manufacturer. Also, an 8-inch pipe repair coupling that joined the main air piping in the tank needed replacement.



Confined space equipment needed for permitted access into tank to perform repairs



Sections of diffuser piping removed from tank that broke, and new piping installed

- The two major electrical events [5/16 & 5/19] that occurred in May still under review. No new incidents with 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]. All UPS's replaced with new units.

On-going plant assistance from W&C SCADA Group, Boston Water & Sewer, Pioneer Electric, and EESCO. Power monitors were removed. The 120-volt power loop is still being fed off of the HSD trailer after the second event on May. Listed below are items under consideration:

1. IR inspection of existing equipment.
 2. Install a 100A active harmonic system at the main switchboard (equipment cost is approx. \$30k).
 3. Connect the dry contacts from the main switchboard surge protection device (24Vdc/ac rated) to monitor surges.
 4. Enable some alarming from the main power monitor to provide low and high voltage levels to let SCADA know when we have over & under-voltage scenarios.
- Plant water basket strainer still investigating replacement unit - same, or different unit. Also, where effluent water is drawn into the system, evaluating the size of the 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. Hypochlorite addition to plant water system started in mid-July to improve water quality of plant water.
 - 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.
 - Aqualine completed scum line repairs at secondary building.



- There were three grinder pump call outs during the month of June.
 - 10 Rockaway Ave. - pump replacement
 - 30 North Truro – cover replacement
 - 97 Rockaway Ave. – inspection for pipe that needed repair

On-going Dig-Safe mark outs completed, due to emergencies, upcoming paving projects, and responded various rattling manhole covers, broken manhole covers/rims, sunken manholes covers/rims. All work that W&C completed is documented in the monthly Work Order Report. Provided assistance to the Hull DPW by using push camera to determine extent of blockages in various storm drain catch basin lines.

- Additional push camera and dye testing completed in the Summit Ave area to map out unidentified lines and manholes.
- 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 due to complex scope 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. Preparing scope of work for ladder repairs/replacements.
- Purchase Order issued for large plant generator heat exchanger replacement. Completed exhaustive search for replacement heat exchangers contacting various vendors, General Motors – Detroit Diesel Div., Kraft Power, and MiltonCat. Both heat exchangers for the 750 KW Kohler unit engine cooling will be replaced with new fabricated units. Plant water piping and coolant water will be modified as needed. Expected delivery of new units – mid to late September.



- Pump Station #1 – Reviewed quotes for replacement pumps. Project approach finalized and will be to replace both pumps, one pump at a time, while keep the station operational, and to reuse existing motors and motor stands. New replacement check valves and pipe support stands will also be installed. Installation quotes will be solicited.



PS 1 pump discharge check valve



Inadequate pipe support



older/inefficient pump

- Continue to review RAS pump repair/replacement options quotes for RAS pumps #2 & #3. Replace pump completely, rebuild, or have fabricated – new rotating assemblies [by ABBA]
- Working with HSD to identify MH structures in need of repairs, as a result of the winter storms, snow plowing, etc. Priority list was developed.
 - Nantasket Ave at Q Street: Regular Frame and Cover will need asphalt
 - Nantasket Ave at W Street: Water tight Frame and Cover, will need asphalt
 - Central Ave at O Street, Regular Frame and Cover, will need asphalt
 - 1141 Nantasket Ave: water tight frame and cover – buried on the side of the road but in line with two manholes in the road, no asphalt needed
 - 24 Prospect Ave – Regular Frame & Cover, asphalt needed
- On-going – deragging of pumps at PS 6. Looking at possible options for a “de-rag” control unit that would plan for scheduled reverse rotation of the pumps to spin out accumulated debris. Working with vendor and electrician to get the specific details and costs.
- Electrician replaced all light fixture ballasts in RST room.
- Yard hydrant survey to be done, since many of the plant water hydrants on the site have issues, where the hydrants do not open, do not close, isolation valves are inoperable – either being stuck open, closed, or partial position.

