

# Preferred Schematic Report
# MEMORIAL ELEMENTARY SCHOOL
## Manchester-by-the-Sea, MA

Submitted February 21, 2018

JCJARCHITECTURE
an employee owned company

MANAGEMENT
PARTNERS, LLC

February 21, 2018

Fenton Bradley
MSBA Project Manager

Massachusetts School Building Authority
40 Broad Street, Suite 500
Boston, MA 02109

**RE: Manchester Memorial Elementary School – Preferred Schematic Report Submission**

Dear Fenton,

Please accept the Module 3 Preferred Schematic Report submission for the Manchester Memorial Elementary School Project. As OPM, we have reviewed the package to assure that it meets the requirements set forth by the MSBA.

We will be sending along the following documents subsequent to SBC vote to approve at our meeting scheduled for March 13, 2018.

- Section 3.3.5
    - 2/13/18 Certified Meeting Minutes

We look forward to your feedback and working with you to proceed with the final evaluation of the proposed alternatives.

Sincerely,

**DORE & WHITTIER MANAGEMENT PARTNERS, LLC.**
Project Managers



Mike Burton
Project Director / Owner's Project Manager

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# INTRODUCTION

SECTION 3.3.1

### 3.3.1 – INTRODUCTION

- Process Overview
- Summary of Updated Project Schedule
- Summary of Final Evaluation of Existing Conditions
- Summary of Final Evaluation of Alternatives
- Summary of District's Preferred Solution
- MSBA Preliminary Design Program Review and District's Response

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## 3.3.1 – INTRODUCTION

The purpose of the Preferred Schematic Report is to define the programmatic, functional, spatial and environmental requirements of the educational facility necessary to meet the District's educational program and perform the review and investigation required to clearly define the existing building deficiencies. Based on the District's educational program we have identified the programmatic space needs for the Manchester Memorial Elementary School project for the Manchester-Essex Regional School District. The space needs, along with an evaluation of existing conditions and site development requirements, have formed the evaluation of alternatives upon which the most educationally appropriate and cost effective solution will be recommended. With that information in-hand, the Preferred Solution has been approved by the Memorial School Building Committee and is being submitted to MSBA for review and comment prior to going to the Board for MSBA approval to proceed with the Schematic Design.

The Manchester-Essex Regional School District submitted their Statement of Interest (SOI) for the Manchester Memorial Elementary School in January of 2015. The project was accepted into the MSBA's Eligibility Phase in January of 2016 and into the Feasibility Phase in September 2016. The deficiencies identified in the SOI are detailed in the Appendix of the previously submitted Preliminary Design Program (PDP). To summarize the deficiencies here, the District has identified that, these deficiencies have been identified as direct problems that the District desires to correct so that they can provide the best possible educational experience for all of their students. The existing Memorial Elementary Schools was originally built in 1951 and also includes two subsequent additions, a six (6) classroom addition in 1954 and another six (6) classroom addition in 1965.

Despite being well maintained the building systems have notably exceed their useful lives. Additionally, the building and site have notable accessibility concerns. Educationally, all classrooms are below the MSBA size standards, are the classrooms in the two additions are significantly smaller. Current classroom configurations do not easily allow for a place for grade-level collaboration projects to occur. The existing building is not conducive to learning for all students.

### PROCESS OVERVIEW

The Preliminary Design Program was submitted to MSBA on November 22, 2017. Review comments from the MSBA were received by the Manchester Regional School District on January 11, 2018 and the responses to those comments are included in the last part of this section. The Design Team met with the School Building Committee on a regular schedule over the duration of the Preferred Schematic Report (PSR) phase of the project and the meeting minutes from all of those meetings can be found in Section 3.3.5 "Local Actions and Approval Certification" of this report.

The Manchester-Essex Regional School District worked diligently to study the various Options before them. From starting with fourteen schemes to the selection of the preferred, the committee rigorously employed the criteria rubric they developed during the PDP phase. At the end of the PDP phase half the schemes were eliminated for a variety of reasons including; intrusion into newly identified wetland areas

along the western property line, the cost impact of having to demolish and rebuild/ replace the existing entry driveways, parking and three tennis courts. After further development of the remaining seven 97) schemes, it became clear that two additional schemes; AR-2 and N-8 had notable limitations and did not fully address the Educational programming goals as developed through the Educational Visioning Sessions and as described in the Educational Plan. On January 10th, the committee voted to move the remaining five schemes to estimating.

During the estimating period, the Design team further developed the remaining five schemes to respond to a number of questions, concerns and requests identified by the Building Committee. For four of the schemes the primary improvements focused on;

- AR-2, adjusting the building footprint to avoid encroachment into identified wetland areas.
- N-1, modifications to allow the potential of separating community access to the gym and cafeteria from the classroom spaces as well as completing the circulation loop to allow occupants to fully circumnavigate around the gymnasium.
- N-3, adjusting the locations of classrooms and specialist spaces to improve desired adjacencies as well as augmenting a separate entry to community spaces such as the gymnasium and cafeteria, and finally.
- N-9, improving the layout of classrooms to mitigate negative sound and circulation impacts to adjacent classrooms.

With the design "improvements" and cost information in hand, the Building Committee determined that, for a number of reasons, N-3 was the preferred solution. Reasons included, best overall configuration to meet the Educational Program, improved vehicular and pedestrian circulation, least number of modulars required, with the potential for no modulars to be required (pending further study.) On February 1, 2018 the Building Committee voted to select Option N-3 as the preferred Option. On February 13, 2018, at a joint meeting of the Building Committee and School Committee, each committee voted to approve the PSR with N-3 as the preferred Scheme, for submission to the MSBA.

The District and project team have implemented an extremely open, transparent and comprehensive design review process. In addition to the open, public meetings detailed below the project public outreach includes a web-site hosted by the District (https://www.mersd.org/domain/767) includes all public presentations and agendas. The District also has gathered public comments not only at the scheduled Community Meeting, but also made Building Committee members available to answer community questions at a number of school events scheduled at both Memorial and Essex Elementary Schools.

School Building Committee Meetings

Multiple School Building Committee meetings were held in which design parameters, site options and building arrangements were presented and discussed. In addition estimated costs for each of the

schemes were presented and discussed. A list of each meeting, as well as the Agenda, presentation, and minutes of these are included in Section 5 of this report.

School Committee Meetings

A joint meeting with the School Committee occurred on February 13, 2018 so those Committee members could benefit from an open discussion of the merits and issues involved with each scheme and configuration. It was at this meeting that the Preliminary Schematic Report was approved for submission to the MSBA.

Community Outreach

Two Community Forum meetings were held on January 31, 2018 to present project information to the public and to receive feedback. One Forum was held at 9:00 AM and the other at 7:00 PM to allow community members options for attendance. The evening Forum was televised on local access network. Each Forum devoted considerable time to public comment and question and was structured in a question and answer format, allowing the District and project team to respond to each question. Both Forums included a break out period where attendees where able to inspect each of the remaining five Options and provide commentary for any Option on Post-It Notes. This was followed by a period of further engagement based on those comments provided.

Other Meetings

The project team, including the Mechanical, Electrical, Plumbing, and Fire Protection engineers, also met with the Building Committee's MEP Sub-Committee on December 4, 2017. The sub-committee was primarily comprised by committee members with specific knowledge or interest in MEP Systems. The Meeting included reviewing the District's experience and interest in a number of potential building systems and approaches. The outcome of the meeting helped to determine the Basis of Design for each system type to be selected by the MEPFP consultants..

## UPDATED PROJECT SCHEDULE

The proposed schedule is included in SECTION 3.3.4 PREFERRED SOLUTION. The primary milestones from that schedule are as follows:

| | |
|---|---|
| Submit the Preferred Schematic Plan to the MSBA | February 21, 2018 |
| MSBA Facilities Subcommittee Assessment Meeting | March 14, 2018<br>-or- March 21 2018 |
| MSBA Board Approval of Preferred Schematic Plan | April 10, 2018 |
| Submit the Schematic Design to the MSBA | July 11, 2018 |
| MSBA Board Approval of Project Scope and Budget | August 29, 2018 |

| | |
|---|---|
| Debt Override for Project Funding | November 2018 |
| Start of Construction | Summer 2019 |
| Move-In Date | Summer 2021<br>-or- January 2022 |

## SUMMARY OF FINAL EVALUATION OF EXISTING CONDITIONS

The Memorial Elementary School, located at 35 Lincoln Street, Manchester-by-the-Sea, MA was originally built in 1951. Two additions were constructed in 1954 and 1965 to increase the number of classrooms. In the District's Statement of Intent (SOI), the following items were noted:

> "The Manchester-Essex Regional School District (MERSD), having completed the construction of a new Middle/High School in 2009, is now working to address the needs of their two Pre-Kindergarten through Grade 5 Elementary Schools. The Memorial Elementary School, located in Manchester in close proximity to the new Middle/High School, serves the elementary aged children of Manchester. The Essex Elementary School, located in Essex approximately 5 miles from the Memorial School, serves the elementary aged children of Essex. Following the completion of a preliminary internal assessment of the existing conditions of the two elementary schools, the MERSD recognized that the two school buildings would require significant improvements and moved to commission a professional School Facilities Needs Assessment.
>
> Following the review of several qualified architectural firms, Habeeb & Associates Architects was selected to conduct the School Facilities Needs Assessment for the two elementary schools. This study includes a Physical Conditions Assessment of the schools to determine the overall condition of the buildings and sites, along with a Space Needs Analysis that takes into account the projected future enrollments through the year 2025 as provided by the MERSD. The firm's study included an update to previous studies which evaluated potential building sites. The Habeeb & Associates team began by conducting a Physical Conditions Assessment to determine the overall existing conditions of the facilities, as well as the costs that would be associated to bring the facilities up to date. H&A's on-site team conducted an inspection that examined five (5) major assessment categories - site, envelope, interiors, mechanical and electrical. Over a period of several days, the assessment occurred by way of field observations and photographs, existing data collection, and discussions with administration. The assessment criteria used in the review included the remaining useful life; an examination of energy efficiency; life cycle costs; technology advances; maintenance planning; handicap accessibility; aesthetics; environmental and health concerns; as well as local and state code regulation requirements.
>
> Following an in-depth, in-house review of all data collected, Memorial School was determined to be in greater physical need than Essex School. However, both schools were deemed to have significant major issues that must be addressed beginning in the next 1-5 years."

The existing Memorial Elementary School is a one story building covering approximately 66,573 square feet. The overall layout of the building is organized with a "core block" of community spaces such as the auditorium, gymnasium and cafeteria/ kitchen connected to two single-loaded corridor classroom wings jutting from the core block as "fingers" to the south. The 1954 and 1965 additions form a third parallel classroom wing just west of the original structure.

The Main Entry is located to the east side of the building and leads directly into the main connecting corridor. The Main Administrative Offices are located to the left (south) of the main entry. The Auditorium is directly opposite the entry and gymnasium and cafeteria/ Kitchen to the right, or north of the entry. The primary mechanical spaces are in the basement. The entire building is built over a combination of crawl spaces and basement passages connecting several mechanical rooms and a storage room. The designated delivery area is to the north of the building. The western corridor loop connects the classroom "quads", the Library, the Gymnasium and various small scale teaching spaces as well as teacher planning spaces. The original building included classrooms that averages 920 nsf, however, classrooms in the 1954/ 1965 addition all average 810-830 nsf. The building wings have different finish floor elevations. The eastern classroom wing which includes the public toilet rooms and nurses office is only accessible via a stair which offers no accessible access and the central and western classroom wings are reached via a non-conforming ramp. This has caused problems for many years and is one of several driving factors that pushed the District to pursue this building project with the MSBA.

## SUMMARY OF FINAL EVALUATION OF ALTERNATIVES

Over the course of the Feasibility Phase the School Building Committee evaluated multiple concept schemes for each grade configuration in consideration. In fact, through the course of the Preliminary Design Program (PDP) phase, fourteen (14) distinct schemes spread across the three required Option-types were explored.

A Renovation-Only/ Code Upgrade scheme was developed, and, although deemed to be unfavorable due to a variety of reasons including the physical limitations of the existing building this continued to be investigated into the Preferred Schematic Phase as required by MSBA. Four (4) Addition/ Renovation schemes were initially developed however; two were immediately eliminated for a variety of reasons including the physical limitations of the existing building, and, in some cases, due to unfavorable existing site conditions and limitations. Nine (9) New Construction schemes were developed in PDP. Again, for a number of reasons described in detail in the PDP report, two were eliminated.

Entering into the PSR phase, the options that were explored were: R-1 (Code-Only), AR-2, AR-4, N-1, N-3, N-8, and N-9. Developed into further detail through the start of the PSR phase, by the time the schemes were ready to send for estimating it was clear to the committee that schemes AR-4 and N-8 had notable deficiencies or limitations and the committee voted to reject these and not include them in the cost estimating effort. The deletion of these two schemes was discussed with the project's MSBA Project

Manager and it was accepted for Manchester-Essex to pursue cost estimating on the remaining five (5) schemes.

These included;

- Option R-1 – Renovation-Only/ Code Upgrade of the existing facility.

- Option AR-2 – Addition/ Renovation of the existing Memorial School. This scheme renovated the grand majority of the existing school, however, it assumed demolition and replacement of the Western Classroom Wing (the 1954 and 1965 additions) which contains twelve significantly undersized classrooms. The new construction and renovations would necessitate relocating a portion of the student population into modulars during a multi-phased construction.

- Option N-1 – New Construction. This scheme assumes demolition and replacement of the entire existing complex. Students would be relocated into modulars and the new structure built in essentially a single phase. Upon completion of construction, students and staff would move into the new building and the older structure demolished and the site developed to its final configuration.

- Option N-3 – New Construction. This scheme assumes demolition and replacement of the entire existing complex. Students would be relocated into modulars and the new structure built in multiple phases. Upon completion of construction, students and staff would move into the new building and the older structure demolished and the site developed to its final configuration.

- Option N-9 - New Construction. This scheme assumes demolition and replacement of the entire existing complex. Students would be relocated into modulars and the new structure built in multiple phases. Upon completion of construction, students and staff would move into the new building and the older structure demolished and the site developed to its final configuration

These five (5) options are described in greater detail in section 3.3.3 Final Evaluation of Alternatives.

## SUMMARY OF DISTRICT'S PREFERRED SOLUTION

After considerable study and evaluation of the proposed design schemes, estimated costs, constructions schedules and evaluation of swing space options, the School Building Committee decided the Preferred Solution is N-3.

N-3 will be a grade K-5 school for 335 students. Additionally, four (4) Pre-K classrooms are included in the design to serve approximately 60 students ages 3-5. The building is proposed to sit on and replace the existing Memorial School. This Option assumes that the new school would be a two story, 82,800 gsf building with a footprint of approximately 56,900sf (the remainder of the square footage would be primarily second floor classroom space for grades 3-5

This option would allow for additional vehicular circulation and parking on site while maintaining the existing traffic patterns. Pedestrian access to the building would be enhanced and new play areas and outdoor learning environments would be created.

This Option requires the District to acquire approximately six (6) modular classrooms to accommodate students which would be displaced by the demolition of a portion of one classroom wing while the remaining Memorial students would remain in the existing school for the duration of the first phase of construction. Once the new, two story classroom wing is complete, all students would move into the new space while the new core spaces and site improvements are constructed.

The Preferred Solution supports the goals identified in the Visioning Sessions and the Educational Program. In working with the District through numerous educational visioning workshops and design reviews, this building plan was developed to address all of the identified goals of the project.

A criteria matrix which outlines the design criteria evaluated and the associated ratings for each of the concepts is included in the Meeting Presentations within Section 5 of this report. In summary, the Committee's consensus was that Option N-3 best met the project criteria and best supported the educational vision outlined in the District's overall plan for its schools.

## MSBA PRELIMINARY DESIGN PROGRAM REVIEW AND DISTRICT'S RESPONSE

The Preliminary Design Program was submitted to MSBA on November 22, 2017. Review comments from the MSBA were received by the Regional School District on January 11, 2018 and the team's responses to those comments are included in this section.

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### 3.3.1.2 – MSBA PRELIMINARY DESIGN PROGRAM REVIEW AND DISTRICT RESPONSE

The MSBA's Preliminary Design Program (PDP) review comments and the District's response are included in this section.

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**ATTACHMENT A**
**MODULE 3 – PRELIMINARY DESIGN PROGRAM REVIEW COMMENTS**

**District:** Manchester-Essex Regional School District
**School:** Manchester Memorial Elementary School
**Owner's Project Manager:** Dore and Whittier Management Partners, LLC.
**Designer Firm:** JCJ Architecture, PC.
**Submittal Due Date:** November 22, 2017
**Submittal Received Date**: November 22, 2017
**Review Date**: November 22, 2017 – January 3, 2018
**Reviewed by**: S. Jimenez, F. Bradley, C. Alles, J. Jumpe

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## MSBA REVIEW COMMENTS

The following comments[1] on the Preliminary Design Program (PDP) submittal are issued pursuant to a review of the project submittal document for the proposed project presented as a part of the Feasibility Study submission in accordance with the MSBA Module 3 Guidelines.

## 3.1 PRELIMINARY DESIGN PROGRAM

| Overview of the Preliminary Design Program Submittal | Complete | Provided; *Refer to comments following each section* | Not Provided; *Refer to comments following each section* | Receipt of District's Response; *To be filled out by MSBA Staff* |
|---|---|---|---|---|
| OPM Certification of Completeness and Conformity | ☒ | ☐ | ☐ | ☐ |
| Table of Contents | ☒ | ☐ | ☐ | ☐ |
| 3.1.1 Introduction | ☒ | ☐ | ☐ | ☐ |
| 3.1.2 Educational Program | ☐ | ☒ | ☐ | ☐ |
| 3.1.3 Initial Space Summary | ☐ | ☒ | ☐ | ☐ |
| 3.1.4 Evaluation of Existing Conditions | ☐ | ☒ | ☐ | ☐ |
| 3.1.5 Site Development Requirements | ☐ | ☒ | ☐ | ☐ |
| 3.1.6 Preliminary Evaluation of Alternatives | ☐ | ☒ | ☐ | ☐ |
| 3.1.7 Local Actions and Approvals Certification(s) | ☒ | ☐ | ☐ | ☐ |
| 3.1.8 Appendices | ☒ | ☐ | ☐ | ☐ |

[1] The written comments provided by the MSBA are solely for purposes of determining whether the submittal documents, analysis process, proposed planning concept and any other design documents submitted for MSBA review appear consistent with the MSBA's guidelines and requirements, and are not for the purpose of determining whether the proposed design and its process may meet any legal requirements imposed by federal, state or local law, including, but not limited to, zoning ordinances and by-laws, environmental regulations, building codes, sanitary codes, safety codes and public procurement laws or for the purpose of determining whether the proposed design and process meet any applicable professional standard of care or any other standard of care. Project designers are obligated to implement detailed planning and technical review procedures to effect coordination of design criteria, buildability, and technical adequacy of project concepts. Each city, town and regional school district shall be solely responsible for ensuring that its project development concepts comply with all applicable provisions of federal, state, and local law. The MSBA recommends that each city, town and regional school district have its legal counsel review its development process and subsequent bid documents to ensure that it is in compliance with all provisions of federal, state and local law, prior to bidding. The MSBA shall not be responsible for any legal fees or costs of any kind that may be incurred by a city, town or regional school district in relation to MSBA requirements or the preparation and review of the project's planning process or plans and specifications.

### 3.1.1 INTRODUCTION

| Provide the following Items | | Complete; *No response required* | Provided; *District's response required* | Not Provided; *District's response required* | Receipt of District's Response; *To be filled out by MSBA Staff* |
|---|---|---|---|---|---|
| 1 | Summary of the Facility Deficiencies and Current S.O.I. | ☒ | ☐ | ☐ | ☐ |
| 2 | Date of invitation to conduct a Feasibility Study and MSBA Board Action Letter | ☒ | ☐ | ☐ | ☐ |
| 3 | Executed Design Enrollment Certification | ☒ | ☐ | ☐ | ☐ |
| 4 | Narrative of the Capital Budget Statement and Target Budget | ☒ | ☐ | ☐ | ☐ |
| 5 | Project Directory with contact information | ☒ | ☐ | ☐ | ☐ |
| 6 | Updated Project Schedule | ☒ | ☐ | ☐ | ☐ |

**MSBA Review Comments:**

*No review comments for this section.*

### 3.1.2 EDUCATIONAL PROGRAM

Provide a summary and description of the existing educational program, and the new or expanded educational vision, specifications, process, teaching philosophy statement, as well as the District's curriculum goals and objectives of the program. Include description of the following items:

| Provide the following Items | | Complete; *No response required* | Provided; *District's response required* | Not Provided; *District's response required* | Receipt of District's Response; *To be filled out by MSBA Staff* |
|---|---|---|---|---|---|
| 1 | Grade and School Configuration Policies | ☒ | ☐ | ☐ | ☐ |
| 2 | Class Size Policies | ☒ | ☐ | ☐ | ☐ |
| 3 | School Scheduling Method | ☒ | ☐ | ☐ | ☐ |
| 4 | Teaching Methodology and Structure | | | | |
| | a) Administrative and Academic Organization/Structure | ☒ | ☐ | ☐ | ☐ |
| | b) Curriculum Delivery Methods and Practices | ☒ | ☐ | ☐ | ☐ |
| | c) English Language Arts/Literacy | ☐ | ☒ | ☐ | ☐ |
| | d) Mathematics | ☒ | ☐ | ☐ | ☐ |
| | e) Science | ☐ | ☒ | ☐ | ☐ |
| | f) Social Studies | ☒ | ☐ | ☐ | ☐ |
| | g) World Languages | ☐ | ☒ | ☐ | ☐ |
| | h) Academic Support Programming Spaces | ☒ | ☐ | ☐ | ☐ |
| | i) Student Guidance and Support Services | ☒ | ☐ | ☐ | ☐ |
| 5 | Teacher Planning and Professional Development | ☐ | ☒ | ☐ | ☐ |
| 6 | Pre-kindergarten | ☒ | ☐ | ☐ | ☐ |

| | | | | | |
|---|---|---|---|---|---|
| 7 | Kindergarten | ☒ | ☐ | ☐ | ☐ |
| 8 | Lunch Programs | ☐ | ☒ | ☐ | ☐ |
| 9 | Technology Instruction Policies and Program Requirements | ☒ | ☐ | ☐ | ☐ |
| 10 | Media Center/Library | ☐ | ☒ | ☐ | ☐ |
| 11 | Visual Arts Programs | ☐ | ☒ | ☐ | ☐ |
| 12 | Performing Arts Programs | ☒ | ☐ | ☐ | ☐ |
| 13 | Physical Education Programs | ☐ | ☒ | ☐ | ☐ |
| 14 | Special Education Programs | ☐ | ☒ | ☐ | ☐ |
| 15 | Vocation and Technology Programs | | | | |
| | a) Non-Chapter 74 Programming | ☐ | ☐ | ☐ | ☐ |
| | b) Chapter 74 Programming | ☐ | ☐ | ☐ | ☐ |
| 16 | Transportation Policies | ☒ | ☐ | ☐ | ☐ |
| 17 | Functional and Spatial Relationships | ☐ | ☐ | ☒ | ☐ |
| 18 | Security and Visual Access Requirements | ☐ | ☒ | ☐ | ☐ |

**MSBA Review Comments:**

*In addition to providing a response to the following review comments, the District must provide an updated educational program to be submitted with the Preferred Schematic Report that addresses the items below; one copy that indicates changes made to the original submittal, and a second "clean copy" that documents the educational program to inform the feasibility study and design of the proposed project:*

***Response:*** ***The District will provide an updated Educational Plan to be included with the Preferred Schematic Report submission as requested***

*4c) The English Language Arts/Literacy section identifies Open Court Resources for phonics and a writing program; however the Grade-level brochures do not indicate Open Court and lists Write Steps as a writing program. Please clarify and coordinate if necessary.*

***Response:*** ***Currently the District uses Open Court Resources Phonics and Write Steps as our writing program K-5. Both these resources are outdated and currently under review. In the Spring of 2019, MERSD will be adopting new materials to support our elementary Balanced Literacy program. Changes in resource materials will not impact program pedagogy and delivery methods.***

*4e) The educational program indicates that the existing school has a large salt-water aquarium that is often used by students and staff. Please indicate if the District currently or proposes to use this aquarium to collect data and to study the biome.*

***Response:*** ***The saltwater aquarium is a focal point for the building and also brings the "sea life" themed murals throughout the hallways to life. The murals were painted by a local artist to visually tie in our core values with sea life to reflect our Manchester-by-the-Sea roots. Staff have used the aquarium for art projects, creative writing projects, and***

***science enrichment lessons throughout the years. Our student services staff also use it on a daily basis for movement breaks and to help anxious students relax. We plan to continue to use it as a focal point, relaxation tool, art/writing subject, and science enrichment tool in coming years.***

*4g) Please provide further detail that describes the anticipated technology support that will be needed in the future for world language instruction. In addition, indicate if the District has considered taking advantage of the more flexible bi-lingual guidelines and/or to use immersion instruction for the youngest students.*

***Response:*** ***The District is not requesting a language lab set-up and does not foresee associated technology support. Currently the District provides exploratory foreign language instruction for elementary students and would like to provide dedicated classroom space for the program. Should financial resources be available in the future, the program would be expanded to provide more intensive instructions.***

*5) Please indicate if the District currently or has considered the music, art, and physical education specialists combining with general classroom instructors and special education personnel for common planning time.*

***Response:*** ***Our master schedule is built to maximize common planning time among classroom teachers. Specialist classes provide prep time for our classroom teachers so we do our best to schedule an entire grade's specialists at the same time for common planning purposes. We have after-school common planning time (collaboration) once a month where classroom teachers, specialists, and special education staff can collaborate on grade-specific topics.***

*8) Please provide additional information associated with the proposed lunch program including how the grade levels will be paired, the anticipated number of lunch seatings, and any specific staffing requirements.*

***Response:*** ***We plan to continue to have one grade eat lunch at a time in the cafeteria and then go out to recess (or vice versa). Grade level pairings (one goes to recess and one has lunch…then switch) change each year based on the master schedule. Since they are not having lunch together nor at recess together, the pairings can be flexible from year to year.***

*10) Please provide information that describes how the Library / Learning Commons will be adaptable for future changes in education and instruction and describe how this space will be staffed.*

***Response:*** ***We currently have a dedicated 1.0 School Librarian that is charged with oversight of the learning commons/library. Additionally we have a 1.0 Technology Integration Specialist charged with oversight of the***

***technology lab. While the two programs are scheduled separately, there are a number of interdisciplinary projects that the two staff members collaborate on together so proximity is important. It is important that the technology center and learning commons are a shared space with defined but fluid work areas.***

***We also envision this space to be a community gathering area that can serve medium to large groups of students and adults. It is requested that the space is flexible enough to feel spacious enough for community gatherings and presentations but yet warm and welcoming to smaller group activities.***

*11) The educational program submitted indicates that having sinks in each classroom was identified as a project goal. Please provide further detail associated with the number of sinks anticipated in each general classroom, special education spaces, and art classrooms.*

***Response:*** ***One large sink is needed in each general- and special-education classroom for cleanup of projects. Younger grades (PK-1) need large, deep sinks that are at student height or equipped with steps so that students can access them. The art classroom needs multiple, large and deep sinks at young students' height (or steps to access) in multiple locations in the room (perhaps 2-3 sink stations).***

*13) Please provide further detail associated with the adaptive physical education program, including but not limited to; the location of these activities, the utilization of the adaptive physical education space, the sound and physical separation that will be incorporated to isolate the adaptive physical education population from other physical education activities, and indicate the anticipated physical requirements of this space.*

***Response:*** ***Currently our adaptive PE program is housed at the Essex Elementary School to support our SWING (Students with Intensive Integrated Needs) program. We do not anticipate moving this program to the Memorial Elementary School.***

*14) The educational program indicates occupational therapy and physical therapy services will be offered in the pre-kindergarten. Please indicate if these services will be offered to the K-5 student population and provide additional information associated with the physical space requirements that are needed to deliver these specialized services.*

***Response:*** ***Occupation and physical therapy requires a space that can house specialized equipment such as swings, mats, a work table, and a trampoline. The space can be shared by the two providers, who each will need room for a desk.***

***We will need three small tutorial spaces for reading tutors and speech and language, who see students throughout the day. These services are not anticipated to change to push in.***

***Upper grades (3-5) will likely continue to require space for small group math and/or writing. These spaces would need to provide seating and desks/tables for up to 6 students. There is a possibility that sessions will run concurrently. As a result, 2 of these spaces are needed. These can double as liaison offices/work spaces/small group instruction for other services. Each room should be large enough for a liaison and a teaching assistant to work with students.***

*Additionally, it is noted that the introduction to the Educational Program indicates that a "push-in" model, rather than a "pull-out" model will be used to deliver special education services. However, the number of small group/specialized spaces proposed indicates there will be spaces that may become underutilized. Please clarify. The MSBA suggests the District work with their consultants to confirm all of their space needs requirements and find ways to improve efficiencies.*

***Response:*** ***See response above***

*17) Not provided. Please include in an updated educational program.*

***Response:*** ***This will be clarified further within the updated Educational Plan to be included with the Preferred Schematic Report submission as requested. However, it is assumed that the following specialized classes shall need classroom space:***

- ***SAIL (2 half-size classrooms, small additional sensory room)***
- ***IRWL (2 full-size classrooms with ability to section off reading tutorial space for 2 teachers and 2 students)***
- ***Preschool (at least 2 classrooms)***

***Of these programs, IRWL is fully self-contained. SAIL students access a combination of inclusion, small group instruction, and tutorials. There is at least one staff member in the classroom working with a student or students throughout the day.***

***Note – JCJ also wanted to comment.***

*18) Please provide further detail associated with any specific security and visual access requirements that will be in place for the pre-kindergarten population to facilitate student pick-up and drop-off.*

***Response:*** ***Each scheme under consideration provides the possibility for a separate entrance for the Pre-Kindergarten program from the other main entry points to the building. However, now that a preferred scheme has been selected for study during the Schematic Design Phase, this element will be studied further during the Schematic Design Phase. The District will confirm their operational preferences. Should they elect to operate with a distinct Pre-K entry, this entry would include security systems***

***that match those of the other primary entry points including an entry vestibule that can act as a sally-port to contain visitors until accepted for entry by staff. Security cameras as well as lock-out overrides for this entry point will be tied into the main office as well as to a small local security "station" which can be operated by a designated staff member during arrival and departure times.***

*No further review comments for this section.*

### 3.1.3 INITIAL SPACE SUMMARY

| Provide the following Items | | Complete; *No response required* | Provided; *District's response required* | Not Provided; *District's response required* | Receipt of District's Response; *To be filled out by MSBA Staff* |
|---|---|---|---|---|---|
| 1 | Space summary; one per approved design enrollment | ☐ | ☒ | ☐ | ☐ |
| 2 | Floor plans of the existing facility | ☒ | ☐ | ☐ | ☐ |
| 3 | Narrative description of reasons for all variances (if any) between proposed net and gross areas as compared to MSBA guidelines | ☒ | ☐ | ☐ | ☐ |

**MSBA Review Comments:**

1) *Based on an agreed upon enrollment of 335 students in grades K-5, plus approximately 20-30 pre-kindergarten students. The MSBA has performed an initial review of the space summary and offers the following:*

- ***Core Academic*** *– The District is proposing to provide a total of 25,500 net square feet (nsf) which exceeds the MSBA guidelines by 10,500 nsf. Per the information provided, the following spaces will be proposed in order for the District to deliver its educational program:*

| ***Anticipated Core Academic Spaces*** ***335 students in grades PK-5*** | ***MSBA Comments*** |
|---|---|
| *(4) Pre-Kindergarten classrooms* | *The proposed represents a significant increase to the existing number of spaces. Please provide additional information that clarifies the existing number of pre-k students and information that supports the proposed increased number of spaces.* |
| *(3) Kindergarten classrooms* | *The proposed number of spaces meets the guidelines.* |
| *(15) General classrooms at 950 nsf** | *Proposes (3) classrooms in excess of guidelines. Please provide additional information that clarifies and supports the proposed class section structure for grades 1-5.* |
| *(2) STEM/ Maker classrooms*** | *Spaces are unique to District.* |

**Please provide proposed scheduling information specific to these spaces.*

***The MSBA will rely on the District's Educational Program and additional information to understand how proposed spaces that are unique to the District will be utilized in the proposed project.*

***Response:*** ***Pre-Kindergarten Classrooms***

***The MERSD currently offers a district-wide integrated preschool program housed at Memorial School in Manchester. Enrollment is currently constrained by available space. The preschool typically serves a total of 20-30 students through a two day program for three year olds and a three day program for four year olds. The student cohort comprises tuition paying peer pals and students with disabilities. The program runs from 8:30am-12:30pm e to space constraints, the current program is limited in size.***

***It is part of the district's vision to provide greater access to Pre-School by expanding the program to all residents with young children ages 3-4. An assessment of demographic data, leads us to conclude that we should anticipate enrollment to average between 45 to 65 students. Integrated Pre-Kindergarten classrooms, by standard, should be a maximum of 15 students; therefore we are requesting four classrooms.***

***Kindergarten Classrooms***

- ***No Comment***

***General Classrooms***

***MERSD School Committee has established class size benchmarks to manage class size.***

| Grade | Class Size Benchmark |
|---|---|
| K | 17-19 |
| 1 | 17-19 |
| 2 | 18-20 |
| 3 | 18-20 |
| 4 | 19-22 |
| 5 | 19-22 |

***Under the current design enrollment, we would only be able to provide two classrooms per grade level which would not allow for us to meet the established guidelines. Memorial school has historically averaged three sections per grade-level with some student cohorts requiring us to go to four sections per grade level to meet class-size guidelines. The community would like us to ensure that we are prepared to maintain the class size guidelines.***

***STEM/ Maker Classrooms***

- ***See Response Below***

*In order for the MSBA to accept the proposed variations to the guidelines, the MSBA needs to better understand how the STEM/Maker-classrooms spaces are to be scheduled in conjunction with the proposed general classrooms and the overall building utilization. Please provide additional information associated with the scheduling and utilization of the STEM/Maker-classrooms, including how these spaces will be monitored and how they support the educational program.*

***Response:*** ***The intention is for the space to be used a team flex-space for STEAM related instruction, Maker exploration, and project work. This space will also serve as a common planning space for the grade, testing space, science material storage (casework) and small-group instructional space.***

***There was a lot of positive feedback at the Ed. Visioning about having shared spaces between 2 (or 3) classrooms with movable walls/doors (sliding barn like doors or garage doors) where materials could be set up in advance for science experiments instead of having 1 or 2 large rooms that teachers would have to travel to and using valuable class time to set up and break down the experiments.***

***Team leaders will create a weekly use and duty schedules and ensure that the supplies and materials within are maintained. Additionally this space will be used for small group presentation/ demonstration of enrichment programs. The STEAM Lab spaces will be distributed throughout the building – one for each the upper and lower grade sets.***

*In addition, the MSBA requests that the District locate square footage associated with pre-kindergarten storage into the gross square footage of the proposed building in subsequent submissions.*

***Response:*** ***This will be revised for the Preferred Schematic Report and beyond***

- ***Special Education*** *– The District is proposing to provide a total of 6,540 nsf which exceeds the MSBA guidelines by 2,010 nsf. Please note that the Special Education program is subject to approval by the Department of Elementary and Secondary Education ("DESE"). The District should provide the required information required with the Schematic Design submittal. Formal*

*approval of the District's proposed Special Education program by the DESE is a prerequisite for executing a Project Funding Agreement with the MSBA.*

***Response:*** ***The variation in square footage for the Special Education elements related to the following elements:***

- ***One (1) additional Self-Contained SPED Room at 950 sf. The guideline calculation 8% of the population, however, the elementary level Intensive Reading as well as the Social & Integrated programs is for the entire District and is presently fully accommodated at Manchester Memorial. Thus, the additional program space is requested to include the additional SPED students that would otherwise attend Essex Elementary***
- ***One (1) additional Self-Contained SPED Toilet at 60 sf. For the reasons outlined above.***
- ***Two (2) Speech Resource Rooms. As described in the response to 3.1.2.17 above, these rooms are to accommodate the existing SAIL and IRWL programs.***

- ***Art & Music*** *– The District is proposing to provide a total of 2,550 nsf which exceeds the MSBA guidelines by 50 nsf. This overage is primarily due to increasing the size of the Music Lesson Room from 150 nsf to 200 nsf. The MSBA does not accept this variation to the guidelines; please reduce overall area to align with guidelines. No further preliminary comments.*

  ***Response:*** ***Given the high participation in the music program, particularly with ensemble instruction, as well as the District's priority for Art and Music programs generally, the increase to 200 nsf will better accommodate the program.***

- ***Health and Physical Education*** *– The District is proposing to provide a total of 7,900 nsf which exceeds the MSBA guidelines by 1,600 nsf. Please note that as of the November 9, 2016 Board of Directors meeting, the District may choose to build a gymnasium and related spaces in excess of MSBA guidelines, but in no event shall the gymnasium exceed 12,000 nsf. Based on the information provided, the MSBA will participate in a gymnasium of up to 6,000 nsf and square footage in excess of the overall category of the MSBA guidelines will be at the sole expense of the District; and the MSBA will exclude from its grant the cost of the total gross square footage in excess of the guidelines for this area. Please acknowledge. Please refer to the attached memorandum which presents MSBA policy regarding gymnasium spaces beyond those included in the guidelines.*

  ***Response:*** ***The District acknowledges the MSBA's policy and understands that any square footage in excess of the Guideline's 6,300 nsf for an elementary enrollment of 335 shall be borne fully by the Regional School District and participating communities.***

- ***Media Center*** *– The overall proposed square footage for this category aligns with the MSBA guidelines. No further preliminary comments.*

  ***Response: Acknowledged***

- ***Dining and Food Service*** *– The overall proposed square footage for this category aligns with the MSBA guidelines. No further preliminary comments.*

  ***Response: Acknowledged***

- ***Medical*** *– The District is proposing to provide a total of 560 nsf which exceeds the MSBA guidelines by 50 nsf. This overage is due to the inclusion of a dedicated shower connected to the Nurse's suite. In subsequent submissions, the MSBA requests that the District account for this space into the gross square footage and reduce overall area to align with the guidelines. Please acknowledge.*

  ***Response: This will be revised for the Preferred Schematic Report and beyond***

- ***Administration and Guidance*** *– The District is proposing to provide a total of 2,401 nsf which exceeds the MSBA guidelines by 351 nsf. This overage is primarily due to the inclusion of larger Parent/Teacher conference room and additional Book Storage. In subsequent submissions, the MSBA requests that the District incorporate the 300 nsf associated with Book Storage into the gross square footage and reduce the overall square footage to align with guidelines. Please acknowledge. No further preliminary comments.*

  ***Response: The space for the book storage will be revised into the gross area for the Preferred Schematic Report and beyond. However, it is still important to the District to enlarge the Parent/ Teacher Conference Room by an additional 50 nsf due to pragmatic concerns about have a space large enough to accommodate parents, teachers and specialist at the same time.***

- ***Custodial and Maintenance*** *– The overall proposed square footage for this category aligns with the MSBA guidelines. No further preliminary comments.*

  ***Response: Acknowledged***

- ***Other*** *– The District is proposing to provide a 1,800 nsf Community Room with storage space to accommodate an existing Town-Operated Parks and Recreation student program presently*

*housed within the Memorial School. The MSBA does not object to including this space in the proposed project, however, this square footage will be considered ineligible for reimbursement. Please acknowledge.*

***Response:*** ***The District acknowledges the MSBA's policy and understands that any square footage for the Community Room shall be borne fully by the Regional School District and participating communities.***

*This review is based on the submitted preliminary space summary for new construction. The final MSBA determination of compliance with MSBA space guidelines in subsequent submittals will vary (in part) depending on the District's preferred solution and the extent that the proposed spaces are located either in existing construction, substantially renovated existing areas, or newly constructed portions of the proposed facility. MSBA will expect spaces located in new or substantially renovated areas to be compliant with MSBA space standards. Please note that upon selection of a preferred solution, the District may be required to adjust spaces/square footage that exceeds the MSBA guidelines and is not supported by the educational program provided.*

*No further review comments for this section.*

### 3.1.4 EVALUATION OF EXISTING CONDITIONS

| Provide the following Items | | Complete; *No response required* | Provided; *District's response required* | Not Provided; *District's response required* | Receipt of District's Response; *To be filled out by MSBA Staff* |
|---|---|---|---|---|---|
| 1 | Confirmation of legal title to the property. | ☒ | ☐ | ☐ | ☐ |
| 2 | Determination that the property is available for development. | ☒ | ☐ | ☐ | ☐ |
| 3 | Existing historically significant features and any | ☐ | ☒ | ☐ | ☐ |

| | Provide the following Items | Complete; *No response required* | Provided; *District's response required* | Not Provided; *District's response required* | Receipt of District's Response; *To be filled out by MSBA Staff* |
|---|---|---|---|---|---|
| | related effect on the project design and/or schedule. | | | | |
| 4 | Determination of any development restrictions that may apply. | ☐ | ☒ | ☐ | ☐ |
| 5 | Initial Evaluation of building code compliance for the existing facility. | ☒ | ☐ | ☐ | ☐ |
| 6 | Initial Evaluation of Architectural Access Board rules and regulations and their application to a potential project. | ☒ | ☐ | ☐ | ☐ |
| 7 | Preliminary evaluation of significant structural, environmental, geotechnical, or other physical conditions that may impact the cost and evaluations of alternatives. | ☒ | ☐ | ☐ | ☐ |
| 8 | Determination for need and schedule for soils exploration and geotechnical evaluation. | ☒ | ☐ | ☐ | ☐ |
| 9 | Environmental site assessments minimally consisting of a Phase I: Initial Site Investigation performed by a licensed site professional. | ☐ | ☒ | ☐ | ☐ |
| 10 | Assessment of the school for the presence of hazardous materials. | ☐ | ☒ | ☐ | ☐ |
| 11 | Previous existing building and/or site reports, studies, drawings, etc. provided by the district, if any. | ☒ | ☐ | ☐ | ☐ |

**MSBA Review Comments:**

*3) The information provided in the project schedule indicates a Project Notification Form will be filed with the Massachusetts Historical Commission (MHC) in April 2018. Please provide a rationale for the proposed timing indicating why this filing cannot be performed sooner. The District should keep the MSBA informed of any decisions and/or proposed actions and should confirm that the proposed project is in conformance with Massachusetts General Law 950, CRM 71.00.*

***Response:*** ***The Project Notification form had not been previously submitted during PDP as there were still a number of potential sites the Building Committee was considering. Now that a site has been settled, and a preferred scheme is soon to be selected, we expect to submit the Notification form in mid-February and include a copy of it in our Preferred Schematic Report.***

*4) The information provided indicates the existing site has numerous jurisdictional areas that will require filing with the Conservation Commission. In response to these review comments, please incorporate a narrative that includes information associated with the potential impact this*

*may have to the proposed project. In addition, provide an updated project schedule that indicates required filing and anticipated approvals dates.*

***Response:*** ***Please refer to the attached letter dated January 26, 2018 from the project civil engineer; Samiotes Consultants of Framingham outlining the anticipated filings and timeline.***

9) *The information provided indicates that two underground storage tanks were removed from the existing site when the school converted from oil to natural gas in 1991. Information provided in the Phase 1 Environmental Site Assessment indicates that contaminated soils may exist. Please note that all costs associated with abatement of contaminated soil from any source and the abatement and removal of fuel storage tanks must be itemized in the cost estimates and will be considered ineligible for MSBA reimbursement. Please acknowledge.*

***Response:*** ***The District acknowledges the MSBA's policy and understands that any abatement of contaminated soils associated with Underground Storage Tanks removed in 1991 shall be borne fully by the Regional School District and participating communities.***

*10) Based on the findings of the hazardous materials report provided by CDW, INC., it appears that the existing facility includes flooring and ceiling material containing asbestos. It should be noted that all costs associated with the removal of flooring and ceiling tiles containing asbestos are ineligible for MSBA reimbursement. In response to these review comments, please describe how the District will account for potential costs in its total project budget.*

***Response:*** ***The District acknowledges the MSBA's policy and understands that any abatement of flooring or ceiling tiles that may contain asbestos shall be borne fully by the Regional School District and participating communities. Costs for abatement of contaminated or asbestos materials have been preliminarily quantified by the consultant and those cost projections shall be included in future estimates.***

*No further review comments for this section.*

### 3.1.5 SITE DEVELOPMENT REQUIREMENTS

| | Provide the following Items | Complete; *No response required* | Provided; *District's response required* | Not Provided; *District's response required* | Receipt of District's Response; *To be filled out by MSBA Staff* |
|---|---|---|---|---|---|
| 1 | A narrative describing project requirements related to site development to be considered during the preliminary and final evaluation of alternatives. | ☐ | ☒ | ☐ | ☐ |
| 2 | Existing site plan(s) | ☐ | ☐ | ☒ | ☐ |

**MSBA Review Comments:**

*1) The information provided indicates that the District considered the following eight sites for development:*

- ***Existing Memorial Elementary School Site*** *(43 Lincoln Street)*
    - *Selected as the preferred site by the Memorial Elementary School Building Committee on October 10, 2017.*

***Response:*** ***Correct***

- ***Brook Street Field Site*** *(Coach Ed Field site)*
    - *The information provided indicates the District and its consultants determined this site is not viable because the overall size of the site, the costs to replicate the flood storage area, and neighborhood impacts could be significant.*

***Response:*** ***Correct***

- ***Sweeney Park Site*** *(Summer Street)*
    - *The information provided indicates the District and its consultants determined this site is not viable because the configuration of the site due to wetland and waterway setbacks, creating an entry point on State Road 127 will require the involvement of MassDOT, and vehicle circulation will be challenging.*

***Response:*** ***Correct***

- ***Middle-High School Site*** *(36 Lincoln Street)*
    - *The information provided indicates the District and its consultants determined this site is not viable because the educational program will not fit on the available site and the proposed project would negatively impact the operation of the Middle-High School.*

***Response:*** ***Correct***

- ***Manchester-By-The Sea Compost Site*** *(197 School Street)*
    - *The information provided indicates the District and its consultants determined this site is not viable because of the significant non-reimbursable site costs including the replacement of the composting facility, the requirement for a septic system or a sewer extension and would result in additional bussing requirements for the District resulting in lost revenue.*

***Response:*** ***Correct***

- ***Transfer Station Site*** *(201 Pine Street)*
  - *The information provided indicates the District and its consultants determined this site is not viable because of the significant non-reimbursable site costs that may be associated with remediation of the site, the community concerns regarding building on a landfill, the close proximity to Hamilton Gun Range, and the play area will be more challenging to accommodate.*

***Response: Correct***

- ***Winthrop Field Site*** *(99-129 Bridge Street)*
  - *The information provided indicates the District and its consultants determined this site is not viable because it is part of the Open space conservatory and has been identified for future conservation, and access from a State Highway would require permitting.*

***Response: Correct***

- ***Anne's Woods Site*** *(Pine Street)*
  - *The information provided indicates the District and its consultants determined this site is not viable because it has difficult site access, over half of the site is either wetlands or flood zones, and the site was rejected for the Middle-High School project specifically to help preserve green space.*

***Response: Correct***

*On October 10, 2017 the Memorial Elementary School Building Committee voted to approve the existing Memorial Elementary School site, on Lincoln Street, as the preferred site for a potential project. As indicated above, eight sites were identified; however, it appears from the October 10, 2017 certified meeting minutes, that the existing middle-high school site was not identified as a site to be evaluated. In response to these review comments, please clarify and include a narrative that describes the local evaluation process of that site. In addition, please provide certified meeting minutes that include the vote language and vote results that eliminate this site from future consideration.*

***Response: See revised certified Meeting Minute attached.***

*2) Not provided. Please submit in response to these review comments. It is noted that the submittal indicates that an "As Built Plan of Manchester, MA" (site plan) was prepared by Hancock Associates, and dated January 26, 2017. Please provide 11 X 17 copies of these drawings for context.*

***Response: An updated survey was created by Samiotes Consultants as part of this project and dated December 18, 2017. A copy of those drawings are included here as an attachment.***

*In addition, provide the following information for each option that the District intends to further evaluate as part of the Preferred Schematic Report:*

- *A circulation diagram that identifies:*
  - *Existing bus and parent drop-off/pick-up locations*
  - *Vehicular and pedestrian circulation*
  - *Emergency vehicle access*

***Response:*** ***This will be provided as part of our Preferred Schematic Report as requested***

- *A diagram and a narrative that describes how a physically challenged individual would access the proposed building.*

***Response:*** ***This will be provided as part of our Preferred Schematic Report as requested***

*No further review comments for this section.*

### 3.1.6 PRELIMINARY EVALUATION OF ALTERNATIVES

| | Provide the following Items | Complete; *No response required* | Provided; *District's response required* | Not Provided; *District's response required* | Receipt of District's Response; *To be filled out by MSBA Staff* |
|---|---|---|---|---|---|
| 1 | Analysis of school district student school assignment practices and available space in other schools in the district | ☒ | ☐ | ☐ | ☐ |
| 2 | Tuition agreement with adjacent school districts | ☐ | ☐ | ☒ | ☐ |
| 3 | Rental or acquisition of existing buildings that could be made available for school use | ☒ | ☐ | ☐ | ☐ |
| 4 | Code Upgrade option that includes repair of systems and/or scope required for purposes of code compliance; with no modification of existing spaces or their function | ☒ | ☐ | ☐ | ☐ |
| 5 | Renovation(s) and/or addition(s) of varying degrees to the existing building(s) | ☒ | ☐ | ☐ | ☐ |
| 6 | Construction of new building and the evaluation of potential locations | ☒ | ☐ | ☐ | ☐ |
| 7 | List of 3 distinct alternatives (including at least 1 renovation and/or addition option) are recommended for further development and evaluation. | ☐ | ☒ | ☐ | ☐ |

**MSBA Review Comments:**

*2) Not provided. Please submit.*

***Response:*** ***See Materials from District Attached***

*7) It should be noted that Section 3.1.6 was submitted incomplete based on MSBA's initial review. Based on information requested by the MSBA, a revised Section 3.1.6 was provided*

*subsequent to receiving the initial Preliminary Design Program. This revised information proposes the following options for further consideration in the Preferred Schematic Report including:*

- ***Base Repair Option**: Code Upgrade/ renovation option*
- ***Addition / Renovation Option AR-2**: (Replaces all existing classroom wings and retains the existing auditorium and gymnasium).*
- ***Addition / Renovation Option AR-4**: (Replaces two of the existing classroom wings and retains the existing auditorium and gymnasium).*
- ***New Construction Option N-1**: (Shifts a majority of the building mass to the south of the property and reduces the degraded area in the riparian zones).*
- ***New Construction Option N-3**: (Shifts a majority of the building mass to the south of the property, reduces the degraded area in the riparian zones, increases the drop-odd/pick-up loop, increases parking, and increases play areas).*
- ***New Construction Option N-8**: (Reduces or eliminates the need for modular, creates a separate bus loop, and consolidates open spaces).*
- ***New Construction Option N-9**: (Reduces or eliminates the need for modular, creates a separate bus loop, consolidates open spaces, extends the drop-off/pick-up drive, and allows for greater adaptation for enrollment variations).*

*All options being considered for further evaluation are being proposed on the existing site and preliminary project costs for these options range from $34 to $57million. In subsequent submittals, and for cost comparative purposes, please include the base repair/code repair option in the final evaluation of alternatives. Please acknowledge.*

***Response:*** ***Acknowledged. The base repair/ code repair option shall be included in the final evaluation of alternatives.***

*No further review comments for this section.*

### 3.1.7 LOCAL ACTIONS AND APPROVAL

| | Provide the following Items | Complete; *No response required* | Provided; *District's response required* | Not Provided; *District's response required* | Receipt of District's Response; *To be filled out by MSBA Staff* |
|---|---|---|---|---|---|
| 1 | Certified copies of the School Building Committee meeting notes showing specific submittal approval vote language and voting results, and a list of associated School Building Committee meeting dates, agenda, attendees and description of the presentation materials | ☒ | ☐ | ☐ | ☐ |
| 2 | Signed Local Actions and Approvals Certification(s): | | | | |
| | a) Submittal approval certificate | ☒ | ☐ | ☐ | ☐ |
| | b) Grade reconfiguration and/or redistricting approval certificate (if applicable) | ☐ | ☐ | ☐ | ☐ |
| 3 | Provide the following items to document approval | | | | |

| | | | | | |
|---|---|---|---|---|---|
| | and public notification of school configuration changes associated with the proposed project | | | | |
| | a) A description of the local process required to authorize a change to the existing grade configuration or redistricting in the district | ☐ | ☐ | ☐ | ☐ |
| | b) A list of associated public meeting dates, agenda, attendees and description of the presentation materials | ☐ | ☐ | ☐ | ☐ |
| | c) Certified copies of the governing body (e.g. School Building Committee) meeting notes showing specific grade reconfiguration and/or redistricting, vote language, and voting results if required locally | ☐ | ☐ | ☐ | ☐ |
| | d) A certification from the Superintendent stating the District's intent to implement a grade configuration or consolidate schools, as applicable. The certification must be signed by the Chief Executive Officer, Superintendent of Schools, and Chair of the School Committee | ☐ | ☐ | ☐ | ☐ |

**MSBA Review Comments:**

*No review comments for this section.*

***Response:*** ***Acknowledged***

### 3.1.8 APPENDICES

| Provide the following Items | | Complete; *No response required* | Provided; *District's response required* | Not Provided; *District's response required* | Receipt of District's Response; *To be filled out by MSBA Staff* |
|---|---|---|---|---|---|
| 1 | Current Statement of Interest | ☒ | ☐ | ☐ | ☐ |
| 2 | MSBA Board Action Letter including the invitation to conduct a Feasibility Study | ☒ | ☐ | ☐ | ☐ |
| 3 | Design Enrollment Certification | ☒ | ☐ | ☐ | ☐ |

**MSBA Review Comments:**

*No review comments for this section.*

***Response:*** ***Acknowledged***

**Additional Comments:**

- *The MSBA issues project advisories from time to time, as informational updates for Districts, Owner's Project Managers (OPMs), and Designers in an effort to facilitate the efficient and effective administration of proposed projects currently pending review by the MSBA. These*

*advisories can be found on the MSBA's website. In response to these review comments, please confirm that the District's consultants have reviewed all project advisories and they have been incorporated into the proposed project as applicable.*

***Response:*** ***JCJ Acknowledges the importance of the Project Advisories posted on the Agency's website and regularly keeps track of these and will incorporate those salient to this project.***

***End***

# MEMORANDUM

Re: Manchester Memorial Elementary School
Preliminary Permitting Schedule SCI File # 17136.00

To: Daniel Ruiz, JCJ Architecture

From: Michelle Kayserman January 26, 2018
Stephen Garvin, PE

This memorandum is an outline and estimated time frame regarding the permitting process with the Town of Manchester that will be required for the new building or a renovation addition.

