



Taissir Alani <taissir_alani@bedfordps.org>

The JGMS/BHS Building Project

3 messages

Jon Sills <jon_sills@bedfordps.org>

Wed, Mar 20, 2019 at 8:56 AM

Dear Renu, Mark, et al,

I write to you in response to your emails below, which call upon Bedford voters to delay the JGMS project. While it is not my role to lobby voters to make spending decisions that impact the schools, it is my responsibility to provide the facts regarding the project, particularly with regard to:

- the project's plans for Net Zero impact,
- the negative impact on our students that a delay would cause,
- and the reasons why the project is well-positioned to be completed on time, given the 14 month construction time frame that we have planned for.

My clarification of the facts as the school department understands them is offered both in summary form (below), and in highly detailed form by way of three in depth memos from our architectural firm (TBA) and our facilities director, Taissir Alani. These include:

- a memo regarding sustainability measures that begins with a perspective on not wasting the embodied energy in the existing structure, while adding highly effective energy conserving features to all new construction.
- a memo that clearly delineates the energy conserving plans for the JGMS addition and the additional plans for the rest of the building.
- a memo that provides detailed information about the planning process, the projects timing, and the specific suggestions for additional energy efficiencies made by Mr. Mullins'.

Summary

1. A Common Commitment to, and Sense of Urgency Around, Energy Efficiency and Carbon Footprint Reduction

- these are the professed values of the school committee and school department
- the plan for the JGMS addition is to strive for at least a Net Zero impact
 - this includes a commitment to, among other measures: a new PVC roof, a new addition rooftop solar system (planned for as a separate project), LED lighting, non-reliance on natural gas as the primary energy source, an energy recovery electrical HVAC system (roof mounted) with CO2 sensors to control ventilation, etc. (Please see memos for additional measures regarding types of insulation, air barriers, windows, etc.)
- additional plans to add energy conserving and sustainability features to the rest of the building, e.g., replacing all lights with LED. As well, infrared studies indicate that a new roof is needed and should be incorporated into our capital planning. It is fully expected that this would provide the opportunity to add a building-wide solar system in the near term.

2. JGMS Is Out of Space and Our Enrollment and Programmatic Needs Are Pressing

- of particular note, the BPS SAIL Program, which is our sub-separate special education program for students with autism, has been developing according to the very real needs of the students whom we serve. Accordingly, as students became older, we added to the Davis SAIL Program, a Lane SAIL Program. Anticipating the maturing of these students has been one of the key drivers for the JGMS project, as these children will grow out of the Lane program and will need a new JGMS program in September, 2021. A delay in the project will prevent us from serving these students in the ways that they deserve.

- we have been repurposing spaces at JGMS for years to accommodate growing enrollment and the development of key student support programs such as the Academic Achievement Center, the English Language Learner classroom, the Design Lab, the Bridge Program for students with social and emotional challenges/disabilities, and the SAIL Inclusive Program for students with moderate autism. As a result, among other impacts: there is no longer a teacher room to support teacher prep; we have teachers travelling to four different classrooms; orchestra is forced to meet in the cafeteria; and the large group instruction room, now divided into two classrooms, is unavailable for the kind of creative cross disciplinary/combined classroom learning opportunities for which it was designed.

3. The School Committee's/School Department Track Record Regarding Project Timing and Completion Is Strong

- As the district developed and positioned the Lane School project, many concerns were raised that it was being rushed and could never be completed within the projected time frame. Because the district had done its due diligence, we were confident that we would deliver, and did so.
- As the district developed and positioned the Davis School project, which is about four times the size of the JGMS project, again, there were voices of concern about the time frame, although there were fewer due to the success of the Lane project. Despite significant delays and a very rainy autumn, the Davis project is on schedule, admittedly requiring some extra-time labor costs, but still well within the budget.
- The same process, with the same architects, most of the same building committee members, and led thoughtfully by Mr Coelho, will, we are confident, yield similar results without additional labor cost. The detailed delineation of the process and anticipated time frame (two summers and the year in between) may be viewed in the memo. As the detailed TBA response to Mr. Mullins' points clarifies, the architects acknowledge that while they would have liked more time, industry conditions do not allow for it, and the project is as well positioned to be on schedule as the preceding two projects.

Please feel free to contact my office with any questions.

I hope that this addresses your concerns, particularly with regard to plans for energy conservation and sustainability and the project's time frame.

