



Marion Cross School Update, Church Street, Norwich, Vermont (Project No. 11647)

Jeff Goodrich <Jeff.Goodrich@pathwaysconsult.com>

Sun, Aug 18, 2019 at 3:12 PM

To: "Jamie Teague (jamieteague@hanovernorwickschools.org)" <jamieteague@hanovernorwickschools.org>

Cc: "Tom Candon (thomas.candon@hnsb.org)" <thomas.candon@hnsb.org>, "Tony Daigle (anthonydaigle@hanovernorwickschools.org)"

<anthonydaigle@hanovernorwickschools.org>, "Steve Revell (srevell@lagvt.com)" <srevell@lagvt.com>, Sarah Finley

<Sarah.Finley@pathwaysconsult.com>, Jeff Goodrich <Jeff.Goodrich@pathwaysconsult.com>

Jamie, as we have discussed recently, we continue to refine our analysis of options and costs for the repair or replacement of the existing on-site wastewater disposal system (system) on behalf of the Norwich School District (District) in the "green" that serves Marion Cross School (MCS).

Status Report

The following paragraphs provide a brief summary of ongoing tasks to assist MCS with evaluating its existing system.

1. Hydrological Evaluation: Lincoln Applied Geology (LAG) has installed monitoring wells on the green to evaluate groundwater conditions. Installation of the wells occurred following graduation in June of this year. Monitoring is ongoing and may take time to yield meaningful results.
2. Test Pits: Tim McCormick, CSS, CWS, LD, observed test pits with Steve Revell, CPG, representing LAG on June 13. Tim recorded soil logs and concluded that the seasonal high water table (SHWT) proximate to the existing system appears to vary between 5.5 feet and 6 feet below ground surface based on soil conditions.
3. Option Assistance: We have continued to assist with evaluating project options that currently include a) repair or replacement of the existing system on the green, b) a municipal connection to Hartford, c) a municipal connection to Hanover, and, more recently, d) consideration of a system on Dresden Recreation Fields property on Route 5.
4. Town of Hartford: We will support the District with presentations to the Hartford Selectboard on September 10.
5. Abutter Coordination: We have received input from representatives of businesses on the east side of Route 5 relative to the potential for partnering for a municipal connection to the Town of Hartford.
6. Funder Interaction: We are currently working with the District to arrange a meeting with key stakeholders to better understand potential funding alternatives for District options.

April 12, 2019 Meeting with Terry Shearer

Along with Tom Candon and Tony Daigle, members of our staff met with Terry Shearer, Regional Engineer, Vermont Agency of Natural Resources (VANR) District 3 on April 12 to discuss new regulations (in affect the day of our meeting) and options relative to the green, the Peisch property, and a Route 5 municipal connection to the Town of Hartford.

1. New Rules: We concluded that the new rules do not consider MCS and possibly existing facilities with respect to flow and treatment needs. Any consideration of repairs and replacement of the existing system will be based on water meter data.
2. Peisch Property: We concluded that the Peisch property is not a viable option based on wetlands, soil conditions (including ledge), metered flows, and other regulatory considerations.
3. Wastewater Assessment: We discussed testing wastewater from MCS to inform any repair or replacement options in the green.
4. Hydrological Assessment: We discussed the District's engagement of a reputable firm to assess hydrological conditions on the green to inform repair or replacement of the existing system as a critical element of work going forward. Although both Craig Heindel and Steve Revell are reputable hydrologists, we discussed engaging Steve for this task since Craig provided the initial assessment that informed the 1988 design.
5. Summary of Meeting: We discussed publishing a summary of this meeting when the District decides to publicize project work.

Existing System

In concert with LAG, we have evaluated the original system design and information supporting the design. While it appears that design elements, developed by reputable firms, were consistent with appropriate standards at the time approvals were provided, the system began to experience problems within 10 years of installation based on anecdotal information. Perhaps more importantly, we understand that system use included flows that were approximately half of what was permitted, which should have provided a significant factor of safety.

1. Effluent Distribution: Our observation of effluent distribution suggests that at least certain winter conditions result in effluent bypassing the existing system to manifest at the surface over much of the green. Although we cannot explain the actual cause of this phenomenon, we believe that it likely results from frozen conditions.
 - a. Although the VANR approves shallow systems (e.g., systems near the ground surface), we have encountered multiple failures over time that we believe have resulted from frost conditions, likely during periods of disuse.
 - b. As we have discussed previously, we anticipate the use of the green as a playground and public facility likely results in frost penetration below the existing system, which likely explains freezing during periods of disuse and the resulting distribution of effluent over much of the green.
2. Mechanical Modifications: The existing mechanical system is in need of upgrades, which we believe should include pump dosing rates and automatic controls to alternate between beds after each dosing event.
3. System Replacement: We cannot offer system repair or replacement options until LAG completes hydrological investigations. As we have stated, and discussed with LAG, any repairs or replacement should include restricting access by vehicles or pedestrians over the system, which will have a significant impact on use of the green. Additionally, hydrological conditions and frost considerations will likely warrant elevating the system and/or providing more cover over the system than currently exists.

Funder Interaction

Our initial interaction with potential funding sources was suspended due to the government shutdown early this year. Our outreach to the Vermont Agency of Commerce and Community Development was suspended following Leo Pullar's retirement as Hartford Town Manager. With input from Brannon Godfrey, the new Town Manager, we have again reached out to seek funding assistance, which we understand may include up to \$40,000 for each new job created, low interest loans, and may include other funding options.

Town of Hartford

Like Leo, Brannon has verbally agreed that the District may enter into an agreement with the Town of Hartford for municipal sewer service. Existing commercial properties/users along the corridor would have the opportunity to work with the District for individual sewer connections (except for the King Arthur Flour system, other systems along the corridor are likely old and in need of improvement).