**Conservation Commission (assume 4-6 months)**:
We are anticipating submitting the Notice of Intent in January (as Design Development will start in November/ December 2018) for the preliminary hearing on January with the assumption that permitting may continue through March. It is assumed that there will be up to 3 hearings/ meetings. Hearings are held approximately once a month (every three weeks on Tuesdays). The submission will require plans to be prepared to the level of Design Development at a minimum. Applications must be submitted approximately 2 weeks before hearing date, as per the table below. A Decision will be issued within 21 days of the closing of the public hearing.

| Submission Deadline (at Noon) | Hearing Date |
|---|---|
| November 19, 2018 | December 4, 2018 |
| December 20, 2018 | January 8, 2019 |
| January 14, 2019 | January 29, 2019 |
| February 4, 2019 | February 19, 2019 |

**Planning Board (assume 4-6 months)**:
We are anticipating submitting to planning board for site plan approval in January (as Design Development will start in November/ December 2018) for the preliminary hearing in January with the assumption that permitting may continue through March. It is assumed that there will be up to 3 hearings/ meetings.

As part of the Planning Board submission, other consultants will need to submit plans for the site plan review application. The required plans to be submitted showing landscaping and lighting/ electrical site plans and details are to be provided by the Landscape Architect and the Electrical Engineer.

p:\projects\2017\17136.00 manchester memorial e.s\documents\feasability\17136.00 mmes permitting schedule 1-26-18.doc

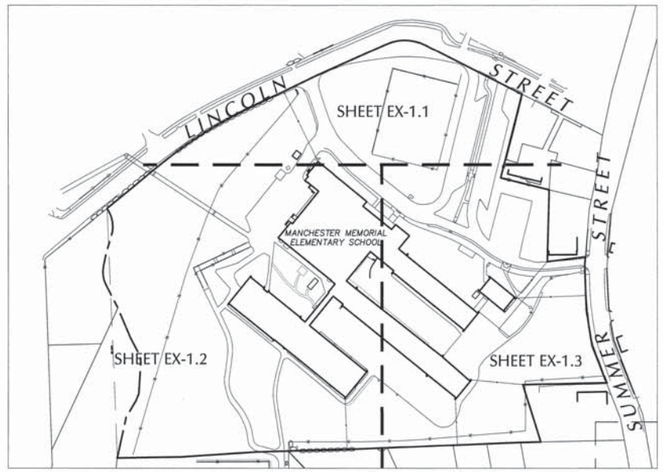
**Samiotes Consultants, Inc.**
Civil Engineers + Land Surveyors

20 A Street
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MASSACHUSETTS STATE PLANE COORDINATE SYSTEM - NAD '83




KEY
NTS




VICINITY MAP
NTS

LEGEND

| | |
|---|---|
| | CATCHBASIN |
| D | DRAIN MANHOLE |
| | AREA DRAIN |
| | ROOF DRAIN |
| | ROOF LEADER |
| S | SEWER MANHOLE |
| CO | CLEAN OUT |
| | HYDRANT |
| | WATER GATE |
| | WATER SERVICE |
| | MONITORING WELL |
| | GAS METER |
| | GAS GATE |
| E | ELECTRIC MANHOLE |
| | ELECTRIC METER |
| | ELECTRIC BOX |
| | UTILITY POLE |
| | LIGHT POLE |
| H | HANDHOLE |
| | TRANSFORMER |
| | COMMUNICATIONS MANHOLE |
| | CATV BOX |
| T | TELEPHONE MANHOLE |
| | FIRE CALL BOX |
| | FIRE SPRINKLER CONNECTION |
| ? | UNKNOWN MANHOLE |
| | SIGN |
| | BOLLARD |
| | MAILBOX |
| | POST |
| | GUY WIRE |
| | WETLAND FLAG |
| | BORING |
| | CONCRETE BOUND WITH DRILL HOLE |
| LPEP | LEAD PLUG WITH ESCUTCHEON PIN |
| MHB | MASSACHUSETTS HIGHWAY BOUND |
| SBDH | STONE BOUND WITH DRILL HOLE |
| | IRON PIPE |
| | DRILLHOLE |
| | IRON REBAR |
| | DECIDUOUS TREE |
| | CONIFEROUS TREE |
| | SHRUB |
| | STUMP |
| | FLAGPOLE |
| | HANDICAP PARKING SPACE |
| D | DRAIN LINE |
| S | SEWER LINE |
| W | WATER LINE |
| G | GAS LINE |
| E | ELECTRIC LINE |
| C | COMMUNICATIONS LINE |
| OHW | OVERHEAD WIRE |
| 60 | INDEX CONTOUR |
| 59 | INTERMEDIATE CONTOUR |
| +58.7 | SPOT GRADE |
| tcw | TOP OF CURB ELEVATION |
| bcw | BOTTOM OF CURB ELEVATION |
| tww | TOP OF WALL ELEVATION |
| bww | BOTTOM OF WALL ELEVATION |
| dsw | DOOR SILL ELEVATION |
| ffew | FINISHED FLOOR ELEVATION |
| WW | WINDOW WELL |
| DWS | DETECTABLE WARNING STRIP |
| n/a | INVERT NOT AVAILABLE |
| OH | OVERHANG |
| LC | LAND COURT |

20 0 10 20 40

1 inch = 20 ft.

ESSEX COUNTRY CLUB
GOLF COURSE

FEMA ZONE A

BANK/MEAN ANNUAL HIGH WATER (EXTENDS THROUGH CULVERT)

(Project Benchmark: Square Cut on Headwall. Elevation=15.54

LINCOLN STREET

CAUSEWAY

GROVE STREET

SUMMER STREET

LINCOLN STREET

GROVE STREET

STREET

(Public - Variable Width)

SIDELINE OF LINCOLN STREET SCALED FROM PLAN BOOK 38 PLAN 21 (SEE NOTE #8)

R=80.00' Δ=51°08'37" L=71.41'

S09° 57' 23"E

137.66'

S60° 06' 00"E

146.08'

S61° 59' 37"E

194.34'

S68° 17' 20"W

1051.12'

S22° 20' 06"E

89.27'

129.20'(M) 129.17'(D)

R=750.00' Δ=13°12'03" L=172.80' CHB: S68° 35' 34"E CHD: 172.42'

129.09'

BROOK

BANK/MEAN ANNUAL HIGH WATER

10' WIDE SEWER EASEMENT PER TOWN OF MANCHESTER GIS

100' WETLAND BUFFER ZONE

100' INNER RIPARIAN

35' NO DISTURB ZONE

50' NO BUILD ZONE

100' WETLAND BUFFER/100' INNER RIPARIAN

Rain Garden

Grand Chapel Path

200' OUTER RIPARIAN

Tennis Courts

Chapins Fence

Chapins Terrace

Concrete Block Retaining Wall

Granite Block Retaining Wall

Chainlink Fence

Picket Fence

Timber Fence

Granite Curb

Bituminous Curb

Bituminous Sidewalk

Bituminous Driveway

Bituminous Parking Lot

Concrete Sidewalk

Concrete Curb

Concrete Pier

Ruined Concrete Pedestrian Bridge

Utility Patch found - (possible utility)

Project Benchmark: Square Cut in Concrete Wall. Elevation=23.90

MANCHESTER MEMORIAL ELEMENTARY SCHOOL 1-Story Brick Building

67 LINCOLN ST PID 47-0-15

N/F 67 LINCOLN STREET CONDOMINIUM L.C. DOCUMENT #246088

EASEMENT SEE PLAN BOOK 444 PLAN 1 & DEED BOOK 33422 PAGE 454

69 LINCOLN ST PID 47-0-14

2-Story Wood Frame Building

N/F HOUDE REALTY TRUST L.C. DOCUMENT #421154

MATCHLINE SHEET EX-1.1
MATCHLINE SHEET EX-1.2

MATCHLINE SHEET EX-1.2
MATCHLINE SHEET EX-1.3

MATCHLINE SHEET EX-1.1
MATCHLINE SHEET EX-1.3

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NOTES:

1. THIS PLAN IS REFERENCED HORIZONTALLY TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 AND VERTICALLY TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 BY RTK GPS OBSERVATIONS TAKEN ON OCTOBER 5, 2017. SEE PLAN FOR PROJECT BENCHMARK LOCATIONS.
2. THIS PLAN IS THE RESULT OF AN INSTRUMENT SURVEY PERFORMED ON OCTOBER 5, 6, 10, 12, 13, 17, 19, 20, 23, 24, 27 & 30 AND NOVEMBER 3, 7, 8 & 9 & DECEMBER 12 OF 2017.
3. UNDERGROUND UTILITIES ARE BASED UPON AN ACTUAL FIELD SURVEY AND INFORMATION OF RECORD. IT IS NOT WARRANTED THAT THEY ARE EXACTLY LOCATED, NOR THAT ALL UNDERGROUND CONDUITS OR OTHER STRUCTURES ARE SHOWN ON THIS PLAN.
4. THE SUBJECT LAND AS SHOWN LIES PARTIALLY WITHIN ZONE A, AREAS WHERE NO BASE FLOOD ELEVATIONS HAVE BEEN DETERMINED, AS INDICATED ON PANEL 4340 FOR THE TOWN OF MANCHESTER-BY-THE-SEA, COMMUNITY NO. 250090, HAVING AN EFFECTIVE DATE OF JULY 16, 2014.
5. PROPERTY LINES SHOWN HEREON WERE DETERMINED FROM THE FOLLOWING PLANS OF RECORD FILED AT THE SOUTH ESSEX COUNTY REGISTRY OF DEEDS AND THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION.
   - 1951 Summer Street (State Layout #3910)
   - Plan Book 38 Plan 21
   - Plan Book 297 Plan 93
   - Plan Book 403 Plan 98
   - Plan Book 416 Plan 48
   - Plan Book 425 Plan 69
   - Plan Book 427 Plan 81
   - Plan Book 444 Plan 1
   - Land Court Case 5245
   - Land Court Case 34407
6. THE CURRENT RECORD OWNER IS THE TOWN OF MANCHESTER. FOR LOCUS DEED, SEE BOOK 3507 PAGE 137 RECORDED AT THE SOUTH ESSEX COUNTY REGISTRY OF DEEDS.
7. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE SEARCH AND MAY NOT SHOW OR REVEAL ANY FACTS THAT WOULD BE DISCLOSED BY ONE.
8. THE SIDELINE OF LINCOLN STREET HAS BEEN SCALED FROM PLAN BOOK 38 PLAN 21. THE SURVEYOR WAS UNABLE TO LOCATE ANY STREET LAYOUT PLANS, STREET TAKING DOCUMENTS OR A WRITTEN DESCRIPTION FOR LINCOLN STREET AT THE TOWN OF MANCHESTER OR THE ESSEX SOUTH COUNTY REGISTRY OF DEEDS.

# MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-BY-THE-SEA, MA

SEAL

COMMONWEALTH OF MASSACHUSETTS
TODD M. CHAPMAN No. 46322
REGISTERED PROFESSIONAL LAND SURVEYOR
1/30/2018

TODD M. CHAPMAN - P.L.S. No. 46322
REGISTERED PROFESSIONAL LAND SURVEYOR FOR SAMIOTES CONSULTANTS, INC.

REVISION

## EXISTING CONDITIONS PLAN

| | |
|---|---|
| JOB # 17136.01 | EX-1.1 |
| DATE: 1-30-2018 | |
| SCALE: as shown | |
| DRAWN BY: CYDP | |
| APPROVED BY: TMC | SHEET 1 OF 3 |

FILE:17136.00 MANCHESTER MEMORIAL ES WS.DWG

MASSACHUSETTS STATE PLANE COORDINATE SYSTEM NAD 83

MATCHLINE SHEET EX-1.1
MATCHLINE SHEET EX-1.2

MATCHLINE SHEET EX-1.2
MATCHLINE SHEET EX-1.3

FEMA ZONE A
(Scaled graphically from FEMA Flood Map)

PLAN BOOK 38 PLAN 21 (SEE NOTE #8)

SAWMILL BROOK

CAUSEWAY BROOK

LINCOLN STREET (Public ~ Variable Width)

S75° 17' 36"E 129.09'

Rolled Concrete Detention Bulldge

Line of Boulders

Conc. Pier

Conc. Pier

Conc. Pier

Conc. Pier

Dam (Ht) 30' HEADWALL 3' DIA.

Dam Rim=17.19 in=(s)=11.79 in=(s)=11.39

CB Rim=16.56 in=(s)=12.70 in=(s)=12.41

CB Rim=15.77 in=4.04 CH

Wooded Area

Wooded Area

Wooded Area

Wooded Area

Dirt

Gravel

Concrete Retaining Wall

Concrete Retaining Wall

Concrete Retaining Wall

Concrete Retaining Wall

Chainlink Fence

Chainlink Fence

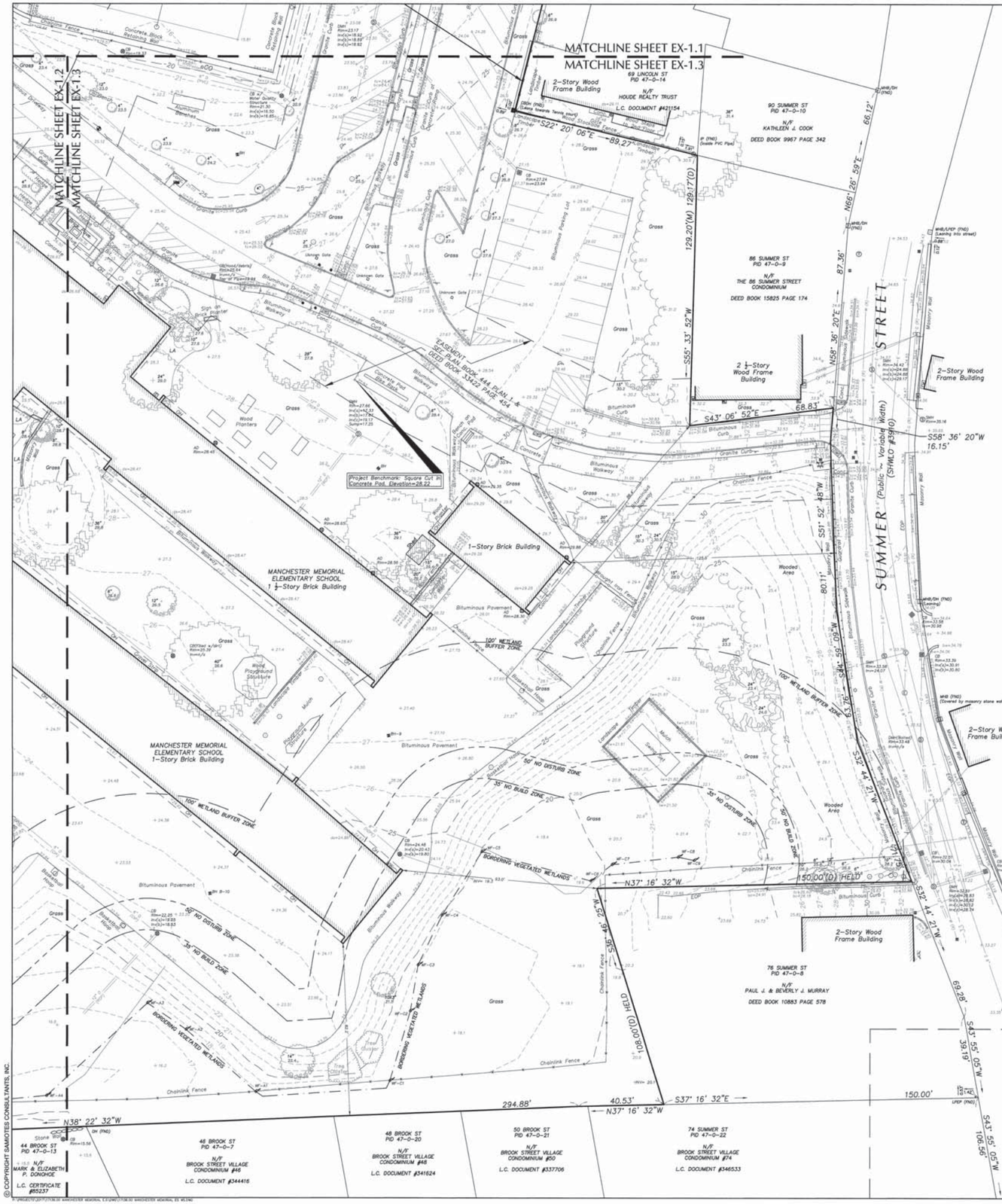
Chainlink Fence

Chainlink Fence

Bituminous Walkway

Bituminous Walkway

Bituminous Walkway




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# MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-BY-THE-SEA, MA

SEAL

COMMONWEALTH OF MASSACHUSETTS
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11/30/2018

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SAMIOTES CONSULTANTS, INC.

REVISION

| | | |
|---|---|---|
| | | |
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## EXISTING CONDITIONS PLAN

| | |
|---|---|
| JOB # 17136.01 | EX-1.3 |
| DATE: 1-30-2018 | |
| SCALE: as shown | |
| DRAWN BY: CY/DP | SHEET 3 OF 3 |
| APPROVED BY: TMC | |

FILE: 17136.00 MANCHESTER MEMORIAL ES WS.DWG

# MEETING MINUTES

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 10/10/2017 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | C. Shefferman |

| Present | Name | Affiliation | Present | Name | Affiliation |
|---|---|---|---|---|---|
| ✓ | Caroline Weld * | SBC Co-Chair | ✓ | Jim LaPosta | JCJ |
| ✓ | Ann Cameron * | SBC Co-Chair | ✓ | Daniel Ruiz | JCJ |
| ✓ | Pam Beaudoin * | Superintendent | ✓ | Lauren Braren | JCJ |
| ✓ | Avi Urbas * | Dir. of Fin. & Ops | | Emily Czarnecki | JCJ |
| ✓ | Alva Ingaharro * | Essex | ✓ | Mike Burton | DWMP |
| ✓ | John Willis * | Principal MMES | ✓ | Steven Brown | DWMP |
| ✓ | Jay Pagliarulo | Dir. of Facilities | ✓ | Christina Shefferman | DWMP |
| ✓ | Andy Oldeman * | Man. Fin. Comm. | | | |
| ✓ | Lisa O'Donnell * | Essex B.O.S. | | | |
| ✓ | Remko Brueker * | Manchester | | | |
| ✓ | Adam Zaiger * | Manchester | | | |
| ✓ | Tyler Virden * | Essex | | | |
| ✓ | George Scharfe * | Manchester | | | |
| ✓ | Gordon Brewster * | Manchester | | | |
| ✓ | Charlie Hay * | Essex | | | |
| ✓ | Sarah Creighton * | Manchester | | | |
| | Maggie Tomaiolo * | Essex | | | |
| ✓ | Jake Foster * | Essex | | | |

**Action Items:**

| Item No. | Responsible Party: | Description |
|---|---|---|
| 7.11 | P. Beaudoin | Site: Swing space availability |
| 8.8 | P. Beaudoin | Poll group for potential school site tours (12/8, 12/14, 12/18) |
| 9.3 | JCJ | Revised Samiotes Proposal |
| 10.4.3 | Budget Collab. Group | Meeting Update |
| 10.8.10 | DWMP/JCJ | PDP Criteria and Feedback Questionnaire |

** SBC Voting Member*

MANAGEMENT PARTNERS, LLC

PROJECT MANAGERS
ARCHITECTS

Newburyport, MA 01950
260 Merrimac Street Bldg 7
978.499.2999 ph
978.499.2944 fax

www.doreandwhittier.com

| Item No. | Description | Action |
|---|---|---|
| 10.1 | Call to Order: 7:00 pm meeting was called to order by the SBC Co-Chair Ann Cameron with 16 of 17 voting members in attendance. S. Brown of DWMP notes the meeting will follow the Power Point presentation that is being projected on the screen and to follow the agenda that was provided to the SBC prior to the meeting via Dropbox. | Record |
| 10.2.1 | Previous Topics & Approval of September 26, 2017 Meeting Minutes: S. Brown explains and reviews the eight previous items requiring action. A review of those items is noted below. | Record |
| 7.11 | Site Understanding: L. Braren reviews site understanding slides included in the JCJ presentation. There are 5 slides total that indicate degraded areas, resource areas, FEMA flood map zone, zone 1 and 2 extents, and property line setbacks. The SBC ask many questions regarding buffer zones, height regulations, zoning restrictions, storm water runoff, and setbacks. The SBC asked whether it might be an option to tear down the building and rebuild exactly where the building is now to avoid any issues. This would mean that during construction, the students would need to be relocated to either another location. P. Beaudoin stated she would contact some other districts to see if they might have a vacant site that might be a consideration. P. Beaudoin to report findings.<br>9/12/17: P. Beaudoin states that she has asked surrounding districts, and has confirmed that Rockport and Beverly do not have anything available. P. Beaudoin is still waiting to hear from Gloucester, Hamilton and Wenham. Once a response received, will report back to the SBC.<br>9/26/17: P. Beaudoin states that she has 3 leads from schools and sites within 10 miles of MMES. Waiting to hear back from the 3 leads and she will report updates to the SBC once information is received.<br><br>10/10/17: No update at this time. Continuing. | Open/P. Beaudoin |
| 8.8 | Educational Planning: D. Stephen provides a brief recap of the Ed. Planning presentation that was presented to the Leadership team back in August. A copy of the slides are attached in the backup. D. Stephen advises that the team should plan when they would like to visit other school sites that have recently gone through the process. The schools requested include Haverhill, Marblehead, and Andover. P. Beaudoin to provide dates in December that will work for the group.<br>9/26/17: P. Beaudoin states that she sent out a scheduling doodle for potential dates to the SBC. Three dates worked best for the group, 12/8, 12/14, 12/18. P. Beaudoin to send another doodle with these dates to confirm which will be best. P. Beaudoin to confirm best date at next meeting.<br><br>10/10/17: No update at this time. Continuing. | Open/P. Beaudoin |
| 9.3 | Invoices & Commitments for Approval: S. Brown states that originally a BRR had been planned for approval this evening. The request will be moved till the tennis court existing survey is reviewed by Samiotes. The report that was just received could be reviewed and used as existing information that the surveyor will no longer need to test for, therefore lowering the cost of the proposal. JCJ to report back to DWMP with any additional cost savings from Samiotes. | |

| | | |
|---|---|---|
| | 10/10/17: No update at this time. Continuing. | Open/JCJ |
| 9.11 | Other Topics Not Reasonably Anticipated 48 hours prior to Meeting: S. Creighton states that there are additional sites that were considered for the MS/HS project that have not been listed for MMES. S. Creighton to provide list of additional sites so the Leadership team can evaluate and understand the sites. If any of the additional sites are considered private land, they will be considered due to site acquisition costs.<br><br>10/10/17: Additional sites were sent to A. Cameron and Leadership team. The 2 additional sites will be discussed tonight. | Closed/Record |
| 10.2.2 | Previous Topics & Approval of September 26, 2017 Meeting Minutes: A motion to approve the 9/12/2017 meeting minutes as submitted made by A. Ingaharro and seconded by L. O'Donnell. Discussion: J. Foster states on item 9.4.4 under "Communications WG Update" that "formerly" needs to be changed to "formally". C. Shefferman acknowledges, and will make the change to the record. Vote: Abstentions: J. Foster, Remainder in attendance all in favor: Motion passes, minutes approved. | Record |
| 10.3 | Invoices & Commitments for Approval: A motion to approve DWMP September OPM invoice #7 in the amount of $11,561.00 as submitted, and JCJ September Invoice #2 in the amount of $24, 285.00 made by G. Scharfe and seconded by S. Creighton. Discussion: A. Urbas explains that DWMP provides him with a monthly cashflow projection that reflects the invoices to ensure they are on track each month. None. Vote: All in favor: Motion passes, invoice approved. | Record |
| 10.4.1 | Ed. Program WG Update: P. Beaudoin states that the leadership team discussed and reviewed the first visioning workshop with D. Stephen, and will have a draft by end of week. The second ed. Visioning workshop is scheduled for 10/23/17. P. Beaudoin states that pre-k still needs to be discussed. | Record |
| 10.4.2 | Facilities Assessment WG Update: S. Brown states that D. Ruiz will be recapping activity from those consultants that are onsite now and in the next couple of weeks and what the work entails under Project Update. | Record |
| 10.4.3 | Budget Collaboration WG Update: A. Cameron states they are meeting this Thursday. A. Urbas, P. Beaudoin, and A. Cameron to report to SBC at our next meeting recap of Budget Collaboration Group meeting. | Record |
| 10.4.4 | Communications WG Update: A. Cameron states next week she is planning on having a conference call with the group. A. Cameron to report back to SBC after call. | Record |
| 10.5 | Budget Update: S. Brown discusses the budget update sheet attached in the meeting packet. Nothing has changed since our last meeting. The budget update sheet is a working document and will continue to be updated with any changes as they progress. | Record |
| 10.6 | Schedule/Look Ahead: S. Brown recaps important dates outlined in the project calendar. An outline of the dates is listed below:<br>➢ 10/23/17-Ed. Visioning Workshop No. 2<br>➢ 10/24/17 SBC Meeting – Building Options Review<br>➢ 11/1/17 Community Meeting No. 2<br>➢ 11/6/17 SBC Meeting for PDP Approval<br>➢ 11/9/17 Submit PDP to MSBA | Record |

| | | |
|---|---|---|
| 10.7 | Project Update: D. Ruiz discusses Project Update from JCJ's presentation. A recap of the project update slides is outlined below:<br>➢ PDP Report in Development<br>➢ Surveyor On-Site, Started 10/5/17<br>➢ Traffic Analysis Starts Week of 10/9/17<br>➢ Community Meeting No. 1 Recap<br>• About 60+ attendees between morning and evening sessions<br>• Some positive feedback received already | Record |
| 10.8.1 | Evaluation of Alternatives-Site: D. Ruiz discusses the Evaluation of Alternatives slides in their presentation. A recap of the evaluation of alternatives is outlined below:<br>➢ Site Selection<br>➢ Some Additional Options<br>➢ Developing the Evaluation Criteria<br>➢ Considering the Options<br>➢ Identified Sites (As identified in the MHS Study)<br>• Memorial School<br>• Brook Street Field<br>• Sweeney Park<br>• MHS Campus<br>• Compost Site<br>• Transfer Station Site<br>➢ Site Criteria<br>• Adequacy (Size)<br>• Availability (Ownership)<br>• Utilities<br>• Environmental (Water/Wildlife/Natural Hazards)<br>• Cost and Time of Construction<br>• Student/Staff Impacts<br>• Community Issues<br>• Proximity to Abutters<br>• Vehicular & Pedestrian Circulation<br>S. Brown states that the team is looking for feedback from the SBC on the criteria as it's developed. This is an active list, and need the SBC to help add/subtract as they evaluate it. | Record |
| 10.8.2 | Evaluation of Alternatives-Brook Street: D. Ruiz explains and discusses each identified site. Each site is listed below along with discussion:<br>➢ Brook Street Field:<br>• Opportunities:<br>o Construction without student disruption<br>o New school stays in the same part of town<br>• Limitations:<br>o Eliminates existing turf field<br>o Location is presently a flood storage area<br>o Costly replication of flood storage adjacent<br>o Would require significant fill<br>o Orients building to residential neighborhood<br>o Vehicular circulation may be challenging | Record |

| | | |
|---|---|---|
| | • Other Considerations:<br>o Assumes Memorial Site could be used for playfields<br>o Brook Street Field due for replacement<br>A motion was made by G. Scharfe and seconded by A. Zaiger to eliminate Brook Street Field as an alternative. Discussion: None. All in favor: Motion passes, unanimously approved. | |
| 10.8.3 | Evaluation of Alternatives-Sweeney Park: D. Ruiz explains and discusses each identified site. Each site is listed below along with discussion:<br>➢ Sweeney Park:<br>• Opportunities:<br>o Construction without student disruption<br>o New school stays in the same part of town<br>• Limitations:<br>o Eliminates existing field<br>o Vehicular circulation may be challenging<br>o Narrow buildable area limits building configuration<br>• Other Considerations:<br>o Not presently part of lease agreement<br>o Assumes Memorial Site could be used for playfields<br>o Town could retain part/all of existing building<br>A motion was made by S. Creighton and seconded by G. Scharfe to eliminate Sweeney Park as an alternative. Discussion: None. All in favor: Motion passes, unanimously approved. | Record |
| 10.8.4 | Evaluation of Alternatives-Student Parking Area-MERMHS: D. Ruiz explains and discusses each identified site. Each site is listed below along with discussion:<br>➢ Student Parking Area-MERMHS:<br>• Opportunities:<br>o Construction without MMES disruption<br>• Limitations:<br>o MHS disruption during construction<br>o Eliminates existing parking w/o replacement<br>o No identified parking for project<br>o Constrained site limits bldg. configurations<br>o Safety concerns due to population increase<br>o PK-5 close to older students<br>o Limits future expansion possibilities<br>o Benefits of shared campus limited<br>o Increased traffic<br>• Other:<br>o Impact on neighborhood<br>A motion was made by S. Creighton and seconded by G. Scharfe to eliminate Student Parking Area-MERMHS as an alternative. Discussion: None. All in favor: Motion passes, unanimously approved. | Record |
| 10.8.5 | Evaluation of Alternatives-Compost Site: D. Ruiz explains and discusses each identified site. Each site is listed below along with discussion:<br>➢ Compost Site: | Record |

| | | |
|---|---|---|
| | • Opportunities:<br>  o Construction without student disruption<br>• Limitations:<br>  o Active compost/would require replacement<br>  o Far from sewer and water services<br>  o Eliminates neighborhood school<br>  o Additional bussing required/loss revenue<br>  o May require a septic system<br>• Other<br>  o Not presently part of lease agreement<br>  o Town could retain part/all of existing building<br>A motion was made by G. Scharfe and seconded by A. Zaiger to eliminate the Compost Site as an alternative. Discussion: None. All in favor: Motion passes, unanimously approved. | |
| 10.8.6 | <u>Evaluation of Alternatives-Transfer Station:</u> D. Ruiz explains and discusses each identified site. Each site is listed below along with discussion:<br>➢ Transfer Station:<br>• Opportunities:<br>  o Construction without student disruption<br>• Limitations:<br>  o Far from sewer and water services<br>  o Eliminates neighborhood school<br>  o Additional bussing required/loss revenue<br>  o May require a septic system<br>  o Play area harder to accommodate<br>  o Remediation may be required<br>  o Potential community issues<br>• Other:<br>  o Not presently part of lease agreement<br>  o Town could retain part/all of existing building<br>A motion was made by A. Zaiger and seconded by the S. Creighton to eliminate Ann's Woods as an alternative. Discussion: None. All in favor: Motion passes, unanimously approved. | Record |
| 10.8.7 | <u>Evaluation of Alternatives-Winthrop Field/Ann's Woods:</u> D. Ruiz explains and discusses each identified site. Each site is listed below along with discussion. A. Cameron states there are two additional sites that the towns have discussed in the past that were not presented. The sites are Winthrop Field, and Ann's Woods. Each alternative is outlined below.<br>➢ Winthrop Field:<br>• Opportunities:<br>  o Over 14 acres available<br>• Limitations:<br>  o Outside neighborhood schools<br>  o Town owns the site<br>  o Wetlands in the middle of the field<br>  o Would take years to obtain the site | Record |

| | | |
|---|---|---|
| | The SBC voted and unanimously agreed to eliminate Winthrop Field as an alternative.<br>➢ Ann's Woods:<br>• Limitations:<br>o Town owns the site<br>o All wetlands<br>o Site is upland<br>o Close to the gun range<br>o Transportation will be an issue<br>A motion was made by S. Creighton and seconded by C. Weld to eliminate Ann's Woods as an alternative. All in favor: Motion passes, unanimously approved. | |
| 10.8.8 | Evaluation of Alternatives-Memorial Site: D. Ruiz explains and discusses each identified site. Each site is listed belong along with discussion:<br>➢ Memorial Site:<br>• Opportunities:<br>o Current site<br>o School stays in current location<br>o District already onsite<br>• Limitations<br>o Potential disruption to students during construction<br>A motion was made by G. Scharfe and seconded by S. Creighton to keep the Memorial Site as the preferred site for the school. Discussion: None. All in favor: Motion passes, unanimously approved. | Record |
| 10.8.9 | Evaluation of Alternatives-Additional Building Options: D. Ruiz discusses additional building options as presented in JCJ's presentation. An outline of each option is below:<br>➢ Option N-5-New Construction-Tennis Court L<br>➢ Option N-6-New Construction-Eastside Courtyard<br>➢ Option N-7-New Construction-Eastside Main Street<br>➢ Option AR-2-New Construction-Curved Main Street<br>After reviewing each option, the SBC stated that if the tennis courts are removed, they will need to be replaced on another site or in a different location onsite. The tennis courts were recently constructed, and are relatively new to the site. | Record |
| 10.8.9.1 | Evaluating the Options-R-1-Renovation Only: JCJ recaps options that have been presented to the SBC so far. R-1-Renovation Only is outlined below:<br>➢ R-1-Renovation Only: Four Walls<br>• Opportunities:<br>o Retain separated auditorium & cafeteria<br>• Limitations:<br>o Various rooms will remain undersized<br>o Challenging to create learning communities<br>o Cost may be similar to "new"<br>o Continues to sprawl across the site<br>• Other:<br>o Remain one story<br>o East side of site remains the same | Record |

| | | |
|---|---|---|
| 10.8.9.2 | Evaluating the Options-R-2-Renovation & Addition: JCJ recaps options that have been presented to the SBC so far. R-2 Renovation & Addition is outlined below.<br>➢ R-2-Renovation & Addition: The Four Walls and More:<br>• Opportunities:<br>o Retain separated auditorium & cafeteria<br>o Better integrate-Pre-K into main building<br>o Learning communities at upper grades<br>o Aggregate administrative spaces<br>• Limitations:<br>o Various rooms will remain undersized<br>o Cost may be similar to "new"<br>o Continues to sprawl across site<br>o No change to cafeteria<br>• Other:<br>o East side of site remains the same<br>o Distributed media center | Record |
| 10.8.9.3 | Evaluating the Options-AR-1-Renovation & Addition: JCJ recaps options that have been presented to the SBC so far. A R-1 "Save the Core" is outlined below.<br>➢ AR-1 Renovation & Addition-Save the Core:<br>• Opportunities:<br>o Saves the existing auditorium and gym<br>o Expands fields and parking<br>o Reduces degraded area<br>• Limitations:<br>o Gym may remain "undersized"<br>o No change to drop-off/pick up loop<br>• Other:<br>o Two-story scheme<br>o Leaves east side "as is"<br>o Condensed footprint | Record |
| 10.8.9.4 | Evaluating the Options-AR-2-Addition Renovation: JCJ recaps options that have been presented to the SBC so far. A R-2 Addition Renovation "Curved Main Street" is outlined below.<br>➢ AR-2-Addition Renovation-Curved Main Street:<br>• Opportunities:<br>o Retains the Auditorium & Gym<br>o Increase Parking<br>o Outdoor Classroom Adjacencies<br>o No Crossing Traffic<br>• Limitations:<br>o Eliminates Tennis Courts<br>o Multiple Phases<br>o Requires Modulars for Entire Population<br>• Other:<br>o One story scheme (two story possible)<br>o Maintains east side "as is" | Record |

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| 10.8.9.5 | Evaluating the Options-N-1-New Construction-The Piano: JCJ recaps options that have been presented to the SBC so far. N-1-New Construction-The Piano is outlined below.<br>➢ N-1 New Construction-The Piano:<br>• Opportunities:<br>o Reduces degraded area<br>o Increases open space<br>o Increased drop-off/pick up loop<br>o Increased parking<br>• Limitations:<br>o Proximity to abutters<br>• Other:<br>o Two-story scheme<br>o Leaves east side "as is"<br>o Condensed footprint<br>o Front door moves to north | Record |
| 10.8.9.6 | Evaluating the Options-N-2-New Construction-The Pinwheel: JCJ recaps options that have been presented to the SBC so far. N-2-New Construction-The Pinwheel is outlined below.<br>➢ N-2 New Construction-The Pinwheel:<br>• Opportunities:<br>o Responds to site circulation (pedestrian)<br>o Enhanced view from classrooms<br>o Separated bus loop<br>• Limitations:<br>o Closed courtyard requires operational commitment<br>o Additional curb cut on Summer Street<br>• Other:<br>o One story scheme<br>o East side remains "as is" | Record |
| 10.8.9.7 | Evaluating the Options-N-3-New Construction-The Hub: JCJ recaps options that have been presented to the SBC so far. N-3-New Construction-The Hub is outlined below.<br>➢ N-3-New Construction-The Hub:<br>• Opportunities:<br>o Increases Drop-Off/Pick UP loop<br>o Reduces degraded area<br>o Increases parking<br>o Increases play areas<br>• Limitations:<br>o TBD<br>• Other:<br>o Two Story Scheme<br>o Moves front door to North | Record |
| 10.8.9.8 | Evaluating the Options-N-4-New Construction-Main Street: JCJ recaps options that have been presented to the SBC so far. N-4-New Construction-Main Street is outlined below.<br>➢ N-4-New Construction-Main Street:<br>• Opportunities:<br>o Allows for smaller 2-grade neighborhoods | Record |

| | | |
|---|---|---|
| | ○ Increased drop-off and pick-up loop<br>○ Increased parking<br>○ Outdoor learning adjacent to classrooms<br>○ Increased play areas<br>• Limitations:<br>○ Larger footprint on site<br>• Other:<br>○ One story scheme (two story possible)<br>○ East side remains "as is" | |
| 10.8.9.9 | Evaluating the Options-N-5-New Construction-Tennis Court L: JCJ recaps options that have been presented to the SBC so far. N-5-New Construction-Tennis Court L is outlined below.<br>➢ N-5-New Construction-Tennis Court L:<br>• Opportunities:<br>○ Extends the parent drop-off loop<br>○ Preserves the tennis courts<br>○ Consolidates outdoor spaces<br>• Limitations:<br>○ Close to abutters<br>○ Exit to Lincoln street eliminated<br>• Other:<br>○ Two Story Scheme<br>○ Orients the building to Summer Street | Record |
| 10.8.9.10 | Evaluating the Options-N-6-New Construction-Eastside Courtyard: JCJ recaps options that have been presented to the SBC so far. N-6-New Construction-Eastside Courtyard is outlined below.<br>➢ N-6-New Construction-Eastside Courtyard:<br>• Opportunities:<br>○ Increased drop-off and pick up loop<br>○ Separated buss loop<br>○ Presence right on Lincoln Street<br>○ Consolidated open spaces<br>• Limitations:<br>○ Crossing traffic between school and field<br>○ Tennis courts eliminated<br>○ Proximity to abutters<br>○ Closed courtyard requires maintenance<br>• Other:<br>○ One story scheme (two story possible)<br>○ Summer Street exit eliminated | Record |
| 10.8.9.11 | Evaluating the Options-N-7-New Construction-Eastside Main Street: JCJ recaps options that have been presented to the SBC so far. N-7-New Construction-Eastside Main Street is outlined below.<br>➢ N-7-New Construction-Eastside Main Street:<br>• Opportunities:<br>○ Increased drop-off and pick up loop | Record |

| | | |
|---|---|---|
| | ○ Separated bus loop<br>○ Presence right on Lincoln Street<br>○ Consolidated open spaces<br>• Limitations:<br>○ Crossing traffic between school and fields<br>○ Tennis courts eliminated<br>○ Proximity to abutters<br>○ Only a Summer Street exit<br>• Other:<br>○ One story scheme (two story possible) | |
| 10.8.10 | Evaluation of Alternatives-Developing the Criteria: D. Ruiz discusses the Developing the Criteria slides presented in the JCJ presentation. Below is an outline of those options:<br>➢ Increased Drop-Off/Pick up Queuing<br>➢ Preserve Auditorium<br>➢ Tennis Courts<br>➢ Vehicular and Pedestrian Circulation<br>➢ Parking<br>➢ Fields/Play Areas/Playgrounds<br>➢ Proximity to Abutters<br>➢ Outdoor Learning Environments<br>➢ Building Layout<br>➢ Community Use<br>➢ Orientation to the Street<br>➢ Lincoln St. vs. Summer St. Access<br>➢ One Story vs. Two Story<br>➢ Safety and Security<br>The team explains that the SBC's input and feedback is important to developing the criteria along with the scoring rubric. The SBC is asked to review the options presented, determine if any criteria needs to be adjusted, and to be ready to score options at the 10/24/17 meeting. DWMP and JCJ to work on criteria and scoring rubric that will be sent to SBC ahead of 10/24 meeting. | DWMP/JCJ |
| 10.9 | Status of PDP Report: D. Ruiz explains and recaps the PDP report. An outline of the information presented is below:<br>➢ PDP Report Update<br>• Existing Conditions Report<br>• Have Received materials from:<br>○ Civil, Structural, Mechanical, Electrical, Plumbing/Fire Protection, Hazardous Materials<br>• Building currently grandfathered by code<br>• Any significant renovation or repair would require existing building to meeting current codes<br>• Any repairs, renovations, additions, must consider 780 CMR, Chapter 34 existing building code<br>• Options being considered would require structure to be updated to meet current building codes | Record |

| | | |
|---|---|---|
| | • Cost to reduce existing core block may be in the same range as the replacement<br>• Services are available on-site water, sanitary, gas, electrical<br>• Stormwater management within surrounding site is not comprehensive<br>• Many stormwater elements are silted up or clogged<br>• Accessibility to and on the site is not comprehensive<br>• Wellhead, riparian and wetland restrictions as previously discussed<br>• Incoming service conductors are exposed and in poor condition this should be addressed promptly<br>• No emergency generator/emergency lighting by battery packs<br>• Renovation would require adding fire sprinklers in 1954 and 1965 additions<br>• Intrusion system sensors are in poor condition<br>• No bi-directional antenna system for FD communication<br>A. Urbas states that the school underwent adding fire alarm monitoring system 5 years ago. Essex Elementary is currently going through adding this same system now. Sprinklers are to protect the building; the fire alarm monitoring system is to notify the students and teachers. | |
| 10.10 | Next Meetings:<br>• 10/23/17 Ed. Programming Workshop #2 (8:30am-3pm)<br>• 10/24/17 SBC Meeting (7pm)<br>• 11/1/17 Community Meeting No. 2<br>• 11/6/17 SBC Meeting (7pm) | Record |
| 10.11 | Other Topics Not Reasonably Anticipated 48 Hours Prior to Meeting: The team asks the SBC to review the existing conditions report on the dropbox since the information will be included in the PDP submission. The SBC is required to vote for PDP submission. | Record |
| 10.12 | Public Comment: None. | Record |
| 10.13 | Adjourn: A motion was made by A. Ingaharro and seconded by G. Scharfe to adjourn the meeting. Discussion: None. Vote: Unanimous to approve. Meeting adjourned at 9:09 pm. | Record |

**Attached:**
*SBC Meeting Agenda, Sign In Sheet, SBC Meeting No. 9 9/26/17 Meeting Minutes,DWMP Invoice #7, JCJ Invoice #2, Cashflow, Manchester Memorial Elementary School Presentation 9/26/17, JCJ Power Point presentation*

**DORE AND WHITTIER ARCHITECTS**
Architects • Project Managers

Christina Shefferman
Assistant Project Manager
Cc: Attendees, File

**The above is my summation of our meeting. If you have any additions and/or corrections, please contact me for incorporation into these minutes.**

# EVALUATION OF EXISTING CONDITIONS

SECTION 3.3.2

### 3.3.2 – EVALUATION OF EXISTING CONDITIONS

- Executive Summary
- Future Testing Recommendations
- Site Survey
- Traffic Impact Analysis

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## 3.3.2 – EVALUATION OF EXISTING CONDITIONS

### EXECUTIVE SUMMARY

The information documented in the Preliminary Design Program document relative to the existing conditions at Memorial Elementary School was generally comprehensive. However, additional materials, were developed during the PSR phase, these include;

- The Site Survey which also describes the preliminary delineation of wetlands. Notably, the site survey identified that Lincoln Street, which abuts the property to the north and east actually extends into the Memorial School property right at the northeast corner. In the coming weeks the District will work with the Town of Manchester-by-the-Sea to correct the property deed description. The site survey drawings are included within this section.
- The Traffic Impact Analysis was also developed during the PSR phase. The Traffic Impact analysis is included within this section.

### FUTURE TESTING RECOMMENDATIONS

A hydrant flow test at the Preferred Option site is anticipated to be conducted in April 2018.

Additional geotechnical exploration at the Preferred Option site may be conducted in Spring 2018

### SITE SURVEY

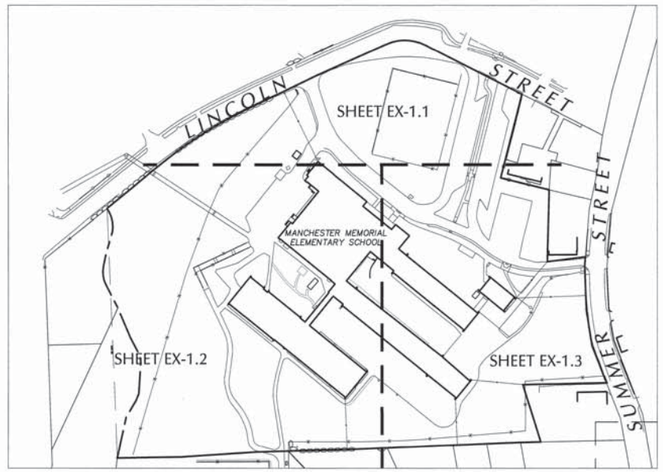
A site survey stamped and signed and Dated January 30, 2018 is included in this section

### TRAFFIC IMPACT ANALYSIS

A draft Traffic Impact Analysis dated February 2018 is included in this section.

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MASSACHUSETTS STATE PLANE COORDINATE SYSTEM - NAD '83




KEY
NTS




VICINITY MAP
NTS

LEGEND

| | |
|---|---|
| | CATCHBASIN |
| D | DRAIN MANHOLE |
| | AREA DRAIN |
| | ROOF DRAIN |
| | ROOF LEADER |
| S | SEWER MANHOLE |
| CO | CLEAN OUT |
| | HYDRANT |
| | WATER GATE |
| | WATER SERVICE |
| | MONITORING WELL |
| | GAS METER |
| | GAS GATE |
| E | ELECTRIC MANHOLE |
| | ELECTRIC METER |
| | ELECTRIC BOX |
| | UTILITY POLE |
| | LIGHT POLE |
| H | HANDHOLE |
| | TRANSFORMER |
| | COMMUNICATIONS MANHOLE |
| | CATV BOX |
| T | TELEPHONE MANHOLE |
| | FIRE CALL BOX |
| | FIRE SPRINKLER CONNECTION |
| ? | UNKNOWN MANHOLE |
| | SIGN |
| | BOLLARD |
| | MAILBOX |
| | POST |
| | GUY WIRE |
| | WETLAND FLAG |
| | BORING |
| | CONCRETE BOUND WITH DRILL HOLE |
| LPEP | LEAD PLUG WITH ESCUTCHEON PIN |
| MHB | MASSACHUSETTS HIGHWAY BOUND |
| SBDH | STONE BOUND WITH DRILL HOLE |
| | IRON PIPE |
| | DRILLHOLE |
| | IRON REBAR |
| | DECIDUOUS TREE |
| | CONIFEROUS TREE |
| | SHRUB |
| | STUMP |
| | FLAGPOLE |
| | HANDICAP PARKING SPACE |
| D | DRAIN LINE |
| S | SEWER LINE |
| W | WATER LINE |
| G | GAS LINE |
| E | ELECTRIC LINE |
| C | COMMUNICATIONS LINE |
| OHW | OVERHEAD WIRE |
| 60 | INDEX CONTOUR |
| 59 | INTERMEDIATE CONTOUR |
| +58.7 | SPOT GRADE |
| tcw | TOP OF CURB ELEVATION |
| bcw | BOTTOM OF CURB ELEVATION |
| tww | TOP OF WALL ELEVATION |
| bww | BOTTOM OF WALL ELEVATION |
| dsw | DOOR SILL ELEVATION |
| ffew | FINISHED FLOOR ELEVATION |
| WW | WINDOW WELL |
| DWS | DETECTABLE WARNING STRIP |
| n/a | INVERT NOT AVAILABLE |
| OH | OVERHANG |
| LC | LAND COURT |

20 0 10 20 40

1 inch = 20 ft.

ESSEX COUNTRY CLUB
GOLF COURSE

FEMA ZONE A

BANK/MEAN ANNUAL HIGH WATER (EXTENDS THROUGH CULVERT)

(Project Benchmark: Square Cut on Headwall. Elevation=15.54

LINCOLN STREET

CAUSEWAY

GROVE STREET

SUMMER STREET

LINCOLN STREET

GROVE STREET

STREET

(Public - Variable Width)

SIDELINE OF LINCOLN STREET SCALED FROM PLAN BOOK 38 PLAN 21 (SEE NOTE #8)

R=80.00' Δ=51°08'37" L=71.41'

S09° 57' 23"E

137.66'

S60° 06' 00"E

146.08'

S61° 59' 37"E

194.34'

S68° 17' 20"W

1051.12'

S22° 20' 06"E

89.27'

129.20'(M) 129.17'(D)

R=750.00' Δ=13°12'03" L=172.80' CHB: S68° 35' 34"E CHD: 172.42'

129.09'

BROOK

BANK/MEAN ANNUAL HIGH WATER

10' WIDE SEWER EASEMENT PER TOWN OF MANCHESTER GIS

100' WETLAND BUFFER ZONE

100' INNER RIPARIAN

35' NO DISTURB ZONE

50' NO BUILD ZONE

100' WETLAND BUFFER/100' INNER RIPARIAN

Rain Garden

Grand Chapel Path

200' OUTER RIPARIAN

Tennis Courts

Chapins Fence

Chapins Terrace

Concrete Block Retaining Wall

Granite Block Retaining Wall

Chainlink Fence

Picket Fence

Timber Fence

Granite Curb

Bituminous Curb

Bituminous Sidewalk

Bituminous Driveway

Bituminous Parking Lot

Concrete Sidewalk

Concrete Curb

Concrete Pier

Ruined Concrete Pedestrian Bridge

Utility Patch found - (possible utility)

Project Benchmark: Square Cut in Concrete Wall. Elevation=23.90

MANCHESTER MEMORIAL ELEMENTARY SCHOOL 1-Story Brick Building

67 LINCOLN ST PID 47-0-15

N/F 67 LINCOLN STREET CONDOMINIUM L.C. DOCUMENT #246088

EASEMENT SEE PLAN BOOK 444 PLAN 1 & DEED BOOK 33422 PAGE 454

69 LINCOLN ST PID 47-0-14

2-Story Wood Frame Building

N/F HOUDE REALTY TRUST L.C. DOCUMENT #421154

MATCHLINE SHEET EX-1.1
MATCHLINE SHEET EX-1.2

MATCHLINE SHEET EX-1.2
MATCHLINE SHEET EX-1.3

MATCHLINE SHEET EX-1.1
MATCHLINE SHEET EX-1.3

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NOTES:

1. THIS PLAN IS REFERENCED HORIZONTALLY TO THE MASSACHUSETTS STATE PLANE COORDINATE SYSTEM NORTH AMERICAN DATUM OF 1983 AND VERTICALLY TO THE NORTH AMERICAN VERTICAL DATUM OF 1988 BY RTK GPS OBSERVATIONS TAKEN ON OCTOBER 5, 2017. SEE PLAN FOR PROJECT BENCHMARK LOCATIONS.
2. THIS PLAN IS THE RESULT OF AN INSTRUMENT SURVEY PERFORMED ON OCTOBER 5, 6, 10, 12, 13, 17, 19, 20, 23, 24, 27 & 30 AND NOVEMBER 3, 7, 8 & 9 & DECEMBER 12 OF 2017.
3. UNDERGROUND UTILITIES ARE BASED UPON AN ACTUAL FIELD SURVEY AND INFORMATION OF RECORD. IT IS NOT WARRANTED THAT THEY ARE EXACTLY LOCATED, NOR THAT ALL UNDERGROUND CONDUITS OR OTHER STRUCTURES ARE SHOWN ON THIS PLAN.
4. THE SUBJECT LAND AS SHOWN LIES PARTIALLY WITHIN ZONE A, AREAS WHERE NO BASE FLOOD ELEVATIONS HAVE BEEN DETERMINED, AS INDICATED ON PANEL 4340 FOR THE TOWN OF MANCHESTER-BY-THE-SEA, COMMUNITY NO. 250090, HAVING AN EFFECTIVE DATE OF JULY 16, 2014.
5. PROPERTY LINES SHOWN HEREON WERE DETERMINED FROM THE FOLLOWING PLANS OF RECORD FILED AT THE SOUTH ESSEX COUNTY REGISTRY OF DEEDS AND THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION.
   - 1951 Summer Street (State Layout #3910)
   - Plan Book 38 Plan 21
   - Plan Book 297 Plan 93
   - Plan Book 403 Plan 98
   - Plan Book 416 Plan 48
   - Plan Book 425 Plan 69
   - Plan Book 427 Plan 81
   - Plan Book 444 Plan 1
   - Land Court Case 5245
   - Land Court Case 34407
6. THE CURRENT RECORD OWNER IS THE TOWN OF MANCHESTER. FOR LOCUS DEED, SEE BOOK 3507 PAGE 137 RECORDED AT THE SOUTH ESSEX COUNTY REGISTRY OF DEEDS.
7. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE SEARCH AND MAY NOT SHOW OR REVEAL ANY FACTS THAT WOULD BE DISCLOSED BY ONE.
8. THE SIDELINE OF LINCOLN STREET HAS BEEN SCALED FROM PLAN BOOK 38 PLAN 21. THE SURVEYOR WAS UNABLE TO LOCATE ANY STREET LAYOUT PLANS, STREET TAKING DOCUMENTS OR A WRITTEN DESCRIPTION FOR LINCOLN STREET AT THE TOWN OF MANCHESTER OR THE ESSEX SOUTH COUNTY REGISTRY OF DEEDS.

# MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-BY-THE-SEA, MA

SEAL

COMMONWEALTH OF MASSACHUSETTS
TODD M. CHAPMAN No. 46322
REGISTERED PROFESSIONAL LAND SURVEYOR
1/30/2018

TODD M. CHAPMAN - P.L.S. No. 46322
REGISTERED PROFESSIONAL LAND SURVEYOR FOR SAMIOTES CONSULTANTS, INC.

REVISION

## EXISTING CONDITIONS PLAN

| | |
|---|---|
| JOB # 17136.01 | EX-1.1 |
| DATE: 1-30-2018 | |
| SCALE: as shown | |
| DRAWN BY: CYDP | |
| APPROVED BY: TMC | SHEET 1 OF 3 |

FILE:17136.00 MANCHESTER MEMORIAL ES WS.DWG

MASSACHUSETTS STATE PLANE COORDINATE SYSTEM NAD 83

MATCHLINE SHEET EX-1.1
MATCHLINE SHEET EX-1.2

MATCHLINE SHEET EX-1.2
MATCHLINE SHEET EX-1.3

FEMA ZONE A
(Scaled graphically from FEMA Flood Map)

PLAN BOOK 38 PLAN 21 (SEE NOTE #8)

SAWMILL BROOK

CAUSEWAY BROOK

LINCOLN STREET (Public ~ Variable Width)

S75° 17' 36"E 129.09'

Rolled Concrete Detention Bulldge

Line of Boulders

Conc. Pier

Conc. Pier

Conc. Pier

Conc. Pier

Dam (Ht) 30' HEADWALL 3' DIA.