Sincerely,
Jon

Dear Climate Concerned Bedford Voters -

Let's all speak up at Town Meeting about Article 21 which is about appropriating funds for the John Glenn Middle School building renovations. It is safer to do a better design and wait a year than rush into it.

Making school renovations energy efficient (even better would be Net Zero!) apparently has not been a priority for the building committee for the JGMS project. Please see Mark Mullins message below, and please spread the word to your friends!

Let's all speak up at Town Meeting to say that it is safer for our children's school and for their climate future for Bedford to delay the project a bit and prioritize energy efficiency.

Renu

----- Forwarded message -----

From: **Mark Mullins** <markjmullins@gmail.com>
Date: Sun, Mar 17, 2019 at 7:52 PM
Subject: Article 21 JGMS
To: David Coelho <david_coelho@bedfordps.org>
Cc: Taissir Alani <taissir_alani@bedfordps.org>

Mr. Coelho, please see my comments below re: the JGMS article based on the meeting on March 14. I do support the JGMS renovation in concept. However, this \$4.7M project appears to be behind schedule, and it does not appear to me that there is enough time this summer to complete a proper design, conduct appropriate due diligence, and plan and build

the project without compromising quality and finishing before the start of school. For these reasons my personal opinion is the article should be deferred to fall TM.

Comments

- This is a very aggressive schedule for a project that involves grading and connecting a new structure into an existing building. Further, if all goes according to schedule, a contractor won't be given an NTP until June 4, which means they will not have any advance time prior to that to do prep work to ensure the project goes smoothly (e.g. developing a thoughtful schedule, lining up quality subcontractors, ordering equipment, getting containers on site, etc.). Plus construction will last just 6 weeks. Simply put, there is no room for error, and IMO it does not seem realistic.
- Additionally, there is simply no time in the schedule for any major changes to the project design. Compounding this, materials such as HVAC units, often have a lead time of 2+ months. This means Bedford might be limited to conventional "off the shelf" equipment, which can be of lower quality and less efficient.
- It seems possible, if not likely, Bedford will pay a price premium for getting it done this summer, in overtime and other related contractor "fast tracking" costs. So this project could cost more in the short run and long run for Bedford residents.
- With regard to quality of design and energy performance, there is simply not enough information to assess at this time. Considering the budgeted design fee is \$426k, I would expect more information at this stage.
- See comments below re: energy performance, although there is not enough information to assess:
 - Consider increasing roof insulation. Small added cost, good savings, should have short payback. Also specify white roof. No added cost for this.
 - Consider low-e and/or triple pane windows. Likely good return (i.e. energy cost savings) on investment.
 - Consider advanced air sealing of envelope to reduce infiltration. Again should have good ROI.
 - Consider insulated finished ceiling to thermally separate space (classroom) from space above ceiling.
 - Curtainwall construction, selected to match existing structure, is notoriously leaky. I have no issues w/ a curtainwall b/c it is designed to match existing. but it's possible the added cost for a better curtainwall might be small compared to energy cost savings.
 - Wall insulation calls for R-20 rigid plus R-13 batt, which is good.
 - No information was provided on mechanical or electrical (i.e. lighting, plug) systems, so I can't comment on those.
 - I don't know if a renovation project such as this must meet the State's energy code, however it is not clear if the project would meet this code.
- The process for this committee could be improved. I was a member of the Lane Bldg committee a few years back. I thought Superintendent Sills, the chair of that committee, set a good example for how to run the process: meetings had a clear, printed agenda, Mr. Sills provided a set of documents he prepared for each meeting, and meetings were held well in advance of TM so that committee members had time to digest and comment on the project. In addition, Mr. Sills took time to explain the materials and actively solicited input from the group. I left feeling the process was fair, even if I did not agree with every aspect of the project. In contrast, the recent March 14 meeting had no agenda, documents presented were incomplete and prepared and assembled not by the schools but by the architect, and the meeting was held only 11 days before TM. I feel the schools simply have not provided enough information for committee members to judge whether the project design is in the best interests of the town or students. The downsides are not worth the small benefit of constructing in 2019 vs 2020.
- Mr. Alani did address questions at the meeting re: project design which I do appreciate.