Relative Option Considerations

1. Existing System: In our August 31, 2018 conceptual evaluation, we noted that the existing system is permitted for 5,460 gallons per day (gpd), which includes 364 students and staff. We also suggested a relative unit cost of \$50/gallon as a means of providing a relative system replacement cost of approximately \$275,000 without consideration of mechanical improvements.
 - a. Our evaluation of actual system and soil conditions indicate that the system consists of four beds that were originally designed to address 5,000 gallons each; each bed includes 4,200 square feet (SF) of area. Another conceptual method to evaluate cost could consider the SF for each bed. In this context, we would suggest a conceptual unit cost of \$25/SF, or \$105,000 to replace each bed. If we assume that all four beds need to be replaced based on historic conditions, potential replacement costs will be in the relative realm of \$420,000 for the existing system without consideration of mechanical improvements.
 - b. Mechanical improvements should include replacing existing valves and controls, adjusting or replacing pumps to adjust dose rates, and inclusion of controls and telemetry to eliminate the need for manually cycling between beds. Although we have not defined specific mechanical modifications, we would suggest a conceptual placeholder of \$75,000 for these improvements.
 - c. Fencing will be needed to prevent access to the new system. Assuming approximately 900 linear feet (LF), at a unit cost of \$35/LF, suggests a conceptual cost of \$31,500 to protect the new system.
 - d. Until we know whether all four beds in the existing system need to be replaced, we suggest consideration of a relative conceptual cost between \$381,500 and \$526,500, which will need to be refined following completion of the LAG evaluation and regulatory input.
2. Town of Hanover Municipal Connection: We recall assisting the New Hampshire Department of Transportation (NHDOT) with Ledyard Bridge improvements, which included installation of sub-slab piping and bridge foundation penetrations to accommodate water

and sewer (we need to confirm actual conditions if the District chooses to proceed with this option).

- a. The distance from Girard Drive to the eastern slab of Ledyard Bridge is approximately 4,200 LF. Assuming a conceptual unit cost of \$210/LF for directional drilling, the conceptual cost for sewer from MCS to the Bridge will be in the range of \$882,000.
- b. The Bridge is approximately 500 LF from the Norwich abutment to the Hanover abutment. At an initial conceptual unit cost of \$800/LF, "hanging" a sewer line on the Bridge will be in the range of \$400,000.
- c. Mechanical costs at the MCS site should include telemetry, a new pump station, a generator, and at least a small shed for controls. We suggest a conceptual cost of approximately \$155,000 for these elements without consideration of upgrades to existing Town of Hanover facilities.
- d. Although we need to better understand all elements of this option, the relative conceptual cost will be in the range of \$1,437,000.
- e. We understand that this option would require an agreement between the Towns of Norwich and Hanover (e.g., we understand that you have indicated that the District may not enter directly into an agreement with the Town of Hanover).

3. Town of Hartford Municipal Connection: In keeping with our previous evaluation of a municipal connection to the Town of Hartford, we offer the following:

- a. The distance from King Arthur Flour to Olcott Drive is approximately 3,200 LF, which, at a unit cost of \$210/LF for directional drilling, suggests a conceptual cost of \$672,000.
- b. The distance from MCS to King Arthur Flour is approximately 3,800 LF, which, at a unit cost of \$210/LF for directional drilling, suggests a conceptual cost of \$798,000.
- c. Using the same conceptual mechanical upgrades used for a connection to the Town of Hanover suggests a conceptual budget of \$155,000.
- d. It is not clear to us whether any upgrades to the Hartford system will be needed to accommodate this project. Additionally, although we acknowledge that King Arthur Flour will have additional costs for pump and treatment system modifications, we have not included such improvements in the context of MCS capital needs.
- e. Although we need to better understand all elements of this option, the relative conceptual cost for this option will be in the range of \$1,625,000.

4. Dresden Recreation Fields: Although we have not conducted soil investigations to assess the potential for a system on the Dresden Recreation Fields to serve MCS, we have created a base map using publicly available information. In general, the primary difference between this option and a connection to the Hartford system is a reduction of 2,000 LF, which is the approximate distance between the entrance to the Dresden Recreation Fields and Olcott Drive. Using a unit cost of \$210/LF for directional drilling suggests a reduction of \$420,000 when compared to the Hartford municipal option, or a relative conceptual cost in the range of \$1,205,000.

In closing, this brief summary is intended to provide the District with a status report of ongoing work and revised relative costs based on the current options we are discussing to address the MCS system. We will know more about possible funding alternatives, including the benefits of potential job creation if the District proceeds with a municipal connection to the Town of Hartford, following a meeting with funders, which we expect to occur in the near future. Finally, we are hopeful that the Hartford Selectboard will ratify Brannon's comments about the project.

Please let me know if you have any question about this summary.

Jeff

Jeffrey S. Goodrich, P.E.

President

Pathways Consulting, LLC

Planning • Civil & Environmental Engineering • Landscape Architecture • Surveying • Construction Assistance

Main Office:

240 Mechanic Street, Suite 100

[Lebanon, New Hampshire 03766](#)

Vermont Office:

[2060 Hartford Avenue](#)

[Wilder, Vermont 05088](#)

www.pathwaysconsult.com

This message and any attachments may contain confidential, proprietary, or privileged information and are intended only for the use of the intended recipients of this message. If you are not the intended recipient of this message, please notify the sender by return email, and delete this and all copies of this message and any attachments from your system. Any unauthorized disclosure, use, distribution, or reproduction of this message or any attachments is prohibited and may be unlawful.