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# RESILIENCY IMPROVEMENTS AT WATERSHOPS POND DAM DRAWDOWN PERIOD MONITORING REPORT #2

**FEBRUARY 23, 2021**

**For Compliance with:**

**Order of Conditions, DEP File No. 294-0607, issued 09/17/2020**

**Section 401 Water Quality Certification, BRP WW 08, DEP Transmittal No. X286704, issued 07/23/2021**

**Section 404 Permit, File No. NAE-2020-02301, issued 10/21/2020**

**Certificate on the SEIR, Secretary of Energy and Environmental Affairs, EOEEA No. 16234, issued 07/31/2020**

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Reviewed by: Tom Jenkins, P.E.

## INTRODUCTION AND METHODOLOGY

In compliance with authorized procedures approved under the above-referenced permits and authorizations, GZA is monitoring dissolved oxygen levels, temperature, and transparency during the period of drawdown associated with the Resiliency Improvements at Watershops Pond Dam Project. This report presents the results of the second monitoring event conducted during the period of drawdown, which commenced with the opening of the low-level outlets at the dam on October 26, 2020. During the winter drawdown period, dissolved oxygen monitoring will occur at a frequency of once every 2 months. From March through October, during the growing season, monitoring will occur monthly.

Ecological resource monitoring was initially identified as a means to gauge the environmental impacts associated with a partial or full drawdown of Watershops Pond that may occur during the Project. The monitoring was discussed conceptually in the Alternatives Analysis included in the Expanded Environmental Notification Form (EENF) for the Project (EOEEA No. 16234, EENF dated June 15, 2020). On July 31, 2020, the Secretary of Energy and Environmental Affairs issued her Certificate on the EENF requiring the preparation of a Single Environmental Impact Report (SEIR). In response to comments received on the EENF and in response to the Secretary's Certificate on the EENF, a detailed draft "Aquatic and Wetland Resource Monitoring and Mitigation Plan"; the "Plan") was developed in coordination with regulatory agencies and was submitted as an integral mitigation commitment detailed within the SEIR dated August 28, 2020. The Plan was referenced in the Secretary's Certificate on the SEIR (October 16, 2020) and became a mitigation requirement associated with the City of Springfield's Preferred Alternative of full pond drawdown during the Project. The basic elements of the Plan were developed based upon prior studies of the pond and consultations with the Springfield Conservation Commission and State and Federal regulatory officials.



A copy of the Plan was provided in **Appendix 1.** to the “Pre-Drawdown Ecological Monitoring Report,” GZA, September 2020.

Monitoring was conducted on February 23, 2021, per the methodology presented in the “Pre-Drawdown Ecological Monitoring Report.” Monitoring occurred within the drawdown pool at the two locations selected during the first sampling event, conducted December 15, 2020 (see **Figure 1** for data collection locations). Vertical profiles were conducted at the two locations and Dissolved Oxygen (DO) and Temperature (°C) were measured at one-foot depth intervals. Secchi disk depth was recorded at each site.

**RESULTS**

The Watershops Pond residual pool encompasses about 22 acres upgradient of the dam where the water exits the pond basin through the dam’s low-level sluice gates. The maximum pool depth is slightly over 4 feet, with most of the pool area less than 2 feet deep. The height of the pool was determined by measuring the surface water elevation below the deck of the privately-owned steel bridge located approximately 200 feet upstream of the dam. The measured surface water elevation was at Elevation 141.05± which is approximately 0.35± feet higher than the water surface elevation that was measured in December 2020.

The water within the pool basin was less turbid than in December, with Secchi Disk depths recorded at 2.5 and 2 feet deep compared to 1 foot during December 2020. Though portions of the pond were ice covered, the water temperature was approximately 1.2° C warmer than previously recorded and averaged approximately 3.2° C with a range of 2.8° C to 4.5°C. The DO exceeded 12.0 mg/l for all samples (**Table 1**).

