



**Maryland Department of Environment**  
**Water and Science Administration**  
**Compliance Program**  
**1800 Washington Blvd, Suite 420**  
**Baltimore, MD 21230-1719**  
**410- 537-3510, 1-800-633-6101**

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**Inspector:** Christopher Lepadatu  
**AI ID:** 8449

**Site Name:** Back River WWTP  
**Facility Address:** 8201 Eastern Ave, Baltimore, MD 21224  
**County:** Baltimore County

**Start Date/Time:** September 14, 2023 9:30 AM  
**End Date /Time:** September 14, 2023 1:30 PM

**Complaint Number:** 28368  
**Media Type(s):** NPDES Municipal Major Surface Water

**Contact(s):** Betty Jacobs – Back River WWTP  
Timothy Simmons – Back River WWTP  
Ronald Turner – Back River WWTP  
Rayford McEachern – Back River WWTP  
Herbert Bell – Atkins  
Chris Kroen – Back River WWTP  
Andrea Buie – Chief of ERCS, Baltimore City DPW

### **NPDES Municipal Major Surface Water**

**Permit / Approval Numbers:** 15DP0581  
**NPDES Numbers:** MD0021555  
**Inspection Reason:** Follow-up (Non-Compliance)  
**Site Status:** Active  
**Compliance Status:** Noncompliance  
**Site Condition:** Additional Investigation Required  
**Recommended Action:** Additional Investigation Required  
**Evidence Collected:** Photos or Videos Taken, Record Review, Visual Observation  
**Delivery Method:** Email  
**Weather:** Calm, Clear, Good

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#### **Inspection Findings:**

Back River Wastewater Treatment Plant (WWTP) is operated by Baltimore City DPW. Some areas of the WWTP are subcontracted and operated by ProStart. These areas include the Headworks, Denitrification Building, and Centrifuges. The facility is authorized to discharge treated effluent through Outfalls 001 and 002. Outfall 001 discharges to Back River, a designated Use II waterway. Use II waterways support estuarine and aquatic life and shellfish harvesting. Outfall 002 discharges to Tradepoint Atlantic who then discharge via three (3) outfalls under their industrial discharge permit (#05DP0064) to Bear Creek and the Patapsco River which is also designated as a Use II waterway. Final

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effluent discharge is split at a junction box and a large portion of the flow (up to 130.0 MGD) goes to Outfall 001 via a step cascading aeration system and the remaining portion (up to 50.0 MGD) goes to Outfall 002.

The current permit has been administratively extended since it expired on April 30, 2023. A revised permit renewal application (#2DP0581) was received by MDE on May 26, 2023.

Back River WWTP is an activated sludge process sewage treatment plant with biological nutrient removal by Modified Ludzack-Ettinger process, ferric chloride for phosphorous removal, denitrification filters for enhanced nutrient removal (ENR), polishing sand filters, chlorination, and dichlorination.

On this day, I met with the individuals listed above for an opening conference followed by a site walk and closing conference.

#### Opening Conference:

- Status of various plans,
  - Assets Management Plan – in progress, Atkins is handling.
  - Wasting & Sludge Management Plan – in progress, Jacobs is handling.
  - Centrifuge Maintenance Plan – in progress, Jacobs is handling.
  - Operations & Maintenance Manual – in progress.
  - Staffing Plan – in progress, Atkins is handling, Prelim plan shared internally in July.
  - PCB Minimization Plan – submitted to MDE on February 17, 2023.
- Headworks,
  - Operated by ProStart.
  - No issues reported.
- Primary Settling Tanks (PSTs),
  - Eleven (11) total – PSTs 1, 7, 8, & 9 in service.
  - PSTs 3 & 4 are under construction and ahead of schedule.
  - PSTs 5 & 10 are being used as flowthrough.
  - PST 2 is filling and is expected to be in service shortly.
  - PST 11 is off-line for mechanical repairs.
  - PST 9 was observed as having a clogged scum trough.
  - PST 6 is off-line, long-term, in need of repairs.
- Activated Sludge Plants (ASP) 2, 3, & 4,
  - ASP 2 –
    - Reactors 6 & 9 are out of service.
    - Clarifier 10B, not in service, used for backwash.
    - Clarifier 6A & 6B, 9B, off-line.
  - ASP 3 –
    - Reactor 13 is off-line because two mixers are broken.
    - Reactor 16 is down due to an issue with rake arms in Clarifiers 16A & 16B.
    - Clarifier 12B is out of service due to an issue with a bent rake arm.
    - Clarifier 13A has a bent rake arm.
    - Clarifier 14A missing skimmer arm.
  - ASP 4 –
    - All reactors and clarifiers are on-line.
- Denitrification (DNF) Building,
  - Operated by ProStart