Dam Rim=17.19 in=(s)=11.79 in=(s)=11.39

CB Rim=16.56 in=(s)=12.70 in=(s)=12.41

CB Rim=15.77 in=4.04 CH

Wooded Area

Wooded Area

Wooded Area

Wooded Area

Dirt

Gravel

Concrete Retaining Wall

Concrete Retaining Wall

Concrete Retaining Wall

Concrete Retaining Wall

Chainlink Fence

Chainlink Fence

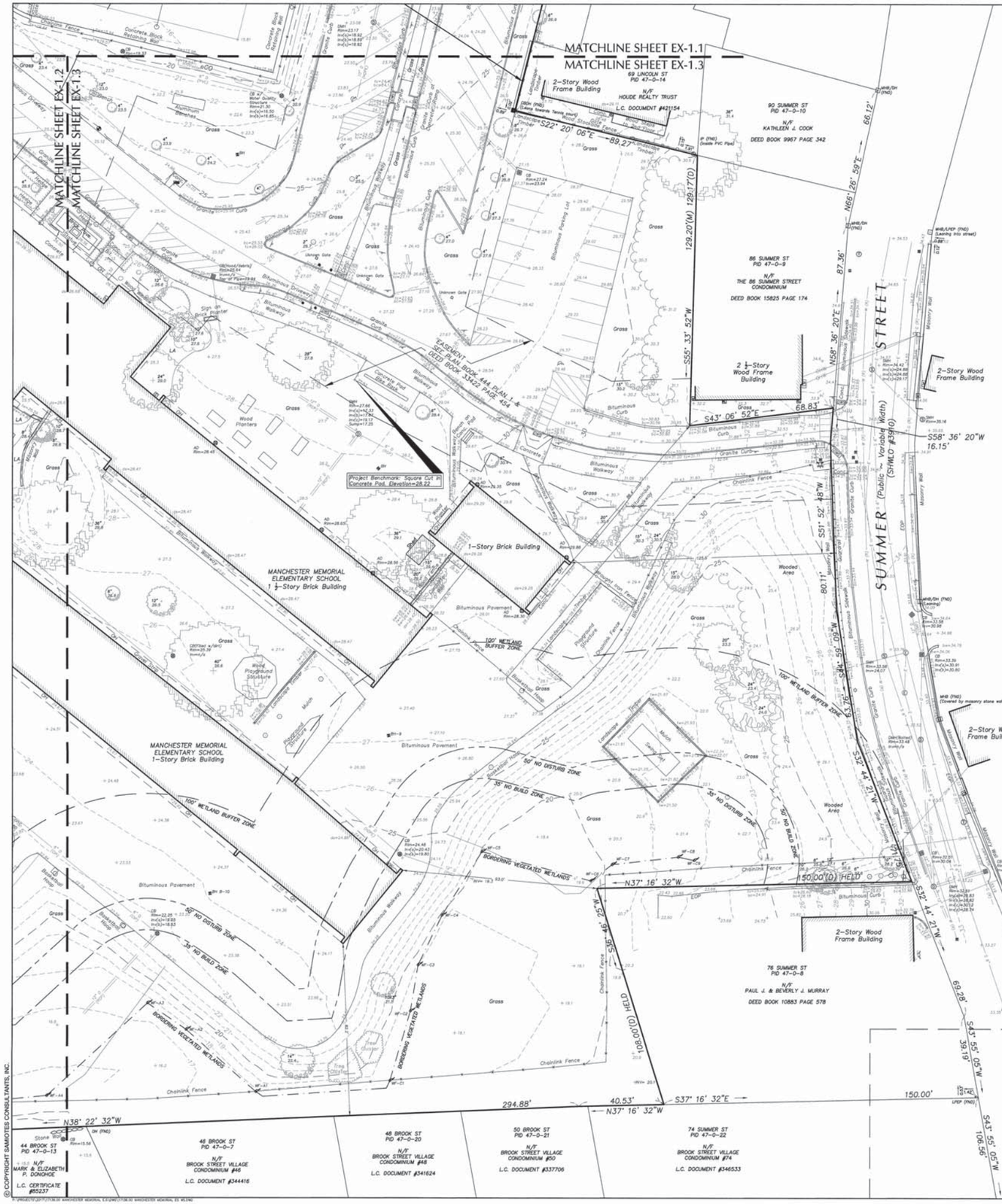
Chainlink Fence

Chainlink Fence

Bituminous Walkway

Bituminous Walkway

Bituminous Walkway




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3. UNDERGROUND UTILITIES ARE BASED UPON AN ACTUAL FIELD SURVEY AND INFORMATION OF RECORD. IT IS NOT WARRANTED THAT THEY ARE EXACTLY LOCATED, NOR THAT ALL UNDERGROUND CONDUITS OR OTHER STRUCTURES ARE SHOWN ON THIS PLAN.
4. THE SUBJECT LAND AS SHOWN LIES PARTIALLY WITHIN ZONE A, AREAS WHERE NO BASE FLOOD ELEVATIONS HAVE BEEN DETERMINED, AS INDICATED ON PANEL 434G FOR THE TOWN OF MANCHESTER-BY-THE-SEA, COMMUNITY NO. 250090, HAVING AN EFFECTIVE DATE OF JULY 16, 2014.
5. PROPERTY LINES SHOWN HEREON WERE DETERMINED FROM THE FOLLOWING PLANS OF RECORD FILED AT THE SOUTH ESSEX COUNTY REGISTRY OF DEEDS AND THE MASSACHUSETTS DEPARTMENT OF TRANSPORTATION.
   - ~1951 Summer Street (State Layout #3910)
   - ~Plan Book 38 Plan 21
   - ~Plan Book 297 Plan 93
   - ~Plan Book 403 Plan 98
   - ~Plan Book 416 Plan 48
   - ~Plan Book 425 Plan 69
   - ~Plan Book 427 Plan 81
   - ~Plan Book 444 Plan 1
   - ~Land Court Case 5245
   - ~Land Court Case 34407
6. THE CURRENT RECORD OWNER IS THE TOWN OF MANCHESTER. FOR LOCUS DEED, SEE BOOK 3507 PAGE 137 RECORDED AT THE SOUTH ESSEX COUNTY REGISTRY OF DEEDS.
7. THIS SURVEY WAS PERFORMED WITHOUT THE BENEFIT OF A TITLE SEARCH AND MAY NOT SHOW OR REVEAL ANY FACTS THAT WOULD BE DISCLOSED BY ONE.
8. THE SIDELINE OF LINCOLN STREET HAS BEEN SCALED FROM PLAN BOOK 38 PLAN 21. THE SURVEYOR WAS UNABLE TO LOCATE ANY STREET LAYOUT PLANS, STREET TAKING DOCUMENTS OR A WRITTEN DESCRIPTION FOR LINCOLN STREET AT THE TOWN OF MANCHESTER OR THE ESSEX SOUTH COUNTY REGISTRY OF DEEDS.

# MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-BY-THE-SEA, MA

SEAL

COMMONWEALTH OF MASSACHUSETTS
TODD M. CHAPMAN
No. 46322
REGISTERED PROFESSIONAL LAND SURVEYOR
11/30/2018

TODD M. CHAPMAN ~ P.L.S. No. 46322
REGISTERED PROFESSIONAL
LAND SURVEYOR FOR
SAMIOTES CONSULTANTS, INC.

REVISION

| | | |
|---|---|---|
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## EXISTING CONDITIONS PLAN

| | |
|---|---|
| JOB # 17136.01 | EX-1.3 |
| DATE: 1-30-2018 | |
| SCALE: as shown | |
| DRAWN BY: CY/DP | SHEET 3 OF 3 |
| APPROVED BY: TMC | |

FILE: 17136.00 MANCHESTER MEMORIAL ES WS.DWG

JCJ Architecture

# Manchester Memorial Elementary School

Lincoln Street

Manchester-by-the-Sea, Massachusetts

# Traffic Impact Analysis




*Existing Manchester Memorial Elementary School*

February 2018

BRYANT ASSOCIATES

Improving lives through infrastructure

640 George Washington Hwy

Building C, Suite 100

Lincoln, RI 02865

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# 1.0 Introduction

## 1.1 Purpose of Study

This traffic study was prepared at the request of JCJ Architecture in connection with its study of the proposed replacement/renovation of the Manchester Memorial Elementary School on Lincoln Street in Manchester-by-the-Sea, Massachusetts. For the benefit of the boards and citizens of Manchester-by-the-Sea, the traffic impacts of the proposed development have been evaluated. The study analyzes traffic use attributable to the proposed development of the site and discusses transportation impacts in the vicinity of the site.

## 1.2 Description of Project

The project site is located on Lincoln Street in Manchester-by-the-Sea, as shown in Figure No. 1. The proposed project includes the replacement/renovation of the existing Manchester Memorial Elementary School to accommodate the future needs of the community. The existing Manchester Memorial Elementary School has 338 elementary school (K-5) students and 13 preschool students. The projected student population for the new school is anticipated to be 335 elementary school students and 60 preschool students.




*Figure No. 1 Location Map*

# 2.0 Existing Conditions

## 2.1 Study Area

The project will primarily utilize Lincoln Street and Summer Street (Route 127) for access to and from the site. Traffic volumes are moderate on Lincoln Street, which is classified as an Urban Collector, as presented in the online Road Inventory Interactive Map, which is based on Year-End 2011 Road Inventory File maintained by the Massachusetts Office of Transportation Planning. Traffic volumes are moderate on Summer Street, which is classified as an Urban Minor Arterial. By definition, an arterial highway emphasizes a high level of mobility for through traffic and access to local roadways. A collector street balances mobility for through traffic and access to local roadways. Land use in the area is primarily residential, institutional, and commercial.

The existing school has two entrance-only driveways and one exit-only driveway on Lincoln Street and one exit-only driveway on Summer Street. The existing northerly entrance-only driveway and southerly exit-only driveway on Lincoln Street allows for access to the northern one-way traffic loop for faculty and visitor parking, and for student pick-up and drop-off. The existing southerly entrance-only driveway on Lincoln Street and the existing exit-only driveway on Summer Street allows for access to the southern one-way traffic loop for bus access, as well as faculty and visitor parking. There is access between the northern loop and the southern loop that is restricted when buses are picking up students.

Students were also observed walking via a pedestrian walkway to a parking area near the intersection of Brooke Street/Norwood Avenue.

### 2.1.1 Existing School Driveways on Lincoln Street

The intersection of Lincoln Street and the existing northerly entrance-only school driveway is a three-way unsignalized intersection. The entrance-only driveway is a one-lane, one-way westbound bituminous roadway, approximately 21.5 feet in width. There is granite curb and bituminous sidewalk on the north side of the roadway. To the north, Lincoln Street is a two-lane, two-way bituminous roadway, approximately 31 feet in width with one 17.5-foot southbound shared vehicle-bicycle travel lane, and one 13.5-foot northbound shared vehicle-bicycle travel lane. There is a crosswalk with pedestrian traffic equipment on Lincoln Street on the north side of the intersection. The pushbutton is not working and the traffic signal is operating with continuously flashing amber lights for the Lincoln Street approach. There is bituminous concrete curb, bituminous sidewalk with a grass strip, and utility poles on the east side of the roadway. To the south, Lincoln Street is a two-lane, two-way bituminous roadway, approximately 30 feet in width with 11-foot shared vehicle-bicycle travel lanes, and 4-foot shoulders. There is bituminous concrete curb, bituminous sidewalk with a grass strip, concrete bollards, metal railing and utility poles on the east side of the roadway. The speed limit is posted at 20 mph within the school zone. During the afternoon dismissal, a queue of vehicles was observed extending from this driveway along the edge of Lincoln Street.

The intersection of Lincoln Street and the existing exit-only school driveway is a three-way unsignalized intersection that is stop controlled on the school driveway. The exit-only driveway is a one-lane, one-way eastbound bituminous roadway, approximately 18 feet in width. There is granite curb on both sides of the roadway. To the north, Lincoln Street is a two-lane, two-way bituminous roadway, approximately 29.5 feet in width with 11.5-foot shared vehicle-bicycle travel lanes, a 4.5-foot painted median, and one-foot shoulders. There is granite curb, bituminous sidewalk with a grass strip, and utility poles on the east side of the roadway. There is granite curb on the west side of the roadway. There is on-street parking, angled and parallel, on the east side of the roadway further to the north. To the south, Lincoln Street is a two-lane, two-way bituminous roadway, approximately 33 feet in width with one 11.5-foot northbound shared vehicle-bicycle travel lane, one 12-foot southbound shared vehicle-bicycle travel plans, an 8-foot painted median, and a 1.5-foot shoulder on the east side. The speed limit is posted at 20 mph within the school zone.

There is a mid-block crosswalk located on Lincoln Street between its intersection with the existing exit-only school driveway and its intersection with the existing southerly entrance-only school driveway. This crosswalk has solar-powered rectangular rapid flash beacons (RRFB) with pedestrian warning signs installed on either side of the road, which can be activated by a pushbutton. Please note that interim approval for RRFBs from the FHWA has been rescinded as of December 21, 2017. The existing RRFBs do not need to be removed and can remain in service until the end of their useful life. There is granite curb, bituminous sidewalk with a grass strip, and utility poles on the east side of the roadway. There is granite curb on the west side of the roadway

The intersection of Lincoln Street and the existing southerly entrance-only school driveway is a three-way unsignalized intersection. The entrance-only driveway is a one-lane, one-way westbound bituminous roadway, approximately 18.5 feet in width. There is granite curb on both sides of the roadway. To the north, Lincoln Street is a two-lane, two-way bituminous roadway, approximately 33 feet in width with one 12-foot southbound shared vehicle-bicycle travel lane, one 11-foot northbound shared vehicle-bicycle travel lane, a 9-foot painted median, and a one-foot shoulder on the east side. There is granite curb, bituminous sidewalk with a grass strip, and utility poles on the east side of the roadway. There is granite curb on the west side of the roadway. To the south, Lincoln Street is a three-lane, two-way bituminous roadway, approximately 34 feet in width with one 10.5-foot shared vehicle-bicycle southbound travel lane, one 10-foot northbound left turn lane, one 11.5-foot shared vehicle-bicycle northbound travel lane, and one-foot shoulders. There is granite curb, bituminous sidewalk with a grass strip, and utility poles on the east side of the roadway. There is granite curb on the west side of the roadway. The speed limit is posted at 20 mph within the school zone.

### 2.1.2 Existing School Driveway on Summer Street

The intersection of Summer Street (Route 127) and the existing exit-only school driveway is a three-way unsignalized intersection that is stop controlled on the school driveway. The exit-only driveway is a one-lane, one-way southbound bituminous roadway, approximately 21.5 feet in width. There is a crosswalk across the driveway. There is granite curb and bituminous sidewalk with a grass strip on the west side

of the roadway. Summer Street is a two-lane, two-way bituminous roadway, approximately 26.5 feet in width with one 11.5-foot westbound travel lane, one 11-foot eastbound travel lane, and two-foot shoulders. There is granite curb and bituminous sidewalk on the west side of the roadway. The speed limit is posted at 25 mph.

### 2.1.3 Surrounding Intersection

The intersection of Lincoln Street and Summer Street (Route 127), located to the southeast of the school, is a three-way unsignalized intersection, which is stop controlled on Lincoln Street. Lincoln Street at its intersection with Summer Street is a three-lane, two-way bituminous roadway, approximately 39.5 feet in width with one 10.5-foot southbound right turn lane, one 10-foot southbound left turn lane, one 16.5-foot northbound travel lane, a 1.5-foot southbound shoulder, and a one-foot northbound shoulder. There is a crosswalk across Lincoln Street. There is granite curb, bituminous sidewalk with a grass strip, and utility poles on the east side of the roadway. There is granite curb on the west side of the roadway. The speed limit is posted at 20 mph within the school zone. Summer Street at its intersection with Lincoln Street is a two-lane, two-way bituminous roadway, approximately 30 feet in width with 11.5-foot travel lanes, and 3.5-foot shoulders. To the east, there is bituminous berm and bituminous sidewalk with a grass strip on the north side of the roadway. To the west, there is granite curb and bituminous sidewalk on the north side of the roadway. There are utility poles on both sides of the roadway. The speed limit is posted at 25 mph.

## 2.2 Data Collection

Traffic turning movement counts were conducted at the intersections of Lincoln Street and the school northerly entrance-only driveway, Lincoln Street and the school southerly driveway, Summer Street and the school exit-only driveway, and Summer Street and Lincoln Street between the hours of 7:00 and 9:00 A.M. and 2:00 and 6:00 P.M. on October 12, 2017. Traffic volumes on Lincoln Street and Summer Street in the vicinity of the school were also obtained from automatic road tube counts between 12:00 A.M. on Thursday, October 12, 2017 and 12:00 A.M. on Friday, October 13, 2015. The traffic count data is shown in Appendix A.

The calculated school A.M. and P.M. peak hours for the Manchester Memorial Elementary School are 7:30 – 8:30 and 2:45– 3:45, respectively. These peak hours were utilized for the analysis of all the study intersections, since the school replacement is the focus of this report.

Pertinent field observations including existing stopping sight distances, location of existing utilities, posted speed limits, traffic control devices, etc. were made on October 24, 2017. Crash data for the study area was obtained from the Manchester-by-the-Sea Police Department for the period of January 1, 2014 through October 10, 2017. In addition, traffic speed data (shown in Appendix E) using road tubes was acquired on Lincoln Street and Summer Street in the vicinity of the school driveways on October 12, 2017.

# 3.0 Traffic Forecasts

## 3.1 Existing Traffic Volumes

Existing traffic volumes for the study area were developed from traffic data obtained by Transportation Data Corporation (TDC).

The total 24-hour two-way traffic volume (from the road tube counts) on Lincoln Street to the north of the school driveway is approximately 4,400 vehicles per day (vpd). The total 24-hour two-way traffic volume on Summer Street to the west of the school driveway is approximately 4,600 vehicles per day (vpd).

The school hours for the Manchester Memorial Elementary School are from 8:25 A.M. to 2:55 P.M. The existing preschool hours are from 8:30 A.M. to 12:30 P.M. The school A.M. peak hour, as indicated in Section 2.2, occurred between 7:30 and 8:30, with two-way traffic volume of 548 vehicles on Lincoln Street and one-way traffic volume of 179 vehicles on the school northerly entrance-only driveway. The school P.M. peak hour was measured between 2:45 and 3:45, with two-way traffic volume on Lincoln Street and one-way traffic volume on the school driveway of 378 vehicles and 46 vehicles, respectively.

The two-way traffic volume on Lincoln Street and the school southerly driveways were 494 vehicles and 93 vehicles respectively, during the school A.M. peak hour. The two-way traffic volumes were 340 vehicles on Lincoln Street and 55 vehicles on the southerly driveways during the school P.M. peak hour.

The two-way traffic volume on Summer Street and the one-way traffic volume on the school exit-only driveway were 425 vehicles and 70 vehicles respectively, during the school A.M. peak hour. The two-way traffic volume was 438 vehicles on Summer Street and the one-way traffic volume was 50 vehicles on the school exit-only driveway during the school P.M. peak hour.

The two-way traffic volumes on Summer Street and Lincoln Street were 575 vehicles and 414 vehicles, respectively, during the school A.M. peak hour. The two-way traffic volumes were 585 vehicles on Summer Street and 297 vehicles on Lincoln Street during the school P.M. peak hour.

## 3.2 Vehicle Trip Generation

To evaluate the traffic impacts of the proposed development, it is necessary to determine the amount of traffic expected to be generated by the proposed site development. Typically, the trip generation calculations are based on data compiled in Trip Generation (9th Edition), an informational report published by the Institute of Transportation Engineers (ITE). Trip Generation is a tool for planners, transportation professionals, zoning boards, and others who are interested in estimating the number of vehicle trips generated by a proposed development or land use. This document is based on more than 5,500 trip generation studies submitted to the Institute by public agencies, developers, consulting firms, and technical associations. More specific information, however, from the traffic turning movement counts for the existing Manchester Memorial Elementary School has been used for the trip generation.

As stated in Section 1.2, the existing Manchester Memorial Elementary School currently has 338 elementary school students and 13 preschool students. The existing preschool hours are 8:30 A.M. to 12:30 P.M. The preschool is broken out into two sessions based on age. On Monday, Wednesday, and Thursday the session is for four and five years old students, and on Tuesday and Thursday for the three years old students. The projected student population for the new school is anticipated to be 335 elementary school students and 60 preschool students. The anticipated net loss of three elementary school students is negligible to overall trip generation. The preschool will offer an afternoon option from 12:30-3:00 P.M. for both sessions. The preschool is anticipated to have 15 students per session in the morning and afternoon.

It is anticipated that two trips will be generated per preschool student in the school A.M. peak for drop-off and in the school P.M. peak for pickup. The directional distribution of the generated trips will be 50% entering and 50% exiting in both the school A.M. and P.M. peak hours, since it is anticipated that the parents will enter, drop off or pick up their student, then promptly exit. The number of trips generated by the preschool staff is anticipated to be negligible or will remain the same. The volumes anticipated to be generated by the increase of preschool students during the school A.M. and P.M. peak hours can be found in Table No. 1.

**Table No. 1**
**Trip Generation Summary**
**Manchester Memorial Elementary School**

| Time Period | Direction | Existing Trips | Proposed Trips | Trip Increase |
|---|---|---|---|---|
| School A.M. Peak Hour | Enter | 13 | 15 | +2 |
| | Exit | 13 | 15 | +2 |
| School P.M. Peak Hour | Enter | 0 | 15 | +15 |
| | Exit | 0 | 15 | +15 |

The distribution of the anticipated new vehicle trips by direction was based upon the existing trip patterns observed in the traffic count data and the anticipated usage of the roadways for the school. The anticipated increase in trips from the proposed school building was added to the existing volumes for analysis of the build conditions. The trip increase entering the school, during the peak hours, were added to the northern driveway which corresponds to the proposed schematic options N-1, N-3, and N-9. If the town decides to select the schematic options R-1 or AR-2, the trips would need to be redistributed to show trip generation at the southern driveway, although this change would likely have a negligible impact on operations. The trip generation calculations and distribution of the traffic anticipated to be generated by the new school are shown in Appendix B.

# 4.0 Capacity Analysis

## 4.1 General

Capacity analyses in this report focus on the peak hours of traffic volume for the school because they represent the most critical periods for operations. It is expected that there will be minimal impact from the elementary school during the remaining hours of the day.

## 4.2 Intersections

The intersection capacity analysis was prepared using the Highway Capacity Manual, 6th edition, published by the Transportation Research Board. The analysis utilizes the concept of Level of Service. The term "level of service" is defined as a qualitative measure describing operational conditions within a traffic stream based on service measures such as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience. There are six levels of service utilized for the analysis. They are given letter designations from A to F, with Level of Service A representing the most favorable operating conditions and Level of Service F the least. Level of Service F is assigned to the movement if the volume-to-capacity ratio for the movement exceeds 1.0, regardless of the control delay. The level of service criteria for unsignalized intersections is shown in Table No. 2.

The computer software, HCS 7, was utilized to perform the capacity analysis for the study area.

**Table No. 2**
**Level of Service Criteria for Unsignalized and Signalized Intersections**
**Source: Highway Capacity Manual, 6th Edition**

| Level Of Service | Average Total Delay (Second/Vehicle) |
|---|---|
| | Unsignalized Intersection |
| A | ≤10 |
| B | >10 and ≤15 |
| C | >15 and ≤25 |
| D | >25 and ≤35 |
| E | >35 and ≤50 |
| F | >50 |

Unsignalized intersection capacity analysis for the intersections of Lincoln Street and the school northerly entrance-only driveway, Lincoln Street and the school southerly driveway, Summer Street and the school exit-only driveway, and Summer Street and Lincoln Street was undertaken using the school A.M. and P.M. peak hour traffic volumes under no-build conditions and build conditions. The school southerly driveways on Lincoln Street were modeled as one intersection due to their close proximity. Based on the options still under consideration, the driveway configuration is not anticipated to be revised. The capacity analysis computations are included in Appendix C. A summary of the level of service for these intersections is shown in Table Nos. 3 and 4 for the school A.M. and P.M. peak hour, respectively.

**Table No. 3**
**School A.M. Peak Hour - Level of Service Summary**
**Unsignalized Intersections**

| Intersection/ Critical Movement | Level of Service (Delay-Second/Vehicle) | |
|---|---|---|
| | No-Build (2017) | Build |
| **Lincoln Street/Northerly Entrance-Only Driveway** | | |
| Northbound Approach | A (1.8) | A (1.8) |
| **Lincoln Street/Southerly Driveway** | | |
| Northbound Approach<br>Eastbound Approach | A (0.2)<br>B (14.9) | A (0.2)<br>B (14.9) |
| **Summer Street/Exit-Only Driveway** | | |
| Southbound Approach | B (11.3) | B (11.3) |
| **Summer Street/Lincoln Street** | | |
| Eastbound Approach<br>Southbound Approach | A (4.8)<br>C (20.5) | A (4.8)<br>C (20.5) |

**Table No. 4**
**School P.M. Peak Hour - Level of Service Summary**
**Unsignalized Intersections**

| Intersection/ Critical Movement | Level of Service (Delay-Second/Vehicle) | |
|---|---|---|
| | No-Build (2017) | Build |
| **Lincoln Street/Northerly Entrance-Only Driveway** | | |
| Northbound Approach | A (0.2) | A (0.3) |
| **Lincoln Street/Southerly Driveway** | | |
| Northbound Approach<br>Eastbound Approach | A (0.2)<br>B (11.1) | A (0.2)<br>B (11.2) |
| **Summer Street/Exit-Only Driveway** | | |
| Southbound Approach | B (12.2) | B (12.3) |
| **Summer Street/Lincoln Street** | | |
| Eastbound Approach<br>Southbound Approach | A (2.0)<br>C (16.8) | A (1.9)<br>C (16.9) |

The unsignalized intersection capacity analysis shows that there will be no change in the levels of service at the intersections.

# 5.0 Safety Analysis

## 5.1 Geometrics

The geometric configurations of the intersections affected by traffic generated by the proposed improvements were examined with regard to safe stopping sight distance using principles presented in A Policy on Geometric Design of Highways and Streets, 2011, of the American Association of State Highway and Transportation Officials (AASHTO). AASHTO provides recommendations for necessary sight distance at intersections.

A design speed of 35 mph was utilized for Lincoln Street in the vicinity of the site driveways based on the observed 85$^{th}$ percentile speeds of 32 mph for the northbound and southbound traffic (see Appendix E). The minimum safe stopping sight distance for roadways with a design speed of 35 mph is 250 feet, as required by AASHTO, Table 3-1. Stopping Sight Distance on Level Roadways, P. 3-4. The existing sight distances at the school driveways are in excess of the minimum sight distances required. It is, however, recommended to trim the low hanging branches to the north of the southerly exit-only driveway to improve sight distance.

A design speed of 35 mph was utilized for Summer Street in the vicinity of the site driveway and Lincoln Street based on the observed 85$^{th}$ percentile speeds of 32 mph for the eastbound and 33 mph for the westbound traffic. The minimum safe stopping sight distance for roadways with a design speed of 35 mph is 250 feet. The existing sight distances at the school driveway and Lincoln Street are in excess of the minimum sight distances required.

## 5.2 Crash History

Crash data for the study area was obtained from the Manchester-by-the-Sea Police Department for the period of January 1, 2014 through October 10, 2017. A summary of the data received is contained in Appendix D. There were five crashes within the study area of the site, as shown in Table No. 6. There was one crash at the intersection of Lincoln Street and the Manchester Memorial Elementary School (MMES) northerly driveway. It was a rear-end crash and resulted in no injuries.

There were two crashes on Lincoln Street between Vine Street and the MMES northerly driveway. These crashes included one side swipe crash, and one crash involved a vehicle hitting an object. Neither of these crashes resulted in injury.

There was one crash at the intersection of Summer Street and Brook Street. It was an angle crash and resulted in no injuries.

There was one crash at the intersection of Summer Street and Sweeney Park. It involved a vehicle hitting an object and resulted in no injuries.

**Table No. 6**
**Summary of Crashes**
**Source: Manchester-by-the-Sea Police Department**

| Crash Location | January 1, 2014 through October 10, 2017 |
|---|---|
| Intersection of Lincoln Street and Manchester Memorial Elementary School Northerly Entrance-Only Driveway | 1 |
| Lincoln Street between Vine Street and Manchester Memorial Elementary School Northerly Entrance-Only Driveway | 2 |
| Intersection of Summer Street and Brook Street | 1 |
| Intersection of Summer Street at Sweeney Park | 1 |
| TOTAL | 5 |

The number and type of crashes that occurred over this three-year plus period does not indicate the presence of unusual conditions that might be worsened by the renovation of the Manchester Memorial Elementary School.

### 5.3 Site Circulation

The Manchester Memorial Elementary School Feasibility Phase – SBC Meeting # 16 schematics, dated January 10, 2018 (see Appendix F) were reviewed with regard to the conceptual layout, pedestrian and vehicular circulation. The preliminary site plans for options N-1, N-3, and N-9 provide for increased stacking on the school site, which would minimize or eliminate queuing on Lincoln Street.

Once a site option is chosen and the sire plan further developed, however, it will be reviewed again. The proposed site will be designed to accommodate the safe movement of emergency vehicles to and from the school.

## 6.0 Conclusions and Recommendations

This traffic impact analysis was conducted to evaluate the impacts on surrounding roadways and intersections due to the proposed improvements at the Manchester Memorial Elementary School on Lincoln Street in Manchester-by-the-Sea, Massachusetts. The proposed options have traffic patterns similar to the existing Manchester Memorial Elementary School.

The unsignalized intersection capacity analysis shows that there will be no change in the levels of service at the intersections.

It is recommended to trim the low hanging branches to the north of the southerly exit-only driveway to improve sight distance. It is also recommended to provide more space on site to stack vehicles during the afternoon dismissal.

Based upon the analyses, traffic operations on the surrounding roadways and intersections will experience minimal change with the addition of traffic generated by the proposed improvements and addition of the afternoon preschool class to the Manchester Memorial Elementary School. No reduction in safety will occur due to the development as proposed.

# APPENDIX A

## Traffic Counts

# *Transportation Data Corporation*

*Mario Perone, mperone1@verizon.net*
*tel (781) 587-0086 cell (781) 439-4999*

Lincoln Street just north of
MMES Enter Only Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

04962Bvolume
Site Code: 217078

| Start | 12-Oct-17 | NB | | SB | | Combined | | 13-Oct | NB | | SB | | Combined | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Thu | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | Fri | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. |
| 12:00 | | 3 | 31 | 0 | 27 | 3 | 58 | | * | * | * | * | * | * |
| 12:15 | | 2 | 40 | 2 | 29 | 4 | 69 | | * | * | * | * | * | * |
| 12:30 | | 0 | 28 | 2 | 20 | 2 | 48 | | * | * | * | * | * | * |
| 12:45 | | 0 | 28 | 1 | 23 | 1 | 51 | | * | * | * | * | * | * |
| 01:00 | | 0 | 29 | 0 | 26 | 0 | 55 | | * | * | * | * | * | * |
| 01:15 | | 0 | 34 | 2 | 26 | 2 | 60 | | * | * | * | * | * | * |
| 01:30 | | 0 | 34 | 0 | 26 | 0 | 60 | | * | * | * | * | * | * |
| 01:45 | | 1 | 35 | 0 | 32 | 1 | 67 | | * | * | * | * | * | * |
| 02:00 | | 0 | 52 | 0 | 29 | 0 | 81 | | * | * | * | * | * | * |
| 02:15 | | 0 | 35 | 0 | 48 | 0 | 83 | | * | * | * | * | * | * |
| 02:30 | | 0 | 26 | 1 | 48 | 1 | 74 | | * | * | * | * | * | * |
| 02:45 | | 1 | ***48*** | 0 | 37 | 1 | ***85*** | | * | * | * | * | * | * |
| 03:00 | | 1 | ***67*** | 0 | 46 | 1 | ***113*** | | * | * | * | * | * | * |
| 03:15 | | 1 | ***41*** | 0 | 36 | 1 | ***77*** | | * | * | * | * | * | * |
| 03:30 | | 3 | ***54*** | 0 | 47 | 3 | ***101*** | | * | * | * | * | * | * |
| 03:45 | | 1 | 41 | 0 | 29 | 1 | 70 | | * | * | * | * | * | * |
| 04:00 | | 1 | 39 | 0 | 33 | 1 | 72 | | * | * | * | * | * | * |
| 04:15 | | 2 | 46 | 0 | 45 | 2 | 91 | | * | * | * | * | * | * |
| 04:30 | | 5 | 30 | 1 | 38 | 6 | 68 | | * | * | * | * | * | * |
| 04:45 | | 9 | 51 | 1 | 55 | 10 | 106 | | * | * | * | * | * | * |
| 05:00 | | 7 | 33 | 0 | 37 | 7 | 70 | | * | * | * | * | * | * |
| 05:15 | | 13 | 37 | 3 | ***64*** | 16 | 101 | | * | * | * | * | * | * |
| 05:30 | | 17 | 34 | 2 | ***59*** | 19 | 93 | | * | * | * | * | * | * |
| 05:45 | | 19 | 23 | 3 | ***52*** | 22 | 75 | | * | * | * | * | * | * |
| 06:00 | | 19 | 35 | 3 | ***45*** | 22 | 80 | | * | * | * | * | * | * |
| 06:15 | | 22 | 21 | 6 | 43 | 28 | 64 | | * | * | * | * | * | * |
| 06:30 | | 31 | 27 | 10 | 40 | 41 | 67 | | * | * | * | * | * | * |
| 06:45 | | 26 | 23 | 19 | 41 | 45 | 64 | | * | * | * | * | * | * |
| 07:00 | | 42 | 31 | 22 | 38 | 64 | 69 | | * | * | * | * | * | * |
| 07:15 | | 61 | 19 | 35 | 29 | 96 | 48 | | * | * | * | * | * | * |
| 07:30 | | ***117*** | 14 | ***56*** | 26 | ***173*** | 40 | | * | * | * | * | * | * |
| 07:45 | | ***49*** | 12 | ***51*** | 31 | ***100*** | 43 | | * | * | * | * | * | * |
| 08:00 | | ***60*** | 19 | ***62*** | 20 | ***122*** | 39 | | * | * | * | * | * | * |
| 08:15 | | ***81*** | 10 | ***69*** | 29 | ***150*** | 39 | | * | * | * | * | * | * |
| 08:30 | | 50 | 8 | 22 | 13 | 72 | 21 | | * | * | * | * | * | * |
| 08:45 | | 48 | 9 | 24 | 18 | 72 | 27 | | * | * | * | * | * | * |
| 09:00 | | 41 | 10 | 32 | 28 | 73 | 38 | | * | * | * | * | * | * |
| 09:15 | | 36 | 9 | 20 | 17 | 56 | 26 | | * | * | * | * | * | * |
| 09:30 | | 34 | 8 | 14 | 19 | 48 | 27 | | * | * | * | * | * | * |
| 09:45 | | 34 | 6 | 25 | 17 | 59 | 23 | | * | * | * | * | * | * |
| 10:00 | | 31 | 1 | 26 | 10 | 57 | 11 | | * | * | * | * | * | * |
| 10:15 | | 40 | 3 | 15 | 4 | 55 | 7 | | * | * | * | * | * | * |
| 10:30 | | 38 | 1 | 28 | 4 | 66 | 5 | | * | * | * | * | * | * |
| 10:45 | | 48 | 1 | 39 | 1 | 87 | 2 | | * | * | * | * | * | * |
| 11:00 | | 40 | 0 | 25 | 6 | 65 | 6 | | * | * | * | * | * | * |
| 11:15 | | 35 | 1 | 24 | 4 | 59 | 5 | | * | * | * | * | * | * |
| 11:30 | | 30 | 1 | 19 | 3 | 49 | 4 | | * | * | * | * | * | * |
| 11:45 | | 29 | 4 | 22 | 4 | 51 | 8 | | * | * | * | * | * | * |
| Total | | 1128 | 1189 | 686 | 1402 | 1814 | 2591 | | 0 | 0 | 0 | 0 | 0 | 0 |
| Day Total | | 2317 | | 2088 | | 4405 | | | 0 | | 0 | | 0 | |
| % Total | | 25.6% | 27.0% | 15.6% | 31.8% | | | | 0.0% | 0.0% | 0.0% | 0.0% | | |
| Peak | - | 07:30 | 02:45 | 07:30 | 05:15 | 07:30 | 02:45 | - | - | - | - | - | - | - |
| Vol. | - | 307 | 210 | 238 | 220 | 545 | 376 | - | - | - | - | - | - | - |
| P.H.F. | | 0.656 | 0.784 | 0.862 | 0.859 | 0.788 | 0.832 | | | | | | | |

| ADT | ADT 4,405 | AADT 4,405 |
|---|---|---|

**_Transportation Data Corporation_**
*Mario Perone, mperone1@verizon.net*
*tel (781) 587-0086 cell (781) 439-4999*

Lincoln Street just north of
MMES Enter Only Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

04962Bvolume
Site Code: 217078

| Start | 12-Oct-17 | NB | | Hour Totals | | SB | | Hour Totals | | Combined Totals | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Thu | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon |
| 12:00 | | 3 | 31 | | | 0 | 27 | | | | |
| 12:15 | | 2 | 40 | | | 2 | 29 | | | | |
| 12:30 | | 0 | 28 | | | 2 | 20 | | | | |
| 12:45 | | 0 | 28 | 5 | 127 | 1 | 23 | 5 | 99 | 10 | 226 |
| 01:00 | | 0 | 29 | | | 0 | 26 | | | | |
| 01:15 | | 0 | 34 | | | 2 | 26 | | | | |
| 01:30 | | 0 | 34 | | | 0 | 26 | | | | |
| 01:45 | | 1 | 35 | 1 | 132 | 0 | 32 | 2 | 110 | 3 | 242 |
| 02:00 | | 0 | 52 | | | 0 | 29 | | | | |
| 02:15 | | 0 | 35 | | | 0 | 48 | | | | |
| 02:30 | | 0 | 26 | | | 1 | 48 | | | | |
| 02:45 | | 1 | 48 | 1 | 161 | 0 | 37 | 1 | 162 | 2 | 323 |
| 03:00 | | 1 | 67 | | | 0 | 46 | | | | |
| 03:15 | | 1 | 41 | | | 0 | 36 | | | | |
| 03:30 | | 3 | 54 | | | 0 | 47 | | | | |
| 03:45 | | 1 | 41 | 6 | 203 | 0 | 29 | 0 | 158 | 6 | 361 |
| 04:00 | | 1 | 39 | | | 0 | 33 | | | | |
| 04:15 | | 2 | 46 | | | 0 | 45 | | | | |
| 04:30 | | 5 | 30 | | | 1 | 38 | | | | |
| 04:45 | | 9 | 51 | 17 | 166 | 1 | 55 | 2 | 171 | 19 | 337 |
| 05:00 | | 7 | 33 | | | 0 | 37 | | | | |
| 05:15 | | 13 | 37 | | | 3 | 64 | | | | |
| 05:30 | | 17 | 34 | | | 2 | 59 | | | | |
| 05:45 | | 19 | 23 | 56 | 127 | 3 | 52 | 8 | 212 | 64 | 339 |
| 06:00 | | 19 | 35 | | | 3 | 45 | | | | |
| 06:15 | | 22 | 21 | | | 6 | 43 | | | | |
| 06:30 | | 31 | 27 | | | 10 | 40 | | | | |
| 06:45 | | 26 | 23 | 98 | 106 | 19 | 41 | 38 | 169 | 136 | 275 |
| 07:00 | | 42 | 31 | | | 22 | 38 | | | | |
| 07:15 | | 61 | 19 | | | 35 | 29 | | | | |
| 07:30 | | 117 | 14 | | | 56 | 26 | | | | |
| 07:45 | | 49 | 12 | 269 | 76 | 51 | 31 | 164 | 124 | 433 | 200 |
| 08:00 | | 60 | 19 | | | 62 | 20 | | | | |
| 08:15 | | 81 | 10 | | | 69 | 29 | | | | |
| 08:30 | | 50 | 8 | | | 22 | 13 | | | | |
| 08:45 | | 48 | 9 | 239 | 46 | 24 | 18 | 177 | 80 | 416 | 126 |
| 09:00 | | 41 | 10 | | | 32 | 28 | | | | |
| 09:15 | | 36 | 9 | | | 20 | 17 | | | | |
| 09:30 | | 34 | 8 | | | 14 | 19 | | | | |
| 09:45 | | 34 | 6 | 145 | 33 | 25 | 17 | 91 | 81 | 236 | 114 |
| 10:00 | | 31 | 1 | | | 26 | 10 | | | | |
| 10:15 | | 40 | 3 | | | 15 | 4 | | | | |
| 10:30 | | 38 | 1 | | | 28 | 4 | | | | |
| 10:45 | | 48 | 1 | 157 | 6 | 39 | 1 | 108 | 19 | 265 | 25 |
| 11:00 | | 40 | 0 | | | 25 | 6 | | | | |
| 11:15 | | 35 | 1 | | | 24 | 4 | | | | |
| 11:30 | | 30 | 1 | | | 19 | 3 | | | | |
| 11:45 | | 29 | 4 | 134 | 6 | 22 | 4 | 90 | 17 | 224 | 23 |
| Total | | 1128 | 1189 | | | 686 | 1402 | | | 1814 | 2591 |
| Combined Total | | 2317 | | | | 2088 | | | | 4405 | |
| Percentage | 0.0% | | | | | | | | | | |
| Total | | 1128 | 1189 | | | 686 | 1402 | | | 1814 | 2591 |
| Percent | | 48.7% | 51.3% | | | 32.9% | 67.1% | | | 41.2% | 58.8% |
| ADT | | ADT 4,405 | | AADT 4,405 | | | | | | | |

# *Transportation Data Corporation*

*Mario Perone, mperone1@verizon.net*
*tel (781) 587-0086 cell (781) 439-4999*

Summer Street just west of
MMES Exit Only Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

04962Avolume
Site Code: 217078

| Start | 12-Oct-17 | EB | | WB | | Combined | | 13-Oct | EB | | WB | | Combined | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Thu | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. | Fri | A.M. | P.M. | A.M. | P.M. | A.M. | P.M. |
| 12:00 | | 2 | 31 | 1 | 39 | 3 | 70 | | * | * | * | * | * | * |
| 12:15 | | 1 | 51 | 0 | 27 | 1 | 78 | | * | * | * | * | * | * |
| 12:30 | | 0 | 56 | 2 | 31 | 2 | 87 | | * | * | * | * | * | * |
| 12:45 | | 0 | 38 | 0 | 31 | 0 | 69 | | * | * | * | * | * | * |
| 01:00 | | 0 | 49 | 1 | 26 | 1 | 75 | | * | * | * | * | * | * |
| 01:15 | | 0 | 33 | 0 | 53 | 0 | 86 | | * | * | * | * | * | * |
| 01:30 | | 0 | 39 | 1 | 27 | 1 | 66 | | * | * | * | * | * | * |
| 01:45 | | 0 | 44 | 0 | 42 | 0 | 86 | | * | * | * | * | * | * |
| 02:00 | | 0 | 52 | 0 | 48 | 0 | 100 | | * | * | * | * | * | * |
| 02:15 | | 0 | 57 | 0 | 36 | 0 | 93 | | * | * | * | * | * | * |
| 02:30 | | 0 | 52 | 1 | 39 | 1 | 91 | | * | * | * | * | * | * |
| 02:45 | | 1 | 39 | 0 | 36 | 1 | 75 | | * | * | * | * | * | * |
| 03:00 | | 3 | 67 | 0 | 55 | 3 | 122 | | * | * | * | * | * | * |
| 03:15 | | 0 | 38 | 0 | ***51*** | 0 | 89 | | * | * | * | * | * | * |
| 03:30 | | 0 | ***64*** | 0 | ***47*** | 0 | ***111*** | | * | * | * | * | * | * |
| 03:45 | | 0 | ***64*** | 0 | ***40*** | 0 | ***104*** | | * | * | * | * | * | * |
| 04:00 | | 1 | ***57*** | 0 | ***60*** | 1 | ***117*** | | * | * | * | * | * | * |
| 04:15 | | 0 | ***71*** | 0 | 43 | 0 | ***114*** | | * | * | * | * | * | * |
| 04:30 | | 0 | 60 | 1 | 32 | 1 | 92 | | * | * | * | * | * | * |
| 04:45 | | 0 | 56 | 2 | 41 | 2 | 97 | | * | * | * | * | * | * |
| 05:00 | | 1 | 52 | 5 | 43 | 6 | 95 | | * | * | * | * | * | * |
| 05:15 | | 4 | 62 | 4 | 58 | 8 | 120 | | * | * | * | * | * | * |
| 05:30 | | 2 | 53 | 8 | 42 | 10 | 95 | | * | * | * | * | * | * |
| 05:45 | | 10 | 55 | 8 | 30 | 18 | 85 | | * | * | * | * | * | * |
| 06:00 | | 3 | 31 | 15 | 34 | 18 | 65 | | * | * | * | * | * | * |
| 06:15 | | 6 | 38 | 16 | 28 | 22 | 66 | | * | * | * | * | * | * |
| 06:30 | | 9 | 50 | 26 | 19 | 35 | 69 | | * | * | * | * | * | * |
| 06:45 | | 9 | 31 | 17 | 28 | 26 | 59 | | * | * | * | * | * | * |
| 07:00 | | 17 | 24 | 29 | 28 | 46 | 52 | | * | * | * | * | * | * |
| 07:15 | | 32 | 33 | 46 | 16 | 78 | 49 | | * | * | * | * | * | * |
| 07:30 | | ***67*** | 22 | ***61*** | 9 | ***128*** | 31 | | * | * | * | * | * | * |
| 07:45 | | ***46*** | 13 | ***69*** | 7 | ***115*** | 20 | | * | * | * | * | * | * |
| 08:00 | | ***41*** | 16 | ***38*** | 7 | ***79*** | 23 | | * | * | * | * | * | * |
| 08:15 | | ***36*** | 16 | ***88*** | 7 | ***124*** | 23 | | * | * | * | * | * | * |
| 08:30 | | 41 | 16 | 37 | 12 | 78 | 28 | | * | * | * | * | * | * |
| 08:45 | | 30 | 17 | 39 | 8 | 69 | 25 | | * | * | * | * | * | * |
| 09:00 | | 29 | 17 | 29 | 13 | 58 | 30 | | * | * | * | * | * | * |
| 09:15 | | 41 | 12 | 33 | 11 | 74 | 23 | | * | * | * | * | * | * |
| 09:30 | | 43 | 8 | 25 | 5 | 68 | 13 | | * | * | * | * | * | * |
| 09:45 | | 27 | 10 | 37 | 8 | 64 | 18 | | * | * | * | * | * | * |
| 10:00 | | 40 | 7 | 30 | 2 | 70 | 9 | | * | * | * | * | * | * |
| 10:15 | | 36 | 9 | 36 | 5 | 72 | 14 | | * | * | * | * | * | * |
| 10:30 | | 39 | 1 | 36 | 0 | 75 | 1 | | * | * | * | * | * | * |
| 10:45 | | 26 | 3 | 34 | 3 | 60 | 6 | | * | * | * | * | * | * |
| 11:00 | | 37 | 1 | 29 | 1 | 66 | 2 | | * | * | * | * | * | * |
| 11:15 | | 31 | 1 | 34 | 0 | 65 | 1 | | * | * | * | * | * | * |
| 11:30 | | 44 | 3 | 38 | 0 | 82 | 3 | | * | * | * | * | * | * |
| 11:45 | | 41 | 2 | 43 | 0 | 84 | 2 | | * | * | * | * | * | * |
| Total | | 796 | 1621 | 919 | 1228 | 1715 | 2849 | | 0 | 0 | 0 | 0 | 0 | 0 |
| Day Total | | 2417 | | 2147 | | 4564 | | | 0 | | 0 | | 0 | |
| % Total | | 17.4% | 35.5% | 20.1% | 26.9% | | | | 0.0% | 0.0% | 0.0% | 0.0% | | |
| Peak | - | 07:30 | 03:30 | 07:30 | 03:15 | 07:30 | 03:30 | - | - | - | - | - | - | - |
| Vol. | - | 190 | 256 | 256 | 198 | 446 | 446 | - | - | - | - | - | - | - |
| P.H.F. | | 0.709 | 0.901 | 0.727 | 0.825 | 0.871 | 0.953 | | | | | | | |

ADT ADT 4,564 AADT 4,564

***Transportation Data Corporation***
*Mario Perone, mperone1@verizon.net*
*tel (781) 587-0086 cell (781) 439-4999*

Summer Street just west of
MMES Exit Only Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

04962Avolume
Site Code: 217078

| Start | 12-Oct-17 | EB | | Hour Totals | | WB | | Hour Totals | | Combined Totals | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Time | Thu | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon | Morning | Afternoon |
| 12:00 | | 2 | 31 | | | 1 | 39 | | | | |
| 12:15 | | 1 | 51 | | | 0 | 27 | | | | |
| 12:30 | | 0 | 56 | | | 2 | 31 | | | | |
| 12:45 | | 0 | 38 | 3 | 176 | 0 | 31 | 3 | 128 | 6 | 304 |
| 01:00 | | 0 | 49 | | | 1 | 26 | | | | |
| 01:15 | | 0 | 33 | | | 0 | 53 | | | | |
| 01:30 | | 0 | 39 | | | 1 | 27 | | | | |
| 01:45 | | 0 | 44 | 0 | 165 | 0 | 42 | 2 | 148 | 2 | 313 |
| 02:00 | | 0 | 52 | | | 0 | 48 | | | | |
| 02:15 | | 0 | 57 | | | 0 | 36 | | | | |
| 02:30 | | 0 | 52 | | | 1 | 39 | | | | |
| 02:45 | | 1 | 39 | 1 | 200 | 0 | 36 | 1 | 159 | 2 | 359 |
| 03:00 | | 3 | 67 | | | 0 | 55 | | | | |
| 03:15 | | 0 | 38 | | | 0 | 51 | | | | |
| 03:30 | | 0 | 64 | | | 0 | 47 | | | | |
| 03:45 | | 0 | 64 | 3 | 233 | 0 | 40 | 0 | 193 | 3 | 426 |
| 04:00 | | 1 | 57 | | | 0 | 60 | | | | |
| 04:15 | | 0 | 71 | | | 0 | 43 | | | | |
| 04:30 | | 0 | 60 | | | 1 | 32 | | | | |
| 04:45 | | 0 | 56 | 1 | 244 | 2 | 41 | 3 | 176 | 4 | 420 |
| 05:00 | | 1 | 52 | | | 5 | 43 | | | | |
| 05:15 | | 4 | 62 | | | 4 | 58 | | | | |
| 05:30 | | 2 | 53 | | | 8 | 42 | | | | |
| 05:45 | | 10 | 55 | 17 | 222 | 8 | 30 | 25 | 173 | 42 | 395 |
| 06:00 | | 3 | 31 | | | 15 | 34 | | | | |
| 06:15 | | 6 | 38 | | | 16 | 28 | | | | |
| 06:30 | | 9 | 50 | | | 26 | 19 | | | | |
| 06:45 | | 9 | 31 | 27 | 150 | 17 | 28 | 74 | 109 | 101 | 259 |
| 07:00 | | 17 | 24 | | | 29 | 28 | | | | |
| 07:15 | | 32 | 33 | | | 46 | 16 | | | | |
| 07:30 | | 67 | 22 | | | 61 | 9 | | | | |
| 07:45 | | 46 | 13 | 162 | 92 | 69 | 7 | 205 | 60 | 367 | 152 |
| 08:00 | | 41 | 16 | | | 38 | 7 | | | | |
| 08:15 | | 36 | 16 | | | 88 | 7 | | | | |
| 08:30 | | 41 | 16 | | | 37 | 12 | | | | |
| 08:45 | | 30 | 17 | 148 | 65 | 39 | 8 | 202 | 34 | 350 | 99 |
| 09:00 | | 29 | 17 | | | 29 | 13 | | | | |
| 09:15 | | 41 | 12 | | | 33 | 11 | | | | |
| 09:30 | | 43 | 8 | | | 25 | 5 | | | | |
| 09:45 | | 27 | 10 | 140 | 47 | 37 | 8 | 124 | 37 | 264 | 84 |
| 10:00 | | 40 | 7 | | | 30 | 2 | | | | |
| 10:15 | | 36 | 9 | | | 36 | 5 | | | | |
| 10:30 | | 39 | 1 | | | 36 | 0 | | | | |
| 10:45 | | 26 | 3 | 141 | 20 | 34 | 3 | 136 | 10 | 277 | 30 |
| 11:00 | | 37 | 1 | | | 29 | 1 | | | | |
| 11:15 | | 31 | 1 | | | 34 | 0 | | | | |
| 11:30 | | 44 | 3 | | | 38 | 0 | | | | |
| 11:45 | | 41 | 2 | 153 | 7 | 43 | 0 | 144 | 1 | 297 | 8 |
| Total | | 796 | 1621 | | | 919 | 1228 | | | 1715 | 2849 |
| Combined Total | | 2417 | | | | 2147 | | | | 4564 | |
| Percentage | 0.0% | | | | | | | | | | |
| Total | | 796 | 1621 | | | 919 | 1228 | | | 1715 | 2849 |
| Percent | | 32.9% | 67.1% | | | 42.8% | 57.2% | | | 37.6% | 62.4% |
| ADT | | ADT 4,564 | | AADT 4,564 | | | | | | | |

# *Transportation Data Corporation*

*Mario Perone, mperone1@verizon.net*
*tel (781) 587-0086 cell (781) 439-4999*


N/S: Lincoln Street
W: MMES Northerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962D
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Northerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 07:00 AM | 2 | 20 | 2 | 42 | 0 | 0 | 0 | 0 | 0 | 66 |
| 07:15 AM | 6 | 25 | 0 | 70 | 2 | 0 | 0 | 0 | 0 | 103 |
| 07:30 AM | 4 | 46 | 0 | 114 | 9 | 0 | 0 | 0 | 0 | 173 |
| 07:45 AM | 22 | 34 | 4 | 47 | 8 | 0 | 0 | 0 | 0 | 115 |
| Total | 34 | 125 | 6 | 273 | 19 | 0 | 0 | 0 | 0 | 457 |
| 08:00 AM | 44 | 18 | 7 | 68 | 22 | 0 | 0 | 0 | 0 | 159 |
| 08:15 AM | 47 | 25 | 5 | 81 | 23 | 0 | 0 | 0 | 0 | 181 |
| 08:30 AM | 2 | 21 | 0 | 50 | 2 | 0 | 0 | 0 | 0 | 75 |
| 08:45 AM | 0 | 27 | 0 | 46 | 0 | 0 | 0 | 0 | 0 | 73 |
| Total | 93 | 91 | 12 | 245 | 47 | 0 | 0 | 0 | 0 | 488 |
| Grand Total | 127 | 216 | 18 | 518 | 66 | 0 | 0 | 0 | 0 | 945 |
| Apprch % | 35.2 | 59.8 | 5 | 88.7 | 11.3 | 0 | 0 | 0 | 0 | |
| Total % | 13.4 | 22.9 | 1.9 | 54.8 | 7 | 0 | 0 | 0 | 0 | |
| Cars & Peds | 127 | 202 | 18 | 503 | 64 | 0 | 0 | 0 | 0 | 914 |
| % Cars & Peds | 100 | 93.5 | 100 | 97.1 | 97 | 0 | 0 | 0 | 0 | 96.7 |
| Trucks & Buses | 0 | 13 | 0 | 11 | 2 | 0 | 0 | 0 | 0 | 26 |
| % Trucks & Buses | 0 | 6 | 0 | 2.1 | 3 | 0 | 0 | 0 | 0 | 2.8 |
| Bikes by Direction | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 |
| % Bikes by Direction | 0 | 0.5 | 0 | 0.8 | 0 | 0 | 0 | 0 | 0 | 0.5 |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Northerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | |
| 07:30 AM | 4 | **46** | 0 | 50 | **114** | 9 | 0 | **123** | 0 | 0 | 0 | 0 | 173 |
| 07:45 AM | 22 | 34 | 4 | 60 | 47 | 8 | 0 | 55 | 0 | 0 | 0 | 0 | 115 |
| 08:00 AM | 44 | 18 | **7** | 69 | 68 | 22 | 0 | 90 | 0 | 0 | 0 | 0 | 159 |
| 08:15 AM | **47** | 25 | 5 | **77** | 81 | **23** | 0 | 104 | 0 | 0 | 0 | 0 | **181** |
| Total Volume | 117 | 123 | 16 | 256 | 310 | 62 | 0 | 372 | 0 | 0 | 0 | 0 | 628 |
| % App. Total | 45.7 | 48 | 6.2 | | 83.3 | 16.7 | 0 | | 0 | 0 | 0 | | |
| PHF | .622 | .668 | .571 | .831 | .680 | .674 | .000 | .756 | .000 | .000 | .000 | .000 | .867 |
| Cars & Peds | 117 | 117 | 16 | 250 | 304 | 60 | 0 | 364 | 0 | 0 | 0 | 0 | 614 |
| % Cars & Peds | 100 | 95.1 | 100 | 97.7 | 98.1 | 96.8 | 0 | 97.8 | 0 | 0 | 0 | 0 | 97.8 |
| Trucks & Buses | 0 | 5 | 0 | 5 | 5 | 2 | 0 | 7 | 0 | 0 | 0 | 0 | 12 |
| % Trucks & Buses | 0 | 4.1 | 0 | 2.0 | 1.6 | 3.2 | 0 | 1.9 | 0 | 0 | 0 | 0 | 1.9 |
| Bikes by Direction | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| % Bikes by Direction | 0 | 0.8 | 0 | 0.4 | 0.3 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0.3 |