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 July.
- Daily safety briefing meetings, review site safety policies with sub-contractors, safety tailgate topics.
- Pure Safety – July – Hard Hat Safety
- Andy Rowe – business unit H&S Manager on site 7/10 to discuss incident reporting, safety observations, safety culture, PS ladder standards
- discuss recent issue with hypo leak at injection quill and near miss. Additional PPE placed in effluent pump room mid-level stairwell, and in hypo storage room. [face shield and goggles]
- Monthly staff safety meeting conducted on 7/31/18
 - Job Aid/tailgate discussions – poisonous plants, poison ivy exposure, JSA
 - Discuss root cause analysis procedure & how to determine why incidents occur
 - Work-Life balance
 - Key points from business center meeting
- June 2018 Lessons Learned, and safety observations discussed – Near misses and incidents from other company projects.
- Repair of loose stair treads where needed
- Install hooks for PPE in areas where hypochlorite is pumped or stored [for face shield and goggles]

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 – Pure Safety and monthly safety meeting.
- 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 June discussed.
- Cody P – on-going training in various areas – plant rounds, station checks, review of various SOP’s.
- Cody P – forklift truck training

Staffing related items:

- Continue involvement with Mass Maritime [MM] internship program/career fair for future interns. Screening possible candidates for fall and winter 2018-2019. W&C to attend Fall Career Fair at MM in October.
- Sunday rotation schedule in place 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					X	X		
July, 2018					*2			
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**

***2 Inspected and needs to be cleaned in August**

10 PROJECT MANAGEMENT & ADMINISTRATION



10.1 ON-GOING PROJECTS AND SUPPORT ITEMS

- On-going - Asset management checkbook for tracking of expenses. Review of account status between W&C and Hull Sewer Dept. is on-going. Closing out of year #3 [03M] and working currently on year #4 [04M].
- Situational awareness discussions and preparation in mid-July [7/17 & 7/21] in anticipation for heavy precipitation and power loss, as thunderstorms predicted/occurred. Used influent gate throttling for one event to regulate flow into the plant and prevent flow surge during one such occasion on July 21st.
- All station wet wells inspected on 7/19/18. High level alarms for wetwells checked. Pump room sump pumps inspected, and station pump room valves exercised.
- On-going UST/AST work.
 - a) Check existing monitoring well water level. Pump this water down and inspect for any possible oil/fuel content – none found.
 - b) Review of wave analysis for future fuel tank design
 - c) Review design flood elevation discuss needed borings/cores/location of underground piping
 - d) Review existing boring data relative to UST slab. Look at other Geotech options
 - e) Planning for the upcoming work for the UST removal
 - f) Review structural drawings for planned AST, design co-ordination/design scope options, tank placement location for the future fuel tank
 - g) Finalization of new AST tank design