Best Regards,

Mark Mullins

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Jon Sills
Superintendent
Bedford Public Schools
Bedford, MA 01730
781-275-7588

3 attachments

 Sustainability Measures.pdf

28K

 **JGMS-EnergyEffMeasures-March13-2019.docx**
32K **JGMS-Email-Response-EnergyEffMeasures-March18-2019.docx**
39K

Taissir Alani <taissir_alani@bedfordps.org>

Wed, Mar 20, 2019 at 10:33 AM

To: Marcia Pyles <marcia_pyles@bedfordps.org>, Peter Cox <peter_cox@bedfordps.org>, Ronald Scaltreto <ronald_scaltreto@bedfordps.org>

FYI.

Thanks,

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Taissir Alani

Director of Facilities

Town of Bedford/Bedford Public Schools

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Taissir Alani <taissir_alani@bedfordps.org>

Wed, Mar 20, 2019 at 10:40 AM

To: Nina Tate <t8brood@gmail.com>

Good Morning Nina,

Attached is Jon' formal response to the concerns raised by some community members and their call to Action to delay the project..

Thanks,

Taissir

----- Forwarded message -----

From: **Jon Sills** <jon_sills@bedfordps.org>

Date: Wed, Mar 20, 2019 at 8:57 AM

Subject: The JGMS/BHS Building Project

To: Renu Bostwick <renu.bostwick@gmail.com>, Mark Mullins <markjmullick@gmail.com>, <uubedford-anno@googlegroups.com>, <first-parish-climate-justice@googlegroups.com>, Dan Brosgol <daniel.brosgol@gmail.com>, Sarah Stanton <sstanton@bedfordma.gov>, Taissir Alani <taissir_alani@bedfordps.org>, Justin Humphries <jhumphreys@tbaarchitects.com>, <Gyadavalli@gmail.com>, Renae Nichols <rsnichols77@gmail.com>, Christine Rabinowitz <Chrisrab50@gmail.com>, Erin Dorr <erin.e.dorr@gmail.com>, Emily Prince <emily_prince-2029@bedfordps.org>, Julie McCay Turner <jmcct@verizon.net>

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BEDFORD FACILITIES DEPARTMENT

101 McMahon Road, Rear
Bedford, MA 01730-2160



MEMO

FROM: Taissir Alani
Director of Facilities

TO: Jon Sills
Schools Superintendent

DATE: March 18, 2019

SUBJECT: JGMS Mark Mullins' Email - Energy Efficiency & Sustainability Measures

Hi Jon,

The JGMS addition design has many energy efficiency and sustainability measures. It is the goal of the project team to achieve a Net Zero for the addition and incorporate many other measures for the school in general. Please note that the new addition will rely mainly on electric power and solar power, where available. The boiler's natural gas will not be the main energy supply to the HVAC equipment.

A few points to consider:

- 1- This project is a result of the Space & Feasibility study which was completed with oversight from the Davis Building Committee. Everyone involved knew this is a school project and not an energy efficiency/sustainability project for the whole school.
 - 2- Facilities has developed/is developing a 6yr/20yr energy and sustainability program. However, it has not been finalized as we await the final report of the Town's Net Zero study to take its recommendations and incorporate them into our 6yr/20yr outlook program.
 - 3- The Two additions at JGMS will be solar-ready. Facilities' plan is to install solar panels for the addition under a separate project managed by Facilities.
 - 4- The JGMS roof solar, similar to Davis, will be part of a comprehensive solar project which Facilities is currently working on with an approved solar vendor and is preparing to present to the School Committee and the Selectmen.
 - 5- All Schools projects (Lane, Davis and now JGMS) have been designed to be completed on a 15-months schedule.
 - 6- JGMS project, although similar to Lane in terms of the addition, it's less work than Lane on the inside and it doesn't involve any major stairs work.
 - 7- JGMS project is less than Lane sqft addition and is about one quarter of the Davis addition. Bedford has been able to achieve the addition at Lane and is achieving the addition at Davis within the 15-month period.
-

Background

The intent of the JGMS project is to construct a 2 story addition this summer, prior to the start of the school year. Last fall, TM approved \$426k for design of the project. The architect, TBA, provided some drawings and a short memo, attached w/ my cryptic notes, and discussed the project. TBA acknowledged the project is behind schedule, and cost estimates have yet to be developed. TBA was planning to send drawings to an estimator on Mar 15 to receive an estimate prior to the TM. TBA also acknowledged the project schedule is very tight. If they meet schedule moving forward, bid documents would be sent 4/29 and bids are due 5/27. The Town would issue an NTP on June 3, construction would start on June 24, and would be substantially complete about 6 weeks later on Aug 7.