# *Transportation Data Corporation*

*Mario Perone, mperone1@verizon.net*
*tel (781) 587-0086 cell (781) 439-4999*


N/S: Lincoln Street
W: MMES Northerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962D
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Northerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 07:00 AM | 2 | 20 | 2 | 42 | 0 | 0 | 0 | 0 | 0 | 66 |
| 07:15 AM | 6 | 21 | 0 | 65 | 2 | 0 | 0 | 0 | 0 | 94 |
| 07:30 AM | 4 | 44 | 0 | 110 | 9 | 0 | 0 | 0 | 0 | 167 |
| 07:45 AM | 22 | 33 | 4 | 46 | 8 | 0 | 0 | 0 | 0 | 113 |
| Total | 34 | 118 | 6 | 263 | 19 | 0 | 0 | 0 | 0 | 440 |
| | | | | | | | | | | |
| 08:00 AM | 44 | 15 | 7 | 68 | 20 | 0 | 0 | 0 | 0 | 154 |
| 08:15 AM | 47 | 25 | 5 | 80 | 23 | 0 | 0 | 0 | 0 | 180 |
| 08:30 AM | 2 | 18 | 0 | 47 | 2 | 0 | 0 | 0 | 0 | 69 |
| 08:45 AM | 0 | 26 | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 71 |
| Total | 93 | 84 | 12 | 240 | 45 | 0 | 0 | 0 | 0 | 474 |
| | | | | | | | | | | |
| Grand Total | 127 | 202 | 18 | 503 | 64 | 0 | 0 | 0 | 0 | 914 |
| Apprch % | 36.6 | 58.2 | 5.2 | 88.7 | 11.3 | 0 | 0 | 0 | 0 | |
| Total % | 13.9 | 22.1 | 2 | 55 | 7 | 0 | 0 | 0 | 0 | |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Northerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | |
| 07:30 AM | 4 | **44** | 0 | 48 | **110** | 9 | 0 | **119** | 0 | 0 | 0 | 0 | 167 |
| 07:45 AM | 22 | 33 | 4 | 59 | 46 | 8 | 0 | 54 | 0 | 0 | 0 | 0 | 113 |
| 08:00 AM | 44 | 15 | **7** | 66 | 68 | 20 | 0 | 88 | 0 | 0 | 0 | 0 | 154 |
| 08:15 AM | **47** | 25 | 5 | **77** | 80 | **23** | 0 | 103 | 0 | 0 | 0 | 0 | **180** |
| Total Volume | 117 | 117 | 16 | 250 | 304 | 60 | 0 | 364 | 0 | 0 | 0 | 0 | 614 |
| % App. Total | 46.8 | 46.8 | 6.4 | | 83.5 | 16.5 | 0 | | 0 | 0 | 0 | | |
| PHF | .622 | .665 | .571 | .812 | .691 | .652 | .000 | .765 | .000 | .000 | .000 | .000 | .853 |

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N/S: Lincoln Street
W: MMES Northerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962D
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Trucks & Buses

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Northerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 4 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 6 |
| 07:30 AM | 0 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 5 |
| 07:45 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 6 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 12 |
| | | | | | | | | | | |
| 08:00 AM | 0 | 3 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 5 |
| 08:15 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:30 AM | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 6 |
| 08:45 AM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| Total | 0 | 7 | 0 | 5 | 2 | 0 | 0 | 0 | 0 | 14 |
| | | | | | | | | | | |
| Grand Total | 0 | 13 | 0 | 11 | 2 | 0 | 0 | 0 | 0 | 26 |
| Apprch % | 0 | 100 | 0 | 84.6 | 15.4 | 0 | 0 | 0 | 0 | |
| Total % | 0 | 50 | 0 | 42.3 | 7.7 | 0 | 0 | 0 | 0 | |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Northerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:15 AM | | | | | | | | | | | | | |
| 07:15 AM | 0 | **4** | 0 | **4** | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | **6** |
| 07:30 AM | 0 | 2 | 0 | 2 | **3** | 0 | 0 | **3** | 0 | 0 | 0 | 0 | 5 |
| 07:45 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 08:00 AM | 0 | 3 | 0 | 3 | 0 | **2** | 0 | 2 | 0 | 0 | 0 | 0 | 5 |
| Total Volume | 0 | 9 | 0 | 9 | 6 | 2 | 0 | 8 | 0 | 0 | 0 | 0 | 17 |
| % App. Total | 0 | 100 | 0 | | 75 | 25 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .563 | .000 | .563 | .500 | .250 | .000 | .667 | .000 | .000 | .000 | .000 | .708 |

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N/S: Lincoln Street
W: MMES Northerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962D
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Bikes by Direction

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Northerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 |
| 07:30 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 07:45 AM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grand Total | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 |
| Apprch % | 0 | 100 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | |
| Total % | 0 | 20 | 0 | 80 | 0 | 0 | 0 | 0 | 0 | |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Northerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:00 AM | | | | | | | | | | | | | |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | **3** | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **3** |
| 07:30 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 07:45 AM | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total Volume | 0 | 1 | 0 | 1 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 |
| % App. Total | 0 | 100 | 0 | | 100 | 0 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .250 | .000 | .250 | .333 | .000 | .000 | .333 | .000 | .000 | .000 | .000 | .417 |

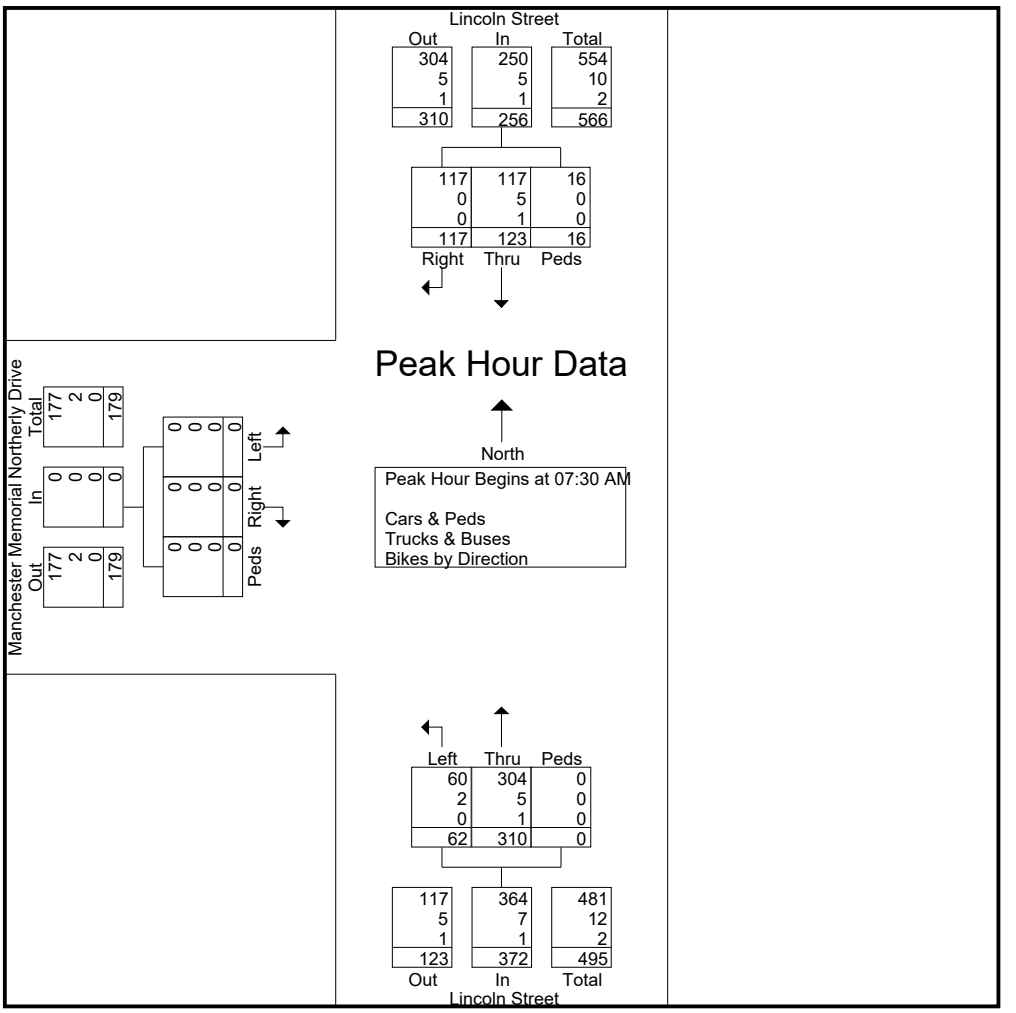
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N/S: Lincoln Street
W: MMES Northerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962D
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Northerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | |
| 07:30 AM | 4 | **46** | 0 | 50 | **114** | 9 | 0 | **123** | 0 | 0 | 0 | 0 | 173 |
| 07:45 AM | 22 | 34 | 4 | 60 | 47 | 8 | 0 | 55 | 0 | 0 | 0 | 0 | 115 |
| 08:00 AM | 44 | 18 | **7** | 69 | 68 | 22 | 0 | 90 | 0 | 0 | 0 | 0 | 159 |
| 08:15 AM | **47** | 25 | 5 | **77** | 81 | **23** | 0 | 104 | 0 | 0 | 0 | 0 | **181** |
| Total Volume | 117 | 123 | 16 | 256 | 310 | 62 | 0 | 372 | 0 | 0 | 0 | 0 | 628 |
| % App. Total | 45.7 | 48 | 6.2 | | 83.3 | 16.7 | 0 | | 0 | 0 | 0 | | |
| PHF | .622 | .668 | .571 | .831 | .680 | .674 | .000 | .756 | .000 | .000 | .000 | .000 | .867 |
| Cars & Peds | 117 | 117 | 16 | 250 | 304 | 60 | 0 | 364 | 0 | 0 | 0 | 0 | 614 |
| % Cars & Peds | 100 | 95.1 | 100 | 97.7 | 98.1 | 96.8 | 0 | 97.8 | 0 | 0 | 0 | 0 | 97.8 |
| Trucks & Buses | 0 | 5 | 0 | 5 | 5 | 2 | 0 | 7 | 0 | 0 | 0 | 0 | 12 |
| % Trucks & Buses | 0 | 4.1 | 0 | 2.0 | 1.6 | 3.2 | 0 | 1.9 | 0 | 0 | 0 | 0 | 1.9 |
| Bikes by Direction | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| % Bikes by Direction | 0 | 0.8 | 0 | 0.4 | 0.3 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0.3 |



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City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962DD
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Northerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 02:00 PM | 4 | 25 | 0 | 53 | 0 | 0 | 0 | 0 | 0 | 82 |
| 02:15 PM | 3 | 43 | 0 | 47 | 1 | 0 | 0 | 0 | 0 | 94 |
| 02:30 PM | 2 | 31 | 0 | 28 | 2 | 0 | 0 | 0 | 0 | 63 |
| 02:45 PM | 7 | 36 | 0 | 43 | 3 | 0 | 0 | 0 | 0 | 89 |
| Total | 16 | 135 | 0 | 171 | 6 | 0 | 0 | 0 | 0 | 328 |
| 03:00 PM | 32 | 21 | 0 | 64 | 0 | 0 | 0 | 0 | 0 | 117 |
| 03:15 PM | 0 | 36 | 0 | 42 | 0 | 0 | 0 | 0 | 0 | 78 |
| 03:30 PM | 3 | 44 | 0 | 51 | 1 | 0 | 0 | 0 | 0 | 99 |
| 03:45 PM | 0 | 29 | 6 | 43 | 0 | 0 | 0 | 0 | 0 | 78 |
| Total | 35 | 130 | 6 | 200 | 1 | 0 | 0 | 0 | 0 | 372 |
| 04:00 PM | 0 | 33 | 0 | 40 | 0 | 0 | 0 | 0 | 0 | 73 |
| 04:15 PM | 0 | 45 | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 90 |
| 04:30 PM | 1 | 38 | 0 | 33 | 1 | 0 | 0 | 0 | 0 | 73 |
| 04:45 PM | 2 | 51 | 0 | 51 | 3 | 0 | 0 | 0 | 0 | 107 |
| Total | 3 | 167 | 0 | 169 | 4 | 0 | 0 | 0 | 0 | 343 |
| 05:00 PM | 3 | 33 | 0 | 34 | 1 | 0 | 0 | 0 | 0 | 71 |
| 05:15 PM | 3 | 61 | 0 | 35 | 1 | 0 | 0 | 0 | 0 | 100 |
| 05:30 PM | 2 | 55 | 0 | 33 | 2 | 0 | 0 | 0 | 0 | 92 |
| 05:45 PM | 0 | 53 | 0 | 24 | 3 | 0 | 0 | 0 | 0 | 80 |
| Total | 8 | 202 | 0 | 126 | 7 | 0 | 0 | 0 | 0 | 343 |
| Grand Total | 62 | 634 | 6 | 666 | 18 | 0 | 0 | 0 | 0 | 1386 |
| Apprch % | 8.8 | 90.3 | 0.9 | 97.4 | 2.6 | 0 | 0 | 0 | 0 | |
| Total % | 4.5 | 45.7 | 0.4 | 48.1 | 1.3 | 0 | 0 | 0 | 0 | |
| Cars & Peds | 62 | 623 | 6 | 644 | 15 | 0 | 0 | 0 | 0 | 1350 |
| % Cars & Peds | 100 | 98.3 | 100 | 96.7 | 83.3 | 0 | 0 | 0 | 0 | 97.4 |
| Trucks & Buses | 0 | 10 | 0 | 18 | 3 | 0 | 0 | 0 | 0 | 31 |
| % Trucks & Buses | 0 | 1.6 | 0 | 2.7 | 16.7 | 0 | 0 | 0 | 0 | 2.2 |
| Bikes by Direction | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 |
| % Bikes by Direction | 0 | 0.2 | 0 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0.4 |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Northerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 02:45 PM | | | | | | | | | | | | | |
| 02:45 PM | 7 | 36 | 0 | 43 | 43 | **3** | 0 | 46 | 0 | 0 | 0 | 0 | 89 |
| 03:00 PM | **32** | 21 | 0 | **53** | **64** | 0 | 0 | **64** | 0 | 0 | 0 | 0 | **117** |
| 03:15 PM | 0 | 36 | 0 | 36 | 42 | 0 | 0 | 42 | 0 | 0 | 0 | 0 | 78 |
| 03:30 PM | 3 | **44** | 0 | 47 | 51 | 1 | 0 | 52 | 0 | 0 | 0 | 0 | 99 |
| Total Volume | 42 | 137 | 0 | 179 | 200 | 4 | 0 | 204 | 0 | 0 | 0 | 0 | 383 |
| % App. Total | 23.5 | 76.5 | 0 | | 98 | 2 | 0 | | 0 | 0 | 0 | | |
| PHF | .328 | .778 | .000 | .844 | .781 | .333 | .000 | .797 | .000 | .000 | .000 | .000 | .818 |
| Cars & Peds | 42 | 131 | 0 | 173 | 192 | 1 | 0 | 193 | 0 | 0 | 0 | 0 | 366 |
| % Cars & Peds | 100 | 95.6 | 0 | 96.6 | 96.0 | 25.0 | 0 | 94.6 | 0 | 0 | 0 | 0 | 95.6 |
| Trucks & Buses | 0 | 5 | 0 | 5 | 8 | 3 | 0 | 11 | 0 | 0 | 0 | 0 | 16 |
| % Trucks & Buses | 0 | 3.6 | 0 | 2.8 | 4.0 | 75.0 | 0 | 5.4 | 0 | 0 | 0 | 0 | 4.2 |
| Bikes by Direction | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| % Bikes by Direction | 0 | 0.7 | 0 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 |

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W: MMES Northerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962DD
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Northerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 02:00 PM | 4 | 24 | 0 | 52 | 0 | 0 | 0 | 0 | 0 | 80 |
| 02:15 PM | 3 | 42 | 0 | 43 | 1 | 0 | 0 | 0 | 0 | 89 |
| 02:30 PM | 2 | 30 | 0 | 26 | 2 | 0 | 0 | 0 | 0 | 60 |
| 02:45 PM | 7 | 33 | 0 | 38 | 0 | 0 | 0 | 0 | 0 | 78 |
| Total | 16 | 129 | 0 | 159 | 3 | 0 | 0 | 0 | 0 | 307 |
| | | | | | | | | | | |
| 03:00 PM | 32 | 20 | 0 | 64 | 0 | 0 | 0 | 0 | 0 | 116 |
| 03:15 PM | 0 | 36 | 0 | 41 | 0 | 0 | 0 | 0 | 0 | 77 |
| 03:30 PM | 3 | 42 | 0 | 49 | 1 | 0 | 0 | 0 | 0 | 95 |
| 03:45 PM | 0 | 29 | 6 | 42 | 0 | 0 | 0 | 0 | 0 | 77 |
| Total | 35 | 127 | 6 | 196 | 1 | 0 | 0 | 0 | 0 | 365 |
| | | | | | | | | | | |
| 04:00 PM | 0 | 33 | 0 | 39 | 0 | 0 | 0 | 0 | 0 | 72 |
| 04:15 PM | 0 | 43 | 0 | 45 | 0 | 0 | 0 | 0 | 0 | 88 |
| 04:30 PM | 1 | 38 | 0 | 32 | 1 | 0 | 0 | 0 | 0 | 72 |
| 04:45 PM | 2 | 51 | 0 | 50 | 3 | 0 | 0 | 0 | 0 | 106 |
| Total | 3 | 165 | 0 | 166 | 4 | 0 | 0 | 0 | 0 | 338 |
| | | | | | | | | | | |
| 05:00 PM | 3 | 33 | 0 | 31 | 1 | 0 | 0 | 0 | 0 | 68 |
| 05:15 PM | 3 | 61 | 0 | 35 | 1 | 0 | 0 | 0 | 0 | 100 |
| 05:30 PM | 2 | 55 | 0 | 33 | 2 | 0 | 0 | 0 | 0 | 92 |
| 05:45 PM | 0 | 53 | 0 | 24 | 3 | 0 | 0 | 0 | 0 | 80 |
| Total | 8 | 202 | 0 | 123 | 7 | 0 | 0 | 0 | 0 | 340 |
| | | | | | | | | | | |
| Grand Total | 62 | 623 | 6 | 644 | 15 | 0 | 0 | 0 | 0 | 1350 |
| Apprch % | 9 | 90.2 | 0.9 | 97.7 | 2.3 | 0 | 0 | 0 | 0 | |
| Total % | 4.6 | 46.1 | 0.4 | 47.7 | 1.1 | 0 | 0 | 0 | 0 | |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Northerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 02:45 PM | | | | | | | | | | | | | |
| 02:45 PM | 7 | 33 | 0 | 40 | 38 | 0 | 0 | 38 | 0 | 0 | 0 | 0 | 78 |
| 03:00 PM | **32** | 20 | 0 | **52** | **64** | 0 | 0 | **64** | 0 | 0 | 0 | 0 | **116** |
| 03:15 PM | 0 | 36 | 0 | 36 | 41 | 0 | 0 | 41 | 0 | 0 | 0 | 0 | 77 |
| 03:30 PM | 3 | **42** | 0 | 45 | 49 | **1** | 0 | 50 | 0 | 0 | 0 | 0 | 95 |
| Total Volume | 42 | 131 | 0 | 173 | 192 | 1 | 0 | 193 | 0 | 0 | 0 | 0 | 366 |
| % App. Total | 24.3 | 75.7 | 0 | | 99.5 | 0.5 | 0 | | 0 | 0 | 0 | | |
| PHF | .328 | .780 | .000 | .832 | .750 | .250 | .000 | .754 | .000 | .000 | .000 | .000 | .789 |

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Client: Bryant/T. Brayton

File Name : 04962DD
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Trucks & Buses

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Northerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 02:00 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 02:15 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 02:30 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 02:45 PM | 0 | 2 | 0 | 5 | 3 | 0 | 0 | 0 | 0 | 10 |
| Total | 0 | 5 | 0 | 8 | 3 | 0 | 0 | 0 | 0 | 16 |
| 03:00 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 03:15 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 03:30 PM | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 4 |
| 03:45 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 3 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 7 |
| 04:00 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:15 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 04:30 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:45 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 5 |
| 05:00 PM | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 |
| Grand Total | 0 | 10 | 0 | 18 | 3 | 0 | 0 | 0 | 0 | 31 |
| Apprch % | 0 | 100 | 0 | 85.7 | 14.3 | 0 | 0 | 0 | 0 | |
| Total % | 0 | 32.3 | 0 | 58.1 | 9.7 | 0 | 0 | 0 | 0 | |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Northerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 02:00 PM | | | | | | | | | | | | | |
| 02:00 PM | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 02:15 PM | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 02:30 PM | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 02:45 PM | 0 | **2** | 0 | **2** | **5** | **3** | 0 | **8** | 0 | 0 | 0 | 0 | **10** |
| Total Volume | 0 | 5 | 0 | 5 | 8 | 3 | 0 | 11 | 0 | 0 | 0 | 0 | 16 |
| % App. Total | 0 | 100 | 0 | | 72.7 | 27.3 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .625 | .000 | .625 | .400 | .250 | .000 | .344 | .000 | .000 | .000 | .000 | .400 |

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Client: Bryant/T. Brayton

File Name : 04962DD
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Bikes by Direction

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Northerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 02:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:15 PM | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 |
| 02:30 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 02:45 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Grand Total | 0 | 1 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 |
| Apprch % | 0 | 100 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | |
| Total % | 0 | 20 | 0 | 80 | 0 | 0 | 0 | 0 | 0 | |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Northerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 02:00 PM | | | | | | | | | | | | | |
| 02:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:15 PM | 0 | 0 | 0 | 0 | **3** | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **3** |
| 02:30 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 02:45 PM | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total Volume | 0 | 1 | 0 | 1 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 |
| % App. Total | 0 | 100 | 0 | | 100 | 0 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .250 | .000 | .250 | .333 | .000 | .000 | .333 | .000 | .000 | .000 | .000 | .417 |

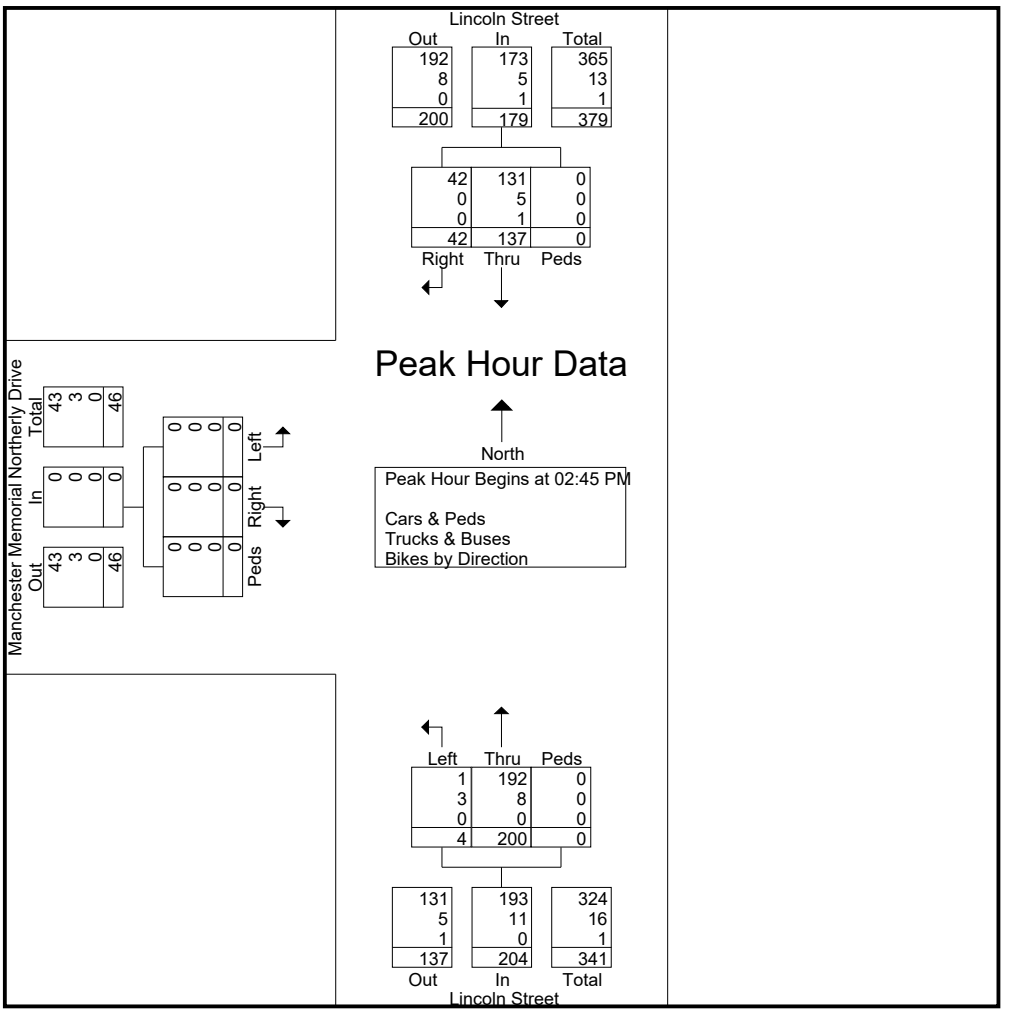
# *Transportation Data Corporation*

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*tel (781) 587-0086 cell (781) 439-4999*


N/S: Lincoln Street
W: MMES Northerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962DD
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Northerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 02:45 PM | | | | | | | | | | | | | |
| 02:45 PM | 7 | 36 | 0 | 43 | 43 | **3** | 0 | 46 | 0 | 0 | 0 | 0 | 89 |
| 03:00 PM | **32** | 21 | 0 | **53** | **64** | 0 | 0 | **64** | 0 | 0 | 0 | 0 | **117** |
| 03:15 PM | 0 | 36 | 0 | 36 | 42 | 0 | 0 | 42 | 0 | 0 | 0 | 0 | 78 |
| 03:30 PM | 3 | **44** | 0 | 47 | 51 | 1 | 0 | 52 | 0 | 0 | 0 | 0 | 99 |
| Total Volume | 42 | 137 | 0 | 179 | 200 | 4 | 0 | 204 | 0 | 0 | 0 | 0 | 383 |
| % App. Total | 23.5 | 76.5 | 0 | | 98 | 2 | 0 | | 0 | 0 | 0 | | |
| PHF | .328 | .778 | .000 | .844 | .781 | .333 | .000 | .797 | .000 | .000 | .000 | .000 | .818 |
| Cars & Peds | 42 | 131 | 0 | 173 | 192 | 1 | 0 | 193 | 0 | 0 | 0 | 0 | 366 |
| % Cars & Peds | 100 | 95.6 | 0 | 96.6 | 96.0 | 25.0 | 0 | 94.6 | 0 | 0 | 0 | 0 | 95.6 |
| Trucks & Buses | 0 | 5 | 0 | 5 | 8 | 3 | 0 | 11 | 0 | 0 | 0 | 0 | 16 |
| % Trucks & Buses | 0 | 3.6 | 0 | 2.8 | 4.0 | 75.0 | 0 | 5.4 | 0 | 0 | 0 | 0 | 4.2 |
| Bikes by Direction | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| % Bikes by Direction | 0 | 0.7 | 0 | 0.6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.3 |



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N/S: Lincoln Street
W: MMES Southerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962C
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Southerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 07:00 AM | 0 | 20 | 0 | 41 | 0 | 0 | 0 | 0 | 0 | 61 |
| 07:15 AM | 0 | 24 | 0 | 71 | 4 | 0 | 0 | 2 | 0 | 101 |
| 07:30 AM | 1 | 46 | 1 | 121 | 3 | 0 | 0 | 3 | 1 | 176 |
| 07:45 AM | 5 | 28 | 1 | 46 | 3 | 0 | 0 | 10 | 0 | 93 |
| Total | 6 | 118 | 2 | 279 | 10 | 0 | 0 | 15 | 1 | 431 |
| | | | | | | | | | | |
| 08:00 AM | 5 | 13 | 4 | 60 | 2 | 0 | 0 | 28 | 0 | 112 |
| 08:15 AM | 4 | 21 | 0 | 77 | 1 | 0 | 0 | 28 | 0 | 131 |
| 08:30 AM | 1 | 20 | 0 | 50 | 0 | 0 | 0 | 2 | 0 | 73 |
| 08:45 AM | 0 | 26 | 0 | 48 | 0 | 0 | 0 | 0 | 0 | 74 |
| Total | 10 | 80 | 4 | 235 | 3 | 0 | 0 | 58 | 0 | 390 |
| | | | | | | | | | | |
| Grand Total | 16 | 198 | 6 | 514 | 13 | 0 | 0 | 73 | 1 | 821 |
| Apprch % | 7.3 | 90 | 2.7 | 97.5 | 2.5 | 0 | 0 | 98.6 | 1.4 | |
| Total % | 1.9 | 24.1 | 0.7 | 62.6 | 1.6 | 0 | 0 | 8.9 | 0.1 | |
| Cars & Peds | 15 | 185 | 6 | 497 | 13 | 0 | 0 | 73 | 1 | 790 |
| % Cars & Peds | 93.8 | 93.4 | 100 | 96.7 | 100 | 0 | 0 | 100 | 100 | 96.2 |
| Trucks & Buses | 0 | 13 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 26 |
| % Trucks & Buses | 0 | 6.6 | 0 | 2.5 | 0 | 0 | 0 | 0 | 0 | 3.2 |
| Bikes by Direction | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 |
| % Bikes by Direction | 6.2 | 0 | 0 | 0.8 | 0 | 0 | 0 | 0 | 0 | 0.6 |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Southerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | |
| 07:30 AM | 1 | **46** | 1 | **48** | **121** | **3** | 0 | **124** | 0 | 3 | **1** | 4 | **176** |
| 07:45 AM | **5** | 28 | 1 | 34 | 46 | 3 | 0 | 49 | 0 | 10 | 0 | 10 | 93 |
| 08:00 AM | 5 | 13 | **4** | 22 | 60 | 2 | 0 | 62 | 0 | **28** | 0 | **28** | 112 |
| 08:15 AM | 4 | 21 | 0 | 25 | 77 | 1 | 0 | 78 | 0 | 28 | 0 | 28 | 131 |
| Total Volume | 15 | 108 | 6 | 129 | 304 | 9 | 0 | 313 | 0 | 69 | 1 | 70 | 512 |
| % App. Total | 11.6 | 83.7 | 4.7 | | 97.1 | 2.9 | 0 | | 0 | 98.6 | 1.4 | | |
| PHF | .750 | .587 | .375 | .672 | .628 | .750 | .000 | .631 | .000 | .616 | .250 | .625 | .727 |
| Cars & Peds | 14 | 103 | 6 | 123 | 296 | 9 | 0 | 305 | 0 | 69 | 1 | 70 | 498 |
| % Cars & Peds | 93.3 | 95.4 | 100 | 95.3 | 97.4 | 100 | 0 | 97.4 | 0 | 100 | 100 | 100 | 97.3 |
| Trucks & Buses | 0 | 5 | 0 | 5 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 12 |
| % Trucks & Buses | 0 | 4.6 | 0 | 3.9 | 2.3 | 0 | 0 | 2.2 | 0 | 0 | 0 | 0 | 2.3 |
| Bikes by Direction | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| % Bikes by Direction | 6.7 | 0 | 0 | 0.8 | 0.3 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0.4 |

# *Transportation Data Corporation*

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N/S: Lincoln Street
W: MMES Southerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962C
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Southerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 07:00 AM | 0 | 20 | 0 | 41 | 0 | 0 | 0 | 0 | 0 | 61 |
| 07:15 AM | 0 | 20 | 0 | 66 | 4 | 0 | 0 | 2 | 0 | 92 |
| 07:30 AM | 1 | 44 | 1 | 117 | 3 | 0 | 0 | 3 | 1 | 170 |
| 07:45 AM | 4 | 28 | 1 | 45 | 3 | 0 | 0 | 10 | 0 | 91 |
| Total | 5 | 112 | 2 | 269 | 10 | 0 | 0 | 15 | 1 | 414 |
| | | | | | | | | | | |
| 08:00 AM | 5 | 10 | 4 | 58 | 2 | 0 | 0 | 28 | 0 | 107 |
| 08:15 AM | 4 | 21 | 0 | 76 | 1 | 0 | 0 | 28 | 0 | 130 |
| 08:30 AM | 1 | 17 | 0 | 47 | 0 | 0 | 0 | 2 | 0 | 67 |
| 08:45 AM | 0 | 25 | 0 | 47 | 0 | 0 | 0 | 0 | 0 | 72 |
| Total | 10 | 73 | 4 | 228 | 3 | 0 | 0 | 58 | 0 | 376 |
| | | | | | | | | | | |
| Grand Total | 15 | 185 | 6 | 497 | 13 | 0 | 0 | 73 | 1 | 790 |
| Apprch % | 7.3 | 89.8 | 2.9 | 97.5 | 2.5 | 0 | 0 | 98.6 | 1.4 | |
| Total % | 1.9 | 23.4 | 0.8 | 62.9 | 1.6 | 0 | 0 | 9.2 | 0.1 | |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Southerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | |
| 07:30 AM | 1 | **44** | 1 | **46** | **117** | **3** | 0 | **120** | 0 | 3 | **1** | 4 | **170** |
| 07:45 AM | 4 | 28 | 1 | 33 | 45 | 3 | 0 | 48 | 0 | 10 | 0 | 10 | 91 |
| 08:00 AM | **5** | 10 | **4** | 19 | 58 | 2 | 0 | 60 | 0 | **28** | 0 | **28** | 107 |
| 08:15 AM | 4 | 21 | 0 | 25 | 76 | 1 | 0 | 77 | 0 | 28 | 0 | 28 | 130 |
| Total Volume | 14 | 103 | 6 | 123 | 296 | 9 | 0 | 305 | 0 | 69 | 1 | 70 | 498 |
| % App. Total | 11.4 | 83.7 | 4.9 | | 97 | 3 | 0 | | 0 | 98.6 | 1.4 | | |
| PHF | .700 | .585 | .375 | .668 | .632 | .750 | .000 | .635 | .000 | .616 | .250 | .625 | .732 |

# *Transportation Data Corporation*

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N/S: Lincoln Street
W: MMES Southerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962C
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Trucks & Buses

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Southerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 4 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 6 |
| 07:30 AM | 0 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 5 |
| 07:45 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 6 | 0 | 6 | 0 | 0 | 0 | 0 | 0 | 12 |
| | | | | | | | | | | |
| 08:00 AM | 0 | 3 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 5 |
| 08:15 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 08:30 AM | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 6 |
| 08:45 AM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| Total | 0 | 7 | 0 | 7 | 0 | 0 | 0 | 0 | 0 | 14 |
| | | | | | | | | | | |
| Grand Total | 0 | 13 | 0 | 13 | 0 | 0 | 0 | 0 | 0 | 26 |
| Apprch % | 0 | 100 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | |
| Total % | 0 | 50 | 0 | 50 | 0 | 0 | 0 | 0 | 0 | |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Southerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:15 AM | | | | | | | | | | | | | |
| 07:15 AM | 0 | **4** | 0 | **4** | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | **6** |
| 07:30 AM | 0 | 2 | 0 | 2 | **3** | 0 | 0 | **3** | 0 | 0 | 0 | 0 | 5 |
| 07:45 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 08:00 AM | 0 | 3 | 0 | 3 | 2 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 5 |
| Total Volume | 0 | 9 | 0 | 9 | 8 | 0 | 0 | 8 | 0 | 0 | 0 | 0 | 17 |
| % App. Total | 0 | 100 | 0 | | 100 | 0 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .563 | .000 | .563 | .667 | .000 | .000 | .667 | .000 | .000 | .000 | .000 | .708 |

# *Transportation Data Corporation*

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N/S: Lincoln Street
W: MMES Southerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962C
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Bikes by Direction

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Southerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 |
| 07:30 AM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 07:45 AM | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 |
| | | | | | | | | | | |
| 08:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | | | | | | | | | | |
| Grand Total | 1 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 0 | 5 |
| Apprch % | 100 | 0 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | |
| Total % | 20 | 0 | 0 | 80 | 0 | 0 | 0 | 0 | 0 | |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Southerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:00 AM | | | | | | | | | | | | | |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | **3** | 0 | 0 | **3** | 0 | 0 | 0 | 0 | **3** |
| 07:30 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 07:45 AM | **1** | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total Volume | 1 | 0 | 0 | 1 | 4 | 0 | 0 | 4 | 0 | 0 | 0 | 0 | 5 |
| % App. Total | 100 | 0 | 0 | | 100 | 0 | 0 | | 0 | 0 | 0 | | |
| PHF | .250 | .000 | .000 | .250 | .333 | .000 | .000 | .333 | .000 | .000 | .000 | .000 | .417 |

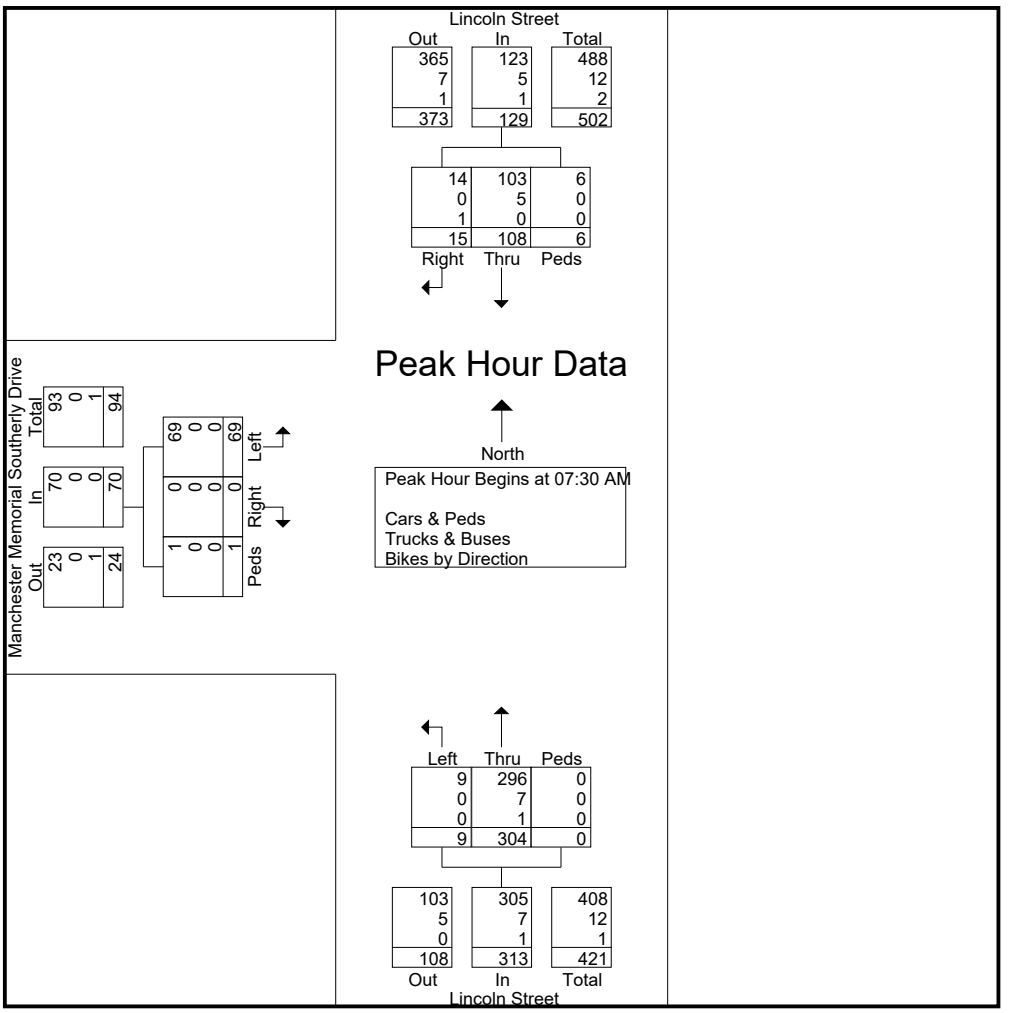
# *Transportation Data Corporation*

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N/S: Lincoln Street
W: MMES Southerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962C
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Southerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | |
| 07:30 AM | 1 | **46** | 1 | **48** | **121** | **3** | 0 | **124** | 0 | 3 | **1** | 4 | **176** |
| 07:45 AM | **5** | 28 | 1 | 34 | 46 | 3 | 0 | 49 | 0 | 10 | 0 | 10 | 93 |
| 08:00 AM | 5 | 13 | **4** | 22 | 60 | 2 | 0 | 62 | 0 | **28** | 0 | **28** | 112 |
| 08:15 AM | 4 | 21 | 0 | 25 | 77 | 1 | 0 | 78 | 0 | 28 | 0 | 28 | 131 |
| Total Volume | 15 | 108 | 6 | 129 | 304 | 9 | 0 | 313 | 0 | 69 | 1 | 70 | 512 |
| % App. Total | 11.6 | 83.7 | 4.7 | | 97.1 | 2.9 | 0 | | 0 | 98.6 | 1.4 | | |
| PHF | .750 | .587 | .375 | .672 | .628 | .750 | .000 | .631 | .000 | .616 | .250 | .625 | .727 |
| Cars & Peds | 14 | 103 | 6 | 123 | 296 | 9 | 0 | 305 | 0 | 69 | 1 | 70 | 498 |
| % Cars & Peds | 93.3 | 95.4 | 100 | 95.3 | 97.4 | 100 | 0 | 97.4 | 0 | 100 | 100 | 100 | 97.3 |
| Trucks & Buses | 0 | 5 | 0 | 5 | 7 | 0 | 0 | 7 | 0 | 0 | 0 | 0 | 12 |
| % Trucks & Buses | 0 | 4.6 | 0 | 3.9 | 2.3 | 0 | 0 | 2.2 | 0 | 0 | 0 | 0 | 2.3 |
| Bikes by Direction | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| % Bikes by Direction | 6.7 | 0 | 0 | 0.8 | 0.3 | 0 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0.4 |



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N/S: Lincoln Street
W: MMES Southerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962CC
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Southerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 02:00 PM | 0 | 26 | 0 | 51 | 0 | 0 | 0 | 2 | 0 | 79 |
| 02:15 PM | 1 | 46 | 0 | 43 | 0 | 0 | 0 | 2 | 0 | 92 |
| 02:30 PM | 3 | 29 | 0 | 26 | 1 | 0 | 0 | 2 | 0 | 61 |
| 02:45 PM | 2 | 33 | 12 | 38 | 3 | 0 | 0 | 9 | 0 | 97 |
| Total | 6 | 134 | 12 | 158 | 4 | 0 | 0 | 15 | 0 | 329 |
| 03:00 PM | 0 | 23 | 8 | 38 | 1 | 0 | 1 | 25 | 0 | 96 |
| 03:15 PM | 0 | 35 | 0 | 34 | 0 | 0 | 1 | 8 | 0 | 78 |
| 03:30 PM | 0 | 44 | 2 | 47 | 0 | 2 | 0 | 5 | 1 | 101 |
| 03:45 PM | 0 | 30 | 0 | 38 | 0 | 0 | 1 | 3 | 0 | 72 |
| Total | 0 | 132 | 10 | 157 | 1 | 2 | 3 | 41 | 1 | 347 |
| 04:00 PM | 0 | 33 | 0 | 39 | 1 | 2 | 0 | 1 | 0 | 76 |
| 04:15 PM | 0 | 45 | 0 | 44 | 0 | 0 | 0 | 1 | 0 | 90 |
| 04:30 PM | 0 | 38 | 0 | 31 | 1 | 0 | 0 | 2 | 0 | 72 |
| 04:45 PM | 0 | 50 | 0 | 54 | 0 | 0 | 0 | 1 | 0 | 105 |
| Total | 0 | 166 | 0 | 168 | 2 | 2 | 0 | 5 | 0 | 343 |
| 05:00 PM | 0 | 35 | 0 | 34 | 0 | 0 | 1 | 2 | 0 | 72 |
| 05:15 PM | 1 | 60 | 0 | 32 | 2 | 0 | 0 | 3 | 0 | 98 |
| 05:30 PM | 0 | 55 | 0 | 32 | 2 | 0 | 1 | 4 | 0 | 94 |
| 05:45 PM | 0 | 53 | 0 | 25 | 1 | 0 | 0 | 4 | 0 | 83 |
| Total | 1 | 203 | 0 | 123 | 5 | 0 | 2 | 13 | 0 | 347 |
| Grand Total | 7 | 635 | 22 | 606 | 12 | 4 | 5 | 74 | 1 | 1366 |
| Apprch % | 1.1 | 95.6 | 3.3 | 97.4 | 1.9 | 0.6 | 6.2 | 92.5 | 1.2 | |
| Total % | 0.5 | 46.5 | 1.6 | 44.4 | 0.9 | 0.3 | 0.4 | 5.4 | 0.1 | |
| Cars & Peds | 6 | 621 | 22 | 584 | 9 | 4 | 5 | 73 | 1 | 1325 |
| % Cars & Peds | 85.7 | 97.8 | 100 | 96.4 | 75 | 100 | 100 | 98.6 | 100 | 97 |
| Trucks & Buses | 0 | 10 | 0 | 20 | 3 | 0 | 0 | 1 | 0 | 34 |
| % Trucks & Buses | 0 | 1.6 | 0 | 3.3 | 25 | 0 | 0 | 1.4 | 0 | 2.5 |
| Bikes by Direction | 1 | 4 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 7 |
| % Bikes by Direction | 14.3 | 0.6 | 0 | 0.3 | 0 | 0 | 0 | 0 | 0 | 0.5 |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Southerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 02:45 PM | | | | | | | | | | | | | |
| 02:45 PM | **2** | 33 | **12** | **47** | 38 | **3** | 0 | 41 | 0 | 9 | 0 | 9 | 97 |
| 03:00 PM | 0 | 23 | 8 | 31 | 38 | 1 | 0 | 39 | **1** | **25** | 0 | **26** | 96 |
| 03:15 PM | 0 | 35 | 0 | 35 | 34 | 0 | 0 | 34 | 1 | 8 | 0 | 9 | 78 |
| 03:30 PM | 0 | **44** | 2 | 46 | **47** | 0 | **2** | **49** | 0 | 5 | **1** | 6 | **101** |
| Total Volume | 2 | 135 | 22 | 159 | 157 | 4 | 2 | 163 | 2 | 47 | 1 | 50 | 372 |
| % App. Total | 1.3 | 84.9 | 13.8 | | 96.3 | 2.5 | 1.2 | | 4 | 94 | 2 | | |
| PHF | .250 | .767 | .458 | .846 | .835 | .333 | .250 | .832 | .500 | .470 | .250 | .481 | .921 |
| Cars & Peds | 2 | 130 | 22 | 154 | 145 | 1 | 2 | 148 | 2 | 47 | 1 | 50 | 352 |
| % Cars & Peds | 100 | 96.3 | 100 | 96.9 | 92.4 | 25.0 | 100 | 90.8 | 100 | 100 | 100 | 100 | 94.6 |
| Trucks & Buses | 0 | 5 | 0 | 5 | 11 | 3 | 0 | 14 | 0 | 0 | 0 | 0 | 19 |
| % Trucks & Buses | 0 | 3.7 | 0 | 3.1 | 7.0 | 75.0 | 0 | 8.6 | 0 | 0 | 0 | 0 | 5.1 |
| Bikes by Direction | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| % Bikes by Direction | 0 | 0 | 0 | 0 | 0.6 | 0 | 0 | 0.6 | 0 | 0 | 0 | 0 | 0.3 |

# *Transportation Data Corporation*

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*tel (781) 587-0086 cell (781) 439-4999*


N/S: Lincoln Street
W: MMES Southerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962CC
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Southerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 02:00 PM | 0 | 25 | 0 | 50 | 0 | 0 | 0 | 2 | 0 | 77 |
| 02:15 PM | 0 | 41 | 0 | 42 | 0 | 0 | 0 | 2 | 0 | 85 |
| 02:30 PM | 3 | 28 | 0 | 25 | 1 | 0 | 0 | 2 | 0 | 59 |
| 02:45 PM | 2 | 31 | 12 | 29 | 0 | 0 | 0 | 9 | 0 | 83 |
| Total | 5 | 125 | 12 | 146 | 1 | 0 | 0 | 15 | 0 | 304 |
| 03:00 PM | 0 | 22 | 8 | 38 | 1 | 0 | 1 | 25 | 0 | 95 |
| 03:15 PM | 0 | 35 | 0 | 33 | 0 | 0 | 1 | 8 | 0 | 77 |
| 03:30 PM | 0 | 42 | 2 | 45 | 0 | 2 | 0 | 5 | 1 | 97 |
| 03:45 PM | 0 | 30 | 0 | 38 | 0 | 0 | 1 | 2 | 0 | 71 |
| Total | 0 | 129 | 10 | 154 | 1 | 2 | 3 | 40 | 1 | 340 |
| 04:00 PM | 0 | 33 | 0 | 38 | 1 | 2 | 0 | 1 | 0 | 75 |
| 04:15 PM | 0 | 43 | 0 | 44 | 0 | 0 | 0 | 1 | 0 | 88 |
| 04:30 PM | 0 | 38 | 0 | 30 | 1 | 0 | 0 | 2 | 0 | 71 |
| 04:45 PM | 0 | 50 | 0 | 53 | 0 | 0 | 0 | 1 | 0 | 104 |
| Total | 0 | 164 | 0 | 165 | 2 | 2 | 0 | 5 | 0 | 338 |
| 05:00 PM | 0 | 35 | 0 | 31 | 0 | 0 | 1 | 2 | 0 | 69 |
| 05:15 PM | 1 | 60 | 0 | 32 | 2 | 0 | 0 | 3 | 0 | 98 |
| 05:30 PM | 0 | 55 | 0 | 32 | 2 | 0 | 1 | 4 | 0 | 94 |
| 05:45 PM | 0 | 53 | 0 | 24 | 1 | 0 | 0 | 4 | 0 | 82 |
| Total | 1 | 203 | 0 | 119 | 5 | 0 | 2 | 13 | 0 | 343 |
| Grand Total | 6 | 621 | 22 | 584 | 9 | 4 | 5 | 73 | 1 | 1325 |
| Apprch % | 0.9 | 95.7 | 3.4 | 97.8 | 1.5 | 0.7 | 6.3 | 92.4 | 1.3 | |
| Total % | 0.5 | 46.9 | 1.7 | 44.1 | 0.7 | 0.3 | 0.4 | 5.5 | 0.1 | |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Southerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | |
| 04:45 PM | 0 | 50 | 0 | 50 | **53** | 0 | 0 | **53** | 0 | 1 | 0 | 1 | **104** |
| 05:00 PM | 0 | 35 | 0 | 35 | 31 | 0 | 0 | 31 | **1** | 2 | 0 | 3 | 69 |
| 05:15 PM | **1** | **60** | 0 | **61** | 32 | **2** | 0 | 34 | 0 | 3 | 0 | 3 | 98 |
| 05:30 PM | 0 | 55 | 0 | 55 | 32 | 2 | 0 | 34 | 1 | **4** | 0 | **5** | 94 |
| Total Volume | 1 | 200 | 0 | 201 | 148 | 4 | 0 | 152 | 2 | 10 | 0 | 12 | 365 |
| % App. Total | 0.5 | 99.5 | 0 | | 97.4 | 2.6 | 0 | | 16.7 | 83.3 | 0 | | |
| PHF | .250 | .833 | .000 | .824 | .698 | .500 | .000 | .717 | .500 | .625 | .000 | .600 | .877 |

# *Transportation Data Corporation*

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*tel (781) 587-0086 cell (781) 439-4999*


N/S: Lincoln Street
W: MMES Southerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962CC
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Trucks & Buses

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Southerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 02:00 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 02:15 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 02:30 PM | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 02:45 PM | 0 | 2 | 0 | 8 | 3 | 0 | 0 | 0 | 0 | 13 |
| Total | 0 | 5 | 0 | 11 | 3 | 0 | 0 | 0 | 0 | 19 |
| 03:00 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 03:15 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 03:30 PM | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 4 |
| 03:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 |
| Total | 0 | 3 | 0 | 3 | 0 | 0 | 0 | 1 | 0 | 7 |
| 04:00 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:15 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 04:30 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:45 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 5 |
| 05:00 PM | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 3 |
| Grand Total | 0 | 10 | 0 | 20 | 3 | 0 | 0 | 1 | 0 | 34 |
| Apprch % | 0 | 100 | 0 | 87 | 13 | 0 | 0 | 100 | 0 | |
| Total % | 0 | 29.4 | 0 | 58.8 | 8.8 | 0 | 0 | 2.9 | 0 | |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Southerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 02:00 PM | | | | | | | | | | | | | |
| 02:00 PM | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 02:15 PM | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 02:30 PM | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 |
| 02:45 PM | 0 | **2** | 0 | **2** | **8** | **3** | 0 | **11** | 0 | 0 | 0 | 0 | **13** |
| Total Volume | 0 | 5 | 0 | 5 | 11 | 3 | 0 | 14 | 0 | 0 | 0 | 0 | 19 |
| % App. Total | 0 | 100 | 0 | | 78.6 | 21.4 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .625 | .000 | .625 | .344 | .250 | .000 | .318 | .000 | .000 | .000 | .000 | .365 |