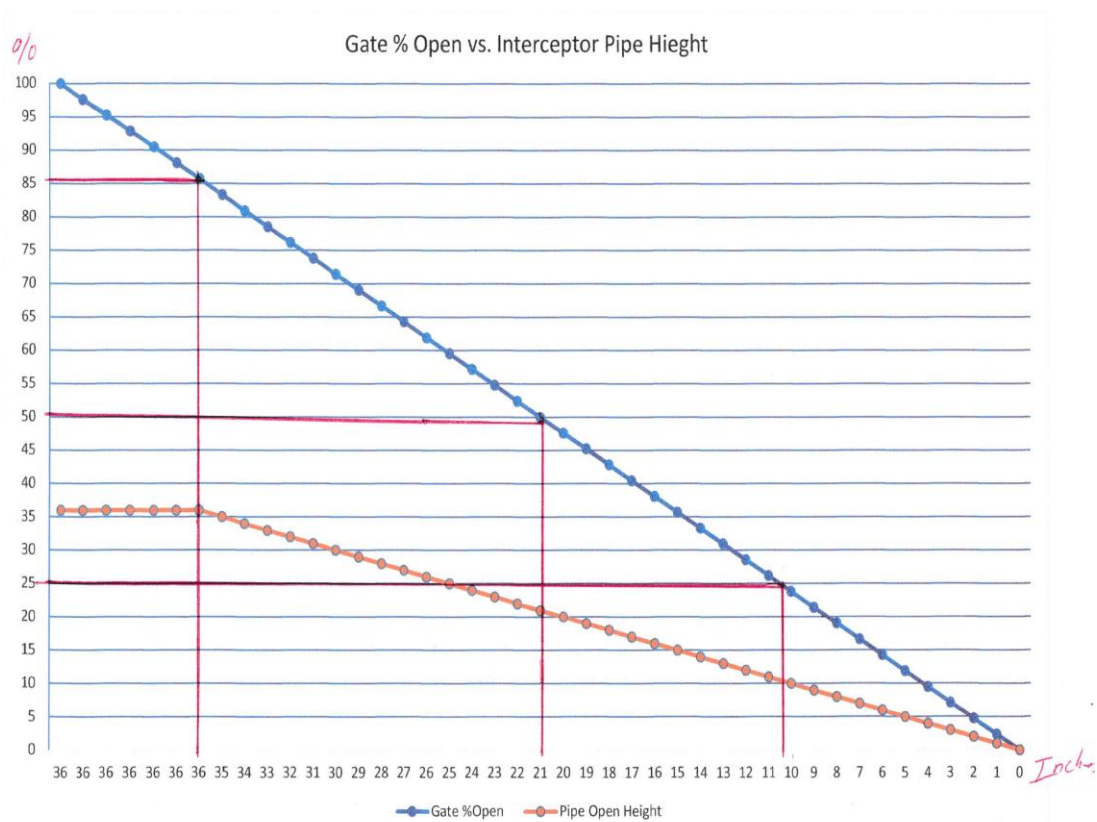
- Deragger – still evaluating software program that would allow for automatic reversal of pump rotation to spin out accumulated rags and debris to minimize the need to shut down a pump so that cleaning can be performed. Possible use at PS 3 and PS 6.
- Still to be done: set up co-ordination meetings with WINDRIVER, National Water Main, and other collection system vendors - to review our Contract Collection System Quota work, upcoming projects.
- YSI process sensors: nothing further done on possible use in facility. ORP, pH, DO & other for areas for possible use.
- Moving closer towards pilot test of Drylet's Aqua Assist product which is used extensively for reducing solids levels in wastewater treatment process systems, and enhancement of secondary effluent. Reviewed proposal and expect trial to start in mid-August.
- W&C Scada working on upgraded control system with DC powered back-up system for the influent and effluent pump back-up systems that would not rely on AC battery back-up power in the event of plant power loss of 120-volt AC power. Control panel built, installation started, additional wiring installed by electrician. Additional trends added to SCADA to include blower KW, influent gate position. Other points/parameters for power monitoring and alarms to be added in near future.
- Operations building control room – HVAC. Smaller units [4] in offices in need of evaluation and possible replacement where needed [may need 2 units]. Working with HSD on HVAC system upgrade plan for building, how best to move forward with upgrade initially prepared by Tighe & Bond.
- Plant fluorescent lighting is of concern. Many of the ops building fixtures have issues with corroded ballasts and light bulb connectors. Will reach out to the state approved contractors providing energy efficient lighting solutions for fixture upgrade/replacement. This might be delayed depending on what other planned building changes are planned for grants and HVAC.
- On-going work with Horizon Energy Solutions on the energy GAP 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. FC coordinating scope, details, and prioritization.

Gap Grant scope of work was approved by the MA DEP, and grant contract documents to be sent out to the town for signature. The Town will implement the energy efficiency upgrades to its aeration and odor control systems and install a heat pump block heater to its existing 750 kW Kohler diesel emergency generator. The aeration upgrades will include installing an actuator on the sludge tank line, along with a flow meter, to adjust the flow rate to the sludge tank as the water levels vary, via SCADA. A Variable Frequency Drive (VFD), with bypass, will be installed to the odor control fan. In total, the Town is projected to save \$26,161 annually through a reduction of approximately 174,404 kWh/year.

- Utility Cloud planning and implementation moving along. New tablets [I Pads] in use. Andy Crawford, Peter Lyons & Alan Fabiano leading the effort and 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
- Peter Lyons working on MADEP mapping grant and application and ARC-GIS. Gunrock area camera work
- Meet with HSD to discuss projects associated with the 4.7M bond.

HVAC
 I&I minor repairs
 Auxiliary Pump
 Clarifier Repairs
 Headworks Concrete Repairs/Influent Pipe CIPP
 Effluent Pump Room
 PS Concrete Repairs
 Engineering

- Utility Cloud – scanning of tie cards. Peter L. looking into options for scanning and move forward with the ID process using the map and lot numbers and addresses. PL reached out to Iron Mountain to see if they can do this, scan all the tie cards and give us back the paper copies as well as the digital files, named appropriately as image files or pdf. Possibly involve support staff in Portland.
- Community support – Hull Lifesaving annual event – “Illumination” corporate supporter; Hull VFW – sponsor annual fundraising effort.
- Prepare chart for influent gate operation, in the event needed in times of high flows, or when plant flow needs to be restricted. Chart would be used as a starting point if the gate needed to be partially closed to regulate influent flow.
- TPO – Treatment Plant Operator magazine article follow-up/review for storm planning. John S and Bill B.