**Table 1. Watershops Pond Drawdown Pool Dissolved Oxygen, Temperature, and Secchi Depth Measurements**  
 Date of Data Collection: 02/23/2021 09:30 AM – 12:00 PM

Tuesday, 02-23-2021; 10:30 AM				Tuesday, 02-23-2021; 09:30 AM			
Surface Water Elevation: 141.05’ (Note: chisel mark on pond side of pier made at 12.00’ below bridge deck)							
Location: Main Body, Near Dam, East of Steel (private) Bridge; 42°05.861 N; 072°33.624 W				Location: Main Body, Central Pond, East of Railroad Bridge; 42°05.940 N; 072°33.345 W			
Secchi Depth (ft)	Depth (ft)	DO (mg/l)	Temp °C	Secchi Depth (ft)	Depth (ft)	DO (mg/l)	Temp °C
2.5	0	13.3	2.8	2.2	0	12.5	4.5
	1	13.0	2.7		1	12.2	3.9
	2	12.8	2.7		2	12.4	3.9
	3	12.6	2.7		2.2 - bottom		
	4.0 - bottom	12.4	2.4				

The average DO concentration at each depth range of the water column is shown in **Table 2**. Because the DO concentration changed very little over depth, the entire water column was above 12 mg/l.



**Table 2. Hypsometric Distribution of Lake Volume and Dissolved Oxygen by Depth**

Depth (ft)	Acres Encompassed by Contour Depth	Water column volume by depth interval (CF)	% vol. of water column within depth interval	Cum. % vol. above interval depth	Average DO (mg/l) (from Table 1)
0-1	22.5	860,941.9	44.7	44.7	12.9
1-2	17.2	623,461.0	32.3	77.0	12.6
2-3	11.6	335,447.7	17.4	94.4	12.6
3-4	4.3	96,265.6	5.0	99.4	12.6
4-5	0.63	11,608.4	0.6	100	12.4
Total		1,927,724.6			
Water elevation at time of monitoring: 141.15 ft					




**DISCUSSION**

The Plan suggested the action level for DO should be 5 mg/l for at least 75% of the surface waters in the residual pool. During the February 2021 monitoring event, this standard was readily met as the average DO concentration exceeded 12 mg/l at all contour elevations. This is an unsurprising result during the non-growing season with low water column temperatures.



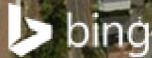
**LEGEND**

**DISSOLVED OXYGEN PROFILE LOCATIONS**

-  ACTUAL POST-DRAWDOWN
-  PROPOSED POST-DRAWDOWN
-  PROPOSED PRE-DRAWDOWN

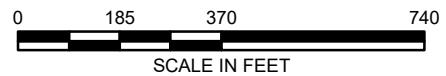


© 2020 - GZA GeoEnvironmental, Inc. J:\0 166600 - 0 166699\15.0166625.20 Watershops Pond Dam\GIS\mxd\DrawdownMonitoringReport\Fig1\_DO\_Monitoring\_Location.mxd, December 21, 2020 - 2:50:01 PM, Adrienne.dunk



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**RESILIENCY IMPROVEMENTS AT WATERSHOPS POND DAM**  
1 ALLEN STREET  
SPRINGFIELD, MASSACHUSETTS

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PREPARED FOR:  
CITY OF SPRINGFIELD  
NATIONAL DISASTER RESILIENCY PROGRAM  
CDBG-NDR GRANT#B-13-MS-25-0002

**DISSOLVED OXYGEN PROFILE  
MONITORING LOCATIONS**

PROJ MGR: JRB	REVIEWED BY: TEJ	CHECKED BY: SLL	FIG. <b>1</b>
DESIGNED BY: ARD	DRAWN BY: ARD	SCALE: 1 in = 350 ft	
DATE: 12/21/2020	PROJECT NO: 15.0166625.20	REVISION NO:	