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- No issues reported. All equipment on-line.
- Sand Filtration Building,
  - 37 of the 48 sand filters are operational.
  - Filters 6, 18, 28, 30, 35, 37, 40, 44, 45, 46, and 47 are out of service.
- Chlorination / Dichlorination / Outfalls,
  - No issues reported.
- Gravity Sludge Thickeners (GSTs),
  - GSTs 1, 3, & 5 are in service.
  - GST 2 is being converted from a holding tank to a mixing clarifier.
  - GST 4 is being used as a holding tank.
  - GST 6 and 8 are out of service with pump issues.
- Gravity Belt Thickeners (GBTs),
  - 8 GBTs in total.
  - 3 are currently in service, #1, #7, and #8.
  - GBT 4 is online, on standby.
  - GBTs 2, 3, 5, & 6 are off-line for repairs.
- Dissolved Air Flotation Units (DAFs),
  - 1 & 2 are in service.
  - 3 & 4 are out of service for repairs / refurbishment.
- Centrifuges,
  - Back River WWTP has four (4) centrifuges.
    - Three (3) are online and operating.
    - #4 is being rebuilt.
  - Two (2) portable centrifuges are in place, on standby, not currently in operation.

#### Site Inspection:

After the opening conference, we reviewed the facility beginning with the headworks.

#### *Headworks*

Raw sewage enters the plant at the mechanical screen building where there are four (4) coarse screening units. Each unit is rated for flows up to 200 million gallons per day (MGD). Unit #1 was in service at the time of the inspection. During normal flows, one coarse screening unit is sufficient to treat the average daily flow.

Effluent from coarse screening flows into two (2) deep wet wells that are over 50 feet deep. The headworks influent pumping station has eight (8) lift pumps installed to pump the screened wastewater from the wet wells to the Fine Screening System. During periods of high flow, screened wastewater can be pumped to two (2) above ground storage tanks each with a capacity of 18 million gallons. The two tanks are connected by two 14- to 16-inch pipes near the top of the tanks to allow one to overflow into the other as needed.

The Fine Screening System features six (6) fine screening units rated for flows up to 100 MGD each. Four (4) screens were in operation at the time of the site inspection and two (2) were on standby. No issues were reported with the fine screening units.

Effluent from the fine screening system travels to the Grit Removal System. Eight (8) grit channels equipped with traveling bridges remove grit from the fine-screened wastewater. Grit channels 6, 7, and 8 were in service at the time of

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the site inspection. Grit channel 5 was out of service for repairs. All others were on standby. Each grit channel and traveling bridge has an 80 MGD capacity. Under normal flow conditions, two grit channels are necessary for satisfactory grit removal. The traveling bridges move back and forth along the grit channel using a submersible pump / suction plate system to remove settled grit from the channels and transfer the grit to classifiers for further dewatering. The classified grit is then dried and transported off-site for disposal. No issues were reported with the grit removal system.

Odor control systems A, B, and C were reported to be in service with no issues.

During this site inspection, we reviewed the equalization (EQ) tanks. The area around the EQ tanks were observed to be clean. The exterior walls of the EQ tanks were also clean. In discussions concerning the operation of the EQ tanks, the WWTP uses the EQ tanks to divert excess flow during periods of high flow normally associated with rain events. It was reported that an electrical failure related to work being completed by PGE caused pumps in the headworks to go offline on the previous day, September 13, 2023. During this time, excess flow due to a rain event was diverted to the EQ tanks. More details are provided in the "Records Review" section of this report.

### *Primary Settling*

Effluent from the Grit Removal System flows to a junction box then to the Primary Settling Tanks (PSTs). Primary Settling is the first stage of treatment where solids and sludge are allowed to settle by gravity and any floating scum or fats, oils, and grease (FOG) is removed. Generally, PSTs are designed to remove a large percentage of the total suspended solids (TSS) and reduce the biochemical oxygen demand (BOD) of the wastewater.

