
ATTACHMENT D
EXISTING AND PROPOSED USE DESCRIPTION

To: Town of Acton Board of Selectman
From: Environmental Partners Group, Inc.
Cc: File
Date: November 20, 2015
Subject: Nagog Water Treatment Plant
Site Plan Special Permit – Use Description

Existing Nagog Pond Water Treatment Facility

The existing water treatment facility at Nagog Pond is an Ozone Disinfection Facility with a hydraulic capacity of 1.5 million gallons per day (MGD). The facility includes a raw water wetwell, a pump control vault, two underground ozone contactors, an ozone generator room, and an air preparation room. The facility was built in 1995 and the building has a foot print of approximately 1,291 square feet. The treatment facility is situated within 200 feet of Nagog Pond and is approximately 275 feet from the Skyline Drive residential development that is currently under construction (The Residences at Quail Ridge). The Nagog Pond dam was constructed over 100 years ago and rehabilitated/repared in 2012. The existing water intake pipe associated with Nagog Pond is also over 100 years old and is in poor condition. The intake pipe extends approximately 1,800 feet into Nagog Pond from the gate house at the dam, and consists of 16-inch diameter cast iron pipe, partially supported on wooden cribbing.

Raw water from Nagog Pond flows by gravity into the wetwell by means of a 16-inch intake pipe and gatehouse at the dam. Water is pumped from the wetwell through the contactors where ozone gas is added for oxidation and disinfection. Ozonated water then flows by gravity to the Route 2A Satellite Pumping Station via a 16-inch cement lined cast iron main (circa 1909). Final treatment is provided at the Rt 2A Satellite Pumping Station including additional disinfection with ultraviolet (UV) light, pH adjustment using potassium hydroxide, fluoridation using sodium fluoride, corrosion control using zinc polyphosphate, and secondary disinfection using sodium hypochlorite. Finished water is then pumped into Concord's water distribution system which provides service to the Town of Concord and several commercial businesses in Acton along Rt 2A.

Technical Memorandum

November 20, 2015

Page 2

Nagog Pond and the Ozone Disinfection Facility are currently operating with a Filtration Avoidance Waiver under the Surface Water Treatment Rule. Compliance and continued operation under the Filtration Avoidance Waiver requires strict conformance with federal and state water quality limits. The existing facilities do not generate any residuals or sanitary wastes.

Proposed Nagog Pond Water Treatment Plant

The principal use of the site will remain the same – the provision and treatment of public drinking water. The proposed Nagog Pond Water Treatment Plant (WTP) will have the same hydraulic design capacity as the existing facility, 1.5 MGD. The new Nagog Pond WTP will incorporate several physical and chemical water treatment processes, including: pre-oxidation with potassium permanganate; coagulation with polyaluminum chloride; two-stage, tapered flocculation; clarification using dissolved air flotation (DAF); primary disinfection using ozone; filtration using granular activated carbon (GAC) media; pH adjustment using potassium hydroxide; corrosion control using zinc polyphosphate; secondary disinfection using sodium hypochlorite; and fluoridation using sodium fluoride. The proposed Nagog Pond WTP will be state of the art and allow for the consistent production of high quality water for Concord's water system customers in both Concord and Acton. Once constructed, the Town will be able to operate the facility with greater flexibility, on an as needed basis, instead of being limited to operating only when the filtration avoidance waiver water quality parameters are satisfied.

The treatment plant building will consist of two stories having a site footprint of 7,165 square feet and a net floor space of 9,338 square feet. The exterior façade is proposed to be cement masonry unit (CMU) architectural block with sufficient windows to provide natural lighting. The building will house all of the treatment processes and equipment and ancillary support spaces such as a control room, water quality laboratory, and operations meeting room.

The new building is much larger than the existing building due to the proposed treatment systems to be employed. The plan is to demolish the existing disinfection facility and build the new WTP within the same site footprint. This is essential as it will allow the new facilities to make use of the existing subsurface spaces which have been blasted out of the ledge.

Technical Memorandum

November 20, 2015

Page 3

The proposed Nagog Pond WTP is being designed as a zero discharge facility. All wastes generated at the facility, with the exception of sanitary wastes, will be recycled. The proposed WTP will include a small disposal system for sanitary wastes (20 gallons per day). Residuals generated from treating the water will be dewatered on site, and the solids trucked off-site for use as compost. Although several of the chemicals used for the treatment of drinking water are classified as hazardous, the proposed Nagog Pond WTP will include suitable secondary containment and sufficient safety measures (including fire sprinklers) in accordance with local and state requirements. The proposed facility will not generate or dispose of any Hazardous Materials or Wastes. In addition to the existing utilities serving the site, the proposed Nagog Pond WTP will require additional utility connections including: natural gas, high speed cable (internet), and water (from the Acton Water District).

As previously indicated, water from Nagog Pond is obtained by means of an old (circa 1909) 16-inch diameter cast iron pipe. Physical inspections of the intake pipe have indicated that it has significantly deteriorated, resulting in decreased hydraulic carrying capacity and risk of failure. Due to the condition of the existing intake pipe, a new raw water intake line is being included with this comprehensive project. The proposed intake pipe is 16-inch diameter high density polyethylene (HDPE). The intake line will include the ability to draw water from two different levels and include an automated “air burst” cleaning system for the intake drum screens.

In addition to the principal use (the production of public drinking water), the project also includes an accessory use: solar photovoltaics. In order to off-set the power requirements of the new Nagog Pond WTP, a photovoltaic array field is being proposed. The solar field will include an area of approximately 68,743 square feet for the installation of 17,768 square feet of photovoltaic arrays (PV). The PV field will be located northeast of the proposed WTP building.