TBA Response: TBA does not acknowledge the project is behind schedule. We said, as we have on the previous projects, that we would love to have more time to develop the project – but that is a response to every project as the entire design and construction industry is busy and all projects are on tighter and tighter timelines. However, this project is on an overall schedule no different from the Lane School which was of a similar scope of work. JGMS Construction work will start this summer, but will continue through the school year and be completed by August of 2020 – not 6 weeks, but 14 months. BHS Construction work will begin in September of 2019 allowing time to move the pre-K out to the Davis School and should only require a few months worth of construction. TBA submitted a 50% set as anticipated on 3/15 to an independent estimator as check on the in-house estimates that were prepared.

Comments

- This is a very aggressive schedule for a project that involves grading and connecting a new structure into an existing building. Further, if all goes according to schedule, a contractor won't be given an NTP until June 4, which means they will not have any advance time prior to that to do prep work to ensure the project goes smoothly (e.g. developing a thoughtful schedule, lining up quality subcontractors, ordering equipment, getting containers on site, etc.) Simply put, there is no room for error, and IMO it's likely the team will need to cut corners if they are to meet the Aug 7 deadline.

TBA Response: The anticipated construction schedule presented and discussed has a duration of 14 months. We expect the work to be complete by the start of August 2020. The NTP would be granted at the start of June 2019 and I would expect that the foundations for the additions would be complete in the first summer, by August 2019. Construction would then continue through the school year and summer of 2020. This is the same schedule that was kept in the Lane School Addition project.

- Additionally, there is simply no time in the schedule for any major changes to the project design. Compounding this, materials such as HVAC units, often has a lead time of 2+ months. This means Bedford might be limited to conventional "off the shelf", "cheap" equipment, which is less reliable, less energy efficient, and may have a shorter lifespan.

TBA Response: TBA, the school principals, the facilities department, and the building committee have been discussing and refining the design of the JGMS and BHS project over the past several months. We have met with all the stakeholders, as well as the AHJ's (informally) to review the goals, layout, and any programmatic and systematic requirements that should be incorporated into the design. A complete HVAC system of variable refrigerant flow units that would supply heat, cooling and fresh air ventilation via electric heat pumps and rooftop energy recovery ventilators along with in-slab radiant heating along the perimeter has been designed for JGMS. There is ample time in a 14 month construction project to review submittals, shop drawings, purchase and install the equipment specified. There is also room for modification should it

be needed. This is the same process and timeline that was used at Lane and is ongoing at the Davis School.

- It seems possible, if not likely, Bedford will pay a price premium for getting it done this summer, in overtime and other related contractor "fast tracking" costs. So this project will cost more in the short run and long run for Bedford residents.

TBA Response: The project does not require that any work must be completed in one summer. As stated above, 14 months duration is ample time for a project of this scale. We would like the foundations to be complete in the first summer so as to limit the large and noisiest equipment in operation during the school year. The timeframe for doing concrete and excavation work during this first summer is not fast tracked and can be done.

- With regard to quality of design and energy performance, there is simply not enough information to assess at this time, which I communicated at the meeting. Considering the design fee is \$426k, I would expect more information at this stage.

TBA Response: The design fee is for both the JGMS and BHS design – which are being designed simultaneous for a single bid, single contract construction. We would be happy to meet and go over the design in detail – I don't believe the last meeting allowed for a detailed discussion, rather an update. Attached is the energy memo we had prepared and I believe was distributed to the committee prior to the meeting.

- Regarding the project energy performance, although there is not enough information to make a proper assessment, I have some comments on the architectural drawings provided:
 - Consider increasing roof insulation. Small added cost, good savings, short payback. Also specify white roof. No added cost for this.

TBA Response: We have R-30 continuous above the roof deck in the design of the new roofs. The membrane is specified as a white PVC. PVC roofing, able to hold ponding water better than EPDM is preferred for future installation of photovoltaics.

- Consider low-e and/or triple pane windows. Likely good return (i.e. energy cost savings) on investment.

