Attn: Eric Busby
Director, Construction
Norther Data Group – Ardent Data Centers
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Dear Eric,

Per your request, we have further developed our water usage study for the data center project located in Maysville, GA at 121 Industrial Drive. We understand the city's concerns about ensuring this project will not utilize excessive amounts of water that could adversely impact local residents, businesses, and ecosystem.

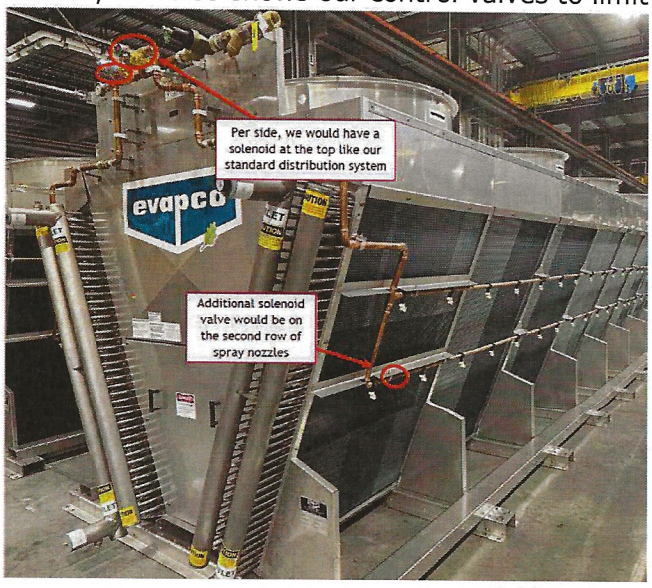
Objective:
In an effort to be transparent and thoroughly disclose our design intent, including all assumptions made, please review the following report that outlines our project goals, typical historical design philosophy of data centers, our new approach, research performed, and analysis of the data available to us with subsequent information on expected impact to Maysville on a per year average and worst case condition to expect over a typical 20year meteorological window. Should there be any further inquiries regarding clarification of our design intent or any of the findings listed herein, please don't hesitate to reach out to me at 336.414.4143, or email me at matt.mumpower@cmmce.com.

Project Goals:
Northern Data engaged CM Mission Critical Engineering (CM|MC) to design an industry leading, cutting-edge data center. Which will use best-in-class hardware and be purpose-built with a focus on sustainability to help shape the data centers of tomorrow. Key metrics for success that were communicated to CM|MC included, high efficiency, minimal water usage, and new design approaches that challenge the status-quo.

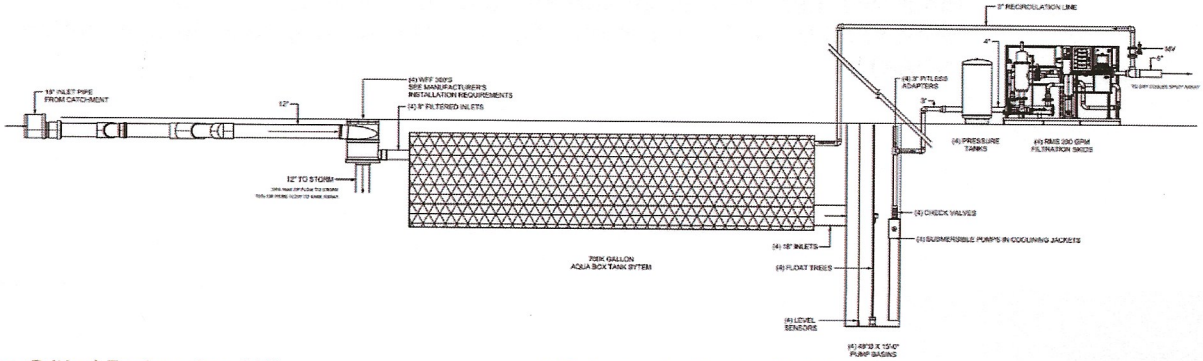
However, dry coolers are very sensitive to ambient temperatures. To that end, we needed to ensure that the critical IT load can be met during a 20year extreme ambient temperature that coincides with a utility outage that engages our onsite generators. In such extreme cases, we needed to find ways to continue to maintain cooling capacity.

At Maysville we innovated an approach to spray water at the dry coolers to depress the ambient DB temperature down to where loop discharge temperatures from the Dry Coolers could maintain our design set point of 113°F. The source of water for these spray nozzles will primarily be our rainwater collection cistern located on site. At the end of the report, you'll find all of our calculations showing how we arrived at our storage quantity on site and how we believe this will ensure that we may never need to utilize municipal supply to spray water over the towers.

