CDW CONSULTANTS, INC
CIVIL & ENVIRONMENTAL ENGINEERS

Memorandum

To:	**Daniel Colli, Associate Principal at Perkins Eastman**
From:	**Eric Wilhelmsen**
Subject:	**Zone II Septic Regulation Review at the Doyon School Site**
Date:	**June 19, 2017**
Project:	**Winthrop Elementary School, Ipswich Ma**

Based on a review of state and local regulations there is nothing that prevents the installation of a new septic system at the Doyon School Site. The Town's Board of Health has jurisdiction over septic systems up to 10,000 gallons per day, any design is subject to their review and approval. Anything over 10,000 gallons per day is permitted through the Massachusetts Department of Environmental Protection (DEP).

Summarizing the issues;
Doyon's existing septic system is 17 years old, copies of the approved plan are available for review at the Ipswich's Board of Health office at Town Hall. Ipswich has local Board of Health septic system regulations, which supplement the State Title 5 Code, 310 CMR 15, however the local regulations do not have any special provisions for drinking water supply Zones, therefore the applicable regulations come directly from State Title 5 Code, 310 CMR 15.

Title 5 code addresses Zone I, Zone II, and Zone A of drinking water supplies.
Zone I: doesn't apply, as there is no public water supply well in the area.
Zone II: does apply, as it's an aquifer (groundwater) area that contributes water to a well, Zone II areas are much larger than Zone I's.
Zone A: does apply, its defined as 400-ft from a body of water used as a drinking supply (i.e. a reservoir, river, etc..) and/or 200-ft from the bank (not the bordering wetland) of a contributing tributary to said body of water used as a drinking supply. For the Doyon School site, only 200-ft provision applies, however it's not an issue, as the resulting Zone A from the bank measures a little under 100-ft from the edge of the bordering vegetative wetland, and septic systems are not allowed within 100-ft of a wetland (per local regulations, and per Title 5 for wetlands bordering a tributary to a surface water supply).

Therefore, the only Zone of concern is the Zone II, the entire lot is within a Zone II, (as is much of the area). There is nothing in the local regulations which prohibits systems in a Zone II. Septic systems in Zone II are allowed per state Title 5.

Per Title 5, Section 15.215, a Zone II is a Designated Nitrogen Sensitive Area (DNSA). According to Section 15.214, a system is limited to a discharge rate of 440 gallons per day per acre except as set forth on Section 15.216 (aggregate flows) or Section 15.217 (enhanced nitrogen removal). The Doyon School parcel is 17.2 acres, a design flows greater than 7,568 gallons per day will require either an aggregation plan per Section 15.126 or an enhanced nitrogen removal system per Section 15.217

The design flows are based on the occupancy of 945 people. For an elementary school, with cafeteria, gymnasium and showers, the design flow rate 10 gallons per day per person, for a total of 9,450 gpd.

(the current existing system also used 10gpd but with a 485 occupancy), therefore an aggregation plan enhanced nitrogen removal will be required.

An Aggregation Plan is an option, however the plan is approved by DEP, and places restrictions on future land use, and may not be the best option in this case due the limiting qualifiers. Enhanced nitrogen removal, on the other hand, can take many forms nor does it necessarily require a full-scale sewer treatment plant. Nitrogen removal can be done with trickling filters or similar technologies, which are mostly underground or partially underground, a common one is a Bioclere system from Aquapoint, http://www.aquapoint.com/bioclere.html