# *Transportation Data Corporation*

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N/S: Lincoln Street
W: MMES Southerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962CC
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Bikes by Direction

| | Lincoln Street From North | | | Lincoln Street From South | | | Manchester Memorial Southerly Drive From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | Thru | Left | Peds | Right | Left | Peds | Int. Total |
| 02:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:15 PM | 1 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 02:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:45 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 1 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 6 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:45 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| Grand Total | 1 | 4 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 7 |
| Apprch % | 20 | 80 | 0 | 100 | 0 | 0 | 0 | 0 | 0 | |
| Total % | 14.3 | 57.1 | 0 | 28.6 | 0 | 0 | 0 | 0 | 0 | |

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Southerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 02:00 PM | | | | | | | | | | | | | |
| 02:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:15 PM | **1** | **4** | 0 | **5** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **5** |
| 02:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:45 PM | 0 | 0 | 0 | 0 | **1** | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 1 |
| Total Volume | 1 | 4 | 0 | 5 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 6 |
| % App. Total | 20 | 80 | 0 | | 100 | 0 | 0 | | 0 | 0 | 0 | | |
| PHF | .250 | .250 | .000 | .250 | .250 | .000 | .000 | .250 | .000 | .000 | .000 | .000 | .300 |

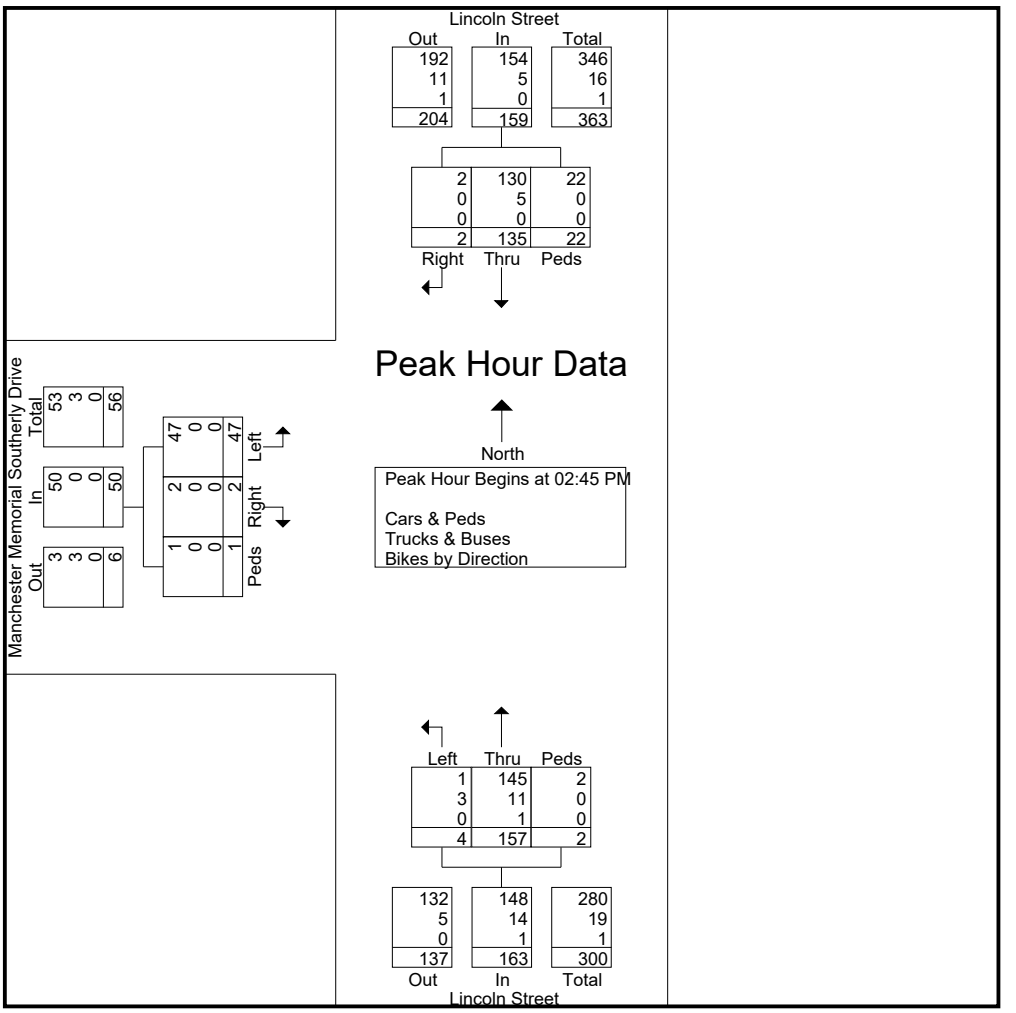
# *Transportation Data Corporation*

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*tel (781) 587-0086 cell (781) 439-4999*


N/S: Lincoln Street
W: MMES Southerly Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962CC
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

| | Lincoln Street From North | | | | Lincoln Street From South | | | | Manchester Memorial Southerly Drive From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Right | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 02:45 PM | | | | | | | | | | | | | |
| 02:45 PM | **2** | 33 | **12** | **47** | 38 | **3** | 0 | 41 | 0 | 9 | 0 | 9 | 97 |
| 03:00 PM | 0 | 23 | 8 | 31 | 38 | 1 | 0 | 39 | **1** | **25** | 0 | **26** | 96 |
| 03:15 PM | 0 | 35 | 0 | 35 | 34 | 0 | 0 | 34 | 1 | 8 | 0 | 9 | 78 |
| 03:30 PM | 0 | **44** | 2 | 46 | **47** | 0 | **2** | **49** | 0 | 5 | **1** | 6 | **101** |
| Total Volume | 2 | 135 | 22 | 159 | 157 | 4 | 2 | 163 | 2 | 47 | 1 | 50 | 372 |
| % App. Total | 1.3 | 84.9 | 13.8 | | 96.3 | 2.5 | 1.2 | | 4 | 94 | 2 | | |
| PHF | .250 | .767 | .458 | .846 | .835 | .333 | .250 | .832 | .500 | .470 | .250 | .481 | .921 |
| Cars & Peds | 2 | 130 | 22 | 154 | 145 | 1 | 2 | 148 | 2 | 47 | 1 | 50 | 352 |
| % Cars & Peds | 100 | 96.3 | 100 | 96.9 | 92.4 | 25.0 | 100 | 90.8 | 100 | 100 | 100 | 100 | 94.6 |
| Trucks & Buses | 0 | 5 | 0 | 5 | 11 | 3 | 0 | 14 | 0 | 0 | 0 | 0 | 19 |
| % Trucks & Buses | 0 | 3.7 | 0 | 3.1 | 7.0 | 75.0 | 0 | 8.6 | 0 | 0 | 0 | 0 | 5.1 |
| Bikes by Direction | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| % Bikes by Direction | 0 | 0 | 0 | 0 | 0.6 | 0 | 0 | 0.6 | 0 | 0 | 0 | 0 | 0.3 |



# *Transportation Data Corporation*

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N: Manchester Memorial Exit Driveway
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962B
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

| | Manchester Memorial Exit Driveway From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 07:00 AM | 0 | 0 | 1 | 0 | 28 | 0 | 17 | 0 | 0 | 46 |
| 07:15 AM | 1 | 2 | 1 | 0 | 46 | 0 | 32 | 0 | 0 | 82 |
| 07:30 AM | 1 | 0 | 1 | 0 | 62 | 0 | 67 | 0 | 0 | 131 |
| 07:45 AM | 4 | 0 | 1 | 0 | 66 | 0 | 46 | 0 | 0 | 117 |
| Total | 6 | 2 | 4 | 0 | 202 | 0 | 162 | 0 | 0 | 376 |
| 08:00 AM | 13 | 11 | 3 | 1 | 25 | 0 | 39 | 0 | 0 | 92 |
| 08:15 AM | 27 | 14 | 8 | 0 | 60 | 0 | 39 | 0 | 0 | 148 |
| 08:30 AM | 2 | 3 | 2 | 0 | 34 | 0 | 47 | 0 | 0 | 88 |
| 08:45 AM | 0 | 0 | 1 | 0 | 38 | 0 | 32 | 0 | 0 | 71 |
| Total | 42 | 28 | 14 | 1 | 157 | 0 | 157 | 0 | 0 | 399 |
| Grand Total | 48 | 30 | 18 | 1 | 359 | 0 | 319 | 0 | 0 | 775 |
| Apprch % | 50 | 31.2 | 18.8 | 0.3 | 99.7 | 0 | 100 | 0 | 0 | |
| Total % | 6.2 | 3.9 | 2.3 | 0.1 | 46.3 | 0 | 41.2 | 0 | 0 | |
| Cars & Peds | 48 | 28 | 18 | 0 | 347 | 0 | 305 | 0 | 0 | 746 |
| % Cars & Peds | 100 | 93.3 | 100 | 0 | 96.7 | 0 | 95.6 | 0 | 0 | 96.3 |
| Trucks & Buses | 0 | 2 | 0 | 0 | 8 | 0 | 13 | 0 | 0 | 23 |
| % Trucks & Buses | 0 | 6.7 | 0 | 0 | 2.2 | 0 | 4.1 | 0 | 0 | 3 |
| Bikes by Direction | 0 | 0 | 0 | 1 | 4 | 0 | 1 | 0 | 0 | 6 |
| % Bikes by Direction | 0 | 0 | 0 | 100 | 1.1 | 0 | 0.3 | 0 | 0 | 0.8 |

| | Manchester Memorial Exit Driveway From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | |
| 07:30 AM | 1 | 0 | 1 | 2 | 0 | 62 | 0 | 62 | **67** | 0 | 0 | **67** | 131 |
| 07:45 AM | 4 | 0 | 1 | 5 | 0 | **66** | 0 | **66** | 46 | 0 | 0 | 46 | 117 |
| 08:00 AM | 13 | 11 | 3 | 27 | **1** | 25 | 0 | 26 | 39 | 0 | 0 | 39 | 92 |
| 08:15 AM | **27** | **14** | **8** | **49** | 0 | 60 | 0 | 60 | 39 | 0 | 0 | 39 | **148** |
| Total Volume | 45 | 25 | 13 | 83 | 1 | 213 | 0 | 214 | 191 | 0 | 0 | 191 | 488 |
| % App. Total | 54.2 | 30.1 | 15.7 | | 0.5 | 99.5 | 0 | | 100 | 0 | 0 | | |
| PHF | .417 | .446 | .406 | .423 | .250 | .807 | .000 | .811 | .713 | .000 | .000 | .713 | .824 |
| Cars & Peds | 45 | 23 | 13 | 81 | 0 | 204 | 0 | 204 | 185 | 0 | 0 | 185 | 470 |
| % Cars & Peds | 100 | 92.0 | 100 | 97.6 | 0 | 95.8 | 0 | 95.3 | 96.9 | 0 | 0 | 96.9 | 96.3 |
| Trucks & Buses | 0 | 2 | 0 | 2 | 0 | 5 | 0 | 5 | 6 | 0 | 0 | 6 | 13 |
| % Trucks & Buses | 0 | 8.0 | 0 | 2.4 | 0 | 2.3 | 0 | 2.3 | 3.1 | 0 | 0 | 3.1 | 2.7 |
| Bikes by Direction | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 5 | 0 | 0 | 0 | 0 | 5 |
| % Bikes by Direction | 0 | 0 | 0 | 0 | 100 | 1.9 | 0 | 2.3 | 0 | 0 | 0 | 0 | 1.0 |

# *Transportation Data Corporation*

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N: Manchester Memorial Exit Driveway
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962B
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds

| | Manchester Memorial Exit Driveway From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 07:00 AM | 0 | 0 | 1 | 0 | 28 | 0 | 17 | 0 | 0 | 46 |
| 07:15 AM | 1 | 2 | 1 | 0 | 46 | 0 | 31 | 0 | 0 | 81 |
| 07:30 AM | 1 | 0 | 1 | 0 | 60 | 0 | 66 | 0 | 0 | 128 |
| 07:45 AM | 4 | 0 | 1 | 0 | 62 | 0 | 45 | 0 | 0 | 112 |
| Total | 6 | 2 | 4 | 0 | 196 | 0 | 159 | 0 | 0 | 367 |
| | | | | | | | | | | |
| 08:00 AM | 13 | 9 | 3 | 0 | 23 | 0 | 38 | 0 | 0 | 86 |
| 08:15 AM | 27 | 14 | 8 | 0 | 59 | 0 | 36 | 0 | 0 | 144 |
| 08:30 AM | 2 | 3 | 2 | 0 | 31 | 0 | 44 | 0 | 0 | 82 |
| 08:45 AM | 0 | 0 | 1 | 0 | 38 | 0 | 28 | 0 | 0 | 67 |
| Total | 42 | 26 | 14 | 0 | 151 | 0 | 146 | 0 | 0 | 379 |
| | | | | | | | | | | |
| Grand Total | 48 | 28 | 18 | 0 | 347 | 0 | 305 | 0 | 0 | 746 |
| Apprch % | 51.1 | 29.8 | 19.1 | 0 | 100 | 0 | 100 | 0 | 0 | |
| Total % | 6.4 | 3.8 | 2.4 | 0 | 46.5 | 0 | 40.9 | 0 | 0 | |

| | Manchester Memorial Exit Driveway From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | |
| 07:30 AM | 1 | 0 | 1 | 2 | 0 | 60 | 0 | 60 | **66** | 0 | 0 | **66** | 128 |
| 07:45 AM | 4 | 0 | 1 | 5 | 0 | **62** | 0 | **62** | 45 | 0 | 0 | 45 | 112 |
| 08:00 AM | 13 | 9 | 3 | 25 | 0 | 23 | 0 | 23 | 38 | 0 | 0 | 38 | 86 |
| 08:15 AM | **27** | **14** | **8** | **49** | 0 | 59 | 0 | 59 | 36 | 0 | 0 | 36 | **144** |
| Total Volume | 45 | 23 | 13 | 81 | 0 | 204 | 0 | 204 | 185 | 0 | 0 | 185 | 470 |
| % App. Total | 55.6 | 28.4 | 16 | | 0 | 100 | 0 | | 100 | 0 | 0 | | |
| PHF | .417 | .411 | .406 | .413 | .000 | .823 | .000 | .823 | .701 | .000 | .000 | .701 | .816 |

# *Transportation Data Corporation*

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*tel (781) 587-0086 cell (781) 439-4999*


N: Manchester Memorial Exit Driveway
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962B
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Trucks & Buses

| | Manchester Memorial Exit Driveway From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 07:30 AM | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 |
| 07:45 AM | 0 | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 0 | 4 |
| Total | 0 | 0 | 0 | 0 | 4 | 0 | 3 | 0 | 0 | 7 |
| | | | | | | | | | | |
| 08:00 AM | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 |
| 08:15 AM | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 4 |
| 08:30 AM | 0 | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 5 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 4 | 0 | 0 | 4 |
| Total | 0 | 2 | 0 | 0 | 4 | 0 | 10 | 0 | 0 | 16 |
| | | | | | | | | | | |
| Grand Total | 0 | 2 | 0 | 0 | 8 | 0 | 13 | 0 | 0 | 23 |
| Apprch % | 0 | 100 | 0 | 0 | 100 | 0 | 100 | 0 | 0 | |
| Total % | 0 | 8.7 | 0 | 0 | 34.8 | 0 | 56.5 | 0 | 0 | |

| | Manchester Memorial Exit Driveway From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:45 AM | | | | | | | | | | | | | |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | **3** | 0 | **3** | 1 | 0 | 0 | 1 | 4 |
| 08:00 AM | 0 | **2** | 0 | **2** | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 3 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | **3** | 0 | 0 | **3** | 4 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 3 | 2 | 0 | 0 | 2 | **5** |
| Total Volume | 0 | 2 | 0 | 2 | 0 | 7 | 0 | 7 | 7 | 0 | 0 | 7 | 16 |
| % App. Total | 0 | 100 | 0 | | 0 | 100 | 0 | | 100 | 0 | 0 | | |
| PHF | .000 | .250 | .000 | .250 | .000 | .583 | .000 | .583 | .583 | .000 | .000 | .583 | .800 |

# *Transportation Data Corporation*

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N: Manchester Memorial Exit Driveway
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962B
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Bikes by Direction

| | Manchester Memorial Exit Driveway From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 07:45 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 08:00 AM | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 1 | 2 | 0 | 1 | 0 | 0 | 4 |
| Grand Total | 0 | 0 | 0 | 1 | 4 | 0 | 1 | 0 | 0 | 6 |
| Apprch % | 0 | 0 | 0 | 20 | 80 | 0 | 100 | 0 | 0 | |
| Total % | 0 | 0 | 0 | 16.7 | 66.7 | 0 | 16.7 | 0 | 0 | |

| | Manchester Memorial Exit Driveway From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:15 AM | | | | | | | | | | | | | |
| 07:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:30 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 08:00 AM | 0 | 0 | 0 | 0 | **1** | **2** | 0 | **3** | 0 | 0 | 0 | 0 | **3** |
| Total Volume | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 5 | 0 | 0 | 0 | 0 | 5 |
| % App. Total | 0 | 0 | 0 | | 20 | 80 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .250 | .500 | .000 | .417 | .000 | .000 | .000 | .000 | .417 |

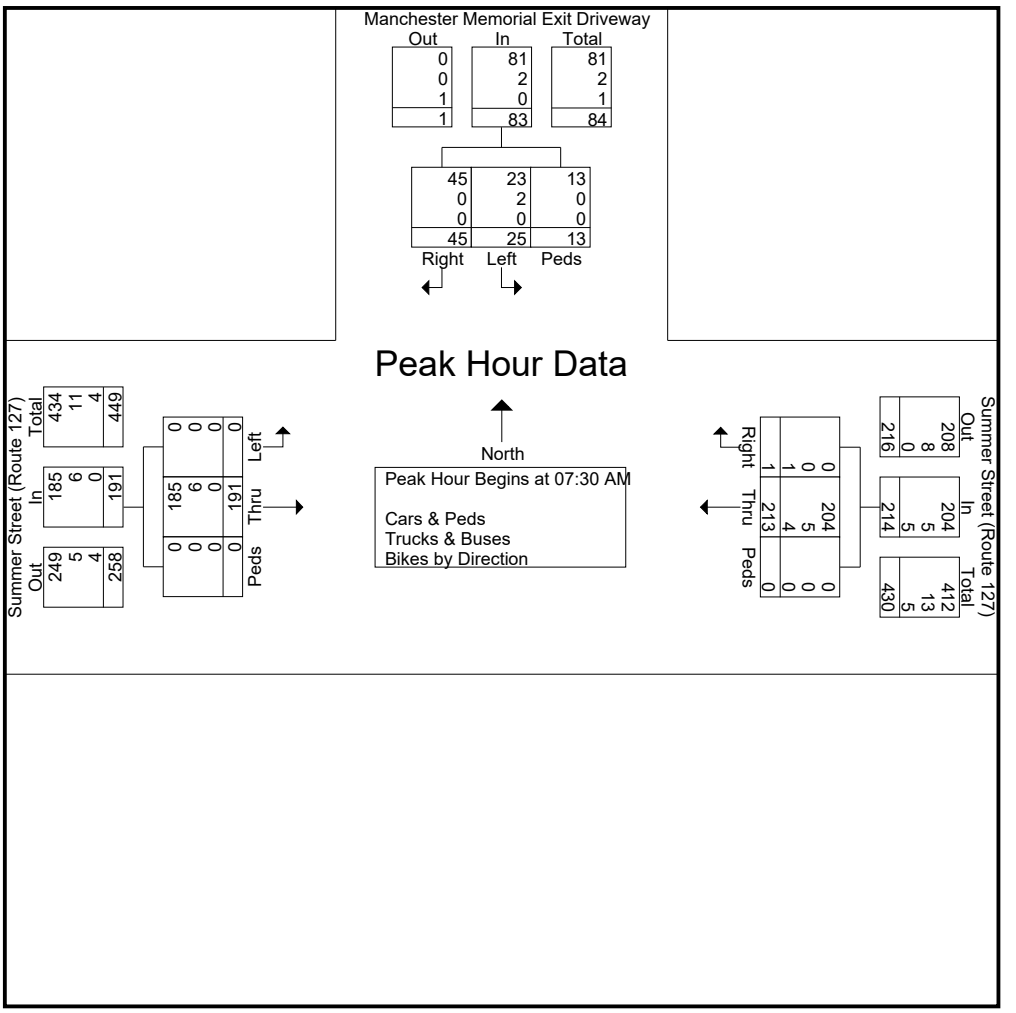
# *Transportation Data Corporation*

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N: Manchester Memorial Exit Driveway
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962B
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

| | Manchester Memorial Exit Driveway From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | |
| 07:30 AM | 1 | 0 | 1 | 2 | 0 | 62 | 0 | 62 | **67** | 0 | 0 | **67** | 131 |
| 07:45 AM | 4 | 0 | 1 | 5 | 0 | **66** | 0 | **66** | 46 | 0 | 0 | 46 | 117 |
| 08:00 AM | 13 | 11 | 3 | 27 | **1** | 25 | 0 | 26 | 39 | 0 | 0 | 39 | 92 |
| 08:15 AM | **27** | **14** | **8** | **49** | 0 | 60 | 0 | 60 | 39 | 0 | 0 | 39 | **148** |
| Total Volume | 45 | 25 | 13 | 83 | 1 | 213 | 0 | 214 | 191 | 0 | 0 | 191 | 488 |
| % App. Total | 54.2 | 30.1 | 15.7 | | 0.5 | 99.5 | 0 | | 100 | 0 | 0 | | |
| PHF | .417 | .446 | .406 | .423 | .250 | .807 | .000 | .811 | .713 | .000 | .000 | .713 | .824 |
| Cars & Peds | 45 | 23 | 13 | 81 | 0 | 204 | 0 | 204 | 185 | 0 | 0 | 185 | 470 |
| % Cars & Peds | 100 | 92.0 | 100 | 97.6 | 0 | 95.8 | 0 | 95.3 | 96.9 | 0 | 0 | 96.9 | 96.3 |
| Trucks & Buses | 0 | 2 | 0 | 2 | 0 | 5 | 0 | 5 | 6 | 0 | 0 | 6 | 13 |
| % Trucks & Buses | 0 | 8.0 | 0 | 2.4 | 0 | 2.3 | 0 | 2.3 | 3.1 | 0 | 0 | 3.1 | 2.7 |
| Bikes by Direction | 0 | 0 | 0 | 0 | 1 | 4 | 0 | 5 | 0 | 0 | 0 | 0 | 5 |
| % Bikes by Direction | 0 | 0 | 0 | 0 | 100 | 1.9 | 0 | 2.3 | 0 | 0 | 0 | 0 | 1.0 |



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N: Manchester Memorial Exit Driveway
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962BB
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

| | Manchester Memorial Exit Driveway From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 02:00 PM | 0 | 0 | 1 | 0 | 49 | 0 | 48 | 0 | 0 | 98 |
| 02:15 PM | 0 | 4 | 0 | 0 | 38 | 0 | 55 | 0 | 0 | 97 |
| 02:30 PM | 2 | 1 | 1 | 0 | 40 | 0 | 45 | 0 | 0 | 89 |
| 02:45 PM | 2 | 7 | 13 | 0 | 41 | 0 | 45 | 0 | 0 | 108 |
| Total | 4 | 12 | 15 | 0 | 168 | 0 | 193 | 0 | 0 | 392 |
| 03:00 PM | 12 | 14 | 7 | 0 | 48 | 0 | 70 | 0 | 0 | 151 |
| 03:15 PM | 2 | 9 | 1 | 0 | 55 | 0 | 39 | 0 | 0 | 106 |
| 03:30 PM | 3 | 3 | 1 | 0 | 44 | 0 | 67 | 0 | 0 | 118 |
| 03:45 PM | 2 | 0 | 6 | 0 | 40 | 0 | 67 | 0 | 0 | 115 |
| Total | 19 | 26 | 15 | 0 | 187 | 0 | 243 | 0 | 0 | 490 |
| 04:00 PM | 1 | 0 | 0 | 0 | 63 | 0 | 57 | 0 | 0 | 121 |
| 04:15 PM | 0 | 0 | 0 | 0 | 41 | 0 | 72 | 0 | 0 | 113 |
| 04:30 PM | 0 | 1 | 3 | 0 | 36 | 0 | 64 | 0 | 0 | 104 |
| 04:45 PM | 0 | 1 | 0 | 0 | 40 | 0 | 55 | 0 | 0 | 96 |
| Total | 1 | 2 | 3 | 0 | 180 | 0 | 248 | 0 | 0 | 434 |
| 05:00 PM | 5 | 0 | 1 | 0 | 36 | 0 | 51 | 0 | 0 | 93 |
| 05:15 PM | 2 | 0 | 0 | 0 | 58 | 0 | 64 | 0 | 0 | 124 |
| 05:30 PM | 2 | 1 | 1 | 0 | 44 | 0 | 55 | 0 | 0 | 103 |
| 05:45 PM | 1 | 0 | 0 | 0 | 31 | 0 | 59 | 0 | 0 | 91 |
| Total | 10 | 1 | 2 | 0 | 169 | 0 | 229 | 0 | 0 | 411 |
| Grand Total | 34 | 41 | 35 | 0 | 704 | 0 | 913 | 0 | 0 | 1727 |
| Apprch % | 30.9 | 37.3 | 31.8 | 0 | 100 | 0 | 100 | 0 | 0 | |
| Total % | 2 | 2.4 | 2 | 0 | 40.8 | 0 | 52.9 | 0 | 0 | |
| Cars & Peds | 33 | 36 | 35 | 0 | 684 | 0 | 891 | 0 | 0 | 1679 |
| % Cars & Peds | 97.1 | 87.8 | 100 | 0 | 97.2 | 0 | 97.6 | 0 | 0 | 97.2 |
| Trucks & Buses | 1 | 2 | 0 | 0 | 16 | 0 | 17 | 0 | 0 | 36 |
| % Trucks & Buses | 2.9 | 4.9 | 0 | 0 | 2.3 | 0 | 1.9 | 0 | 0 | 2.1 |
| Bikes by Direction | 0 | 3 | 0 | 0 | 4 | 0 | 5 | 0 | 0 | 12 |
| % Bikes by Direction | 0 | 7.3 | 0 | 0 | 0.6 | 0 | 0.5 | 0 | 0 | 0.7 |

| | Manchester Memorial Exit Driveway From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 03:00 PM | | | | | | | | | | | | | |
| 03:00 PM | **12** | **14** | **7** | **33** | 0 | 48 | 0 | 48 | **70** | 0 | 0 | **70** | **151** |
| 03:15 PM | 2 | 9 | 1 | 12 | 0 | **55** | 0 | **55** | 39 | 0 | 0 | 39 | 106 |
| 03:30 PM | 3 | 3 | 1 | 7 | 0 | 44 | 0 | 44 | 67 | 0 | 0 | 67 | 118 |
| 03:45 PM | 2 | 0 | 6 | 8 | 0 | 40 | 0 | 40 | 67 | 0 | 0 | 67 | 115 |
| Total Volume | 19 | 26 | 15 | 60 | 0 | 187 | 0 | 187 | 243 | 0 | 0 | 243 | 490 |
| % App. Total | 31.7 | 43.3 | 25 | | 0 | 100 | 0 | | 100 | 0 | 0 | | |
| PHF | .396 | .464 | .536 | .455 | .000 | .850 | .000 | .850 | .868 | .000 | .000 | .868 | .811 |
| Cars & Peds | 19 | 26 | 15 | 60 | 0 | 178 | 0 | 178 | 235 | 0 | 0 | 235 | 473 |
| % Cars & Peds | 100 | 100 | 100 | 100 | 0 | 95.2 | 0 | 95.2 | 96.7 | 0 | 0 | 96.7 | 96.5 |
| Trucks & Buses | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 9 | 7 | 0 | 0 | 7 | 16 |
| % Trucks & Buses | 0 | 0 | 0 | 0 | 0 | 4.8 | 0 | 4.8 | 2.9 | 0 | 0 | 2.9 | 3.3 |
| Bikes by Direction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| % Bikes by Direction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0.4 | 0.2 |

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N: Manchester Memorial Exit Driveway
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962BB
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds

| | Manchester Memorial Exit Driveway From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 02:00 PM | 0 | 0 | 1 | 0 | 48 | 0 | 46 | 0 | 0 | 95 |
| 02:15 PM | 0 | 4 | 0 | 0 | 36 | 0 | 55 | 0 | 0 | 95 |
| 02:30 PM | 2 | 1 | 1 | 0 | 37 | 0 | 43 | 0 | 0 | 84 |
| 02:45 PM | 1 | 3 | 13 | 0 | 40 | 0 | 41 | 0 | 0 | 98 |
| Total | 3 | 8 | 15 | 0 | 161 | 0 | 185 | 0 | 0 | 372 |
| | | | | | | | | | | |
| 03:00 PM | 12 | 14 | 7 | 0 | 46 | 0 | 67 | 0 | 0 | 146 |
| 03:15 PM | 2 | 9 | 1 | 0 | 53 | 0 | 39 | 0 | 0 | 104 |
| 03:30 PM | 3 | 3 | 1 | 0 | 42 | 0 | 64 | 0 | 0 | 113 |
| 03:45 PM | 2 | 0 | 6 | 0 | 37 | 0 | 65 | 0 | 0 | 110 |
| Total | 19 | 26 | 15 | 0 | 178 | 0 | 235 | 0 | 0 | 473 |
| | | | | | | | | | | |
| 04:00 PM | 1 | 0 | 0 | 0 | 62 | 0 | 57 | 0 | 0 | 120 |
| 04:15 PM | 0 | 0 | 0 | 0 | 41 | 0 | 72 | 0 | 0 | 113 |
| 04:30 PM | 0 | 1 | 3 | 0 | 35 | 0 | 64 | 0 | 0 | 103 |
| 04:45 PM | 0 | 0 | 0 | 0 | 40 | 0 | 54 | 0 | 0 | 94 |
| Total | 1 | 1 | 3 | 0 | 178 | 0 | 247 | 0 | 0 | 430 |
| | | | | | | | | | | |
| 05:00 PM | 5 | 0 | 1 | 0 | 36 | 0 | 49 | 0 | 0 | 91 |
| 05:15 PM | 2 | 0 | 0 | 0 | 57 | 0 | 62 | 0 | 0 | 121 |
| 05:30 PM | 2 | 1 | 1 | 0 | 44 | 0 | 55 | 0 | 0 | 103 |
| 05:45 PM | 1 | 0 | 0 | 0 | 30 | 0 | 58 | 0 | 0 | 89 |
| Total | 10 | 1 | 2 | 0 | 167 | 0 | 224 | 0 | 0 | 404 |
| | | | | | | | | | | |
| Grand Total | 33 | 36 | 35 | 0 | 684 | 0 | 891 | 0 | 0 | 1679 |
| Apprch % | 31.7 | 34.6 | 33.7 | 0 | 100 | 0 | 100 | 0 | 0 | |
| Total % | 2 | 2.1 | 2.1 | 0 | 40.7 | 0 | 53.1 | 0 | 0 | |

| | Manchester Memorial Exit Driveway From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 03:00 PM | | | | | | | | | | | | | |
| 03:00 PM | **12** | **14** | **7** | **33** | 0 | 46 | 0 | 46 | **67** | 0 | 0 | **67** | **146** |
| 03:15 PM | 2 | 9 | 1 | 12 | 0 | **53** | 0 | **53** | 39 | 0 | 0 | 39 | 104 |
| 03:30 PM | 3 | 3 | 1 | 7 | 0 | 42 | 0 | 42 | 64 | 0 | 0 | 64 | 113 |
| 03:45 PM | 2 | 0 | 6 | 8 | 0 | 37 | 0 | 37 | 65 | 0 | 0 | 65 | 110 |
| Total Volume | 19 | 26 | 15 | 60 | 0 | 178 | 0 | 178 | 235 | 0 | 0 | 235 | 473 |
| % App. Total | 31.7 | 43.3 | 25 | | 0 | 100 | 0 | | 100 | 0 | 0 | | |
| PHF | .396 | .464 | .536 | .455 | .000 | .840 | .000 | .840 | .877 | .000 | .000 | .877 | .810 |

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N: Manchester Memorial Exit Driveway
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962BB
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Trucks & Buses

| | Manchester Memorial Exit Driveway From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 02:00 PM | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 3 |
| 02:15 PM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 02:30 PM | 0 | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 5 |
| 02:45 PM | 1 | 2 | 0 | 0 | 1 | 0 | 3 | 0 | 0 | 7 |
| Total | 1 | 2 | 0 | 0 | 7 | 0 | 7 | 0 | 0 | 17 |
| 03:00 PM | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 4 |
| 03:15 PM | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 03:30 PM | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 5 |
| 03:45 PM | 0 | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 5 |
| Total | 0 | 0 | 0 | 0 | 9 | 0 | 7 | 0 | 0 | 16 |
| 04:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 2 |
| Grand Total | 1 | 2 | 0 | 0 | 16 | 0 | 17 | 0 | 0 | 36 |
| Apprch % | 33.3 | 66.7 | 0 | 0 | 100 | 0 | 100 | 0 | 0 | |
| Total % | 2.8 | 5.6 | 0 | 0 | 44.4 | 0 | 47.2 | 0 | 0 | |

| | Manchester Memorial Exit Driveway From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 02:15 PM | | | | | | | | | | | | | |
| 02:15 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 02:30 PM | 0 | 0 | 0 | 0 | 0 | **3** | 0 | **3** | 2 | 0 | 0 | 2 | 5 |
| 02:45 PM | **1** | **2** | 0 | **3** | 0 | 1 | 0 | 1 | **3** | 0 | 0 | **3** | **7** |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 2 | 2 | 0 | 0 | 2 | 4 |
| Total Volume | 1 | 2 | 0 | 3 | 0 | 8 | 0 | 8 | 7 | 0 | 0 | 7 | 18 |
| % App. Total | 33.3 | 66.7 | 0 | | 0 | 100 | 0 | | 100 | 0 | 0 | | |
| PHF | .250 | .250 | .000 | .250 | .000 | .667 | .000 | .667 | .583 | .000 | .000 | .583 | .643 |

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E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962BB
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Bikes by Direction

| | Manchester Memorial Exit Driveway From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 02:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:45 PM | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 |
| Total | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 3 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 03:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 04:00 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:30 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 04:45 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 3 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:15 PM | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 3 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:45 PM | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 |
| Total | 0 | 0 | 0 | 0 | 2 | 0 | 3 | 0 | 0 | 5 |
| Grand Total | 0 | 3 | 0 | 0 | 4 | 0 | 5 | 0 | 0 | 12 |
| Apprch % | 0 | 100 | 0 | 0 | 100 | 0 | 100 | 0 | 0 | |
| Total % | 0 | 25 | 0 | 0 | 33.3 | 0 | 41.7 | 0 | 0 | |

| | Manchester Memorial Exit Driveway From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:30 PM | | | | | | | | | | | | | |
| 04:30 PM | 0 | 0 | 0 | 0 | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | 1 |
| 04:45 PM | 0 | **1** | 0 | **1** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:15 PM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | **2** | 0 | 0 | **2** | **3** |
| Total Volume | 0 | 1 | 0 | 1 | 0 | 2 | 0 | 2 | 2 | 0 | 0 | 2 | 5 |
| % App. Total | 0 | 100 | 0 | | 0 | 100 | 0 | | 100 | 0 | 0 | | |
| PHF | .000 | .250 | .000 | .250 | .000 | .500 | .000 | .500 | .250 | .000 | .000 | .250 | .417 |

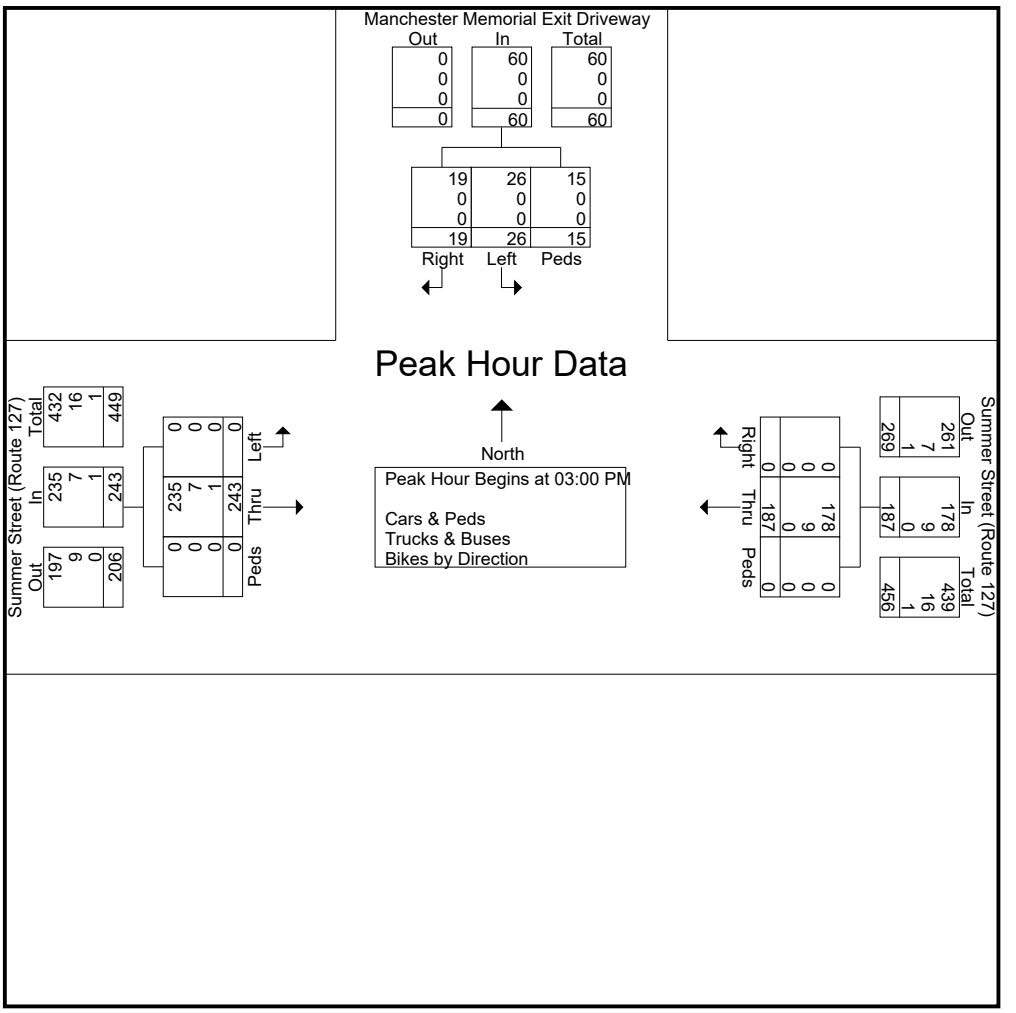
# *Transportation Data Corporation*

*Mario Perone, mperone1@verizon.net*
*tel (781) 587-0086 cell (781) 439-4999*


N: Manchester Memorial Exit Driveway
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962BB
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

| | Manchester Memorial Exit Driveway From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 03:00 PM | | | | | | | | | | | | | |
| 03:00 PM | **12** | **14** | **7** | **33** | 0 | 48 | 0 | 48 | **70** | 0 | 0 | **70** | **151** |
| 03:15 PM | 2 | 9 | 1 | 12 | 0 | **55** | 0 | **55** | 39 | 0 | 0 | 39 | 106 |
| 03:30 PM | 3 | 3 | 1 | 7 | 0 | 44 | 0 | 44 | 67 | 0 | 0 | 67 | 118 |
| 03:45 PM | 2 | 0 | 6 | 8 | 0 | 40 | 0 | 40 | 67 | 0 | 0 | 67 | 115 |
| Total Volume | 19 | 26 | 15 | 60 | 0 | 187 | 0 | 187 | 243 | 0 | 0 | 243 | 490 |
| % App. Total | 31.7 | 43.3 | 25 | | 0 | 100 | 0 | | 100 | 0 | 0 | | |
| PHF | .396 | .464 | .536 | .455 | .000 | .850 | .000 | .850 | .868 | .000 | .000 | .868 | .811 |
| Cars & Peds | 19 | 26 | 15 | 60 | 0 | 178 | 0 | 178 | 235 | 0 | 0 | 235 | 473 |
| % Cars & Peds | 100 | 100 | 100 | 100 | 0 | 95.2 | 0 | 95.2 | 96.7 | 0 | 0 | 96.7 | 96.5 |
| Trucks & Buses | 0 | 0 | 0 | 0 | 0 | 9 | 0 | 9 | 7 | 0 | 0 | 7 | 16 |
| % Trucks & Buses | 0 | 0 | 0 | 0 | 0 | 4.8 | 0 | 4.8 | 2.9 | 0 | 0 | 2.9 | 3.3 |
| Bikes by Direction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| % Bikes by Direction | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0.4 | 0 | 0 | 0.4 | 0.2 |



# *Transportation Data Corporation*

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N: Lincoln Street
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962A
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

| | Lincoln Street From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 07:00 AM | 5 | 14 | 0 | 32 | 22 | 1 | 11 | 7 | 0 | 92 |
| 07:15 AM | 7 | 19 | 1 | 55 | 40 | 0 | 15 | 18 | 0 | 155 |
| 07:30 AM | 16 | 28 | 3 | 78 | 45 | 3 | 20 | 48 | 0 | 241 |
| 07:45 AM | 11 | 17 | 1 | 33 | 55 | 0 | 30 | 16 | 0 | 163 |
| Total | 39 | 78 | 5 | 198 | 162 | 4 | 76 | 89 | 0 | 651 |
| | | | | | | | | | | |
| 08:00 AM | 3 | 8 | 2 | 41 | 23 | 0 | 28 | 21 | 0 | 126 |
| 08:15 AM | 4 | 16 | 4 | 63 | 57 | 2 | 40 | 13 | 0 | 199 |
| 08:30 AM | 4 | 16 | 2 | 36 | 30 | 1 | 36 | 14 | 0 | 139 |
| 08:45 AM | 5 | 20 | 0 | 40 | 35 | 0 | 23 | 8 | 0 | 131 |
| Total | 16 | 60 | 8 | 180 | 145 | 3 | 127 | 56 | 0 | 595 |
| | | | | | | | | | | |
| Grand Total | 55 | 138 | 13 | 378 | 307 | 7 | 203 | 145 | 0 | 1246 |
| Apprch % | 26.7 | 67 | 6.3 | 54.6 | 44.4 | 1 | 58.3 | 41.7 | 0 | |
| Total % | 4.4 | 11.1 | 1 | 30.3 | 24.6 | 0.6 | 16.3 | 11.6 | 0 | |
| Cars & Peds | 53 | 127 | 13 | 365 | 296 | 7 | 191 | 141 | 0 | 1193 |
| % Cars & Peds | 96.4 | 92 | 100 | 96.6 | 96.4 | 100 | 94.1 | 97.2 | 0 | 95.7 |
| Trucks & Buses | 2 | 11 | 0 | 9 | 6 | 0 | 11 | 4 | 0 | 43 |
| % Trucks & Buses | 3.6 | 8 | 0 | 2.4 | 2 | 0 | 5.4 | 2.8 | 0 | 3.5 |
| Bikes by Direction | 0 | 0 | 0 | 4 | 5 | 0 | 1 | 0 | 0 | 10 |
| % Bikes by Direction | 0 | 0 | 0 | 1.1 | 1.6 | 0 | 0.5 | 0 | 0 | 0.8 |

| | Lincoln Street From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | |
| 07:30 AM | **16** | **28** | 3 | **47** | **78** | 45 | **3** | **126** | 20 | **48** | 0 | **68** | **241** |
| 07:45 AM | 11 | 17 | 1 | 29 | 33 | 55 | 0 | 88 | 30 | 16 | 0 | 46 | 163 |
| 08:00 AM | 3 | 8 | 2 | 13 | 41 | 23 | 0 | 64 | 28 | 21 | 0 | 49 | 126 |
| 08:15 AM | 4 | 16 | **4** | 24 | 63 | **57** | 2 | 122 | **40** | 13 | 0 | 53 | 199 |
| Total Volume | 34 | 69 | 10 | 113 | 215 | 180 | 5 | 400 | 118 | 98 | 0 | 216 | 729 |
| % App. Total | 30.1 | 61.1 | 8.8 | | 53.8 | 45 | 1.2 | | 54.6 | 45.4 | 0 | | |
| PHF | .531 | .616 | .625 | .601 | .689 | .789 | .417 | .794 | .738 | .510 | .000 | .794 | .756 |
| Cars & Peds | 33 | 65 | 10 | 108 | 208 | 171 | 5 | 384 | 112 | 96 | 0 | 208 | 700 |
| % Cars & Peds | 97.1 | 94.2 | 100 | 95.6 | 96.7 | 95.0 | 100 | 96.0 | 94.9 | 98.0 | 0 | 96.3 | 96.0 |
| Trucks & Buses | 1 | 4 | 0 | 5 | 5 | 4 | 0 | 9 | 6 | 2 | 0 | 8 | 22 |
| % Trucks & Buses | 2.9 | 5.8 | 0 | 4.4 | 2.3 | 2.2 | 0 | 2.3 | 5.1 | 2.0 | 0 | 3.7 | 3.0 |
| Bikes by Direction | 0 | 0 | 0 | 0 | 2 | 5 | 0 | 7 | 0 | 0 | 0 | 0 | 7 |
| % Bikes by Direction | 0 | 0 | 0 | 0 | 0.9 | 2.8 | 0 | 1.8 | 0 | 0 | 0 | 0 | 1.0 |

# *Transportation Data Corporation*

*Mario Perone, mperone1@verizon.net*
*tel (781) 587-0086 cell (781) 439-4999*


N: Lincoln Street
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962A
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds

| | Lincoln Street From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 07:00 AM | 5 | 14 | 0 | 32 | 22 | 1 | 11 | 7 | 0 | 92 |
| 07:15 AM | 7 | 15 | 1 | 52 | 40 | 0 | 15 | 17 | 0 | 147 |
| 07:30 AM | 15 | 27 | 3 | 74 | 44 | 3 | 19 | 48 | 0 | 233 |
| 07:45 AM | 11 | 17 | 1 | 33 | 51 | 0 | 30 | 15 | 0 | 158 |
| Total | 38 | 73 | 5 | 191 | 157 | 4 | 75 | 87 | 0 | 630 |
| | | | | | | | | | | |
| 08:00 AM | 3 | 5 | 2 | 39 | 20 | 0 | 26 | 20 | 0 | 115 |
| 08:15 AM | 4 | 16 | 4 | 62 | 56 | 2 | 37 | 13 | 0 | 194 |
| 08:30 AM | 3 | 14 | 2 | 34 | 28 | 1 | 34 | 13 | 0 | 129 |
| 08:45 AM | 5 | 19 | 0 | 39 | 35 | 0 | 19 | 8 | 0 | 125 |
| Total | 15 | 54 | 8 | 174 | 139 | 3 | 116 | 54 | 0 | 563 |
| | | | | | | | | | | |
| Grand Total | 53 | 127 | 13 | 365 | 296 | 7 | 191 | 141 | 0 | 1193 |
| Apprch % | 27.5 | 65.8 | 6.7 | 54.6 | 44.3 | 1 | 57.5 | 42.5 | 0 | |
| Total % | 4.4 | 10.6 | 1.1 | 30.6 | 24.8 | 0.6 | 16 | 11.8 | 0 | |

| | Lincoln Street From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | |
| 07:30 AM | **15** | **27** | 3 | **45** | **74** | 44 | **3** | **121** | 19 | **48** | 0 | **67** | **233** |
| 07:45 AM | 11 | 17 | 1 | 29 | 33 | 51 | 0 | 84 | 30 | 15 | 0 | 45 | 158 |
| 08:00 AM | 3 | 5 | 2 | 10 | 39 | 20 | 0 | 59 | 26 | 20 | 0 | 46 | 115 |
| 08:15 AM | 4 | 16 | **4** | 24 | 62 | **56** | 2 | 120 | **37** | 13 | 0 | 50 | 194 |
| Total Volume | 33 | 65 | 10 | 108 | 208 | 171 | 5 | 384 | 112 | 96 | 0 | 208 | 700 |
| % App. Total | 30.6 | 60.2 | 9.3 | | 54.2 | 44.5 | 1.3 | | 53.8 | 46.2 | 0 | | |
| PHF | .550 | .602 | .625 | .600 | .703 | .763 | .417 | .793 | .757 | .500 | .000 | .776 | .751 |

# *Transportation Data Corporation*

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N: Lincoln Street
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962A
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Trucks & Buses

| | Lincoln Street From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 6 |
| 07:30 AM | 1 | 1 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 6 |
| 07:45 AM | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 1 | 0 | 4 |
| Total | 1 | 5 | 0 | 4 | 3 | 0 | 1 | 2 | 0 | 16 |
| | | | | | | | | | | |
| 08:00 AM | 0 | 3 | 0 | 1 | 0 | 0 | 2 | 1 | 0 | 7 |
| 08:15 AM | 0 | 0 | 0 | 1 | 1 | 0 | 3 | 0 | 0 | 5 |
| 08:30 AM | 1 | 2 | 0 | 2 | 2 | 0 | 1 | 1 | 0 | 9 |
| 08:45 AM | 0 | 1 | 0 | 1 | 0 | 0 | 4 | 0 | 0 | 6 |
| Total | 1 | 6 | 0 | 5 | 3 | 0 | 10 | 2 | 0 | 27 |
| | | | | | | | | | | |
| Grand Total | 2 | 11 | 0 | 9 | 6 | 0 | 11 | 4 | 0 | 43 |
| Apprch % | 15.4 | 84.6 | 0 | 60 | 40 | 0 | 73.3 | 26.7 | 0 | |
| Total % | 4.7 | 25.6 | 0 | 20.9 | 14 | 0 | 25.6 | 9.3 | 0 | |

| | Lincoln Street From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 08:00 AM | | | | | | | | | | | | | |
| 08:00 AM | 0 | **3** | 0 | **3** | 1 | 0 | 0 | 1 | 2 | **1** | 0 | 3 | 7 |
| 08:15 AM | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 3 | 0 | 0 | 3 | 5 |
| 08:30 AM | **1** | 2 | 0 | 3 | **2** | **2** | 0 | **4** | 1 | 1 | 0 | 2 | **9** |
| 08:45 AM | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | **4** | 0 | 0 | **4** | 6 |
| Total Volume | 1 | 6 | 0 | 7 | 5 | 3 | 0 | 8 | 10 | 2 | 0 | 12 | 27 |
| % App. Total | 14.3 | 85.7 | 0 | | 62.5 | 37.5 | 0 | | 83.3 | 16.7 | 0 | | |
| PHF | .250 | .500 | .000 | .583 | .625 | .375 | .000 | .500 | .625 | .500 | .000 | .750 | .750 |

# *Transportation Data Corporation*

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N: Lincoln Street
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962A
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Bikes by Direction

| | Lincoln Street From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 07:00 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 07:15 AM | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| 07:30 AM | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 2 |
| 07:45 AM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| Total | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 5 |
| | | | | | | | | | | |
| 08:00 AM | 0 | 0 | 0 | 1 | 3 | 0 | 0 | 0 | 0 | 4 |
| 08:15 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 08:30 AM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 08:45 AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 1 | 3 | 0 | 1 | 0 | 0 | 5 |
| | | | | | | | | | | |
| Grand Total | 0 | 0 | 0 | 4 | 5 | 0 | 1 | 0 | 0 | 10 |
| Apprch % | 0 | 0 | 0 | 44.4 | 55.6 | 0 | 100 | 0 | 0 | |
| Total % | 0 | 0 | 0 | 40 | 50 | 0 | 10 | 0 | 0 | |

| | Lincoln Street From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:15 AM | | | | | | | | | | | | | |
| 07:15 AM | 0 | 0 | 0 | 0 | **2** | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 07:30 AM | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 2 |
| 07:45 AM | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 08:00 AM | 0 | 0 | 0 | 0 | 1 | **3** | 0 | **4** | 0 | 0 | 0 | 0 | **4** |
| Total Volume | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 9 | 0 | 0 | 0 | 0 | 9 |
| % App. Total | 0 | 0 | 0 | | 44.4 | 55.6 | 0 | | 0 | 0 | 0 | | |
| PHF | .000 | .000 | .000 | .000 | .500 | .417 | .000 | .563 | .000 | .000 | .000 | .000 | .563 |

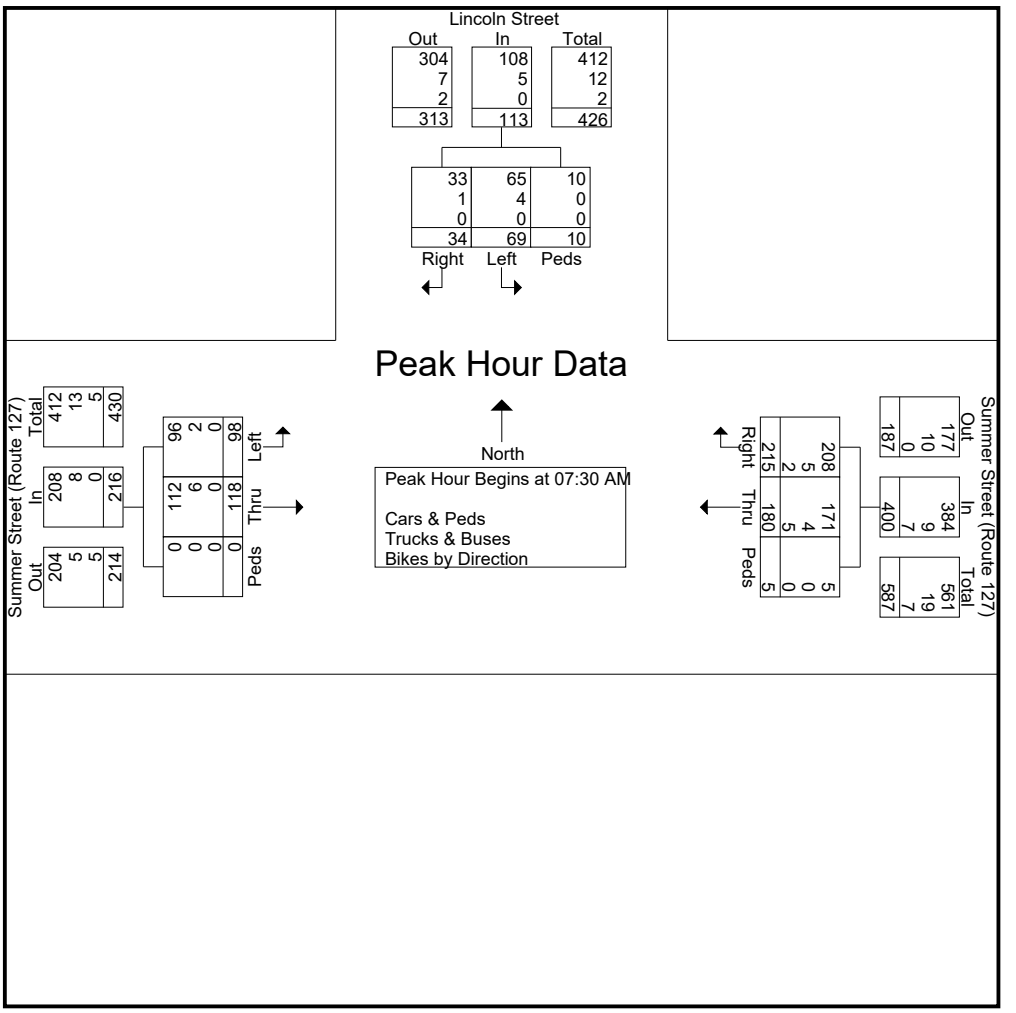
# *Transportation Data Corporation*

*Mario Perone, mperone1@verizon.net*
*tel (781) 587-0086 cell (781) 439-4999*


N: Lincoln Street
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962A
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

| | Lincoln Street From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 07:00 AM to 08:45 AM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 07:30 AM | | | | | | | | | | | | | |
| 07:30 AM | **16** | **28** | 3 | **47** | **78** | 45 | **3** | **126** | 20 | **48** | 0 | **68** | **241** |
| 07:45 AM | 11 | 17 | 1 | 29 | 33 | 55 | 0 | 88 | 30 | 16 | 0 | 46 | 163 |
| 08:00 AM | 3 | 8 | 2 | 13 | 41 | 23 | 0 | 64 | 28 | 21 | 0 | 49 | 126 |
| 08:15 AM | 4 | 16 | **4** | 24 | 63 | **57** | 2 | 122 | **40** | 13 | 0 | 53 | 199 |
| Total Volume | 34 | 69 | 10 | 113 | 215 | 180 | 5 | 400 | 118 | 98 | 0 | 216 | 729 |
| % App. Total | 30.1 | 61.1 | 8.8 | | 53.8 | 45 | 1.2 | | 54.6 | 45.4 | 0 | | |
| PHF | .531 | .616 | .625 | .601 | .689 | .789 | .417 | .794 | .738 | .510 | .000 | .794 | .756 |
| Cars & Peds | 33 | 65 | 10 | 108 | 208 | 171 | 5 | 384 | 112 | 96 | 0 | 208 | 700 |
| % Cars & Peds | 97.1 | 94.2 | 100 | 95.6 | 96.7 | 95.0 | 100 | 96.0 | 94.9 | 98.0 | 0 | 96.3 | 96.0 |
| Trucks & Buses | 1 | 4 | 0 | 5 | 5 | 4 | 0 | 9 | 6 | 2 | 0 | 8 | 22 |
| % Trucks & Buses | 2.9 | 5.8 | 0 | 4.4 | 2.3 | 2.2 | 0 | 2.3 | 5.1 | 2.0 | 0 | 3.7 | 3.0 |
| Bikes by Direction | 0 | 0 | 0 | 0 | 2 | 5 | 0 | 7 | 0 | 0 | 0 | 0 | 7 |
| % Bikes by Direction | 0 | 0 | 0 | 0 | 0.9 | 2.8 | 0 | 1.8 | 0 | 0 | 0 | 0 | 1.0 |