TBA Response: The thermally broken 6" aluminum curtainwall specified contains dual glazed, low-e glazing, with an overall system U-value of 0.31 (below that required by the IECC). Generally, triple pane glazing is considerably more expensive than dual pane and is more effective on the northerly sides of the building. As this is the southerly side, we have specified low-e glazing; have 10" fins along the vertical mullions of the system that will provide shading at the exterior (where it is most effective at reducing solar heat gain), roller blinds inside the rooms, and in some spaces an interior light shelf that will provide further shading along the perimeter of the space while bouncing natural light deeper into the space.

- Consider advanced air sealing of envelope to reduce infiltration. Again should have good ROI. For example, air seal at top of wall along W-beam to provide continuous air barrier. The roof/wall section, which is designed to match existing structure, is complicated and has many points which could fail and allow air/water infiltration (which will also make space hotter in warm weather). Sealing will mitigate this risk and could actually help simplify the wall construction. TBA has selected a continuous adhesive vapor barrier and it's their call however this approach doesn't provide thermal insulation, and batt insulation also allows airflow, reducing R-value.

TBA Response: The MA building code has required a continuous air barrier between wall and roof for several versions now. This project, like the Lane and Davis will have a continuous air/vapor barrier (AVB) at the full surface of wall sheathing that is continuous with the underslab vapor retarder at the first floor and is

wrapped around the roof overhang and tied into the vapor retarder at the roof deck. The AVB is wrapped into all window and door openings and is tied to the curtainwall framing. It is also wrapped around all through-wall or through-roof penetrations. TBA recognizes the complications and discontinuity in the detailing of the existing structure, both the 1960 and 2003 portions of the building. Our details show the path of this AVB at each condition. Additionally we will be insulating inside any roof overhang to address thermal bridging created by the steel needed to support the cladding.

- Consider insulated finished ceiling to thermally separate space (classroom) from space above ceiling.

TBA Response: Separating the classroom space from the space above the drop ceilings does not eliminate the need to temper the ceiling plenum. Sprinkler pipes and equipment is above the ceilings. Our goal is to insulate continuously at the exterior of the sheathing at walls and roof to create a thermal barrier.

- Curtainwall construction, selected to match existing structure, is notoriously leaky. I have no issues w/ a curtainwall b/c it is designed to match existing. but it's possible the added cost for a better curtainwall might be small compared to energy cost savings.

TBA Response: The thermally broken 6" aluminum curtainwall specified contains dual glazed, low-e glazing, with an overall system U-value of 0.31 (below that required by the IECC). Generally, triple pane glazing is considerably more expensive than dual pane and is more effective on the northerly sides of the building. As this is the southerly side, we have specified low-e glazing; have 10" fins along the vertical mullions of the system that will provide shading at the exterior (where it is most effective at reducing solar heat gain), roller blinds inside the rooms, and in some spaces an interior light shelf that will provide further shading along the perimeter of the space while bouncing natural light deeper into the space.

- Wall insulation calls for R-20 rigid plus R-13 batt, which is good.
- No information was provided on mechanical or electrical (i.e. lighting, plug) systems, so I can't comment on those.

TBA Response: All lighting is LED, will be on occupancy sensors and daylight sensors. This allows that lighting will only turn on if the natural daylighting is below a set value. We also have different zones of the room on separate sensors allowing that space along the glazed perimeter may not need lights on, while the internal areas do. We also have designed task or point of work lighting to allow for some individual work without the need for overall illumination.

- Given above it's not clear this project would meet the State's stretch energy code. I don't know if it's required that this type of renovation project meet this code, but if Bedford is still a Green Community, if we are to qualify in the future for State funding we do have certain obligations to meet.

TBA Response: The 2015 IECC is the energy code in effect. The new additions are required to comply with the code for new construction. Renovated areas are not, though we make efforts to do so, especially if we are replacing entire systems.

- The process for this committee leaves a lot to be desired. I was a member of the Lane Bldg committee a few years back. I thought Superintendent Sills, the chair of that committee, set a good example for how to run the process: meetings had a clear, printed agenda, Mr. Sills provided a set of documents he prepared at each meeting, and meetings were held well in advance of TM so that committee members had time to digest and comment on the project. In addition, Mr. Sills took time to explain the materials and actively solicited input from the group. I left feeling the process was fair, even if I did not agree with every aspect of the project. In contrast, the recent March 14 meeting had no agenda, documents presented were incomplete and prepared and assembled not by the schools but by the architect, and the meeting was held late, 11 days before TM. It comes across as rushed and haphazard. In my opinion, the schools simply have not provided enough information for committee members

to judge whether the project design is in the best interests of the town or students.