Staff have developed a chart that correlates the closing of the influent gate to the interceptor flow levels (height) in the pipe. This will allow for better operational control of the influent rates during a storm event.

11 WORK ORDER SUMMARY

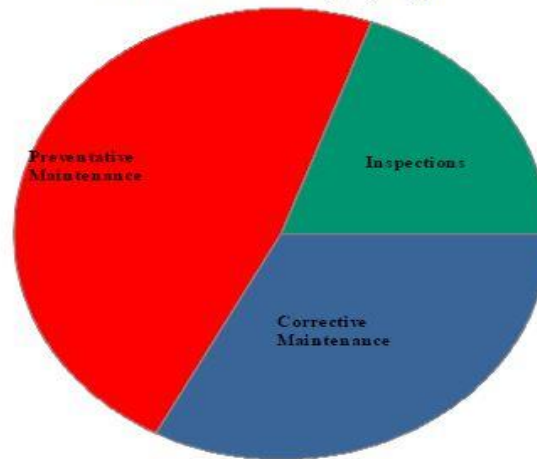


Maintenance History Report Hull Wastewater

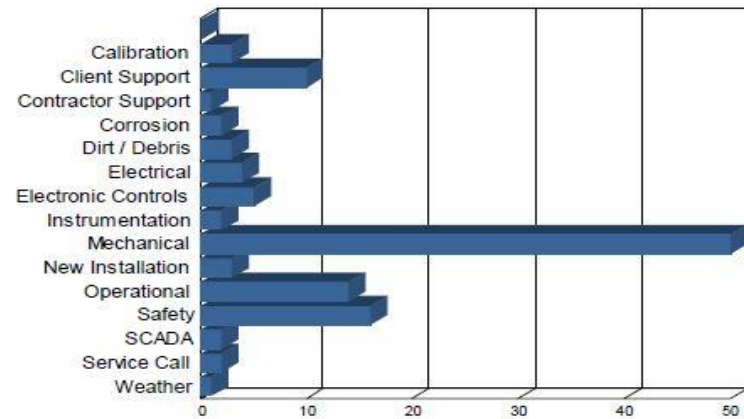
Start Date: 7/1/2018
End Date: 7/31/2018

Corrective Maintenance	39
Inspection:	23
Preventative Maintenance	57
Total Work Orders	119

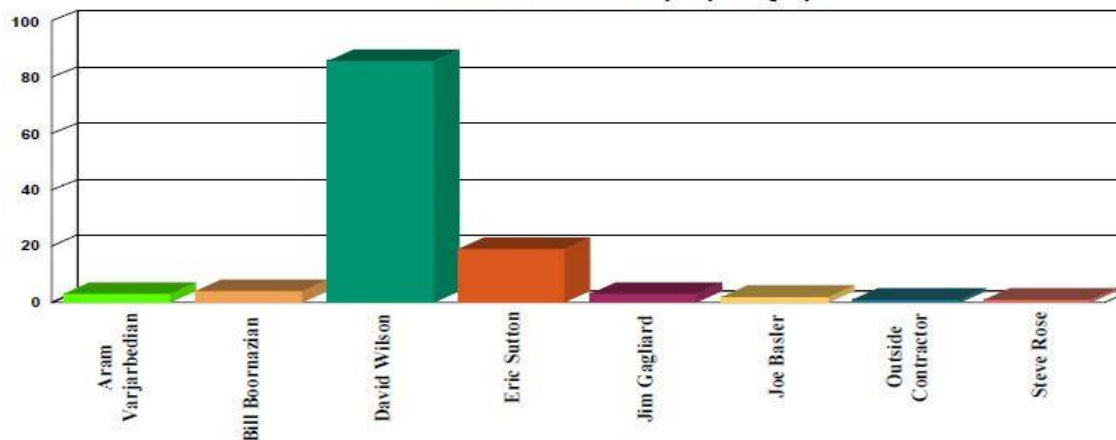
Work Order History By Type



Work Order History by Reason



Work Order History By Employee



Employee	WO Count	Labor Hours
Aram Varjarbedian	3	3
Bill Boornazian	4	12
David Wilson	88	264
Eric Sutton	19	26
Jim Gagliard	3	3
Joe Basler	2	3
Outside Contractor	1	8
Steve Rose	1	2
Totals	119	321