# *Transportation Data Corporation*

*Mario Perone, mperone1@verizon.net*
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N: Lincoln Street
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962AA
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds - Trucks & Buses - Bikes by Direction

| | Lincoln Street From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 02:00 PM | 8 | 19 | 1 | 33 | 40 | 0 | 33 | 17 | 0 | 151 |
| 02:15 PM | 4 | 40 | 3 | 29 | 35 | 0 | 42 | 15 | 0 | 168 |
| 02:30 PM | 5 | 26 | 1 | 22 | 34 | 0 | 41 | 5 | 0 | 134 |
| 02:45 PM | 7 | 27 | 21 | 27 | 35 | 0 | 39 | 14 | 0 | 170 |
| Total | 24 | 112 | 26 | 111 | 144 | 0 | 155 | 51 | 0 | 623 |
| 03:00 PM | 2 | 22 | 7 | 26 | 45 | 0 | 73 | 12 | 0 | 187 |
| 03:15 PM | 9 | 27 | 1 | 23 | 47 | 0 | 35 | 12 | 0 | 154 |
| 03:30 PM | 10 | 34 | 1 | 35 | 34 | 0 | 60 | 10 | 0 | 184 |
| 03:45 PM | 4 | 25 | 5 | 23 | 34 | 0 | 50 | 16 | 0 | 157 |
| Total | 25 | 108 | 14 | 107 | 160 | 0 | 218 | 50 | 0 | 682 |
| 04:00 PM | 7 | 26 | 0 | 28 | 59 | 0 | 48 | 11 | 0 | 179 |
| 04:15 PM | 7 | 36 | 0 | 32 | 34 | 0 | 62 | 11 | 0 | 182 |
| 04:30 PM | 7 | 33 | 4 | 20 | 27 | 0 | 51 | 13 | 1 | 156 |
| 04:45 PM | 6 | 41 | 0 | 41 | 36 | 0 | 45 | 10 | 0 | 179 |
| Total | 27 | 136 | 4 | 121 | 156 | 0 | 206 | 45 | 1 | 696 |
| 05:00 PM | 3 | 33 | 1 | 25 | 32 | 1 | 40 | 11 | 0 | 146 |
| 05:15 PM | 11 | 48 | 2 | 26 | 48 | 1 | 58 | 7 | 0 | 201 |
| 05:30 PM | 10 | 45 | 1 | 25 | 39 | 0 | 46 | 10 | 0 | 176 |
| 05:45 PM | 7 | 44 | 0 | 20 | 27 | 0 | 54 | 6 | 0 | 158 |
| Total | 31 | 170 | 4 | 96 | 146 | 2 | 198 | 34 | 0 | 681 |
| Grand Total | 107 | 526 | 48 | 435 | 606 | 2 | 777 | 180 | 1 | 2682 |
| Apprch % | 15.7 | 77.2 | 7 | 41.7 | 58.1 | 0.2 | 81.1 | 18.8 | 0.1 | |
| Total % | 4 | 19.6 | 1.8 | 16.2 | 22.6 | 0.1 | 29 | 6.7 | 0 | |
| Cars & Peds | 105 | 514 | 48 | 416 | 589 | 2 | 757 | 173 | 1 | 2605 |
| % Cars & Peds | 98.1 | 97.7 | 100 | 95.6 | 97.2 | 100 | 97.4 | 96.1 | 100 | 97.1 |
| Trucks & Buses | 2 | 9 | 0 | 16 | 13 | 0 | 12 | 7 | 0 | 59 |
| % Trucks & Buses | 1.9 | 1.7 | 0 | 3.7 | 2.1 | 0 | 1.5 | 3.9 | 0 | 2.2 |
| Bikes by Direction | 0 | 3 | 0 | 3 | 4 | 0 | 8 | 0 | 0 | 18 |
| % Bikes by Direction | 0 | 0.6 | 0 | 0.7 | 0.7 | 0 | 1 | 0 | 0 | 0.7 |

| | Lincoln Street From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 03:30 PM | | | | | | | | | | | | | |
| 03:30 PM | **10** | 34 | 1 | **45** | **35** | 34 | 0 | 69 | 60 | 10 | 0 | 70 | **184** |
| 03:45 PM | 4 | 25 | **5** | 34 | 23 | 34 | 0 | 57 | 50 | **16** | 0 | 66 | 157 |
| 04:00 PM | 7 | 26 | 0 | 33 | 28 | **59** | 0 | **87** | 48 | 11 | 0 | 59 | 179 |
| 04:15 PM | 7 | **36** | 0 | 43 | 32 | 34 | 0 | 66 | **62** | 11 | 0 | **73** | 182 |
| Total Volume | 28 | 121 | 6 | 155 | 118 | 161 | 0 | 279 | 220 | 48 | 0 | 268 | 702 |
| % App. Total | 18.1 | 78.1 | 3.9 | | 42.3 | 57.7 | 0 | | 82.1 | 17.9 | 0 | | |
| PHF | .700 | .840 | .300 | .861 | .843 | .682 | .000 | .802 | .887 | .750 | .000 | .918 | .954 |
| Cars & Peds | 27 | 118 | 6 | 151 | 116 | 156 | 0 | 272 | 216 | 47 | 0 | 263 | 686 |
| % Cars & Peds | 96.4 | 97.5 | 100 | 97.4 | 98.3 | 96.9 | 0 | 97.5 | 98.2 | 97.9 | 0 | 98.1 | 97.7 |
| Trucks & Buses | 1 | 3 | 0 | 4 | 2 | 4 | 0 | 6 | 4 | 1 | 0 | 5 | 15 |
| % Trucks & Buses | 3.6 | 2.5 | 0 | 2.6 | 1.7 | 2.5 | 0 | 2.2 | 1.8 | 2.1 | 0 | 1.9 | 2.1 |
| Bikes by Direction | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| % Bikes by Direction | 0 | 0 | 0 | 0 | 0 | 0.6 | 0 | 0.4 | 0 | 0 | 0 | 0 | 0.1 |

# *Transportation Data Corporation*

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*tel (781) 587-0086 cell (781) 439-4999*


N: Lincoln Street
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962AA
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Cars & Peds

| | Lincoln Street From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 02:00 PM | 8 | 18 | 1 | 32 | 39 | 0 | 31 | 17 | 0 | 146 |
| 02:15 PM | 4 | 36 | 3 | 28 | 33 | 0 | 42 | 15 | 0 | 161 |
| 02:30 PM | 5 | 25 | 1 | 20 | 31 | 0 | 39 | 5 | 0 | 126 |
| 02:45 PM | 6 | 26 | 21 | 21 | 35 | 0 | 36 | 9 | 0 | 154 |
| Total | 23 | 105 | 26 | 101 | 138 | 0 | 148 | 46 | 0 | 587 |
| | | | | | | | | | | |
| 03:00 PM | 2 | 21 | 7 | 26 | 44 | 0 | 70 | 12 | 0 | 182 |
| 03:15 PM | 9 | 27 | 1 | 22 | 45 | 0 | 35 | 12 | 0 | 151 |
| 03:30 PM | 9 | 33 | 1 | 34 | 33 | 0 | 58 | 9 | 0 | 177 |
| 03:45 PM | 4 | 25 | 5 | 23 | 31 | 0 | 48 | 16 | 0 | 152 |
| Total | 24 | 106 | 14 | 105 | 153 | 0 | 211 | 49 | 0 | 662 |
| | | | | | | | | | | |
| 04:00 PM | 7 | 26 | 0 | 27 | 58 | 0 | 48 | 11 | 0 | 177 |
| 04:15 PM | 7 | 34 | 0 | 32 | 34 | 0 | 62 | 11 | 0 | 180 |
| 04:30 PM | 7 | 33 | 4 | 19 | 26 | 0 | 51 | 13 | 1 | 154 |
| 04:45 PM | 6 | 41 | 0 | 40 | 36 | 0 | 43 | 10 | 0 | 176 |
| Total | 27 | 134 | 4 | 118 | 154 | 0 | 204 | 45 | 1 | 687 |
| | | | | | | | | | | |
| 05:00 PM | 3 | 33 | 1 | 23 | 32 | 1 | 39 | 10 | 0 | 142 |
| 05:15 PM | 11 | 47 | 2 | 26 | 47 | 1 | 56 | 7 | 0 | 197 |
| 05:30 PM | 10 | 45 | 1 | 24 | 39 | 0 | 46 | 10 | 0 | 175 |
| 05:45 PM | 7 | 44 | 0 | 19 | 26 | 0 | 53 | 6 | 0 | 155 |
| Total | 31 | 169 | 4 | 92 | 144 | 2 | 194 | 33 | 0 | 669 |
| | | | | | | | | | | |
| Grand Total | 105 | 514 | 48 | 416 | 589 | 2 | 757 | 173 | 1 | 2605 |
| Apprch % | 15.7 | 77.1 | 7.2 | 41.3 | 58.5 | 0.2 | 81.3 | 18.6 | 0.1 | |
| Total % | 4 | 19.7 | 1.8 | 16 | 22.6 | 0.1 | 29.1 | 6.6 | 0 | |

| | Lincoln Street From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 04:45 PM | | | | | | | | | | | | | |
| 04:45 PM | 6 | 41 | 0 | 47 | **40** | 36 | 0 | **76** | 43 | **10** | 0 | 53 | 176 |
| 05:00 PM | 3 | 33 | 1 | 37 | 23 | 32 | **1** | 56 | 39 | 10 | 0 | 49 | 142 |
| 05:15 PM | **11** | **47** | **2** | **60** | 26 | **47** | 1 | 74 | **56** | 7 | 0 | **63** | **197** |
| 05:30 PM | 10 | 45 | 1 | 56 | 24 | 39 | 0 | 63 | 46 | 10 | 0 | 56 | 175 |
| Total Volume | 30 | 166 | 4 | 200 | 113 | 154 | 2 | 269 | 184 | 37 | 0 | 221 | 690 |
| % App. Total | 15 | 83 | 2 | | 42 | 57.2 | 0.7 | | 83.3 | 16.7 | 0 | | |
| PHF | .682 | .883 | .500 | .833 | .706 | .819 | .500 | .885 | .821 | .925 | .000 | .877 | .876 |

# *Transportation Data Corporation*

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N: Lincoln Street
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962AA
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Trucks & Buses

| | Lincoln Street From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 02:00 PM | 0 | 1 | 0 | 1 | 1 | 0 | 2 | 0 | 0 | 5 |
| 02:15 PM | 0 | 1 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 4 |
| 02:30 PM | 0 | 1 | 0 | 1 | 3 | 0 | 2 | 0 | 0 | 7 |
| 02:45 PM | 1 | 1 | 0 | 6 | 0 | 0 | 0 | 5 | 0 | 13 |
| Total | 1 | 4 | 0 | 9 | 6 | 0 | 4 | 5 | 0 | 29 |
| | | | | | | | | | | |
| 03:00 PM | 0 | 1 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 4 |
| 03:15 PM | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 3 |
| 03:30 PM | 1 | 1 | 0 | 1 | 1 | 0 | 2 | 1 | 0 | 7 |
| 03:45 PM | 0 | 0 | 0 | 0 | 3 | 0 | 2 | 0 | 0 | 5 |
| Total | 1 | 2 | 0 | 2 | 7 | 0 | 6 | 1 | 0 | 19 |
| | | | | | | | | | | |
| 04:00 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:15 PM | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 04:30 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 04:45 PM | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 2 |
| Total | 0 | 2 | 0 | 3 | 0 | 0 | 1 | 0 | 0 | 6 |
| | | | | | | | | | | |
| 05:00 PM | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 4 |
| 05:15 PM | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 1 | 0 | 5 |
| | | | | | | | | | | |
| Grand Total | 2 | 9 | 0 | 16 | 13 | 0 | 12 | 7 | 0 | 59 |
| Apprch % | 18.2 | 81.8 | 0 | 55.2 | 44.8 | 0 | 63.2 | 36.8 | 0 | |
| Total % | 3.4 | 15.3 | 0 | 27.1 | 22 | 0 | 20.3 | 11.9 | 0 | |

| | Lincoln Street From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 02:00 PM | | | | | | | | | | | | | |
| 02:00 PM | 0 | **1** | 0 | 1 | 1 | 1 | 0 | 2 | **2** | 0 | 0 | 2 | 5 |
| 02:15 PM | 0 | 1 | 0 | 1 | 1 | 2 | 0 | 3 | 0 | 0 | 0 | 0 | 4 |
| 02:30 PM | 0 | 1 | 0 | 1 | 1 | **3** | 0 | 4 | 2 | 0 | 0 | 2 | 7 |
| 02:45 PM | **1** | 1 | 0 | **2** | **6** | 0 | 0 | **6** | 0 | **5** | 0 | **5** | **13** |
| Total Volume | 1 | 4 | 0 | 5 | 9 | 6 | 0 | 15 | 4 | 5 | 0 | 9 | 29 |
| % App. Total | 20 | 80 | 0 | | 60 | 40 | 0 | | 44.4 | 55.6 | 0 | | |
| PHF | .250 | 1.00 | .000 | .625 | .375 | .500 | .000 | .625 | .500 | .250 | .000 | .450 | .558 |

# *Transportation Data Corporation*

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N: Lincoln Street
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962AA
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

Groups Printed- Bikes by Direction

| | Lincoln Street From North | | | Summer Street (Route 127) From East | | | Summer Street (Route 127) From West | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | Right | Thru | Peds | Thru | Left | Peds | Int. Total |
| 02:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:15 PM | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 02:30 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 02:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 3 |
| Total | 0 | 3 | 0 | 1 | 0 | 0 | 3 | 0 | 0 | 7 |
| | | | | | | | | | | |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| 03:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:30 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 03:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| | | | | | | | | | | |
| 04:00 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 04:15 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:30 PM | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 04:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 |
| Total | 0 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 3 |
| | | | | | | | | | | |
| 05:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 05:15 PM | 0 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 3 |
| 05:30 PM | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:45 PM | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 3 |
| Total | 0 | 0 | 0 | 2 | 2 | 0 | 3 | 0 | 0 | 7 |
| | | | | | | | | | | |
| Grand Total | 0 | 3 | 0 | 3 | 4 | 0 | 8 | 0 | 0 | 18 |
| Apprch % | 0 | 100 | 0 | 42.9 | 57.1 | 0 | 100 | 0 | 0 | |
| Total % | 0 | 16.7 | 0 | 16.7 | 22.2 | 0 | 44.4 | 0 | 0 | |

| | Lincoln Street From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 02:15 PM | | | | | | | | | | | | | |
| 02:15 PM | 0 | **3** | 0 | **3** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **3** |
| 02:30 PM | 0 | 0 | 0 | 0 | **1** | 0 | 0 | **1** | 0 | 0 | 0 | 0 | 1 |
| 02:45 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | **3** | 0 | 0 | **3** | 3 |
| 03:00 PM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 1 |
| Total Volume | 0 | 3 | 0 | 3 | 1 | 0 | 0 | 1 | 4 | 0 | 0 | 4 | 8 |
| % App. Total | 0 | 100 | 0 | | 100 | 0 | 0 | | 100 | 0 | 0 | | |
| PHF | .000 | .250 | .000 | .250 | .250 | .000 | .000 | .250 | .333 | .000 | .000 | .333 | .667 |

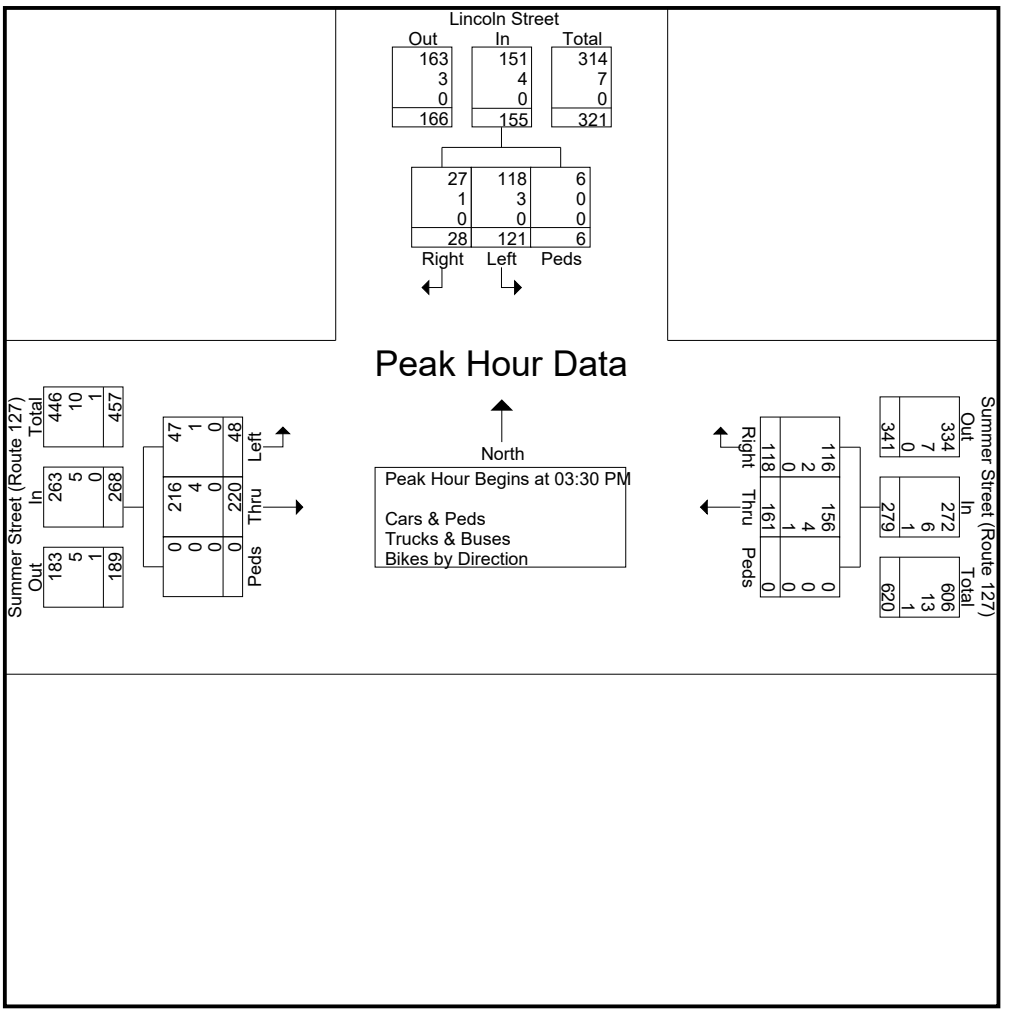
# *Transportation Data Corporation*

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N: Lincoln Street
E/W: Summer Street (Route 127)
City, State: Mancester-by-the-Sea, MA
Client: Bryant/T. Brayton

File Name : 04962AA
Site Code : 217078
Start Date : 10/12/2017
Page No : 1

| | Lincoln Street From North | | | | Summer Street (Route 127) From East | | | | Summer Street (Route 127) From West | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Start Time | Right | Left | Peds | App. Total | Right | Thru | Peds | App. Total | Thru | Left | Peds | App. Total | Int. Total |
| Peak Hour Analysis From 02:00 PM to 05:45 PM - Peak 1 of 1 | | | | | | | | | | | | | |
| Peak Hour for Entire Intersection Begins at 03:30 PM | | | | | | | | | | | | | |
| 03:30 PM | **10** | 34 | 1 | **45** | **35** | 34 | 0 | 69 | 60 | 10 | 0 | 70 | **184** |
| 03:45 PM | 4 | 25 | **5** | 34 | 23 | 34 | 0 | 57 | 50 | **16** | 0 | 66 | 157 |
| 04:00 PM | 7 | 26 | 0 | 33 | 28 | **59** | 0 | **87** | 48 | 11 | 0 | 59 | 179 |
| 04:15 PM | 7 | **36** | 0 | 43 | 32 | 34 | 0 | 66 | **62** | 11 | 0 | **73** | 182 |
| Total Volume | 28 | 121 | 6 | 155 | 118 | 161 | 0 | 279 | 220 | 48 | 0 | 268 | 702 |
| % App. Total | 18.1 | 78.1 | 3.9 | | 42.3 | 57.7 | 0 | | 82.1 | 17.9 | 0 | | |
| PHF | .700 | .840 | .300 | .861 | .843 | .682 | .000 | .802 | .887 | .750 | .000 | .918 | .954 |
| Cars & Peds | 27 | 118 | 6 | 151 | 116 | 156 | 0 | 272 | 216 | 47 | 0 | 263 | 686 |
| % Cars & Peds | 96.4 | 97.5 | 100 | 97.4 | 98.3 | 96.9 | 0 | 97.5 | 98.2 | 97.9 | 0 | 98.1 | 97.7 |
| Trucks & Buses | 1 | 3 | 0 | 4 | 2 | 4 | 0 | 6 | 4 | 1 | 0 | 5 | 15 |
| % Trucks & Buses | 3.6 | 2.5 | 0 | 2.6 | 1.7 | 2.5 | 0 | 2.2 | 1.8 | 2.1 | 0 | 1.9 | 2.1 |
| Bikes by Direction | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| % Bikes by Direction | 0 | 0 | 0 | 0 | 0 | 0.6 | 0 | 0.4 | 0 | 0 | 0 | 0 | 0.1 |



# APPENDIX B

## Trip Generation

November 7, 2017
BAI No. 217078

# Trip Generation Calculations

Manchester Memorial Elementary School
Lincoln Street
Manchester-by-the-Sea, Massachusetts

Currently, there are approximately 338 elementary students and 13 preschool students at the existing Manchester Memorial Elementary School. The existing preschool hours are 8:30 A.M. to 12:30 P.M. The preschool is broken out into two sessions based on age. On Monday, Wednesday, and Thursday the session is for four and five year old students, and on Tuesday and Thursday for the three year old students. The projected student population for the new school is anticipated to be 335 elementary school students and 60 preschool students. The anticipated net loss of three elementary school students is negligible to overall trip generation. The preschool will offer an afternoon option from 12:30-3:00 P.M. for both sessions. The preschool is anticipated to have 15 students per session in the morning and afternoon. It is anticipated that two trips will be generated per preschool student in the school A.M. peak for drop-off and in the school P.M. peak for pickup. The directional distribution of the generated trips will be 50% entering and 50% exiting in both the school A.M. and P.M. peak hours, since it is anticipated that the parents will enter, drop off or pick up their student, then promptly exit. The number of trips generated by the preschool staff is anticipated to be negligible or will remain the same.

| Session Option | | Existing Number of Preschool Students | Number of Anticipated Preschool Students |
|---|---|---|---|
| Session 1 (Monday/Wednesday/Friday) | Morning | 13 | 15 |
| | Afternoon | 0 | 15 |
| Session 2 (Tuesday/Thursday) | Morning | 13 | 15 |
| | Afternoon | 0 | 15 |
| **Total** | | **26** | **60** |

## School A.M. Peak Hour

During the school A.M. peak hour, there are 13 trips entering and 13 trips exiting the existing Manchester Memorial Elementary School driveways for the preschool students. These trips are the parents dropping off their preschool students. The projected number of trips is 15 trips entering and 15 trips exiting.

The **increase** in the number of trips entering and exiting the proposed site for the projected number of preschool students is:

15 - 13 = 2, trips entering
15 - 13 = 2, trips exiting

# Trip Generation Calculations

Manchester Memorial Elementary School
Lincoln Street
Manchester-by-the-Sea, Massachusetts

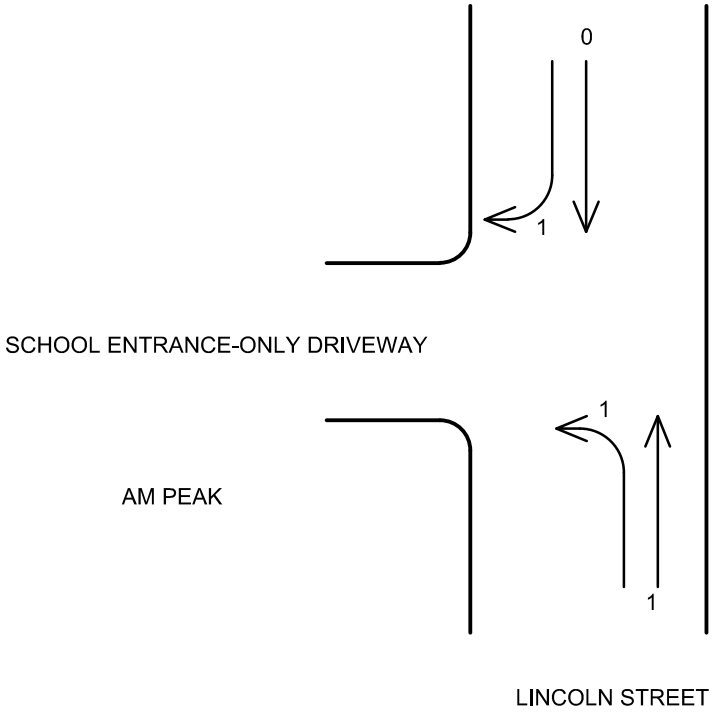
## School P.M. Peak Hour

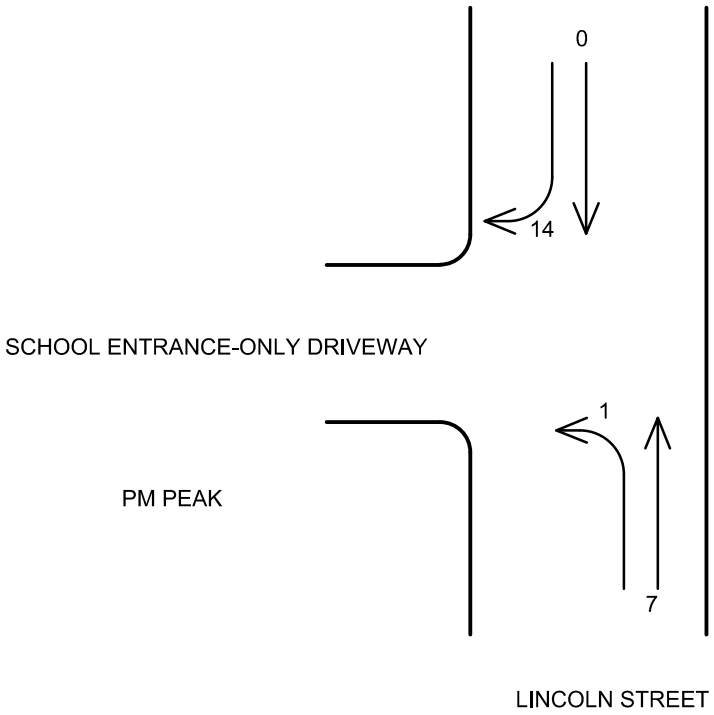
During the school P.M. peak hour, there are 0 trips entering and 0 trips exiting the existing Manchester Memorial Elementary School driveways for the preschool students. The projected number of trips is 15 trips entering and 15 trips exiting. These trips are the parents picking up their preschool students.

The **increase** in the number of trips entering and exiting the proposed site for the projected number of preschool students is:

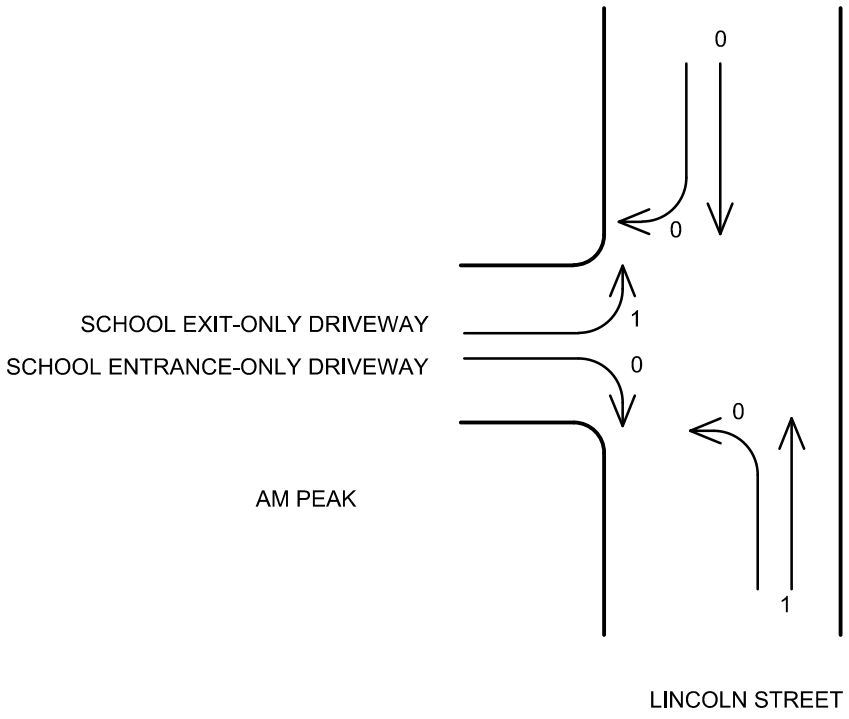
| | | | | | |
|---|---|---|---|---|---|
| 15 | - | 0 | = | 15, | trips entering |
| 15 | - | 0 | = | 15, | trips exiting |

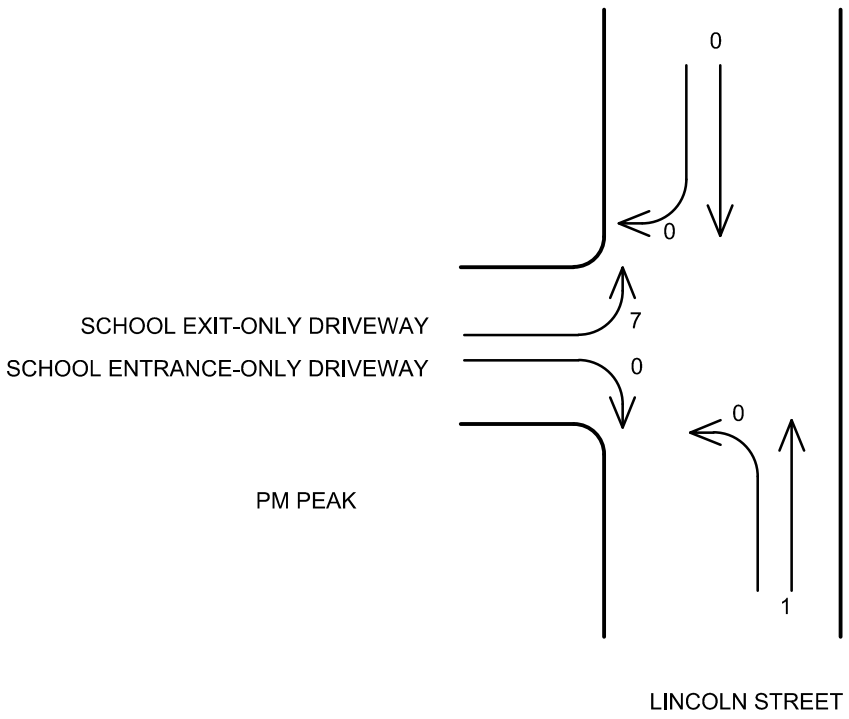
TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
SITE GENERATED TRIPS



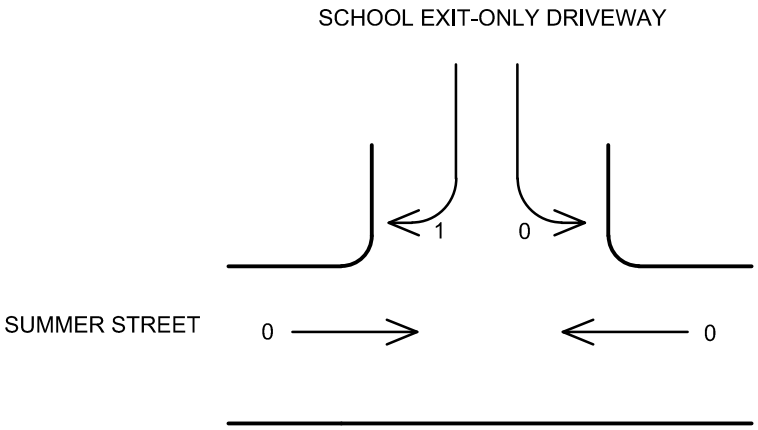



TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
SITE GENERATED TRIPS

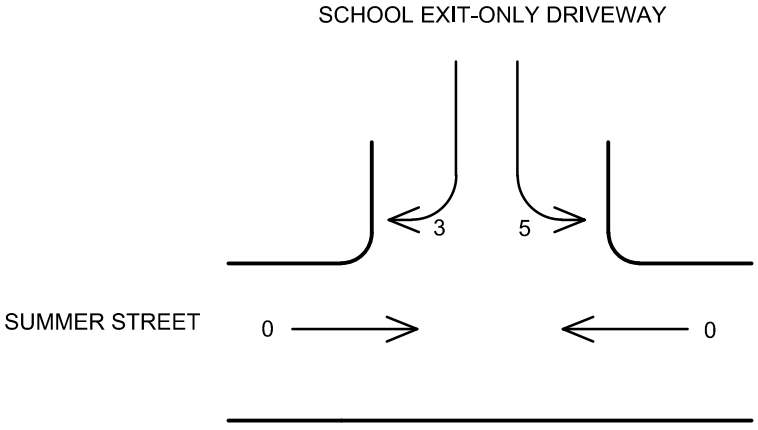


TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
SITE GENERATED TRIPS

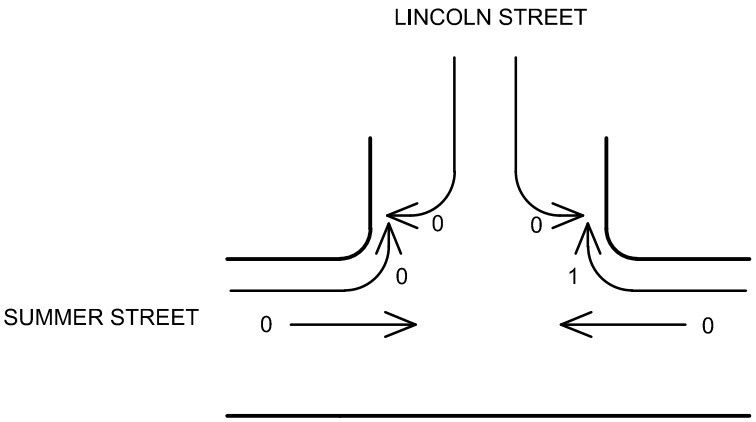



AM PEAK

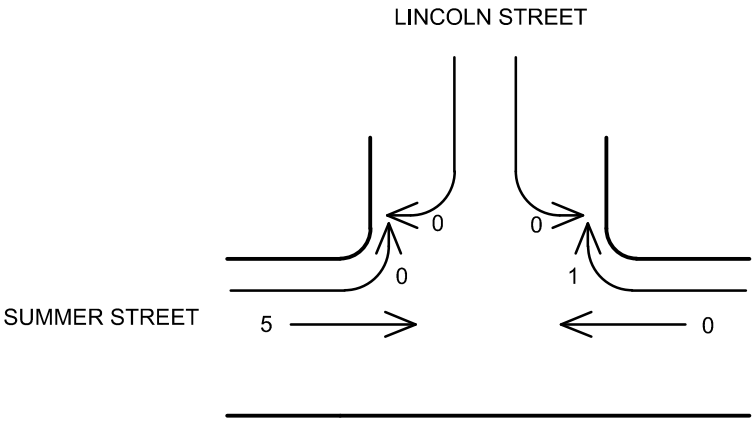



PM PEAK

TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
SITE GENERATED TRIPS




AM PEAK

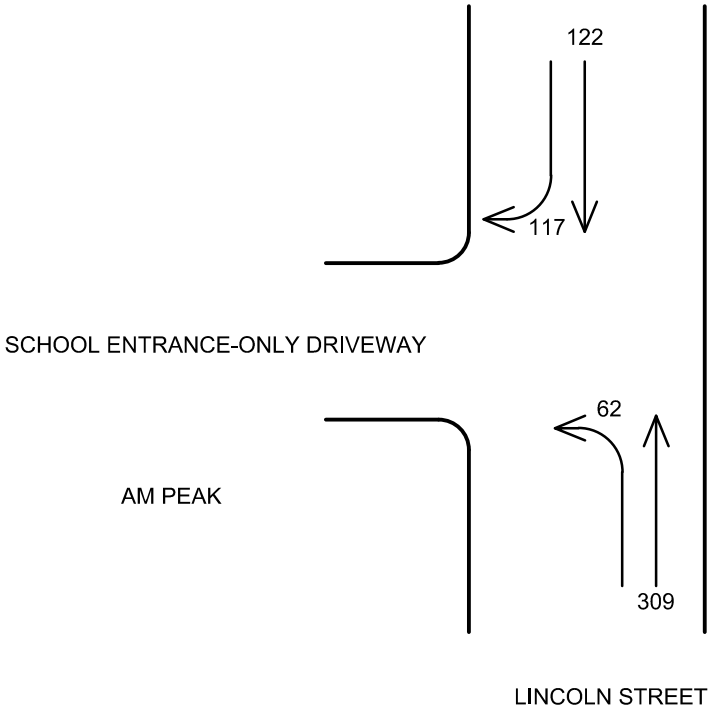


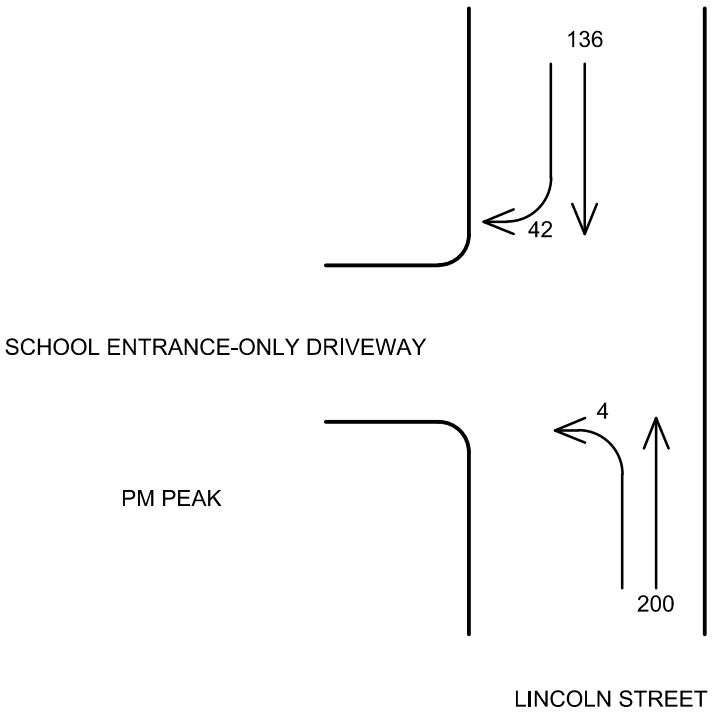

PM PEAK

# APPENDIX C

## Intersection Capacity Analysis Computations

TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
NO BUILD CONDITIONS



# HCS7 Two-Way Stop-Control Report

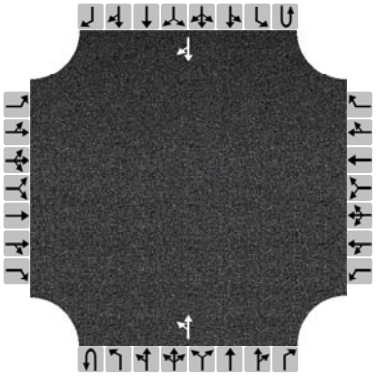
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | AM Peak - Existing |
| Intersection Orientation | North-South |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | Lincoln St/MMES N DW |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | MMES Entrance-Only DW |
| North/South Street | Lincoln Street |
| Peak Hour Factor | 0.87 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | | | | | | | | LT | | | | | | TR |
| Volume, V (veh/h) | | | | | | | | | | 62 | 309 | | | | 122 | 117 |
| Percent Heavy Vehicles (%) | | | | | | | | | | 3 | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | | | | | | | | | 4.13 | | | | | | |
| Base Follow-Up Headway (sec) | | | | | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | | | | | | | | | 2.23 | | | | | | |

## Delay, Queue Length, and Level of Service

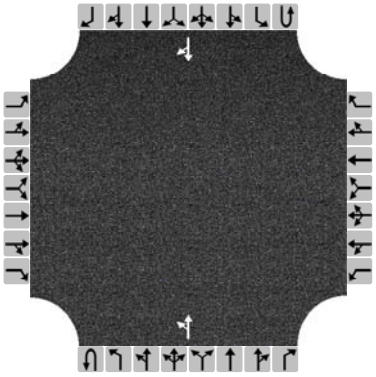
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | | | | | 71 | | | | | | |
| Capacity, c (veh/h) | | | | | | | | | | 1282 | | | | | | |
| v/c Ratio | | | | | | | | | | 0.06 | | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | | | | | 0.2 | | | | | | |
| Control Delay (s/veh) | | | | | | | | | | 8.0 | | | | | | |
| Level of Service, LOS | | | | | | | | | | A | | | | | | |
| Approach Delay (s/veh) | | | | | | | | | | 1.8 | | | | | | |
| Approach LOS | | | | | | | | | | | | | | | | |

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# HCS7 Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | rb | Intersection | Lincoln St/MMES N DW |
| Agency/Co. | Bryant Associates, Inc. | Jurisdiction | Manchester-by-the-Sea |
| Date Performed | 10/26/2017 | East/West Street | MMES Entrance-Only DW |
| Analysis Year | 2017 | North/South Street | Lincoln Street |
| Time Analyzed | PM Peak - Existing | Peak Hour Factor | 0.82 |
| Intersection Orientation | North-South | Analysis Time Period (hrs) | 0.25 |
| Project Description | 217078 Manchester Memorial Elementary School | | |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | | | | | | | | LT | | | | | | TR |
| Volume, V (veh/h) | | | | | | | | | | 4 | 200 | | | | 136 | 42 |
| Percent Heavy Vehicles (%) | | | | | | | | | | 75 | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

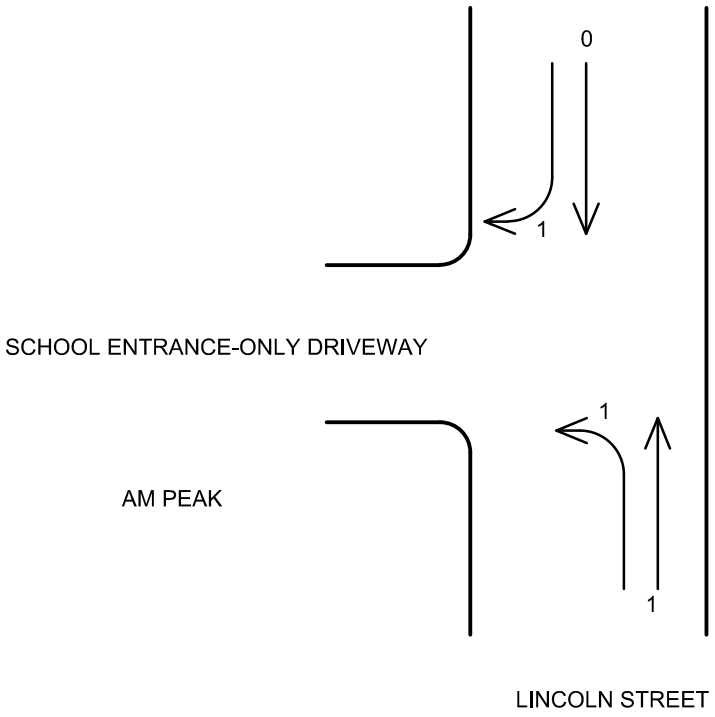
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | | | | | | | | | 4.85 | | | | | | |
| Base Follow-Up Headway (sec) | | | | | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | | | | | | | | | 2.88 | | | | | | |

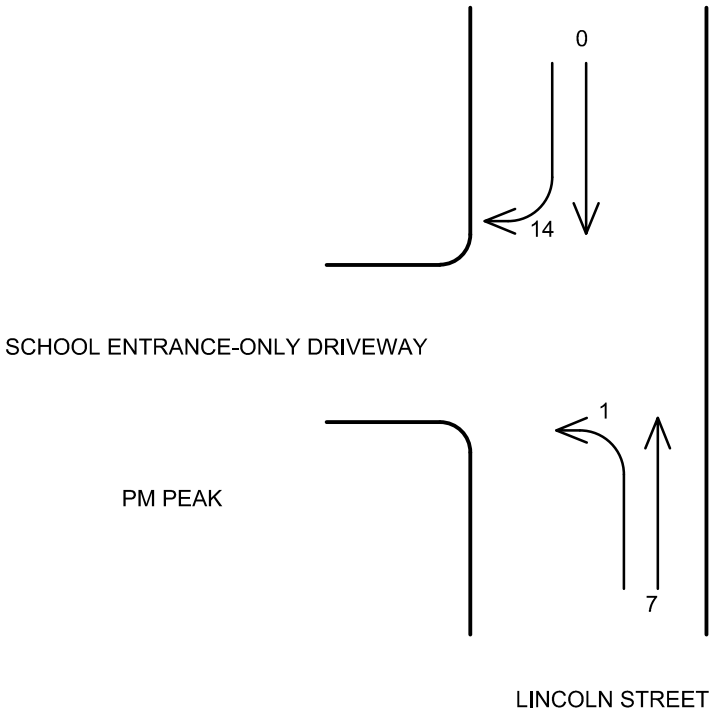
## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | | | | | 5 | | | | | | |
| Capacity, c (veh/h) | | | | | | | | | | 1017 | | | | | | |
| v/c Ratio | | | | | | | | | | 0.00 | | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | | | | | 0.0 | | | | | | |
| Control Delay (s/veh) | | | | | | | | | | 8.6 | | | | | | |
| Level of Service, LOS | | | | | | | | | | A | | | | | | |
| Approach Delay (s/veh) | | | | | | | | | | 0.2 | | | | | | |
| Approach LOS | | | | | | | | | | | | | | | | |

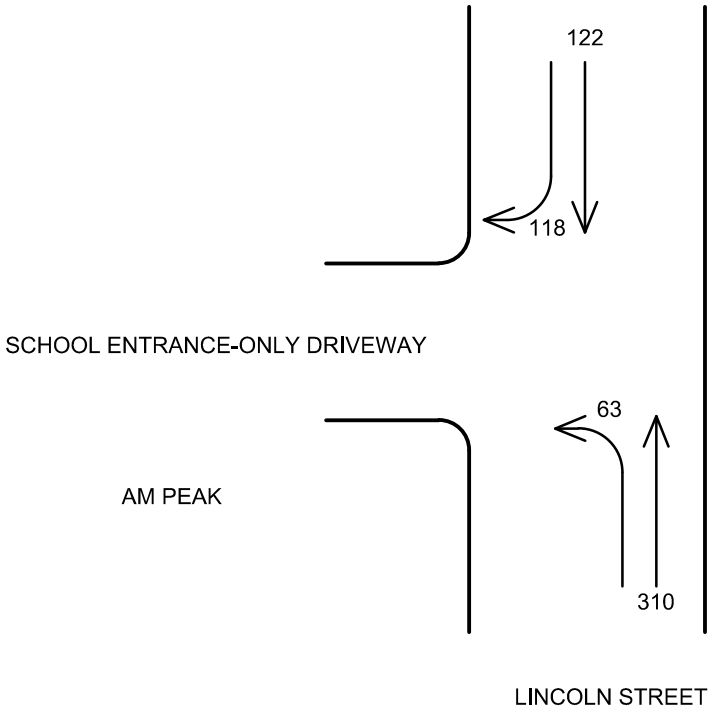
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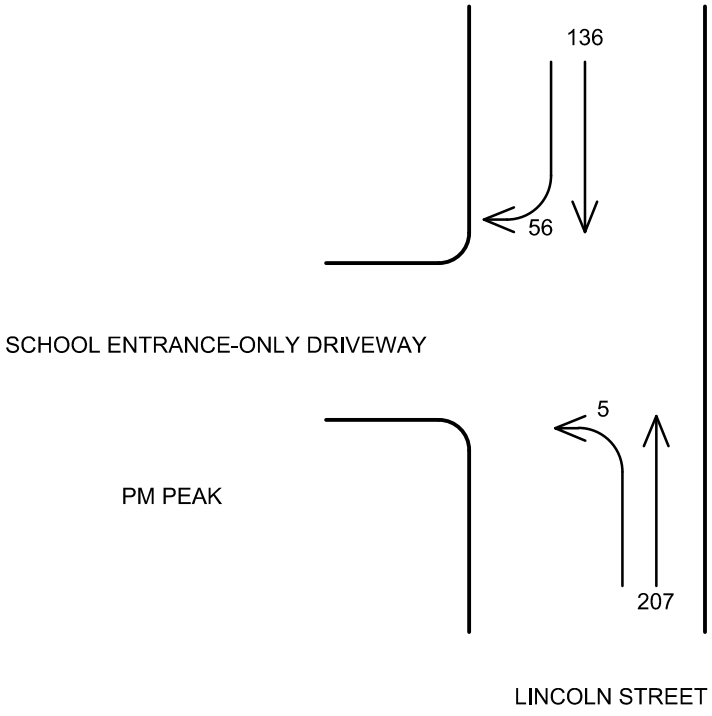
TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
SITE GENERATED TRIPS



TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
BUILD CONDITIONS



# HCS7 Two-Way Stop-Control Report

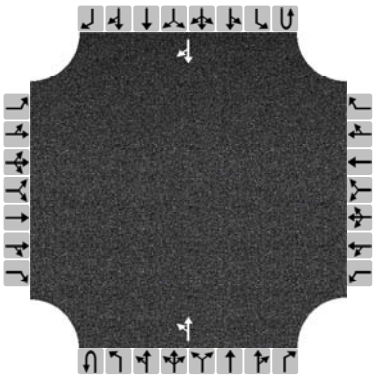
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | AM Peak - Build |
| Intersection Orientation | North-South |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | Lincoln St/MMES N DW |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | MMES Entrance-Only DW |
| North/South Street | Lincoln Street |
| Peak Hour Factor | 0.87 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | | | | | | | | LT | | | | | | TR |
| Volume, V (veh/h) | | | | | | | | | | 63 | 310 | | | | 122 | 118 |
| Percent Heavy Vehicles (%) | | | | | | | | | | 3 | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | | | | | | | | | 4.13 | | | | | | |
| Base Follow-Up Headway (sec) | | | | | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | | | | | | | | | 2.23 | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | | | | | 72 | | | | | | |
| Capacity, c (veh/h) | | | | | | | | | | 1280 | | | | | | |
| v/c Ratio | | | | | | | | | | 0.06 | | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | | | | | 0.2 | | | | | | |
| Control Delay (s/veh) | | | | | | | | | | 8.0 | | | | | | |
| Level of Service, LOS | | | | | | | | | | A | | | | | | |
| Approach Delay (s/veh) | | | | | | | | | | 1.8 | | | | | | |
| Approach LOS | | | | | | | | | | | | | | | | |

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# HCS7 Two-Way Stop-Control Report

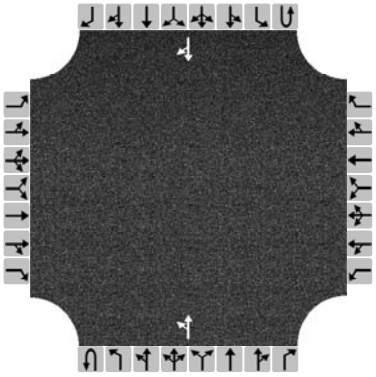
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | PM Peak - Build |
| Intersection Orientation | North-South |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | Lincoln St/MMES N DW |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | MMES Entrance-Only DW |
| North/South Street | Lincoln Street |
| Peak Hour Factor | 0.82 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 0 | 0 | | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | | | | | | | | LT | | | | | | TR |
| Volume, V (veh/h) | | | | | | | | | | 5 | 207 | | | | 136 | 56 |
| Percent Heavy Vehicles (%) | | | | | | | | | | 75 | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

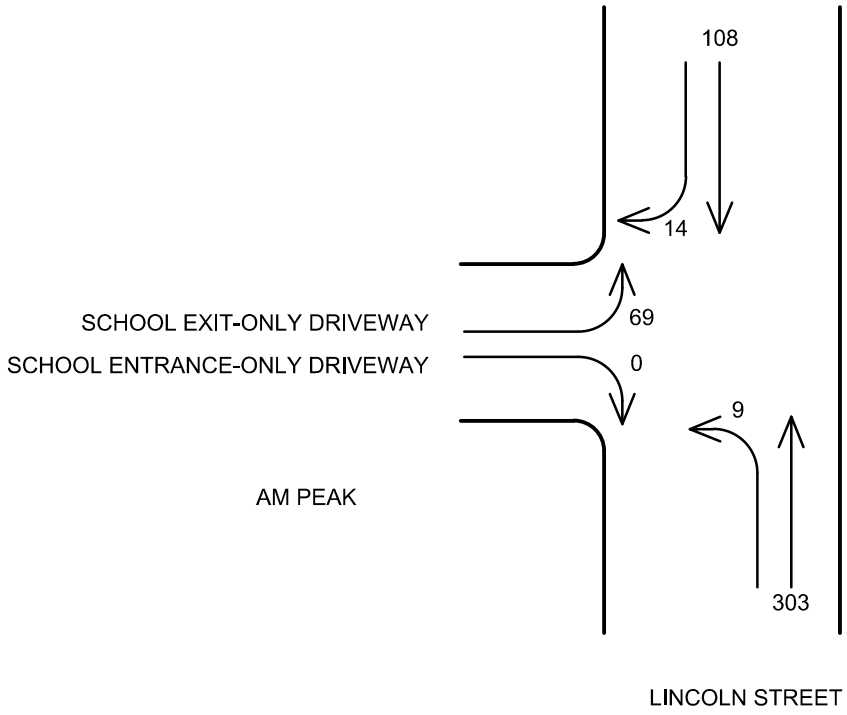
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | | | | | | | | | 4.85 | | | | | | |
| Base Follow-Up Headway (sec) | | | | | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | | | | | | | | | 2.88 | | | | | | |