Below is an image of the spray nozzle array we intend to install on the dry coolers, this also shows our control valves to limit water use as needed:



Below is a snip of the storage tank design we intend to provide at this site:



3. Model Preparation:
   Once data is collected we insert our design 3D model elements and geometry at the site into a program that allows us to simulate wind conditions, ambient temps, and equipment heat rejection operations (flow, speed, temp). We call this process "External CFD", meaning a computation fluid dynamic calculation of fluid movement(in this case air movement) over our building and site. We take the two wind directions and coincident speeds that appear to be a worst case impact to our rooftop heat rejection equipment. We then set the model up to run these two wind cases with utility on (generators off), and utility off (generators on). Resulting in four evaluated scenarios.

Design Review/Analysis:

All data provided herein represents our Phase 1 Building. Future buildings at this project location would be designed identically in approach and scale.

1. Analysis:
   The worst case high ambient weather period over the past 20 years of collected data that would force our dry coolers to use water spray coincided with the worst case drought season. We used this data along side the worst case CFD run with generators on and producing high heat exhaust, to evaluate the absolute extreme condition this building may experience.

   Additionally, we assumed that our 700,000 gallon rainwater storage system would not be allowed to be pre-filled by the city upon start-up. Therefore, this analysis assumed 0 gallons for starting volume, and assumed the start date to coincide with our projected move-in date of January of 2027.

2. Results:
   Below is a table showing the hours of ambient temp about 95 Deg F, where the Dry Coolers could potentially need water to be sprayed on them to maintain discharge temp. 2007 is the worst case ambient year.

	Hours Above 95°F											
	Total Hours	January	February	March	April	May	June	July	August	Septemeber	October	November	December
2004	0	0	0	0	0	0	0	0	0	0	0	0	0
2005	6	0	0	0	0	0	0	6	0	0	0	0	0
2006	51	0	0	0	0	0	16	17	18	0	0	0	0
2007	111	0	0	0	0	0	0	0	111	0	0	0	0
2008	27	0	0	0	0	0	12	6	9	0	0	0	0
2009	16	0	0	0	0	0	16	0	0	0	0	0	0
2010	56	0	0	0	0	0	11	41	4	0	0	0	0
2011	38	0	0	0	0	0	15	5	18	0	0	0	0
2012	50	0	0	0	0	0	24	26	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	5	0	0	0	0	0	0	0	5	0	0	0	0
2015	13	0	0	0	0	0	1	6	6	0	0	0	0
2016	7	0	0	0	0	0	7	0	0	0	0	0	0
2017	0	0	0	0	0	0	0	0	0	0	0	0	0
2018	0	0	0	0	0	0	0	0	0	0	0	0	0
2019	16	0	0	0	0	0	0	0	4	9	3	0	0
2020	1	0	0	0	0	0	0	1	0	0	0	0	0
2021	0	0	0	0	0	0	0	0	0	0	0	0	0
2022	28	0	0	0	0	0	28	0	0	0	0	0	0
2023	15	0	0	0	0	0	0	3	12	0	0	0	0
2024	14	0	0	0	0	0	7	5	2	0	0	0	0

Summary:

Each building will have five primary systems that use water:

1. Fire Sprinkler System - dry pipe system in data halls, typical wet pipe in administrative areas. Water consumed only in the event of a fire.
2. Potable Domestic Water - used by daily occupants of building.
3. Technology Cooling Loop - used to cool technology systems in the data halls.
4. Facility Cooling Loop - used to cool electrical rooms and server rear doors.
5. Dry Cooler Ambient Spray System - used on a limited basis only during very hot days with certain wind conditions to provide additional cooling to the Technology Cooling Loop.

Additionally, we are planning to install a Rain Water Storage System to reclaim runoff water at each building that would be used to supplement water required for the cooling systems. The planned water storage system can hold up to 700,000 gallons of water. Ardent plans to partially fill these tanks Day 1 by shipping in water trucks and allowing runoff water to fill them the rest of the way.

When construction on a building is completed and the systems are being started, our engineers estimate the following volume of water will be required:

1. Fire Sprinkler System - TBD. Fire protection system volume was omitted from this analysis, as our design is delegated to awarded FP Contractor and final system layout is unknown at this time.
2. Potable Domestic Water - TBD. On a daily basis, the building is estimated to use 332.5 gallons of water. For comparison, the average home uses 312.5 gallons of water per day.
3. Technology Cooling Loop - 87,561 gallons, consumed upon initial system flushing process. This system will never use any more water because it will require a special solution that will be shipped to the site and added to the system as needed. We could work with the water authority to schedule the filling of this system to occur during non-peak use hours if needed. If the water demand is too high, we could also arrange to have water trucks deliver this water to the site and not use any city water.
4. Facility Cooling Loop - 152,612 gallons, consumed upon initial system fill/flushing process. We could work with the water authority to schedule the filling of this system to occur during non-peak use hours if needed. If the water demand is too high, we could also arrange to have water trucks deliver this water to the site and not use any city water. This loop would only have a trickle (non-measurable) amount of water consumption during operations to refill any leaks that occur due to maintenance events or otherwise.