There are eleven (11) PSTs at the facility. During the site inspection, the following observations were made:

- PST 1 is in operation, no issues observed or reported.
- PST 2 repairs are complete, in the process of refilling.
- PST 3 & 4 are out of service and under construction, reportedly ahead of schedule.
- PST 5 is operating as a flow through, there is an issue with the center ring which is scheduled to be repaired after PST 2 is back in service.
- PST 6 is out of service, long-term. The clarifier needs to be cleaned out and have a new center mount and catwalk installed, potentially next year.
- PST 7 is in service, no issues observed or reported.
- PST 8 is in service, no issues observed or reported.
- PST 9 is in service. The scum trough was observed to be clogged and not functional.
- PST 10 is operating as a flow through, will be out of service for repairs once PST 9 has been in service for a few weeks.
- PST 11 is out of service for mechanical repairs.

### *Sludge Handling / Processing*

Following the PSTs, we moved on to review the Gravity Sludge Thickeners (GSTs), Gravity Belt Thickeners (GBTs), Dissolved Air Flotation Units (DAFs), Sludge Holding Tanks, and Centrifuges.

GSTs 1, 3, and 5 were in service. GSTs 6 and 8 are out of service with pump issues. GST 4 is being used as a holding tank. GST 2 is in the process of being converted to a mixing clarifier. No violations were observed or reported. GST 2 was empty. The water level in GST 6 was low. The water level in all other GSTs was normal.

GBTs use gravity and a porous drainage belt to dewater and thicken sludge. The WWTP has 8 GBTs in total. GBT 1, 7, and 8 were in service. GBT 4 is on standby. GBT 5 is out of service, long-term due to an issue with the gearbox. GBT 6 is out of service due to a leaking polymer pump. GBT 3 is out of service with a mechanical repair to its lid – expected to be repaired this week. GBT 2 is out of service undergoing a rebuild. The GBT building and operation appeared to be normal. No issues were observed or reported.

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The WWTP has four (4) Dissolved Air Flotation Units (DAFs) installed. A DAF unit is designed to remove TSS, FOG, and BOD from wastewater. DAFs are ideal for processing particles and floc that are of neutral density, slow-settling, or buoyant. DAF 1 and 2 are in service. DAF 3 and 4 are drawn down and out of service for repairs / refurbishment. Sludge levels in DAF 1 and 2 were observed to be normal. No issues were observed or reported.

From the GSTs, GBTs, and DAF units, sludge is transferred to sludge holding tanks #1 or #26 which are located near the centrifuge building and drying facility.



Image 1: Sludge Holding Tank, Tank 1.



Image 2: Sludge Holding Tank, Tank 26.

The facility has four (4) centrifuges in total, three (3) of which are operational. The fourth unit is down in the process of being rebuilt. Two (2) portable centrifuges provided by Synagro are located at the rear of the building and are on standby. On the day of the inspection, the centrifuges were not operating due to a low volume of sludge available for processing. Sludge holding tank #1 was observed to be mostly empty with a low volume of residual sludge in the bottom. Sludge holding tank #26 was observed to be approximately 1/3<sup>rd</sup> full. No issues were observed or reported.

#### *Activated Sludge Plants (ASPs)*

Effluent from Primary Settling flows to a flow distribution building to one (1) of three (3) Activated Sludge Plants (ASPs) numbered 2, 3, and 4. The ASPs each contain six (6) biological reactors for nitrogen removal. ASPs 2 and 3

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have a three-pass train designated A, B, and C for each reactor while ASP 4 is a two-pass system. There are twelve (12) secondary clarifiers associated with each ASP for a total of thirty-six (36) secondary clarifiers at the facility.

Only ASP #2 was observed during this inspection. Trains 5, 7, 8, and 10 were in service. Reactor trains 6 and 9 were out of service for mechanical repairs. No issues were observed or reported with the reactor trains that are in service.

The twelve (12) secondary clarifiers (#5A/B - #10A/B) associated with ASP #2 were observed during this inspection. The following observations were made on the clarifiers.

- 5A, in service, scum trough clogged.
- 5B, in service, scum trough clogged.
- 6A, not in service.
- 6B, not in service.
- 7A, in service, no issues observed or reported.
- 7B, in service, scum trough clogged.
- 8A, in service, scum trough clogged, excess vegetation.
- 8B, in service, scum trough clogged, excess vegetation.
- 9A, not in service.
- 9B, not in service.
- 10A, in service, scum trough clogged, excess vegetation.
- 10B, not in service.