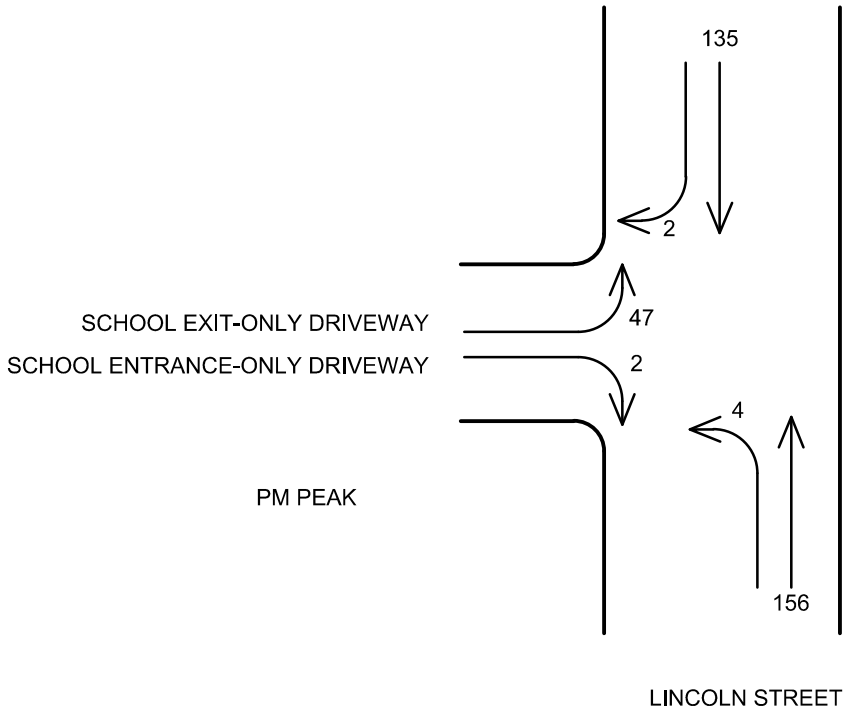
## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | | | | | 6 | | | | | | |
| Capacity, c (veh/h) | | | | | | | | | | 1000 | | | | | | |
| v/c Ratio | | | | | | | | | | 0.01 | | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | | | | | 0.0 | | | | | | |
| Control Delay (s/veh) | | | | | | | | | | 8.6 | | | | | | |
| Level of Service, LOS | | | | | | | | | | A | | | | | | |
| Approach Delay (s/veh) | | | | | | | | | | 0.3 | | | | | | |
| Approach LOS | | | | | | | | | | | | | | | | |

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TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
NO BUILD CONDITIONS



# HCS7 Two-Way Stop-Control Report

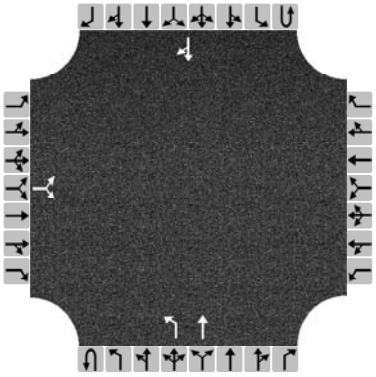
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | AM Peak - Existing |
| Intersection Orientation | North-South |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | Lincoln St/MMES S DW |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | MMES Southerly DW |
| North/South Street | Lincoln Street |
| Peak Hour Factor | 0.73 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 1 | 0 | | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | LR | | | | | | | L | T | | | | | TR |
| Volume, V (veh/h) | | 69 | | 0 | | | | | | 9 | 303 | | | | 108 | 14 |
| Percent Heavy Vehicles (%) | | 0 | | 0 | | | | | | 0 | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | 0 | | | | | | | | | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 7.1 | | 6.2 | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | 6.40 | | 6.20 | | | | | | 4.10 | | | | | | |
| Base Follow-Up Headway (sec) | | 3.5 | | 3.3 | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | 3.50 | | 3.30 | | | | | | 2.20 | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | 95 | | | | | | | 12 | | | | | | |
| Capacity, c (veh/h) | | | 458 | | | | | | | 1421 | | | | | | |
| v/c Ratio | | | 0.21 | | | | | | | 0.01 | | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | 0.8 | | | | | | | 0.0 | | | | | | |
| Control Delay (s/veh) | | | 14.9 | | | | | | | 7.6 | | | | | | |
| Level of Service, LOS | | | B | | | | | | | A | | | | | | |
| Approach Delay (s/veh) | | 14.9 | | | | | | | | 0.2 | | | | | | |
| Approach LOS | | B | | | | | | | | | | | | | | |

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# HCS7 Two-Way Stop-Control Report

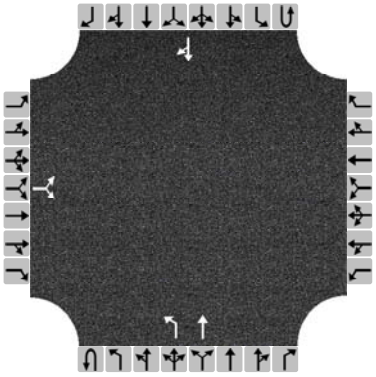
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | PM Peak - Existing |
| Intersection Orientation | North-South |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | Lincoln St/MMES S DW |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | MMES Southerly DW |
| North/South Street | Lincoln Street |
| Peak Hour Factor | 0.92 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 1 | 0 | | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | LR | | | | | | | L | T | | | | | TR |
| Volume, V (veh/h) | | 47 | | 2 | | | | | | 4 | 156 | | | | 135 | 2 |
| Percent Heavy Vehicles (%) | | 0 | | 0 | | | | | | 75 | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | 0 | | | | | | | | | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

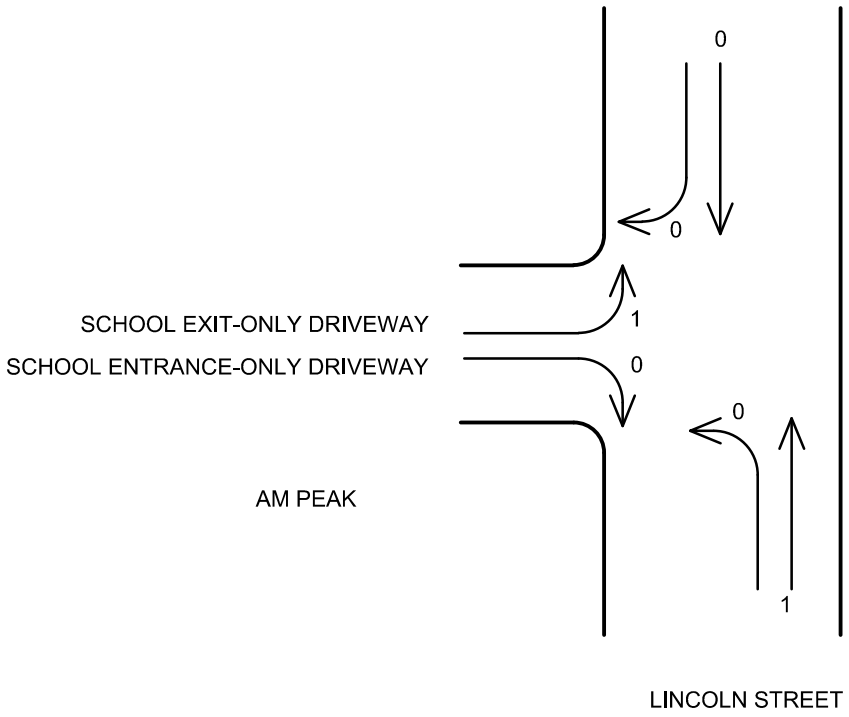
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 7.1 | | 6.2 | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | 6.40 | | 6.20 | | | | | | 4.85 | | | | | | |
| Base Follow-Up Headway (sec) | | 3.5 | | 3.3 | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | 3.50 | | 3.30 | | | | | | 2.88 | | | | | | |

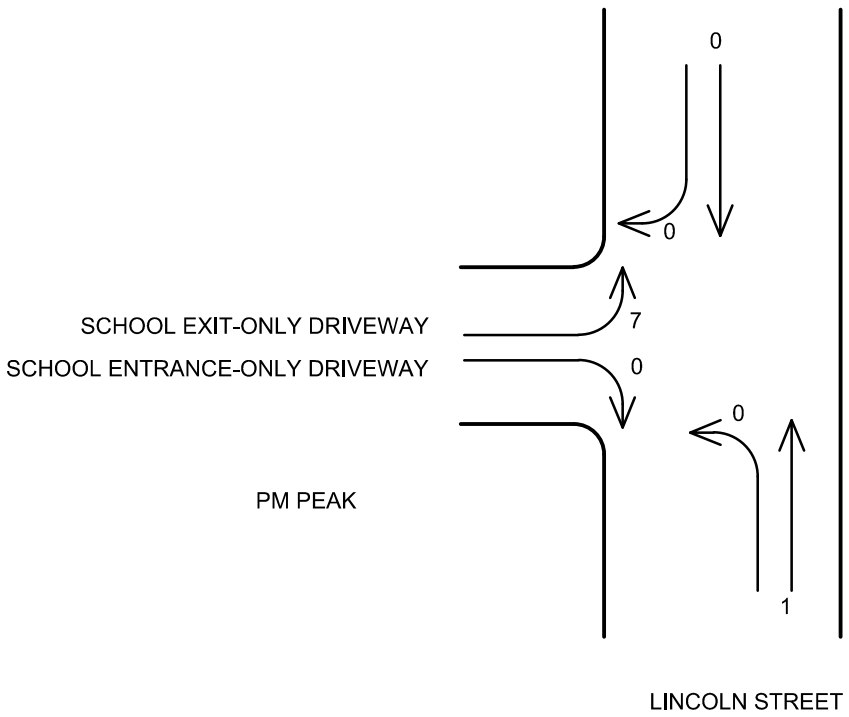
## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | 53 | | | | | | | 4 | | | | | | |
| Capacity, c (veh/h) | | | 643 | | | | | | | 1083 | | | | | | |
| v/c Ratio | | | 0.08 | | | | | | | 0.00 | | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | 0.3 | | | | | | | 0.0 | | | | | | |
| Control Delay (s/veh) | | | 11.1 | | | | | | | 8.3 | | | | | | |
| Level of Service, LOS | | | B | | | | | | | A | | | | | | |
| Approach Delay (s/veh) | | 11.1 | | | | | | | | 0.2 | | | | | | |
| Approach LOS | | B | | | | | | | | | | | | | | |

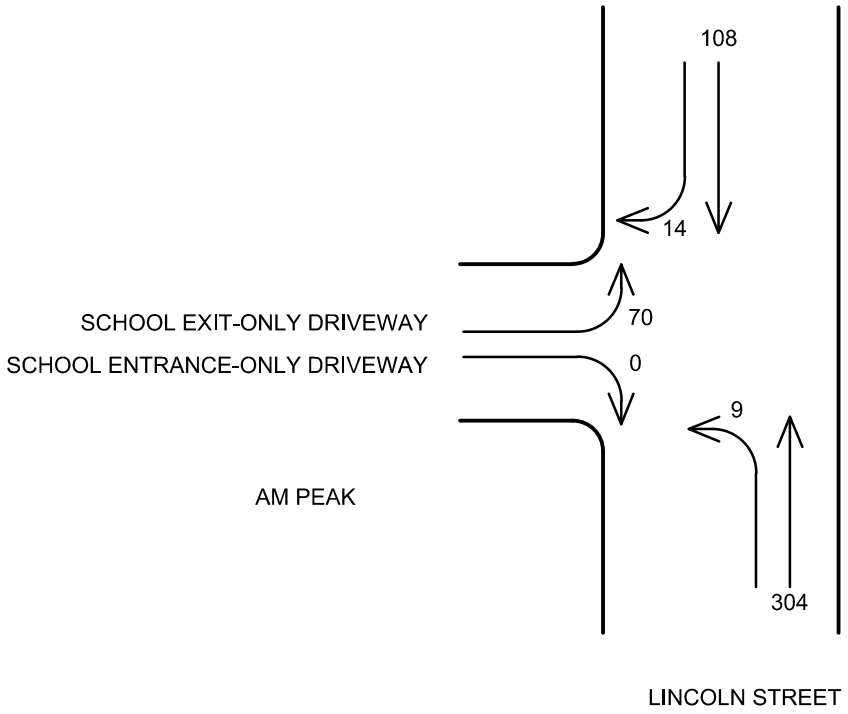
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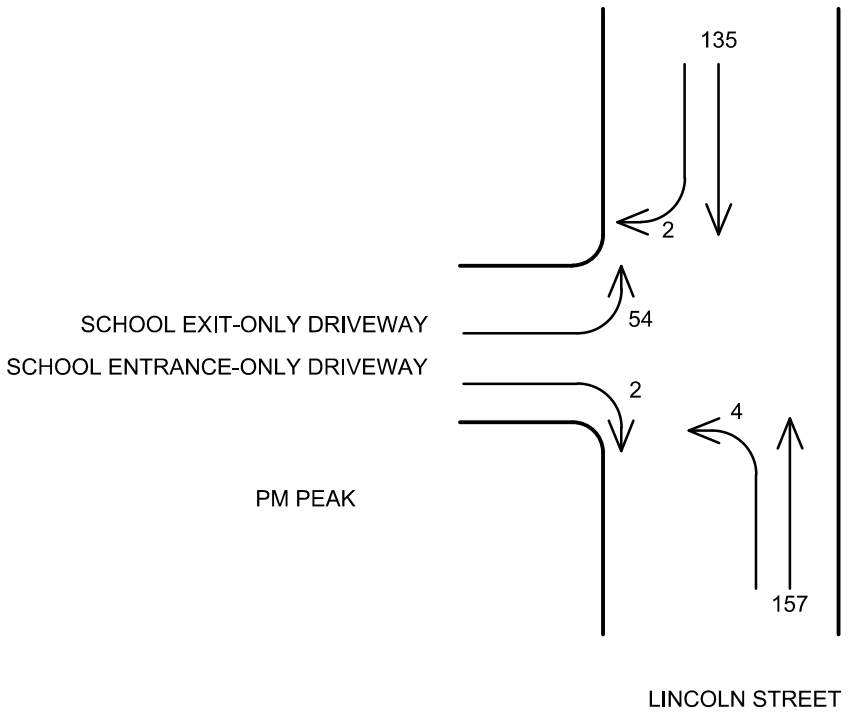
TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
SITE GENERATED TRIPS



TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
BUILD CONDITIONS



# HCS7 Two-Way Stop-Control Report

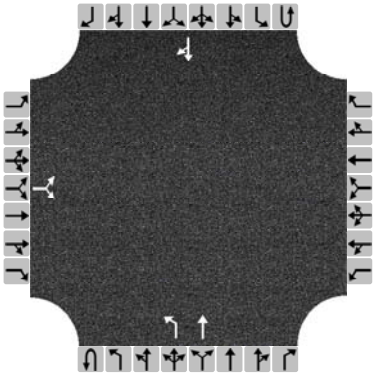
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | AM Peak - Build |
| Intersection Orientation | North-South |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | Lincoln St/MMES S DW |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | MMES Southerly DW |
| North/South Street | Lincoln Street |
| Peak Hour Factor | 0.73 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 1 | 0 | | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | LR | | | | | | | L | T | | | | | TR |
| Volume, V (veh/h) | | 70 | | 0 | | | | | | 9 | 304 | | | | 108 | 14 |
| Percent Heavy Vehicles (%) | | 0 | | 0 | | | | | | 0 | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | 0 | | | | | | | | | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 7.1 | | 6.2 | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | 6.40 | | 6.20 | | | | | | 4.10 | | | | | | |
| Base Follow-Up Headway (sec) | | 3.5 | | 3.3 | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | 3.50 | | 3.30 | | | | | | 2.20 | | | | | | |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | 96 | | | | | | | 12 | | | | | | |
| Capacity, c (veh/h) | | | 458 | | | | | | | 1421 | | | | | | |
| v/c Ratio | | | 0.21 | | | | | | | 0.01 | | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | 0.8 | | | | | | | 0.0 | | | | | | |
| Control Delay (s/veh) | | | 14.9 | | | | | | | 7.6 | | | | | | |
| Level of Service, LOS | | | B | | | | | | | A | | | | | | |
| Approach Delay (s/veh) | | 14.9 | | | | | | | | 0.2 | | | | | | |
| Approach LOS | | B | | | | | | | | | | | | | | |

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# HCS7 Two-Way Stop-Control Report

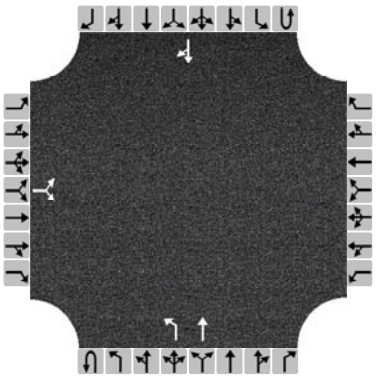
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | PM Peak - Build |
| Intersection Orientation | North-South |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | Lincoln St/MMES S DW |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | MMES Southerly DW |
| North/South Street | Lincoln Street |
| Peak Hour Factor | 0.92 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: North-South

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | | 10 | 11 | 12 | | 7 | 8 | 9 | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 |
| Number of Lanes | | 0 | 1 | 0 | | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 |
| Configuration | | | LR | | | | | | | L | T | | | | | TR |
| Volume, V (veh/h) | | 54 | | 2 | | | | | | 4 | 157 | | | | 135 | 2 |
| Percent Heavy Vehicles (%) | | 0 | | 0 | | | | | | 75 | | | | | | |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | 0 | | | | | | | | | | | | | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

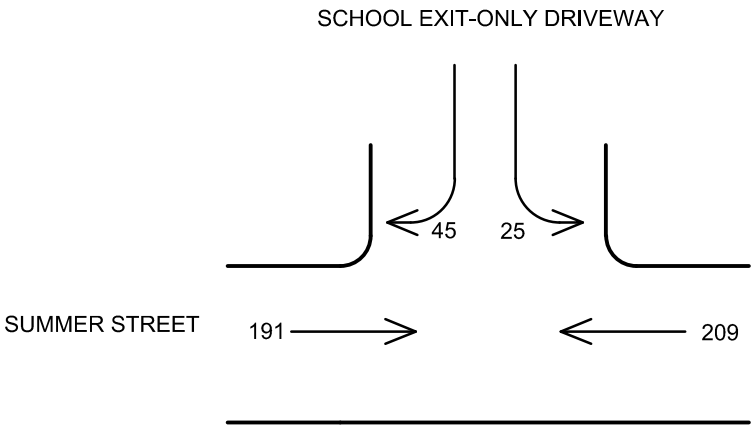
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 7.1 | | 6.2 | | | | | | 4.1 | | | | | | |
| Critical Headway (sec) | | 6.40 | | 6.20 | | | | | | 4.85 | | | | | | |
| Base Follow-Up Headway (sec) | | 3.5 | | 3.3 | | | | | | 2.2 | | | | | | |
| Follow-Up Headway (sec) | | 3.50 | | 3.30 | | | | | | 2.88 | | | | | | |

## Delay, Queue Length, and Level of Service

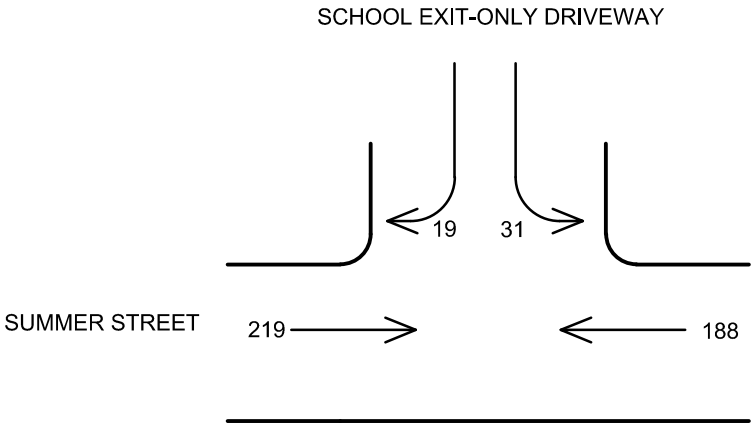
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | 61 | | | | | | | 4 | | | | | | |
| Capacity, c (veh/h) | | | 641 | | | | | | | 1083 | | | | | | |
| v/c Ratio | | | 0.10 | | | | | | | 0.00 | | | | | | |
| 95% Queue Length, $Q_{95}$ (veh) | | | 0.3 | | | | | | | 0.0 | | | | | | |
| Control Delay (s/veh) | | | 11.2 | | | | | | | 8.3 | | | | | | |
| Level of Service, LOS | | | B | | | | | | | A | | | | | | |
| Approach Delay (s/veh) | | 11.2 | | | | | | | | 0.2 | | | | | | |
| Approach LOS | | B | | | | | | | | | | | | | | |

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TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
NO BUILD CONDITIONS




AM PEAK




PM PEAK

# HCS7 Two-Way Stop-Control Report

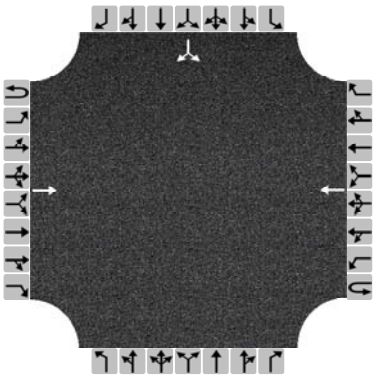
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | AM Peak - Existing |
| Intersection Orientation | East-West |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | MMES Exit DW/Summer St |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | Summer Street |
| North/South Street | MMES Exit-Only Driveway |
| Peak Hour Factor | 0.82 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | | T | | | | T | | | | | | | | LR | |
| Volume, V (veh/h) | | | 191 | | | | 209 | | | | | | | 25 | | 45 |
| Percent Heavy Vehicles (%) | | | | | | | | | | | | | | 8 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | | Undivided | | | | | | | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | | | | | | | | | | | | | 6.48 | | 6.20 |
| Base Follow-Up Headway (sec) | | | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | | | | | | | | | | | | | 3.57 | | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | | | | | | | | | | 85 | |
| Capacity, c (veh/h) | | | | | | | | | | | | | | | 652 | |
| v/c Ratio | | | | | | | | | | | | | | | 0.13 | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | | | | | | | | | | 0.4 | |
| Control Delay (s/veh) | | | | | | | | | | | | | | | 11.3 | |
| Level of Service, LOS | | | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | | | | | | | | | | | | | | 11.3 | | |
| Approach LOS | | | | | | | | | | | | | | B | | |

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# HCS7 Two-Way Stop-Control Report

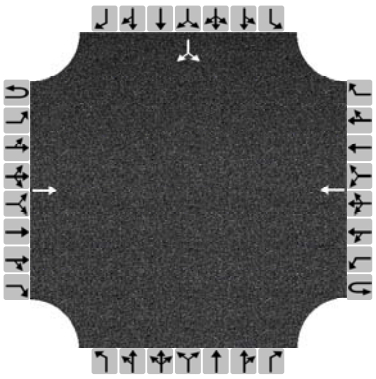
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | PM Peak - Existing |
| Intersection Orientation | East-West |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | MMES Exit DW/Summer St |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | Summer Street |
| North/South Street | MMES Exit-Only Driveway |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | | T | | | | T | | | | | | | | LR | |
| Volume, V (veh/h) | | | 219 | | | | 188 | | | | | | | 31 | | 19 |
| Percent Heavy Vehicles (%) | | | | | | | | | | | | | | 7 | | 5 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | | Undivided | | | | | | | | | | | | | |

## Critical and Follow-up Headways

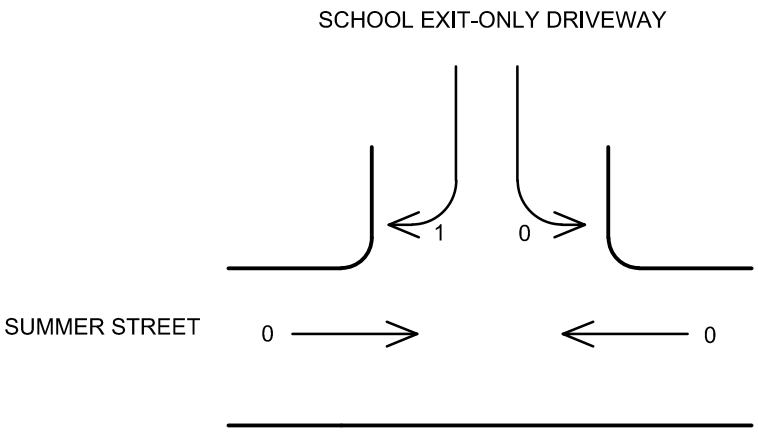
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | | | | | | | | | | | | | 6.47 | | 6.25 |
| Base Follow-Up Headway (sec) | | | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | | | | | | | | | | | | | 3.56 | | 3.34 |

## Delay, Queue Length, and Level of Service

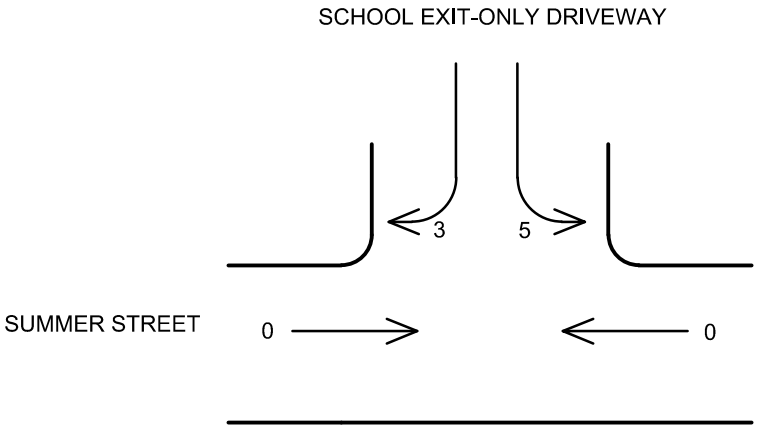
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | | | | | | | | | | 63 | |
| Capacity, c (veh/h) | | | | | | | | | | | | | | | 566 | |
| v/c Ratio | | | | | | | | | | | | | | | 0.11 | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | | | | | | | | | | 0.4 | |
| Control Delay (s/veh) | | | | | | | | | | | | | | | 12.2 | |
| Level of Service, LOS | | | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | | | | | | | | | | | | | | 12.2 | | |
| Approach LOS | | | | | | | | | | | | | | B | | |

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TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
SITE GENERATED TRIPS

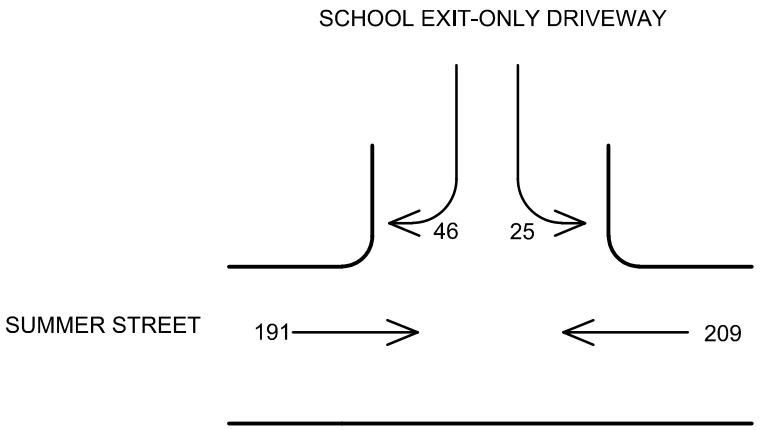



AM PEAK

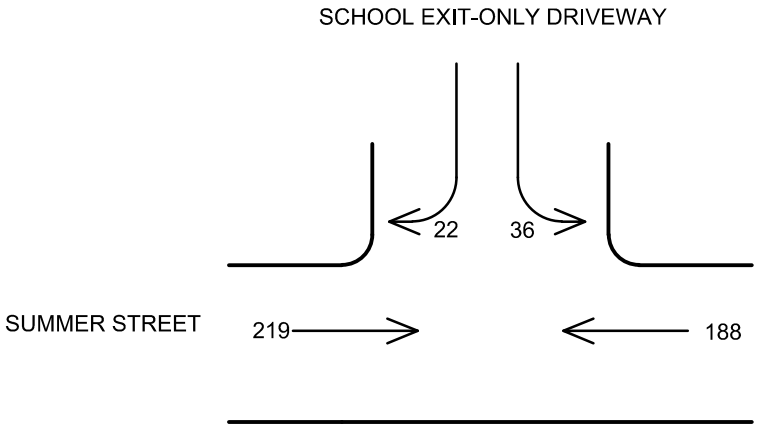



PM PEAK

TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
BUILD CONDITIONS




AM PEAK




PM PEAK

# HCS7 Two-Way Stop-Control Report

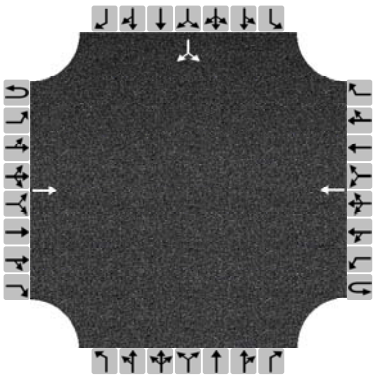
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | AM Peak - Build |
| Intersection Orientation | East-West |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | MMES Exit DW/Summer St |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | Summer Street |
| North/South Street | MMES Exit-Only Driveway |
| Peak Hour Factor | 0.82 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | | T | | | | T | | | | | | | | LR | |
| Volume, V (veh/h) | | | 191 | | | | 209 | | | | | | | 25 | | 46 |
| Percent Heavy Vehicles (%) | | | | | | | | | | | | | | 8 | | 0 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | | Undivided | | | | | | | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | | | | | | | | | | | | | 6.48 | | 6.20 |
| Base Follow-Up Headway (sec) | | | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | | | | | | | | | | | | | 3.57 | | 3.30 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | | | | | | | | | | 86 | |
| Capacity, c (veh/h) | | | | | | | | | | | | | | | 653 | |
| v/c Ratio | | | | | | | | | | | | | | | 0.13 | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | | | | | | | | | | 0.5 | |
| Control Delay (s/veh) | | | | | | | | | | | | | | | 11.3 | |
| Level of Service, LOS | | | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | | | | | | | | | | | | | | 11.3 | | |
| Approach LOS | | | | | | | | | | | | | | B | | |

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# HCS7 Two-Way Stop-Control Report

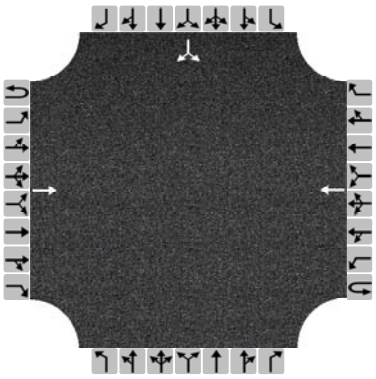
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | PM Peak - Build |
| Intersection Orientation | East-West |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | MMES Exit DW/Summer St |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | Summer Street |
| North/South Street | MMES Exit-Only Driveway |
| Peak Hour Factor | 0.80 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | | T | | | | T | | | | | | | | LR | |
| Volume, V (veh/h) | | | 219 | | | | 188 | | | | | | | 36 | | 22 |
| Percent Heavy Vehicles (%) | | | | | | | | | | | | | | 7 | | 5 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | | Undivided | | | | | | | | | | | | | |

## Critical and Follow-up Headways

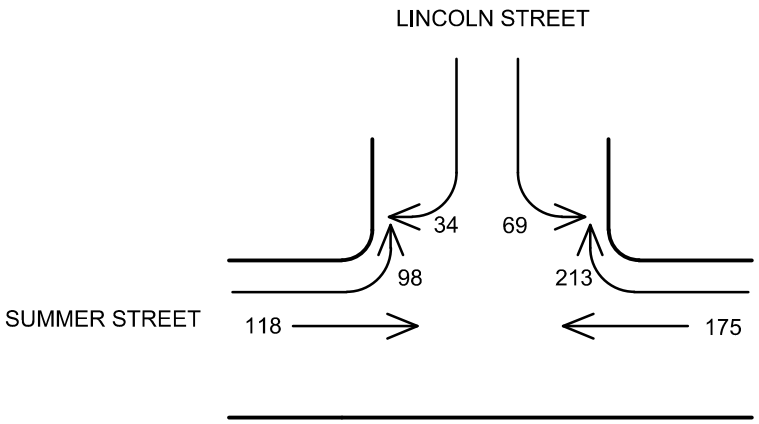
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | | | | | | | | | | | | | 6.47 | | 6.25 |
| Base Follow-Up Headway (sec) | | | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | | | | | | | | | | | | | 3.56 | | 3.34 |

## Delay, Queue Length, and Level of Service

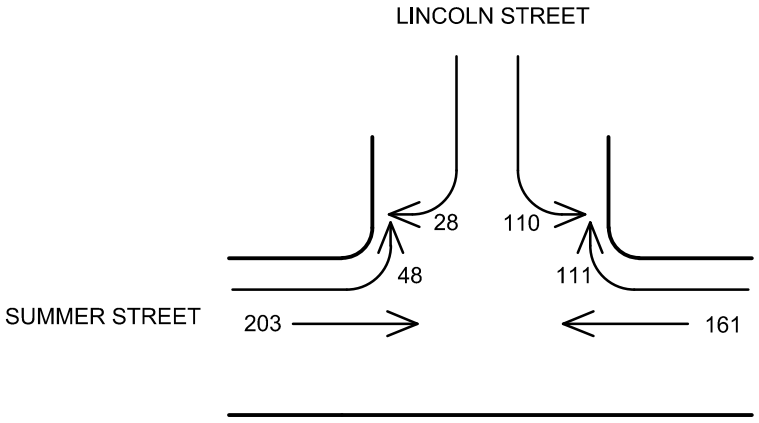
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | | | | | | | | | | | | | | 73 | |
| Capacity, c (veh/h) | | | | | | | | | | | | | | | 567 | |
| v/c Ratio | | | | | | | | | | | | | | | 0.13 | |
| 95% Queue Length, $Q_{95}$ (veh) | | | | | | | | | | | | | | | 0.4 | |
| Control Delay (s/veh) | | | | | | | | | | | | | | | 12.3 | |
| Level of Service, LOS | | | | | | | | | | | | | | | B | |
| Approach Delay (s/veh) | | | | | | | | | | | | | | 12.3 | | |
| Approach LOS | | | | | | | | | | | | | | B | | |

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TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
NO BUILD CONDITIONS




AM PEAK




PM PEAK

# HCS7 Two-Way Stop-Control Report

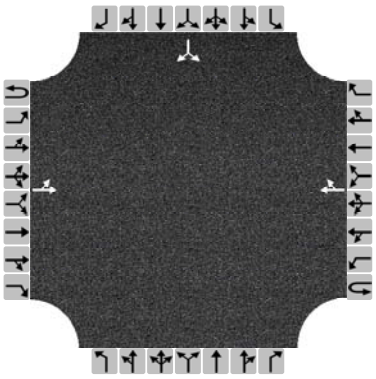
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | AM Peak - Existing |
| Intersection Orientation | East-West |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | Lincoln St/Summer St |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | Summer Street |
| North/South Street | Lincoln Street |
| Peak Hour Factor | 0.76 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | LT | | | | | | TR | | | | | | | LR | |
| Volume, V (veh/h) | | 98 | 118 | | | | 175 | 213 | | | | | | 69 | | 34 |
| Percent Heavy Vehicles (%) | | 2 | | | | | | | | | | | | 6 | | 3 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | 4.12 | | | | | | | | | | | | 6.46 | | 6.23 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | 2.22 | | | | | | | | | | | | 3.55 | | 3.33 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 129 | | | | | | | | | | | | | 136 | |
| Capacity, c (veh/h) | | 1032 | | | | | | | | | | | | | 367 | |
| v/c Ratio | | 0.12 | | | | | | | | | | | | | 0.37 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.4 | | | | | | | | | | | | | 1.7 | |
| Control Delay (s/veh) | | 9.0 | | | | | | | | | | | | | 20.5 | |
| Level of Service, LOS | | A | | | | | | | | | | | | | C | |
| Approach Delay (s/veh) | | 4.8 | | | | | | | | | | | | 20.5 | | |
| Approach LOS | | | | | | | | | | | | | | C | | |

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# HCS7 Two-Way Stop-Control Report

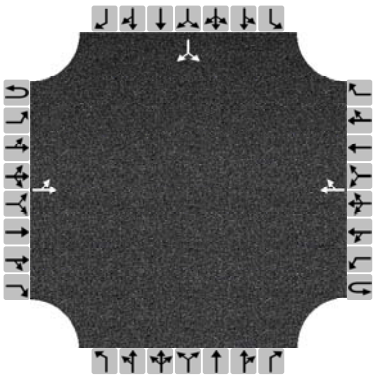
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | PM Peak - Existing |
| Intersection Orientation | East-West |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | Lincoln St/Summer St |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | Summer Street |
| North/South Street | Lincoln Street |
| Peak Hour Factor | 0.90 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | LT | | | | | | TR | | | | | | | LR | |
| Volume, V (veh/h) | | 48 | 203 | | | | 161 | 111 | | | | | | 110 | | 28 |
| Percent Heavy Vehicles (%) | | 13 | | | | | | | | | | | | 3 | | 7 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

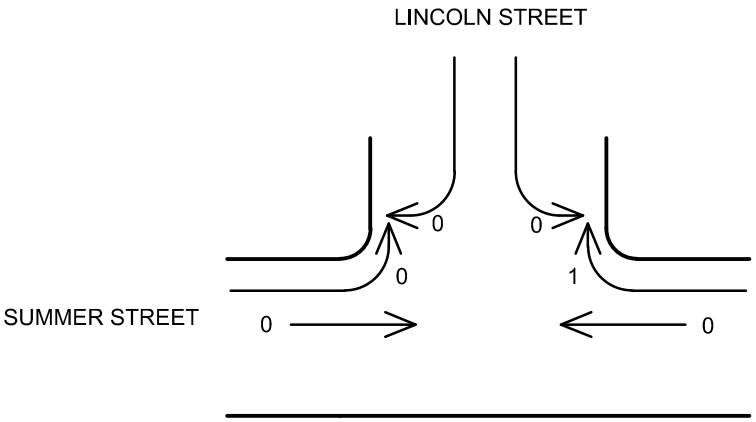
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | 4.23 | | | | | | | | | | | | 6.43 | | 6.27 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | 2.32 | | | | | | | | | | | | 3.53 | | 3.36 |

## Delay, Queue Length, and Level of Service

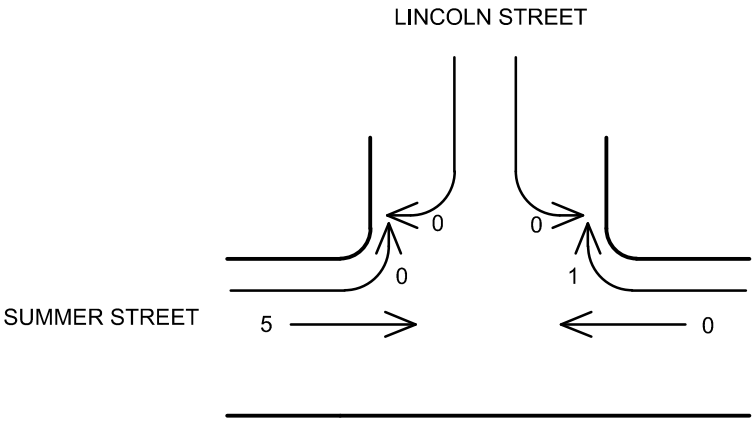
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 53 | | | | | | | | | | | | | 153 | |
| Capacity, c (veh/h) | | 1123 | | | | | | | | | | | | | 457 | |
| v/c Ratio | | 0.05 | | | | | | | | | | | | | 0.34 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.1 | | | | | | | | | | | | | 1.5 | |
| Control Delay (s/veh) | | 8.4 | | | | | | | | | | | | | 16.8 | |
| Level of Service, LOS | | A | | | | | | | | | | | | | C | |
| Approach Delay (s/veh) | | 2.0 | | | | | | | | | | | | 16.8 | | |
| Approach LOS | | | | | | | | | | | | | | C | | |

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TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
SITE GENERATED TRIPS

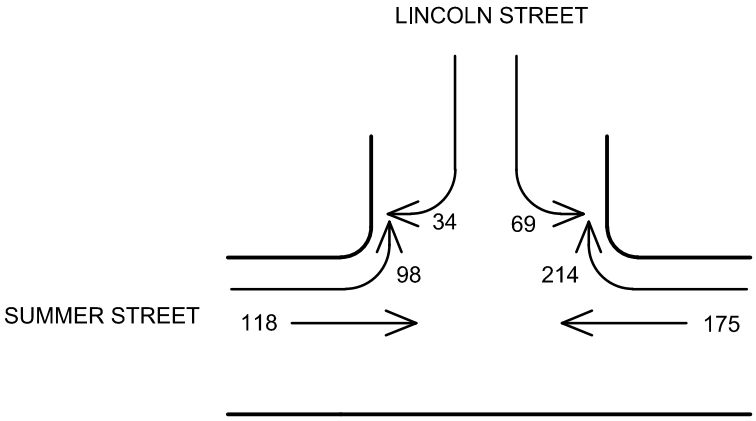



AM PEAK

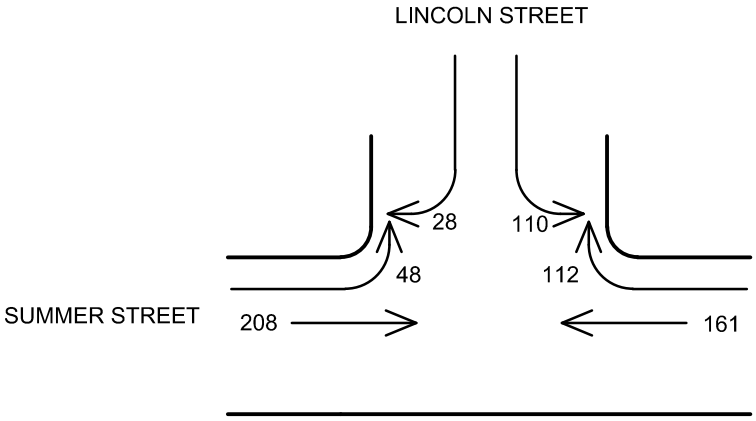



PM PEAK

TRAFFIC VOLUMES
SCHOOL RENOVATIONS
LINCOLN STREET, MANCHESTER-BY-THE-SEA, MA
BUILD CONDITIONS




AM PEAK




PM PEAK

# HCS7 Two-Way Stop-Control Report

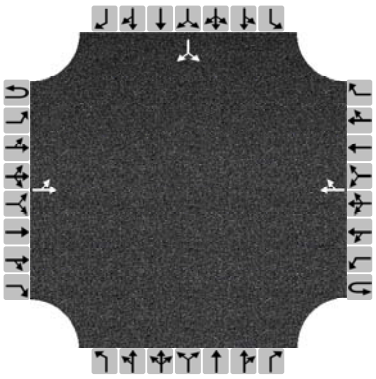
## General Information

| | |
|---|---|
| Analyst | rb |
| Agency/Co. | Bryant Associates, Inc. |
| Date Performed | 10/26/2017 |
| Analysis Year | 2017 |
| Time Analyzed | AM Peak - Build |
| Intersection Orientation | East-West |
| Project Description | 217078 Manchester Memorial Elementary School |

## Site Information

| | |
|---|---|
| Intersection | Lincoln St/Summer St |
| Jurisdiction | Manchester-by-the-Sea |
| East/West Street | Summer Street |
| North/South Street | Lincoln Street |
| Peak Hour Factor | 0.76 |
| Analysis Time Period (hrs) | 0.25 |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | LT | | | | | | TR | | | | | | | LR | |
| Volume, V (veh/h) | | 98 | 118 | | | | 175 | 214 | | | | | | 69 | | 34 |
| Percent Heavy Vehicles (%) | | 2 | | | | | | | | | | | | 6 | | 3 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | 4.12 | | | | | | | | | | | | 6.46 | | 6.23 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | 2.22 | | | | | | | | | | | | 3.55 | | 3.33 |

## Delay, Queue Length, and Level of Service

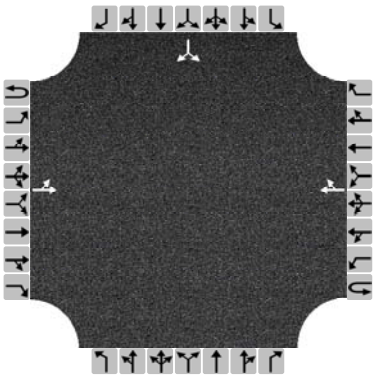
| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 129 | | | | | | | | | | | | | 136 | |
| Capacity, c (veh/h) | | 1030 | | | | | | | | | | | | | 366 | |
| v/c Ratio | | 0.13 | | | | | | | | | | | | | 0.37 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.4 | | | | | | | | | | | | | 1.7 | |
| Control Delay (s/veh) | | 9.0 | | | | | | | | | | | | | 20.5 | |
| Level of Service, LOS | | A | | | | | | | | | | | | | C | |
| Approach Delay (s/veh) | | 4.8 | | | | | | | | | | | | 20.5 | | |
| Approach LOS | | | | | | | | | | | | | | C | | |

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# HCS7 Two-Way Stop-Control Report

| General Information | | Site Information | |
|---|---|---|---|
| Analyst | rb | Intersection | Lincoln St/Summer St |
| Agency/Co. | Bryant Associates, Inc. | Jurisdiction | Manchester-by-the-Sea |
| Date Performed | 10/26/2017 | East/West Street | Summer Street |
| Analysis Year | 2017 | North/South Street | Lincoln Street |
| Time Analyzed | PM Peak - Build | Peak Hour Factor | 0.90 |
| Intersection Orientation | East-West | Analysis Time Period (hrs) | 0.25 |
| Project Description | 217078 Manchester Memorial Elementary School | | |

## Lanes



Major Street: East-West

## Vehicle Volumes and Adjustments

| Approach | Eastbound | | | | Westbound | | | | Northbound | | | | Southbound | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Movement | U | L | T | R | U | L | T | R | U | L | T | R | U | L | T | R |
| Priority | 1U | 1 | 2 | 3 | 4U | 4 | 5 | 6 | | 7 | 8 | 9 | | 10 | 11 | 12 |
| Number of Lanes | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | | 0 | 0 | 0 | | 0 | 1 | 0 |
| Configuration | | LT | | | | | | TR | | | | | | | LR | |
| Volume, V (veh/h) | | 48 | 208 | | | | 161 | 112 | | | | | | 110 | | 28 |
| Percent Heavy Vehicles (%) | | 13 | | | | | | | | | | | | 3 | | 7 |
| Proportion Time Blocked | | | | | | | | | | | | | | | | |
| Percent Grade (%) | | | | | | | | | | | | | | 0 | | |
| Right Turn Channelized | | No | | | | No | | | | No | | | | No | | |
| Median Type/Storage | | Undivided | | | | | | | | | | | | | | |

## Critical and Follow-up Headways

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Base Critical Headway (sec) | | 4.1 | | | | | | | | | | | | 7.1 | | 6.2 |
| Critical Headway (sec) | | 4.23 | | | | | | | | | | | | 6.43 | | 6.27 |
| Base Follow-Up Headway (sec) | | 2.2 | | | | | | | | | | | | 3.5 | | 3.3 |
| Follow-Up Headway (sec) | | 2.32 | | | | | | | | | | | | 3.53 | | 3.36 |

## Delay, Queue Length, and Level of Service

| | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Flow Rate, v (veh/h) | | 53 | | | | | | | | | | | | | 153 | |
| Capacity, c (veh/h) | | 1122 | | | | | | | | | | | | | 454 | |
| v/c Ratio | | 0.05 | | | | | | | | | | | | | 0.34 | |
| 95% Queue Length, $Q_{95}$ (veh) | | 0.1 | | | | | | | | | | | | | 1.5 | |
| Control Delay (s/veh) | | 8.4 | | | | | | | | | | | | | 16.9 | |
| Level of Service, LOS | | A | | | | | | | | | | | | | C | |
| Approach Delay (s/veh) | | 1.9 | | | | | | | | | | | | 16.9 | | |
| Approach LOS | | | | | | | | | | | | | | C | | |

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# APPENDIX D

## Crash Data Summary

Project: Traffic Impact Analysis
Manchester Memorial Elementary School

Manchester-by-the-Sea, MA

BAI Project No. 217078

| Person No. | |
|---|---|
| O | Operator |
| P | Passenger |
| U | Unknown |

| Crash Type | |
|---|---|
| A | Angle |
| BC | Bicycle |
| HO | Head-on |
| DEER | Deer |
| OBJ | Object |
| PED | Pedestrian |
| RE | Rear-End |
| SW | Side-swipe |

Project: Traffic Impact Analysis
Manchester Memorial Elementary School

Manchester-by-the-Sea, MA

BAI Project No. 217078

Summary of Crash Data for the Years 2014, 2015, 2016, 2017

| Year | Property Damage Only | Injury | Fatal | Total |
|---|---|---|---|---|
| 2014 | 2 | 0 | 0 | 2 |
| 2015 | 1 | 0 | 0 | 1 |
| 2016 | 2 | 0 | 0 | 2 |
| 2017 | 0 | 0 | 0 | 0 |

**Project:** Traffic Impact Analysis
Manchester Memorial Elementary School

Manchester-by-the-Sea, MA

**BAI Project No.** 217078

Summary of Crash Data for the Years 2014, 2015, 2016, 2017

| Crash No. | Report No. | Vehicle No. | Date | Direction of Travel | Intersection/Crash Location | Person No. | No. of Injuries | Fatalities | Accident Type | Pavement Condition | Weather | Lighting | Military Time | Day |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 106349 | 1 | 4/6/2014 | NORTH | INTERSECTION OF SUMMER STREET AND BROOK STREET | O | 0 | 0 | A | DRY | CLEAR | DAYLIGHT | 1500 | SUNDAY |
| | | 2 | | EAST | | O | 0 | 0 | | | | | | |
| 2 | 106366 | 1 | 4/7/2014 | NORTH | INTERSECTION OF LINCOLN STREET AND MANCHESTER MEMORIAL ELEMENTARY SCHOOL NORTHERLY DRIVEWAY | O | 0 | 0 | RE | DRY | CLEAR | DAYLIGHT | 725 | MONDAY |
| | | 2 | | NORTH | | O/P | 0 | 0 | | | | | | |
| | | 3 | | NORTH | | O | 0 | 0 | | | | | | |
| 3 | 126890 | 1 | 9/25/2015 | NORTH | LINCOLN STREET BETWEEN VINE STREET AND MANCHESTER MEMORIAL ELEMENTARY SCHOOL NORTHERLY DRIVEWAY | O | 0 | 0 | SW | DRY | CLEAR | DAYLIGHT | 852 | FRIDAY |
| | | 2 | | PARKED | | - | | | | | | | | |
| 4 | 135579 | 1 | 5/14/2016 | EAST | SUMMER STREET AT SWEENEY PARK | O | 0 | 0 | OBJ | DRY | CLEAR | DAYLIGHT | 1701 | SATURDAY |
| 5 | 137660 | 1 | 6/30/2016 | SOUTH | LINCOLN STREET BETWEEN VINE STREET AND MANCHESTER MEMORIAL ELEMENTARY SCHOOL NORTHERLY DRIVEWAY | O | 0 | 0 | OBJ | DRY | CLEAR | DAYLIGHT | 825 | THURSDAY |
| | | | | | | TOTAL | 0 | 0 | | | | | | |

# APPENDIX E

## Speed Data

***Transportation Data Corporation***
*Mario Perone, mperone1@verizon.net*
*tel (781) 587-0086 cell (781) 439-4999*

Lincoln Street just north of
MMES Enter Only Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

04962Bspeed
Site Code: 217078

Northbound

| Start Time | 1 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 75 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/12/17 | 0 | 0 | 0 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 01:00 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 02:00 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 03:00 | 0 | 0 | 1 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 04:00 | 0 | 0 | 0 | 1 | 9 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| 05:00 | 0 | 0 | 1 | 20 | 34 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 56 |
| 06:00 | 1 | 0 | 2 | 54 | 37 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 98 |
| 07:00 | 7 | 21 | 97 | 107 | 32 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 269 |
| 08:00 | 5 | 15 | 99 | 88 | 32 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 239 |
| 09:00 | 2 | 2 | 14 | 76 | 42 | 7 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 145 |
| 10:00 | 9 | 4 | 43 | 70 | 29 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 157 |
| 11:00 | 6 | 7 | 25 | 67 | 28 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 134 |
| 12 PM | 3 | 2 | 23 | 53 | 43 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 127 |
| 13:00 | 2 | 3 | 35 | 56 | 33 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 132 |
| 14:00 | 21 | 24 | 58 | 45 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 161 |
| 15:00 | 6 | 15 | 50 | 79 | 49 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 203 |
| 16:00 | 0 | 2 | 25 | 91 | 46 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 166 |
| 17:00 | 4 | 0 | 23 | 65 | 31 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 127 |
| 18:00 | 4 | 0 | 14 | 64 | 20 | 3 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 106 |
| 19:00 | 2 | 0 | 16 | 41 | 14 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 76 |
| 20:00 | 1 | 0 | 7 | 20 | 14 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 46 |
| 21:00 | 0 | 0 | 2 | 16 | 13 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 33 |
| 22:00 | 0 | 1 | 2 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| 23:00 | 0 | 1 | 0 | 0 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 6 |
| Total | 73 | 97 | 537 | 1021 | 527 | 55 | 6 | 0 | 0 | 1 | 0 | 0 | 0 | 2317 |
| Percent | 3.2% | 4.2% | 23.2% | 44.1% | 22.7% | 2.4% | 0.3% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |

Daily

| | |
|---|---|
| 15th Percentile : | 21 MPH |
| 50th Percentile : | 27 MPH |
| 85th Percentile : | 32 MPH |
| 95th Percentile : | 34 MPH |
| Mean Speed(Average) : | 27 MPH |
| 10 MPH Pace Speed : | 21-30 MPH |
| Number in Pace : | 1558 |
| Percent in Pace : | 67.2% |
| Number of Vehicles > 30 MPH : | 589 |
| Percent of Vehicles > 30 MPH : | 25.4% |

| Grand Total | 73 | 97 | 537 | 1021 | 527 | 55 | 6 | 0 | 0 | 1 | 0 | 0 | 0 | 2317 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Overall

| | |
|---|---|
| 15th Percentile : | 21 MPH |
| 50th Percentile : | 27 MPH |
| 85th Percentile : | 32 MPH |
| 95th Percentile : | 34 MPH |
| Mean Speed(Average) : | 27 MPH |
| 10 MPH Pace Speed : | 21-30 MPH |
| Number in Pace : | 1558 |
| Percent in Pace : | 67.2% |
| Number of Vehicles > 30 MPH : | 589 |
| Percent of Vehicles > 30 MPH : | 25.4% |