- Mr. Alani did address some questions re: project design and was excellent as usual. However without the information it's hard to assess the project merits.
- Considering the lack of information provided (and no info prepared by school staff), the late date of the meeting (11 days prior to TM), and the fact the project is behind schedule, I did not leave the meeting confident school administration staff have done the proper due diligence on this \$4.7M project.

TBA Response: TBA has enjoyed being a part of the Lane, Davis, JGMS and BHS projects over the past few years and I have been especially appreciative of the team approach that Bedford has taken. TBA was hired to do the Lane School in February of 2016 and went from Feasibility Study through Bidding in three months time. The project went from an anticipated four classroom addition to a six classroom addition, cafeteria expansion, and substantial renovation of the core of the building. Construction began in July of 2016 and was complete in August of 2017. The Davis School, while having a more time to develop, followed a very similar track – a much more involved program than anticipated – began construction in May of 2018 and is on track for completion in August of 2019. Both projects had a full month of bidding and received several bids that were in a tight range of values. I have confidence that the same overall schedule can be kept on this JGMS and BHS project.

I would ask that the ESC consider the merits of energy performance of this project, if possible prior to TM, and make a recommendation. From what I've seen there's not enough information to assess energy performance or overall construction quality.

Given that all recent past school construction projects are approved unanimously or nearly so at TM, I'm quite certain the same will happen on March 25. I actually support the JGMS addition in concept. However, this support is not a "blank check", and based on the schedule alone (6 weeks start to finish??), I would much rather see Article 21 deferred to the fall. School staff have not shown that this design is ready for prime time, or that they've done their homework. There isn't enough time to design/plan the project properly, and the potential risks are too great for the small benefit of constructing in 2019 vs. 2020.

TBA Response: As stated above, we have met with the staff at both schools and been in discussions with school and facilities over the past several months. We will have an update on our estimate based on the 50% CDs by this coming Friday in advance of the town meeting. There is time to complete the documents to be ready for bidding in May of 2019. There is also time to meet and review in detail prior the documents being available to bidders. I am happy to do that. The 14 month construction period is sufficient for the scope of work and to allow for handling latent conditions and potential changes in scope.

Best,

Mark Mullins



TBA ARCHITECTS, INC

MEMORANDUM

TO: JGMS BUILDING COMMITTEE
FROM: TBA ARCHITECTS, INC.
SUBJECT: JGMS SUSTAINABILITY MEMO
DATE: MARCH 13, 2019
CC: TAISSIR ALANI

We believe the greatest step we can take in sustainability on this project (and any renovation/addition project) is the reuse and renovation of the existing building and systems. The embodied energy in the existing structure and systems cannot be recovered and once built should be utilized as long as possible. When the system has performed its useful life, it should be replaced with new high efficiency systems and/or components. To that end, this approach utilizes new, energy efficient systems and materials within the smallest addition footprints necessary to meet the school's needs, while allowing for continued use of existing structure and systems as they continue to perform.

A new PVC roof will allow for new and increased insulation across the roof surface. In addition to a higher insulation value (R-30) at the new roof at the additions, the existing roof will have an additional 2" of insulation as a result of the alternate to replace the existing roof. With this new PVC roof, we can consider the entire roof for future installation of photovoltaics. Given the age and condition of the existing roof, a new one would likely be required prior to placement of any panels or equipment. Furthermore, the new south addition will offer the opportunity to cut back the older concrete slab roof structure. This older structure currently acts as a heat sink. Any decrease in the amount of exposed concrete structure will improve the energy efficiency of the entire building.

TBA's design employs a combination of brick façade exterior walls and a curtain wall system, much like the existing building. The exterior walls of the new addition will have continuous insulation at R-20, with the addition of R-13 batt insulation within the stud cavities. The curtain wall, with an overall U value of .31, will incorporate several vents in each new classroom or work space. The quantities of these vents depend on the size of each interior space. In addition, sun shading fins along all southeast and southwest-facing facades will decrease the amount of solar gains these new spaces experience, requiring less mechanical cooling. The combination of the highly insulated exterior

walls and the high thermal performance curtain wall system will contribute to an much more energy efficient building envelop at these new additions.

Heating and cooling are provided via air source heat pumps located on the roof. These systems are entirely electric, and, potentially, offset by future photovoltaic arrays on the roof. Radiant floor heating at the curtain walls, tied to the existing hydronic system, will increase comfort.