Image 3: ASP 2, Reactor Train 5.

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Image 4: Clarifier 8A, Scum trough clogged, excess vegetation.

#### *Denitrification Filters (DNFs)*

At the DNF building, there are four filter quads with each quad containing 13 Tetra Denitrification Filters with a total of 52 filters. It was reported that all 52 filters were functional and in operation at the time of the site inspection. No issues were reported.

#### *Sand Filters*

The sand filters at the facility are used to polish the wastewater coming from the DNF building. There are 48 total filters. 37 filters were observed to be in service at the time of the site inspection.

#### *Chlorination / Dichlorination Facility and Final Outfalls*

The final effluent at the step aeration system was observed to be clear and without any noticeable foam, solids, or odor. No visible floating scum or solids were observed in the chlorine contact chambers at the facility. The temperature of the composite sampler for Outfall 001 was observed to be 4°C. The temperature of the composite sampler for Outfall 002 was observed to be 6°C.



Image 5: Final effluent, Step Aeration System.

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I reviewed the lab located at the Chlorination / Dichlorination Facility. All pH buffers were current. No violations were observed with the logbooks. Copies of the pH and DO calibration records were provided to me for review.

Closing Conference:

After the Chlorination / Dichlorination Facility, we returned to the administration building for an exit conference.

Records Review:

Following the site inspection, laboratory reports and calibration records were reviewed. DMRs for August 2023 were not yet uploaded to netDMR at the time of the site inspection. No violations were observed in the pH and DO calibration records. No violations were observed in the laboratory analysis reports.

After the site inspection, MDE received a call reporting the following notices of noncompliance events that occurred on September 13, 2023.

1. Bypass from 4:45am to 10:30am due to a power outage as BGE was doing work. The denitrification filters were bypassed during the outage.
2. Activated sludge gate failed, 3:00pm to 3:30pm, approximately 400 gallons overflowed on the ground and was cleaned up. Did not reach Waters of the State (WOS).
3. EQ tank overflowed, 11:45am to 11:50am. Discharge did not reach Waters of the State (WOS). No reason was given.

I called Rayford McEarchern, Back River WWTP, who was present at the pre-site inspection and exit conference. He provided the following additional details:

1. Bypass from 4:45am to 10:30am due to a power outage as BGE was doing work. The denitrification filters were bypassed during the outage.
  - a. During elevated influent flow, they were able to divert most of the excess influent to the EQ Tanks. There was still a portion that came through the plant due to pumps being out as a result of the power outage. They needed to bypass the denitrification filters in order to keep up with the excess flow.
2. Activated sludge gate failed, 3:00pm to 3:30pm, approximately 400 gallons overflowed on the ground and was cleaned up. Did not reach Waters of the State (WOS).
  - a. The activated sludge return/waste gate from Reactor 12 of ASR 3 experienced a failure causing mixed liquor to overflow at the effluent end of the Reactor.
3. EQ tank overflowed, 11:45am to 11:50am. Discharge did not reach Waters of the State (WOS). No reason was given.
  - a. This was one of the large EQ tanks at the facility (there are two which are joined at the top by two 14- to 16-inch pipes which allow one to overflow into the other, each tank has a capacity of 18 million gallons). The reason given for the overflow was excess flow volume coupled with the BGE power outage and pump failure.

I observed the area of Reactor 12 of ASR 3 during the site inspection as it is on the way from sludge processing to ASR 2. The area was clean – no signs of a spill. As for why it wasn't mentioned during the site inspection, I followed up with Timothy Simmons who led the site walk today and regularly leads the site walks. He reported that he was not aware of this overflow before our site walk today.



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I observed the EQ tank area during the site inspection. The exterior walls and base around each EQ tank was observed to be clear – no evidence of a spill or overflow. I followed up with Timothy Simmons. He was not aware of the EQ tanks overflowing before the site walk today.



Image 6: Exterior EQ Tank 1.



Image 7: Exterior, EQ Tank area.

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Image 8: Exterior, EQ Tank area.