Mechanical ventilation is provided via two roof-mounted ERV's (one at each addition) rather than individual unit vents. The ERV is quieter for the classrooms and provides greater comfort. The ventilation system is controlled via CO2 sensors which call for ventilation when CO2 levels get to a certain setpoint. Additionally, this will act as an interlock between the mechanical and natural ventilation as the CO2 levels should be maintained below the setpoint when the windows are open.

All new classrooms - all have floor to ceiling glazing at the curtain wall for maximized natural daylight. Every room will be provided with roller screens for shading and blackout. All new electrical lighting shall be LED with some indirect/direct pendants and some downlights. Classrooms shall be switched by zone, influenced by proximity to curtain wall. In addition to the multi-zoned switching, they will pair occupancy sensors and illumination sensors, allowing the staff to create different lighting schemes that respond to lighting levels at the interior and exterior edges of rooms as well as for teaching scenarios.

Materials will be specified that are low to no VOC, reducing off-gassing. The flooring will be a vinyl quartz tile that does not require any sealants (waxing) and is cleaned with non-toxic, mild soap and water cleansers. The art room will be a polished, sealed concrete, reducing the use of new materials for this durable floor.

All plumbing fixtures are low-flow. Faucets shall be a non-electric metering type.

END

BEDFORD FACILITIES DEPARTMENT

101 McMahon Road, Rear
Bedford, MA 01730-2160



MEMO

FROM: Taissir Alani
Director of Facilities

TO: Jon Sills
Schools Superintendent

DATE: March 13, 2019

SUBJECT: JGMS Addition/Renovation – Energy Efficiency & Sustainability Measures

Hi Jon,

The JGMS addition design has many energy efficiency and sustainability measures. It is the goal of the project team to achieve a Net Zero for the addition and incorporate more measures for the school in general. Please note that the new addition will rely mainly on electric power and solar power, where available. The boiler's natural gas will not be the main energy supply to the HVAC equipment.

Here is a quick list of measures being considered:

- 1- Roof:
 - A. Existing Roof : A infrared scanning study and analysis was performed and showed the roof has many areas which would need to be addressed. Therefore, it is recommended that the roof be replaced. Replacement would provide Bedford the opportunity for a solar system. Furthermore, a 2" of additional insulation would be added to the existing roof when the new PVC is added.
 - B. New Addition Roof: Proposed a PVC with increased insulation value (R-30).
- 2- Solar:
 - A. Existing Roof: If the roof is replaced, a new solar system would follow.
 - B. New Addition Roof: Would have a solar system under a separate project managed by Bedford
- 3- Lighting:
 - A. Existing Building: Facilities is managing the replacement of the school's lights with new LED lights.
 - B. New Addition: LED Lighting is specified and will be installed.
(This combination work is the most cost effective and is similar to what is being done at Davis currently).
- 4- HVAC:
 - A. Existing "A" Wing Between the two corners of the Addition: Will be retrofitted w/heat pumps, similar to the new addition described below.
 - B. New Addition: Heating and cooling is provided via heat pumps which would be mounted on the roof. This system is totally electric and no fossil fuel will be used for heating. The mechanical ventilation is provided via two roof-mounted Energy Recovery Ventilators (ERVs) which are quieter for the classrooms and provide more comfort. The mechanical system will also have CO2 sensors which will control when ventilation is used based on set points and activities.

- 5- Addition Envelop (Windows, Walls,etc): Using combination of continuous insulation at R20 for exterior walls, and a curtain wall system with an overall U value of .31
- 6- Flooring: A more durable 2x2 Vinyl Quartz Tile (VQT) floor tiles will be used. This floor does not require adding any sealant (waxing) and is cleaned with non-toxic, mild soap and water cleansers.
- 7- Windows: All new classrooms will have floor to ceiling glazing at the curtain wall to maximize the natural daylight. Roller screens for shading will also be installed.
- 8- Hot Water Heaters: 2-900 Gal tanks will be replaced with smaller size and more efficient water heaters with additional on-demand controls.
- 9- Electric Sub-Metering- Addition: The electric services to the two wings of the additions will be metered separately for bench marking, measurement and tracking.

Near Future Measure:

- A. Solar for the whole building. A Town-wide public buildings project
- B. Energy Management System (EMS). A Town-wide public buildings project. This is part of the Town's six (6) year capital program.