I reviewed records for the Back River Influent Pumping Station where influent flows to the Fine Screen Facility (FSF), Total Flow, Flow to EQ Tank 1, and Flow to EQ Tank 2 are recorded. Records indicate that no flow was diverted to the EQ tanks on September 10, 11, or 12. Records on September 13, 2023, indicate that flow was diverted to EQ Tank 1 from 9/13, 12:00am, until 9/13, 11:00am. I will continue to request the flow volumes and monitor their use in subsequent site inspections.

Violation(s):

**With respect to the above authorization, the following violations of Environment Article Title 9 by Baltimore City DPW were observed on this date with corrections needed immediately:**

1. Crucial equipment maintenance and repairs are not being performed by the Back River WWTP at the level necessary to efficiently operate and maintain the treatment works as detailed in this report. The Back River WWTP has failed to provide enough qualified staff to adequately operate and maintain the WWTP. This is a violation of General Condition B3a and b of the NPDES permit, which specifies the following:
  - a. Facilities shall be operated efficiently to minimize upsets and discharges of excessive pollutants.
  - b. The permittee shall provide an adequate operating staff qualified to carry out operation, maintenance, and testing functions required to ensure compliance with this permit.

**CORRECTION: The Back River WWTP should immediately comply with the requirements under General Condition B3 of the NPDES permit and adequately operate and maintain the treatment works.**

2. There has not been adequate long-term planning for staff replacement and system upgrades and changes at the Back River WWTP. A staffing plan is necessary to determine the gap between current staffing levels and required levels to comply with General Condition B3a and b of the NPDES permit. **CORRECTION: The Back River WWTP should immediately submit to the Department a comprehensive staffing plan. The plan should be implemented by the date of submission to the Department to ensure that there is sufficient staff to comply with the requirements of General Condition B3b of the NPDES permit.**
3. The DO monitoring probes used to continuously monitor DO in the biological reactors are not functional. The DO monitoring probes and other associated equipment have been ordered and Back River WWTP staff are waiting for parts. Current scheduled delivery and installation is to occur in October 2023. **CORRECTION: The Back River WWTP should keep the Department informed monthly on the status of the replacement of the DO sensors and associated equipment necessary to automatically monitor and control DO in the reactors at the activated sludge plants. All equipment necessary for treatment should be kept in**

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**satisfactory condition in order to comply with the requirements of General Condition B3 of the NPDES permit.**



4. The scum troughs on PST #9, ASP #2 Clarifiers #5A, #5B, #7B, #8A, #8B, and #10A are clogged with scum. This is a violation of General Condition B3 of the NPDES permit. **CORRECTION: The Back River WWTP should maintain the PSTs and Clarifiers as required to keep them functioning properly to comply with the requirements under General Condition B3 of the NPDES permit. The scum troughs should be cleared and the pumps repaired or replaced as needed.**
  
5. Significant vegetation growth was observed in ASP #2 Clarifiers #8A, #8B, and #10A. Excessive vegetation growth can negatively affect a clarifier's performance and efficiency for wastewater treatment. This is a violation of General Condition B3 of the NPDES permit. **CORRECTION: All vegetation should be removed from the secondary clarifiers and routine maintenance should be performed to prevent the recurrence of the problem to minimize upsets and discharges of excessive pollutants as required under General Condition B3 a and b of the permit.**

**Monthly inspections will continue.**

Contact this Inspector upon implementation of the requested corrective actions, reasonably necessary to bring this site into compliance. If the corrective actions cannot be completed within the prescribed time frame above, you should continue to advise the Inspector, at least every 30 days, of the status of the measures taken to complete the corrective actions. If you have any questions, need assistance, or to request a re-inspection, please contact this Inspector by phone, 410-537-3521, or email, christopher.lepadatu@maryland.gov.

STATE LAW PROVIDES FOR PENALTIES FOR VIOLATIONS OF MARYLAND ENVIRONMENT ARTICLE TITLE 9 FOR EACH DAY THE VIOLATION CONTINUES. THE MARYLAND DEPARTMENT OF THE ENVIRONMENT MAY SEEK PENALTIES FOR THE AFOREMENTIONED VIOLATIONS OF TITLE 9 ON THIS SITE FOR EACH DAY THE VIOLATION CONTINUES.

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Inspector:  9/27/23	Received by:  11/7/2023
Christopher Lepadatu /Date christopher.lepadatu@maryland.gov 410-537-3521	Signature/Date Michael Hallmen Print Name