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Lincoln Street just north of
MMES Enter Only Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

04962Bspeed
Site Code: 217078

Southbound

| Start Time | 1 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 75 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/12/17 | 0 | 0 | 0 | 3 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 5 |
| 01:00 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 02:00 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 03:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:00 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 05:00 | 0 | 0 | 0 | 4 | 3 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 8 |
| 06:00 | 2 | 1 | 5 | 13 | 13 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 38 |
| 07:00 | 11 | 6 | 59 | 69 | 18 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 164 |
| 08:00 | 9 | 9 | 67 | 57 | 31 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 177 |
| 09:00 | 4 | 0 | 21 | 41 | 23 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 91 |
| 10:00 | 3 | 4 | 22 | 53 | 24 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 108 |
| 11:00 | 1 | 2 | 19 | 46 | 18 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 90 |
| 12 PM | 6 | 1 | 24 | 38 | 28 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 99 |
| 13:00 | 1 | 2 | 27 | 49 | 28 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 110 |
| 14:00 | 19 | 27 | 59 | 47 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 162 |
| 15:00 | 27 | 3 | 21 | 61 | 43 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 158 |
| 16:00 | 4 | 5 | 6 | 86 | 65 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 171 |
| 17:00 | 3 | 3 | 18 | 113 | 69 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 212 |
| 18:00 | 2 | 0 | 22 | 91 | 48 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 169 |
| 19:00 | 2 | 0 | 14 | 71 | 34 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 124 |
| 20:00 | 3 | 1 | 4 | 42 | 25 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 80 |
| 21:00 | 0 | 1 | 9 | 42 | 26 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 81 |
| 22:00 | 0 | 0 | 2 | 12 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 19 |
| 23:00 | 0 | 0 | 1 | 6 | 9 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| Total | 97 | 65 | 401 | 946 | 522 | 56 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2088 |
| Percent | 4.6% | 3.1% | 19.2% | 45.3% | 25.0% | 2.7% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |

Daily

| | |
|---|---|
| 15th Percentile : | 21 MPH |
| 50th Percentile : | 27 MPH |
| 85th Percentile : | 32 MPH |
| 95th Percentile : | 34 MPH |
| Mean Speed(Average) : | 27 MPH |
| 10 MPH Pace Speed : | 26-35 MPH |
| Number in Pace : | 1468 |
| Percent in Pace : | 70.3% |
| Number of Vehicles > 30 MPH : | 579 |
| Percent of Vehicles > 30 MPH : | 27.7% |

| Grand Total | 97 | 65 | 401 | 946 | 522 | 56 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 2088 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Overall

| | |
|---|---|
| 15th Percentile : | 21 MPH |
| 50th Percentile : | 27 MPH |
| 85th Percentile : | 32 MPH |
| 95th Percentile : | 34 MPH |
| Mean Speed(Average) : | 27 MPH |
| 10 MPH Pace Speed : | 26-35 MPH |
| Number in Pace : | 1468 |
| Percent in Pace : | 70.3% |
| Number of Vehicles > 30 MPH : | 579 |
| Percent of Vehicles > 30 MPH : | 27.7% |

***Transportation Data Corporation***
*Mario Perone, mperone1@verizon.net*
*tel (781) 587-0086 cell (781) 439-4999*

Summer Street just west of
MMES Exit Only Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

04962Aspeed
Site Code: 217078

Eastbound

| Start Time | 1 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 75 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/12/17 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| 01:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 02:00 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 03:00 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 3 |
| 04:00 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 05:00 | 0 | 0 | 4 | 6 | 6 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| 06:00 | 0 | 1 | 2 | 15 | 8 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 27 |
| 07:00 | 4 | 0 | 17 | 88 | 51 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 162 |
| 08:00 | 2 | 5 | 24 | 80 | 33 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 148 |
| 09:00 | 1 | 2 | 17 | 79 | 34 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 140 |
| 10:00 | 1 | 1 | 20 | 85 | 31 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 141 |
| 11:00 | 3 | 1 | 26 | 79 | 39 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 153 |
| 12 PM | 7 | 2 | 29 | 86 | 51 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 176 |
| 13:00 | 3 | 0 | 14 | 96 | 45 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 165 |
| 14:00 | 4 | 2 | 31 | 102 | 56 | 4 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 200 |
| 15:00 | 8 | 2 | 39 | 119 | 59 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 233 |
| 16:00 | 5 | 0 | 32 | 121 | 84 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 244 |
| 17:00 | 3 | 2 | 30 | 100 | 81 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 222 |
| 18:00 | 3 | 2 | 17 | 79 | 46 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 150 |
| 19:00 | 0 | 1 | 17 | 47 | 21 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 92 |
| 20:00 | 0 | 0 | 8 | 30 | 26 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 65 |
| 21:00 | 0 | 1 | 3 | 23 | 18 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 47 |
| 22:00 | 0 | 0 | 1 | 10 | 8 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 20 |
| 23:00 | 0 | 0 | 0 | 3 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 7 |
| Total | 44 | 22 | 331 | 1250 | 704 | 62 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 2417 |
| Percent | 1.8% | 0.9% | 13.7% | 51.7% | 29.1% | 2.6% | 0.0% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |

Daily

| | |
|---|---|
| 15th Percentile : | 24 MPH |
| 50th Percentile : | 28 MPH |
| 85th Percentile : | 32 MPH |
| 95th Percentile : | 34 MPH |
| Mean Speed(Average) : | 29 MPH |
| 10 MPH Pace Speed : | 26-35 MPH |
| Number in Pace : | 1954 |
| Percent in Pace : | 80.8% |
| Number of Vehicles > 30 MPH : | 770 |
| Percent of Vehicles > 30 MPH : | 31.9% |

| Grand Total | 44 | 22 | 331 | 1250 | 704 | 62 | 1 | 3 | 0 | 0 | 0 | 0 | 0 | 2417 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Overall

| | |
|---|---|
| 15th Percentile : | 24 MPH |
| 50th Percentile : | 28 MPH |
| 85th Percentile : | 32 MPH |
| 95th Percentile : | 34 MPH |
| Mean Speed(Average) : | 29 MPH |
| 10 MPH Pace Speed : | 26-35 MPH |
| Number in Pace : | 1954 |
| Percent in Pace : | 80.8% |
| Number of Vehicles > 30 MPH : | 770 |
| Percent of Vehicles > 30 MPH : | 31.9% |

***Transportation Data Corporation***
*Mario Perone, mperone1@verizon.net*
*tel (781) 587-0086 cell (781) 439-4999*

Summer Street just west of
MMES Exit Only Driveway
City, State: Manchester-by-the-Sea, MA
Client: Bryant/T. Brayton

04962Aspeed
Site Code: 217078

Westbound

| Start Time | 1 15 | 16 20 | 21 25 | 26 30 | 31 35 | 36 40 | 41 45 | 46 50 | 51 55 | 56 60 | 61 65 | 66 70 | 71 75 | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 10/12/17 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 01:00 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 02:00 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 03:00 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 04:00 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 |
| 05:00 | 0 | 0 | 1 | 10 | 9 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 25 |
| 06:00 | 0 | 1 | 1 | 30 | 34 | 8 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 74 |
| 07:00 | 4 | 6 | 20 | 93 | 72 | 10 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 205 |
| 08:00 | 10 | 41 | 24 | 68 | 56 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 202 |
| 09:00 | 3 | 0 | 10 | 61 | 43 | 7 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 124 |
| 10:00 | 4 | 3 | 24 | 66 | 36 | 2 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 136 |
| 11:00 | 1 | 7 | 13 | 65 | 54 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 144 |
| 12 PM | 5 | 6 | 10 | 63 | 43 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 128 |
| 13:00 | 5 | 3 | 10 | 62 | 63 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 148 |
| 14:00 | 4 | 4 | 18 | 77 | 56 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 159 |
| 15:00 | 4 | 16 | 29 | 96 | 48 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 193 |
| 16:00 | 3 | 3 | 22 | 93 | 50 | 5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 176 |
| 17:00 | 11 | 7 | 19 | 80 | 50 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 173 |
| 18:00 | 1 | 4 | 10 | 57 | 35 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 109 |
| 19:00 | 1 | 1 | 12 | 25 | 19 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 60 |
| 20:00 | 0 | 1 | 1 | 17 | 15 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 34 |
| 21:00 | 1 | 0 | 2 | 15 | 13 | 6 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 37 |
| 22:00 | 0 | 1 | 0 | 2 | 6 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 10 |
| 23:00 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| Total | 57 | 104 | 226 | 984 | 706 | 68 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2147 |
| Percent | 2.7% | 4.8% | 10.5% | 45.8% | 32.9% | 3.2% | 0.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | |

Daily

| | |
|---|---|
| 15th Percentile : | 23 MPH |
| 50th Percentile : | 28 MPH |
| 85th Percentile : | 33 MPH |
| 95th Percentile : | 34 MPH |
| Mean Speed(Average) : | 28 MPH |
| 10 MPH Pace Speed : | 26-35 MPH |
| Number in Pace : | 1690 |
| Percent in Pace : | 78.7% |
| Number of Vehicles > 30 MPH : | 776 |
| Percent of Vehicles > 30 MPH : | 36.1% |

| Grand Total | 57 | 104 | 226 | 984 | 706 | 68 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2147 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

Overall

| | |
|---|---|
| 15th Percentile : | 23 MPH |
| 50th Percentile : | 28 MPH |
| 85th Percentile : | 33 MPH |
| 95th Percentile : | 34 MPH |
| Mean Speed(Average) : | 28 MPH |
| 10 MPH Pace Speed : | 26-35 MPH |
| Number in Pace : | 1690 |
| Percent in Pace : | 78.7% |
| Number of Vehicles > 30 MPH : | 776 |
| Percent of Vehicles > 30 MPH : | 36.1% |

# APPENDIX F

## Supplemental Plans

# **R-1** FOUR WALLS




1. GYMNASIUM
2. CAFETERIA
3. LIBRARY / MEDIA
4. ADMIN
5. CLASSROOMS
6. PARKING
7. PLAYFIELDS
8. OUTDOOR LEARNING

NORTH

MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

# AR-2 SAVE THE CORE




1. GYMNASIUM
2. CAFETERIA
3. LIBRARY / MEDIA
4. ADMIN
5. CLASSROOMS
6. PARKING
7. PLAYFIELDS
8. OUTDOOR LEARNING

NORTH

MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

# **N-1** THE PIANO




1. GYMNASIUM
2. CAFETERIA
LIBRARY / MEDIA ABOVE
4. ADMIN
5. CLASSROOMS
6. PARKING
7. PLAYFIELDS
8. OUTDOOR LEARNING

NORTH

MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

# **N-3** THE HUB




1. GYMNASIUM
2. CAFETERIA
3. LIBRARY / MEDIA
4. ADMIN
5. CLASSROOMS
6. PARKING
7. PLAYFIELDS
8. OUTDOOR LEARNING

NORTH

MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

# **N-9** THE HOOK




1. GYMNASIUM
2. CAFETERIA
3. LIBRARY / MEDIA
4. ADMIN
5. CLASSROOMS
6. PARKING
7. PLAYFIELDS
8. OUTDOOR LEARNING

NORTH

MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

APPENDIX A

MASSACHUSETTS HISTORICAL COMMISSION
220 MORRISSEY BOULEVARD
BOSTON, MASS. 02125
617-727-8470, FAX: 617-727-5128

## PROJECT NOTIFICATION FORM

Project Name: Memorial Elementary School

Location / Address: 43 Lincoln Street

City / Town: Manchester-by-the-Sea

Project Proponent

Name: Manchester-Essex Regional School District

Address: 36 Lincoln Street

City/Town/Zip/Telephone: Manchester-by-the-Sea, MA 01944

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

| Agency Name | Type of License or funding (specify) |
|---|---|
| Manchester-Essex Regional School District | Local funding and permits |
| Massachusetts State Building Authority | State funding |

**Project Description (narrative):**

New, freestanding, two-story, 82,800 sf school for 335+ students in Grades Pre-K through 5 on the site of an existing school. Project includes the development of new parking and play fields to support the new facility. The construction will be completed in multiple phases.

**Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition.**

The existing, freestanding, one-story, 81,000 sf school built in 1969 will be demolished in multiple phases as replacement sections are constructed and occupied.

**Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation.**

The project does not include rehabilitation of any existing buildings.

**Does the project include new construction? If so, describe (attach plans and elevations if necessary).**

The project includes new construction. See Project Description above and attached site plan and floor plans.

APPENDIX A (continued)

**To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify.**

There are no historic or archeaological properties known to exist within the project's area of potential impact.

**What is the total acreage of the project area?**

| | | | |
|---|---|---|---|
| Woodland | 0.0 acres | Productive Resources: | |
| Wetland | 0.0 acres | Agriculture | 0.0 acres |
| Floodplain | 0.0 acres | Forestry | 0.0 acres |
| Open space | 8.5 acres | Mining/Extraction | 0.0 acres |
| Developed | 5.9 acres | Total Project Acreage | 14.4 acres |

**What is the acreage of the proposed new construction?** 1.5 acres

**What is the present land use of the project area?**

The present land use of the project area is for a public elementary school.

**Please attach a copy of the section of the USGS quadrangle map which clearly marks the project location.**

Project location clearly marked on attached copy of the USGS quadrangle map.

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

---

Signature of Person submitting this form: _____ Date: September 9, 2016

Name: Daniel F. B. Ruiz MCPPO

Address: JCJ Architecture | One State Street, Suite 900

City/Town/Zip: Boston, MA 02109

Telephone: 617-520-6605

REGULATORY AUTHORITY

950 CMR 71.00: M.G.L. c. 9, §§ 26-27C as amended by St. 1988, c. 254.

**MEMORIAL ELEMENTARY SCHOOL - PREFERRED SOLUTION – SITE PLAN**



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**PREFERRED SOLUTION – FLOOR PLANS**




SECOND FLOOR PLAN




FIRST FLOOR PLAN

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**PREFERRED SOLUTION – CONCEPTUAL PHASING PLANS**

For Option N-3, one potential phasing solution consists of; installing approximately 6 modulars to replace the classrooms in the southern end of the western classroom wing of the existing complex. That wing would then be fully demolished and the first phase of a new classroom wing be constructed. Once complete, it would be anticipated that the majority of students would then occupy the classrooms in the first construction. The subsequent phase would see the demolition of the central and eastern wing and Pre-K free standing building. Phase two of the new construction would then be constructed. The final phase would see the demolition of the remaining elements of the existing building. Further discussions with the district may potentially further reduce the number of modulars required.



PHASE ONE



PHASE TWO



PHASE THREE



PHASE FOUR



PHASE FIVE

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**USGS QUADRANGLE MAP**



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# FINAL EVALUATION OF ALTERNATIVES

SECTION 3.3.3

### 3.3.3 – Final Evaluation of Alternates

- Analysis of Alternatives
  - Option R-1
  - Option AR-2
  - Option AR-4
  - Option N-1
  - Option N-3
  - Option N-8
  - Option N-9
- Expected Review/ Permitting Requirements
- Zoning Requirements
- Utilities
- Site and Building Systems Narratives
  - Structural System Narrative
  - Mechanical System Narrative (Including Anticipated Loads)
  - Electrical and Technology System Narrative (Including Anticipated Loads)
  - Plumbing System Narrative
  - Fire Protection System Narrative
  - Civil/ Site System Narrative
- Cost Estimates (Uniformat II)

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### 3.3.3 – FINAL EVALUATION OF ALTERNATIVES

After documenting the Educational Program, the Initial Space Summary, evaluating the Existing Conditions and Site Development Requirements, the Designer developed a series of preliminary options for the sites that have been moved forward for consideration by the Memorial School Building Committee (SBC) per their motion and vote at their November 14, 2017 meeting. These options were developed with the SBC's consideration and comment.

As part of this process, potential phasing strategies were analyzed and discussed. Given the small site, the sprawling nature of the existing building, and the various regulatory restrictions further limiting the potential buildable area, understanding how to phase each Option was a critical element of the Committee's analysis. For most Options, the basic strategy revolved around a partial demolition of some of the classroom wing(s), relocation of a portion of the student population into modulars and then the construction of a sufficient amount of new classroom spaces to either reduce or eliminate the need for modulars in subsequent phases of construction. Notably, Option 1 allowed for the entire new building to be constructed in a single phase, while Option N-3 provided for the least number of modulars to be used.

While a Code-Upgrade/ Renovation option was discussed it became evident that the significant components of the District's Educational Program would not be achieved through such an approach. Two of the original four renovation/addition options were also considered. One Scheme, AR-4 was eventually dropped from further consideration and estimating because it was considered to not sufficiently accomplish the District's educational goals for the cost of the effort. AR-2 was evaluated and developed further.

### ANALYSIS OF ALTERNATIVES

The options that were explored in the PDP were each developed with additional detail that helped the School Building Committee (SBC) understand the inherent advantages and disadvantages of each option and ultimately help the SBC move toward a decision on the Preferred Solution to be submitted to the MSBA.

Coming out of the Preliminary Design program Phase the Building Committee began the Preferred Schematic Phase considering seven (7) options. These included R-1 (Code Update/ Renovation) AR-2 and AR-4 (Addition Renovation) and N-1, N-3, N-8 and N-9 (New Construction.) These were developed to a similar level of detail that was then presented to the School Building Committee. At their meeting on January 10, 2018 the School Building Committee's voted to eliminate Options AR-4 and N-8 for reasons outlined in greater detail below. At the same meeting, the committee voted to submit the remaining Options for estimating. This included Options R-1, AR-2, N-1, N-3, and N-9. These five options are described in greater detail below. These options meet the MSBA criteria for addition/renovation options and new options for this phase of the process.

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## OPTION R-1: (RENOVATION/ CODE-ONLY OPTION)

Studies a full Code upgrade of the existing Memorial Elementary School. This option would preserve all of the existing pedestrian and vehicular site circulation but does not allow for increased parking or vehicular queuing. Some play areas to be updated. * While not generally favored, this option was moved forward by the Committee for further consideration as required by MSBA.

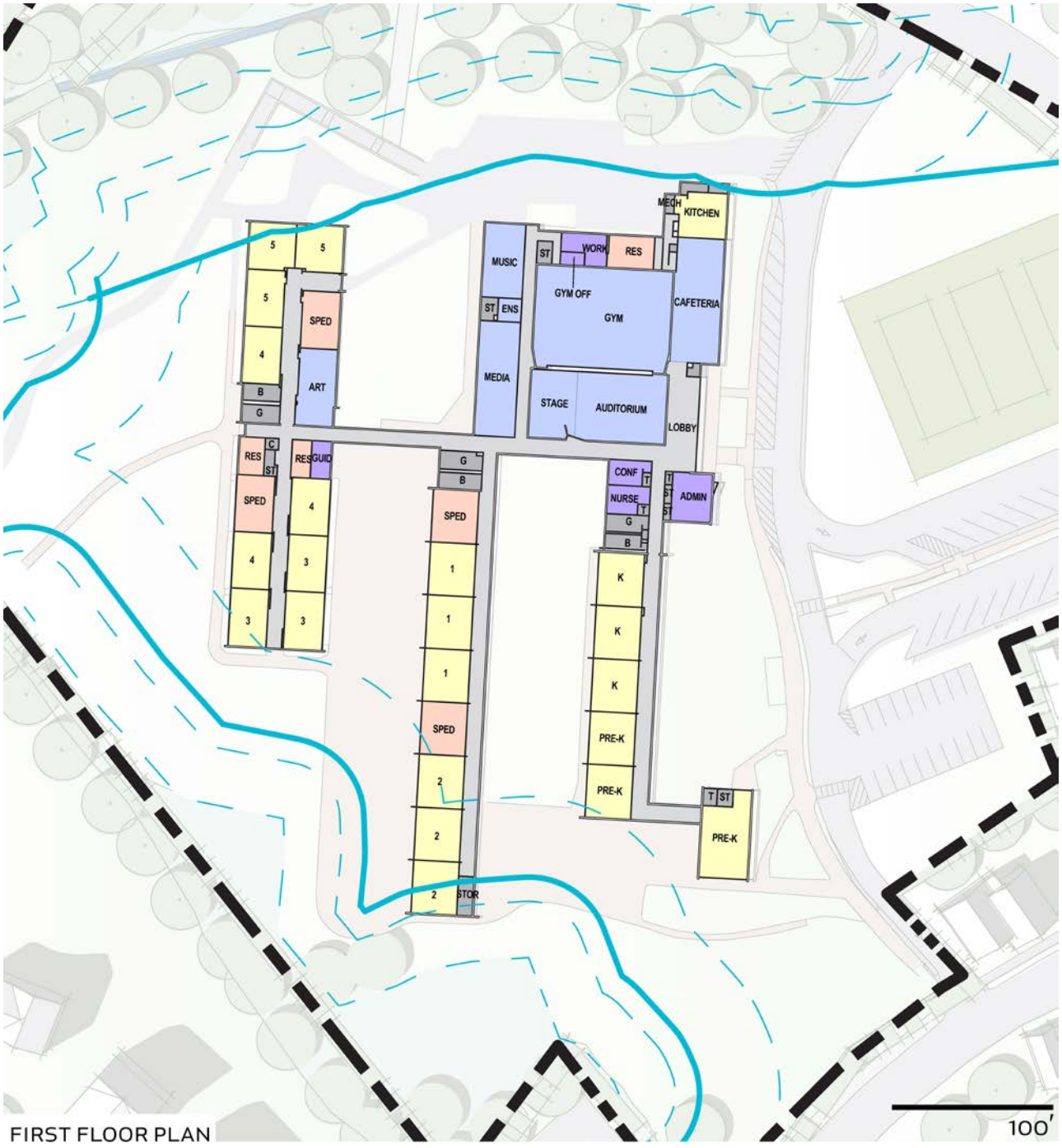
### EVALUATION OF POTENTIAL CONSTRUCTION IMPACTS

In order to implement this option, the Town must acquire modular classrooms to provide swing space for the students that are currently occupying the building. Conceptual Phasing Plans are included below.

### CONCEPTUAL ARCHITECTURAL AND SITE PLANS




*Option R-1 Site Plan*




*Option R-1 Floor Plan*

## CONCEPTUAL PHASING PLANS

Given the anticipated complexity of phasing the construction of this Memorial School project, we looked closely at potential phasing solutions for each of the Options. For Option R-1, one potential phasing solution consists of; installing approximately 12 modulars to replace the classrooms in the west wing of the existing complex. That western classroom wing would then be fully renovated. The subsequent phases would see the renovation of the central classroom second, and then the eastern wing and Pre-K free standing building. The final phase would focus on renovation of the core areas including the gym, auditorium and cafeteria program spaces. The number of modular required could potentially be reduced through the course of the construction period.



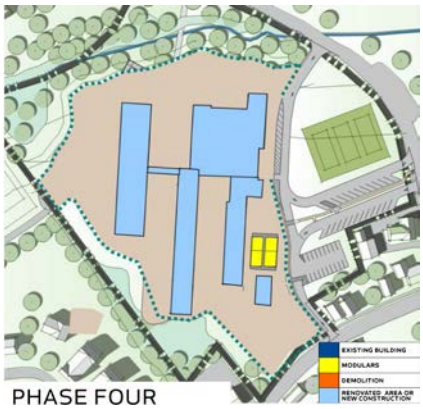
PHASE ONE



PHASE TWO



PHASE THREE



PHASE FOUR

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### OPTION AR-2 (ADDITION RENOVATION)

Studies a full renovation of the existing core spaces (Gym, Cafeteria, Auditorium) of the existing building with the demolition of the existing classroom wings and the addition of a new, 2 story classroom wing to accommodate 335 students. This option would preserve most of the existing pedestrian and vehicular site circulation but does not allow for increased vehicular queuing. Some additional parking to be constructed and all play areas to be updated. * This option was moved forward by the Committee for further consideration.

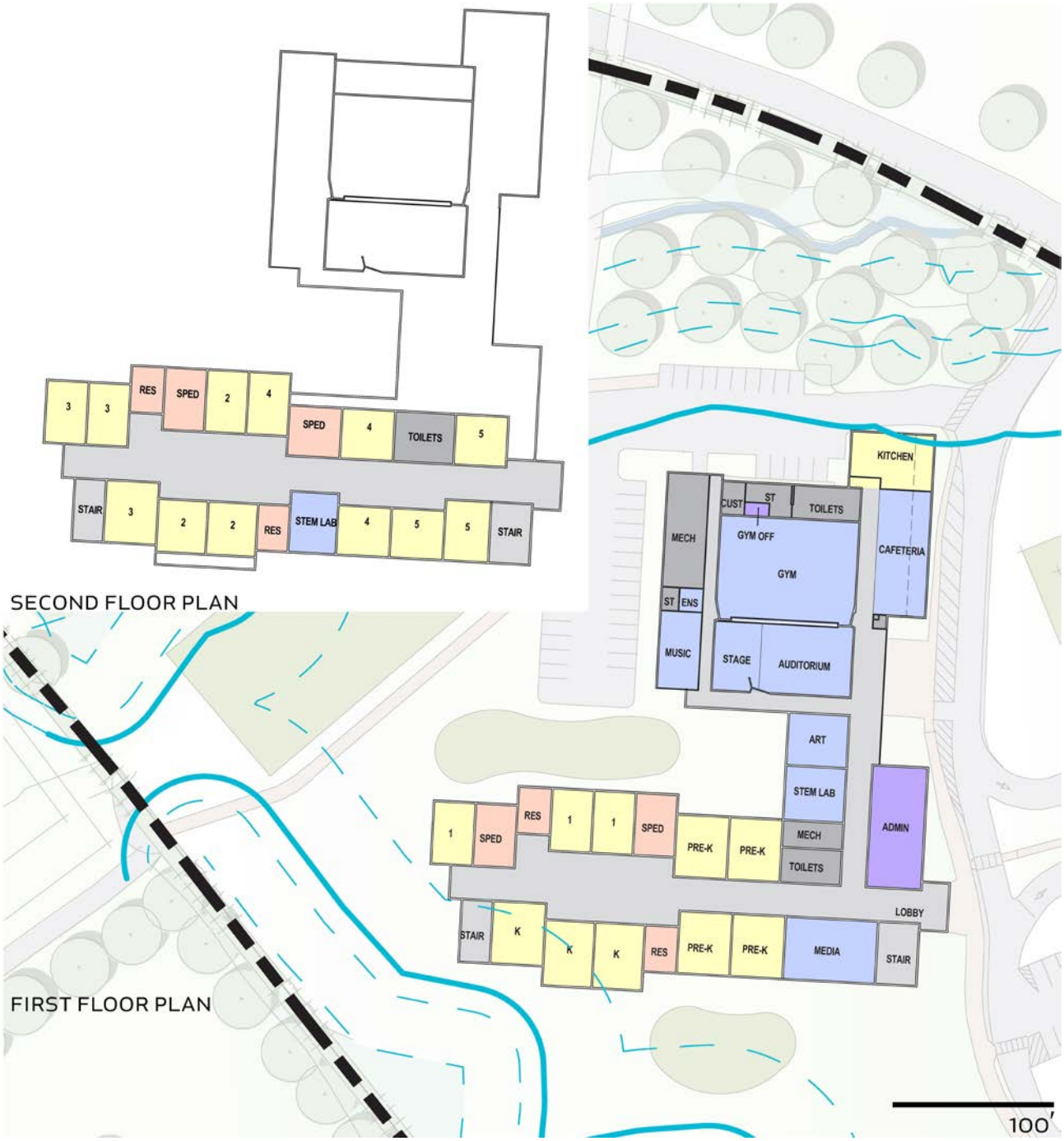
### EVALUATION OF POTENTIAL CONSTRUCTION IMPACTS

In order to implement this option, the Town must acquire modular classrooms to provide swing space for the students that are currently occupying the building. The construction would entail demolishing portions of the existing building at the outset of the schedule, constructing the new classroom addition, and then renovating the existing core. Conceptual Phasing Plans are included below.

### CONCEPTUAL ARCHITECTURAL AND SITE PLANS




*Option AR-2 Site Plan*




*Option AR-2 Floor Plans*

## CONCEPTUAL PHASING PLANS

For Option AR-2, one potential phasing solution consists of; installing approximately 14 modulars to replace the classrooms in the west and central wings of the existing complex. Those wings would then be fully demolished and the first phase of a new classroom wing be constructed. Once complete, it would be anticipated that the majority of students would then occupy the classrooms in the first construction. The subsequent phase would see the demolition of the eastern wing and Pre-K free standing building. Phase two of the new construction would then be constructed. The final phase would focus on renovation of the core areas including the gym, auditorium and cafeteria program spaces. The number of modular required would be reduced through the course of the construction period



PHASE ONE



PHASE TWO



PHASE THREE



PHASE FOUR



PHASE FIVE

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### OPTION AR-4 (ADDITION RENOVATION)

Studies a full renovation of the existing core spaces (Gym, Cafeteria, Auditorium) and two classroom wings of the existing building with the demolition of one existing classroom wing and the addition of a new, 2 story classroom wing in its place to accommodate 335 students. This option would preserve most of the existing pedestrian and vehicular site circulation but does not allow for increased parking or vehicular queuing. All play areas to be updated. * This option was not moved forward by the Committee for further consideration.

### EVALUATION OF POTENTIAL CONSTRUCTION IMPACTS

Option not pursued.

### CONCEPTUAL ARCHITECTURAL AND SITE PLANS




*Option AR-4 Site Plan*




*Option AR-4 Floor Plans*

**CONCEPTUAL PHASING PLANS**

This Scheme was eliminated prior to the analysis of phasing

### OPTION N-1 (NEW CONSTRUCTION)

Studies a new, PRE-K - 5 (335) school located on the site of the existing Memorial Elementary School. This Option assumes that the new school would be a two story, 88,500sf building with a footprint of approximately 53,500sf (remainder of the square footage would be second floor classroom space). This option would preserve some of the existing site circulation while allowing for increased parking and vehicular queuing and all pedestrian access and play areas to be updated. This Option requires some of the Memorial students to occupy modular classrooms on site while some remain in the existing space through the duration of the first phase of construction then to all move into the new building as the remainder of the existing school is demolished. * This option was moved forward by the Committee for further consideration.

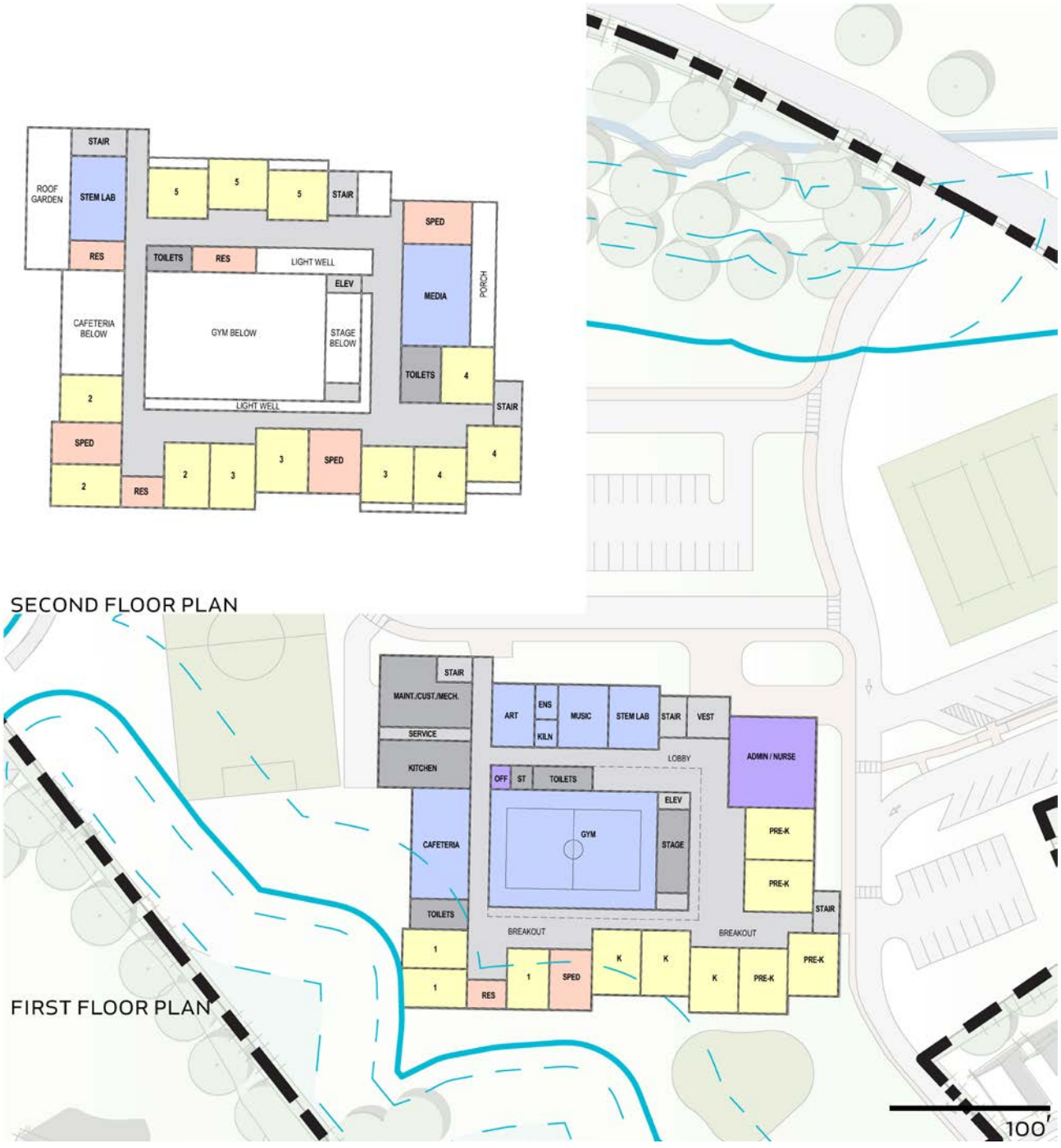
### EVALUATION OF POTENTIAL CONSTRUCTION IMPACTS

In order to implement this option, the Town must acquire modular classrooms to provide swing space on site for the students that are currently occupying two of the classroom wings. The construction would entail demolishing portions of the existing building at the outset of the schedule, constructing the new school, followed by the demolition of the remainder of the existing school and completion of new site amenities. Conceptual Phasing Plans are included below.

### CONCEPTUAL ARCHITECTURAL AND SITE PLANS




*Option N-1 Site Plan*




*Option N-1 Floor Plans*

**CONCEPTUAL PHASING PLANS**

For Option N-1, one potential phasing solution consists of; relocating the existing driveway to the east to allow sufficient room for the future construction's building pad. From there, approximately 14 modulars would need to be installed to replace the classrooms in the eastern and central wings of the existing complex. Those wings would then be fully demolished and the entire new building constructed in a single phase. Once complete, students would then occupy the new building permanently. The subsequent phase would see the demolition of the remaining existing structure. The number of modular required would likely remain steady through the course of construction.



PHASE ONE



PHASE TWO



PHASE THREE

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### OPTION N-3 (NEW CONSTRUCTION)

Studies a new, PRE-K - 5 (335) school located on the site of the existing Memorial Elementary School. This Option assumes that the new school would be a two story, 82,800sf building with a footprint of approximately 56,900sf (remainder of the square footage would be second floor classroom space. This option would preserve some of the existing site circulation while allowing for increased parking and vehicular queuing and all pedestrian access and play areas to be updated. This Option requires some of the Memorial students to occupy modular classrooms on site while some remain in the existing space through the duration of the first phase of construction then to all move into the new building as the remainder of the existing school is demolished. * This option was moved forward by the Committee for further consideration.

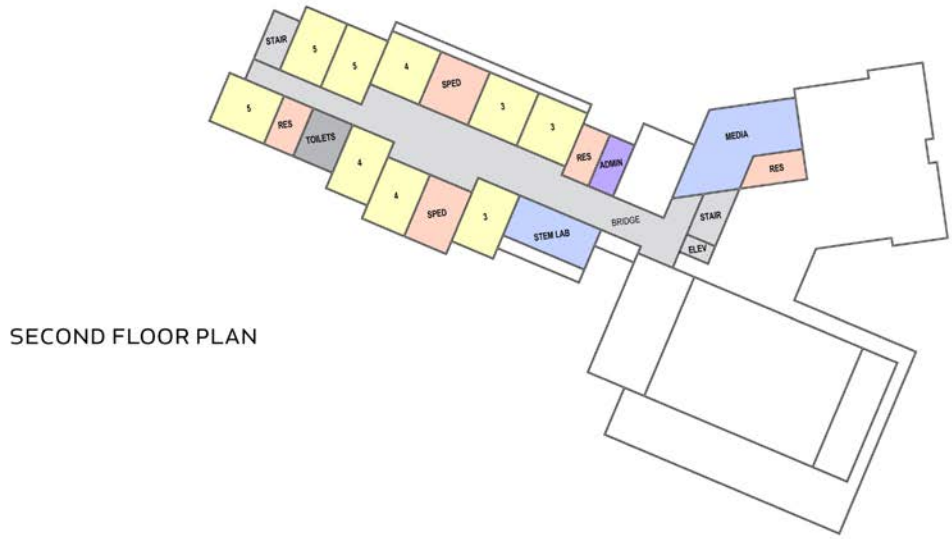
### EVALUATION OF POTENTIAL CONSTRUCTION IMPACTS

In order to implement this option, the Town must acquire modular classrooms to provide swing space on site for the students that are currently occupying one half of one existing classroom wing. The construction would entail demolishing a portion of the existing building at the outset of the schedule and construction of a new classroom wing, followed by the demolition of the remainder of the existing classrooms to make way for the new core spaces. Once the new school is complete, the remainder of the existing school would be demolished, allowing for the completion of new site amenities. Conceptual Phasing Plans are included below.

### CONCEPTUAL ARCHITECTURAL AND SITE PLANS




*Option N-3 Site Plan*







*Option N-3 Floor Plans*

## CONCEPTUAL PHASING PLANS

For Option N-3, one potential phasing solution consists of; installing approximately 6 modulars to replace the classrooms in the southern end of the western classroom wing of the existing complex. That wing would then be fully demolished and the first phase of a new classroom wing be constructed. Once complete, it would be anticipated that the majority of students would then occupy the classrooms in the first construction. The subsequent phase would see the demolition of the central and eastern wing and Pre-K free standing building. Phase two of the new construction would then be constructed. The final phase would see the demolition of the remaining elements of the existing building. Further discussions with the district may potentially further reduce the number of modulars required.















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### OPTION N-8 (NEW CONSTRUCTION)

Studies a new, PRE-K - 5 (335) school located on the site of the existing Memorial Elementary School. This Option assumes that the new school would be a two story building. This option would allow both the pedestrian and vehicular circulation to be reworked on site and all of the play areas to be updated. This Option requires some of the Memorial students to occupy modular classrooms on site while some remain in the existing space through the duration of the first phase of construction then to all move into the new building as the remainder of the existing school is demolished. This option would preserve some of the existing site circulation while allowing for increased parking and vehicular queuing and all pedestrian access and play areas to be updated. * This option was not moved forward by the Committee for further consideration.

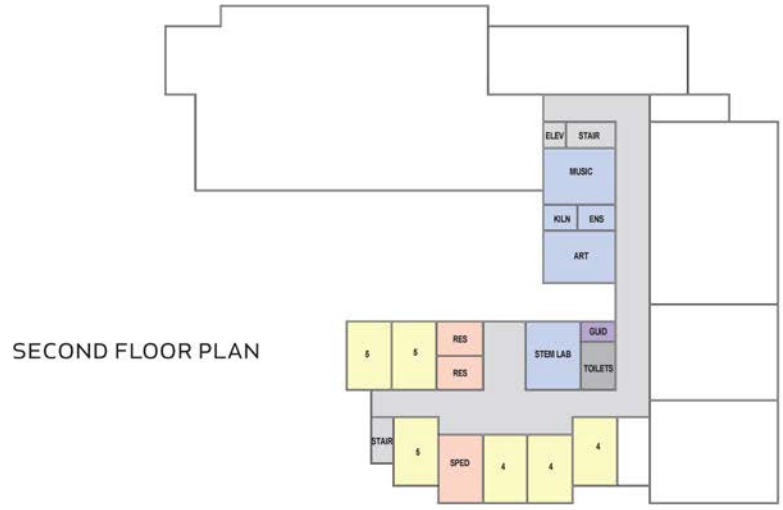
### EVALUATION OF POTENTIAL CONSTRUCTION IMPACTS

Option not pursued.

### CONCEPTUAL ARCHITECTURAL AND SITE PLANS




*Option N-8 Site Plan*







*Option N-8*

*Floor Plans*

**CONCEPTUAL PHASING PLANS**



### OPTION N-9 (NEW CONSTRUCTION)

Studies a new, PRE-K - 5 (335) school located on the site of the existing Memorial Elementary School. This Option assumes that the new school would be a two story, 87,700sf building with a footprint of approximately 58,000sf (remainder of the square footage would be second floor classroom space). This option would preserve some of the existing site circulation while allowing for increased parking and vehicular queuing and all pedestrian access and play areas to be updated. This Option requires some of the Memorial students to occupy modular classrooms on site while some remain in the existing space through the duration of the first phase of construction then to all move into the new building as the remainder of the existing school is demolished. * This option was moved forward by the Committee for further consideration.

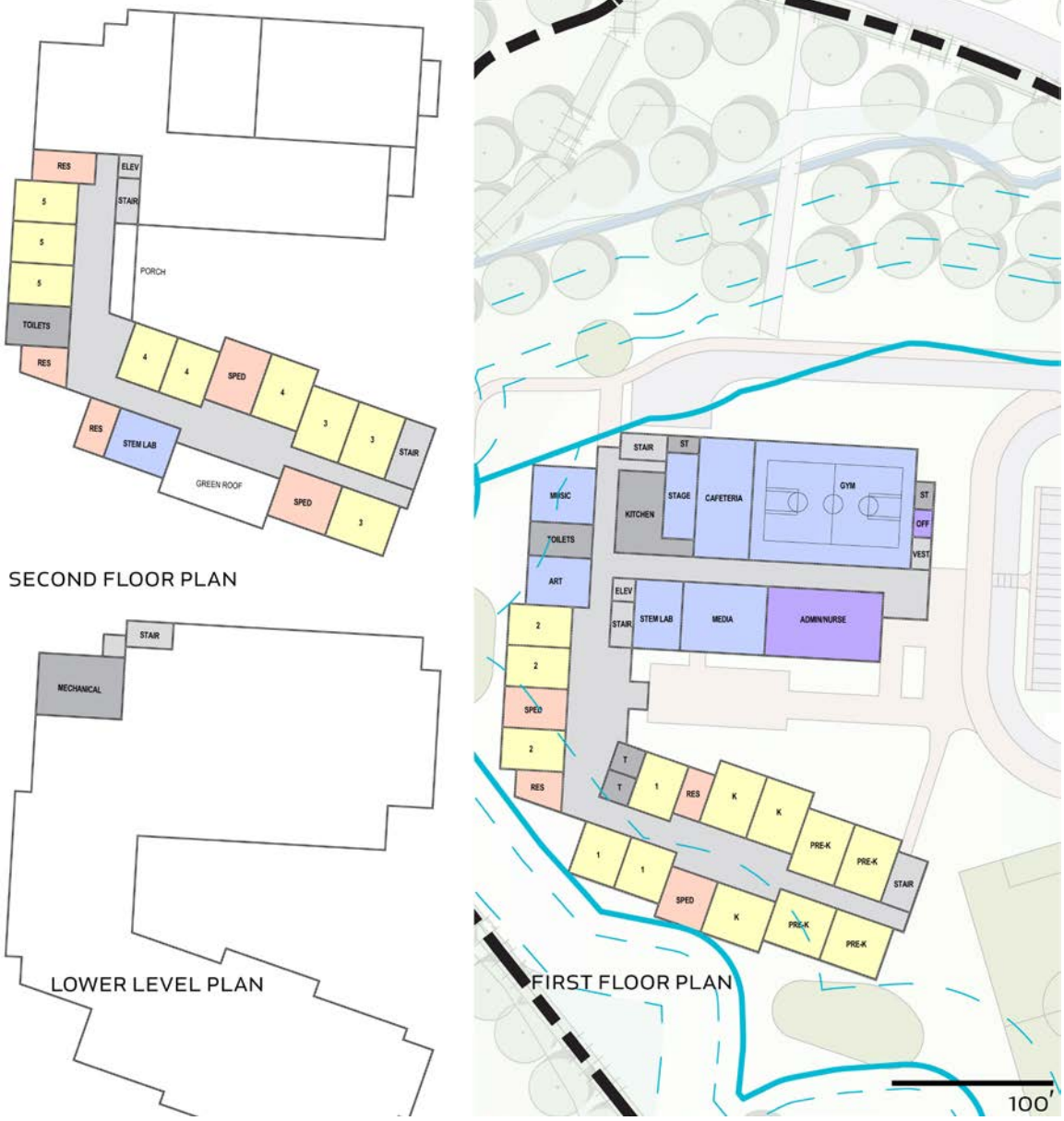
### EVALUATION OF POTENTIAL CONSTRUCTION IMPACTS

In order to implement this option, the Town must acquire modular classrooms to provide swing space on site for the students that are currently occupying two existing classroom wings. The construction would entail demolishing a portion of the existing building at the outset of the schedule and construction of new classroom wings, followed by the demolition of the remainder of the existing classrooms and core spaces to make way for the new core spaces. Once the new school is complete, new site amenities would be constructed. Conceptual Phasing Plans are included below.

### CONCEPTUAL ARCHITECTURAL AND SITE PLANS



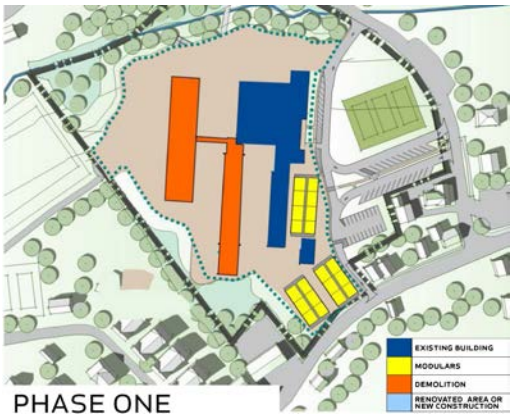

*Option N-9 Site Plan*




*Option N-9 Floor Plans*

## CONCEPTUAL PHASING PLANS

For Option N-9, one potential phasing solution consists of; installing approximately 20 modulars to replace the classrooms in the western and central classroom wing of the existing complex. Those wings would then be fully demolished and the first phase of a new classroom wing be constructed. The first phase would also include some of the common spaces including the cafeteria, server and kitchen. Once complete, it would be anticipated that the majority of students would then occupy the classrooms in the first construction. The subsequent phase would see the demolition of the remaining elements of the existing building. An alternate would be to break up the second phase to minimize the extent the gym would be unavailable.



PHASE ONE



PHASE TWO



PHASE THREE



PHASE FOUR

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## EXPECTED REVIEW/PERMITTING REQUIREMENTS

Permitting requirements were anticipated to be similar and likely the same for all the Options that were considered through this phase. Permitting requirements include;

A. Notice of Intent – Conservation Commission and MassDEP – Alterations within 100-foot and 200-foot riparian waterway resource areas as well as the 50-ffot and 100-foot setback for wetland zones.

B. Site Plan Review – Manchester Planning Board – Major site construction project.

C. Zoning Board of Appeals – Manchester-by-the-Sea Zoning Board of Appeals – Relief from potential Zoning requirements such as maximum building height.

D. Water Main/Service Connections – Manchester-by-the-Sea Department of Public Works – Review of existing water main relocation and connection to proposed building.

E. Sewer Piping/Service Connections – Manchester-by-the-Sea Department of Public Works – Review of existing sewer relocation and connection to proposed building.

## ZONING REQUIREMENTS

The existing Memorial School site, located at 43 Lincoln Street, Manchester-by-the-Sea, is located within the "G" "General District" zoning district. No Zoning Overlay Districts exist on the site as of February 2018. The following dimensions are required in the G district:

G – General District

| | |
|---|---|
| • Minimum Lot Area | 6,000 Square Feet |
| • Minimum Lot Frontage | 60 Feet |
| • Minimum Front Yard Setback | 5 Feet |
| • Minimum Rear Yard Setback | 10 Feet |
| • Minimum Side Yard Setback | 10 Feet |
| • Maximum Building Coverage | 40 % |
| • Maximum Lot Coverage | 70 % |
| • Maximum Height of Structures | 35 Feet |
| • Maximum Floors | 2-1/2 Stories |

## UTILITIES

The source, capacities, and methods of obtaining all utilities is described in greater detail within the Civil Engineer's System Narrative included within this section

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## SITE AND BUILDING SYSTEMS NARRATIVES

Included within this section are the System Narratives from the major engineering disciplines. These narratives include the specific and varying requirements based on the particular Options explored; Renovation Only, Addition-Renovation and New Construction. These narratives were used to assist the Designer's and Owner's Project Manager's Cost Estimators with their efforts.

Included in the next pages are the system narratives for the Structural, Mechanical, Electrical and Technology, Plumbing and Fire Protection, and Civil/ Site elements.

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# PROPOSED SCHEME N-1 – New Construction

The scheme calls for phased demolition of the existing building, construction of modular structures and construction of the new school structure. The two story Academic wings housing the Classrooms and the Administration Spaces will be designed to receive a single story vertical addition.

## SUBSTRUCTURE

### Foundations

Based on the foundations of the existing structure, the columns of the proposed structure would bear on reinforced concrete spread footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft.-0 in. below grade. With the assumed bearing capacity of the soil of 2 tons/sf, a typical interior footing would be 9 ft. – 0 in. x 9 ft. - 0 in. x 24 in. deep and the typical exterior footings would be 8 ft. x 8 ft. x 24 in. deep in the two story areas. Typical interior footings at the interface with the Gymnasium and other interior spaces would be 9 ft. x 9 ft. x 24 in. deep. The exterior foundation walls would be 14 in. to 16 in. thick, reinforced cast-in-place concrete walls on 24 to 36 in. wide continuous reinforced concrete strip footings around the perimeter of the building extending a minimum of 4 ft. – 0 in. below finished grade.

### Slabs-on-Grade

Based on the existing school construction, the lowest level of the proposed structure would be a 5 in. thick concrete slab-on-grade reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 8 in. of compacted granular structural fill and a base course of 8 in. of compacted gravel.

## SUPERSTRUCTURE

### Floor Construction

#### Typical Floor Construction

A 5 ¼ in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. The weight of the structural steel is estimated to be 13 psf for the typical framing.

### Roof Construction

#### Typical Roof Construction

The roof construction would be galvanized, corrugated 1 ½ in. deep, Type 'B' metal roof deck spanning between wide flange steel beams and girders. At locations of roof supported mechanical equipment, a concrete slab will be provided similar to the typical supported slab. The weight of the structural steel is estimated to be 13 psf.

#### Typical Roof Construction over the Academic Wings and Administration Spaces

The roof construction of this portion of the structure would be the typical floor construction as it would be designed to receive a future one story vertical addition

### Low Roof Structure

The roof would be a continuation of the adjacent floor and would be similar to the typical floor construction of 5 ¼ in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. This roof will be supporting the mechanical units. The units would be screened by a screen comprised of structural steel posts and beams. The weight of the structural steel is estimated to be 15 psf.

### Gymnasium Roof Framing

The roof construction would be acoustic, galvanized, corrugated 3 in. deep, Type 'NA' metal roof deck spanning between long span steel joists. The weight of the steel joists and structural steel framing is estimated to be 13 psf. The Gymnasium roof framing will also support a folding partition that will open up to the Cafeteria.

## VERTICAL FRAMING ELEMENTS

### Columns

Columns will be hollow structural steel columns. Typical columns would be HSS 8 x 8 columns and the columns at the double story spaces at the Gymnasium and Cafeteria would be HSS 12 x 12.

### Lateral Load-Resisting System

The typical lateral load resisting system for the structure would be ordinary concentric braced frames comprised of HSS structural steel members.

# PROPOSED SCHEME N-3 – New Construction

The scheme calls for phased demolition of the existing building, construction of modular structures and construction of the new school structure. The single story Academic Wing will be designed to receive a future one story vertical addition.

## SUBSTRUCTURE

### Foundations

Based on the foundations of the existing structure, the columns of the proposed structure would bear on reinforced concrete spread footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft.-0 in. below grade. With the assumed bearing capacity of the soil of 2 tons/sf, a typical interior footing would be 8 ft. – 0 in. x 8 ft. - 0 in. x 24 in. deep and the typical exterior footings would be 7 ft. x 7 ft. x 24 in. deep in the one and two story areas. Typical interior footings at the interface with the Gymnasium and other interior spaces would be 9 ft. x 9 ft. x 24 in. deep. Typical exterior footings for the Gymnasium would be 7 ft. – 0 in. x 7 ft. – 0 in. x 24 in. deep. The single story structure will be designed to receive a future one story vertical addition. The exterior foundation walls would be 14 in. to 16 in. thick, reinforced cast-in-place concrete walls on 24 to 36 in. wide continuous reinforced concrete strip footings around the perimeter of the building extending a minimum of 4 ft. – 0 in. below finished grade.

### Slabs-on-Grade

Based on the existing school construction, the lowest level of the proposed structure would be a 5 in. thick concrete slab-on-grade reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 8 in. of compacted granular structural fill and a base course of 8 in. of compacted gravel.

## SUPERSTRUCTURE

### Floor Construction

#### Typical Floor Construction

A 5 ¼ in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. The weight of the structural steel is estimated to be 13 psf for the typical framing.

### Roof Construction

#### Typical Roof Construction

The roof construction would be galvanized, corrugated 1 ½ in. deep, Type 'B' metal roof deck spanning between wide flange steel beams and girders. At locations of roof supported mechanical equipment, a concrete slab will be provided similar to the typical supported slab. The weight of the structural steel is estimated to be 13 psf.

#### Typical Single Story Roof Construction

The roof construction of this portion of the structure would be the typical floor construction as it would be designed to receive a future one story vertical addition.

### Low Roof Structure

The roof would be a continuation of the adjacent floor and would be similar to the typical floor construction of 5 ¼ in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. This roof will be supporting the mechanical units. The units would be screened by a screen comprised of structural steel posts and beams. The weight of the structural steel is estimated to be 15 psf.

### Gymnasium Roof Framing

The roof construction would be acoustic, galvanized, corrugated 3 in. deep, Type 'NA' metal roof deck spanning between long span steel joists. The weight of the steel joists and structural steel framing is estimated to be 13 psf.

## VERTICAL FRAMING ELEMENTS

### Columns

Columns will be hollow structural steel columns. Typical columns would be HSS 8 x 8 columns and the columns at the double story spaces at the Gymnasium and Cafeteria would be HSS 12 x 12.

### Lateral Load-Resisting System

The typical lateral load resisting system for the structure would be ordinary concentric braced frames comprised of HSS structural steel members.

# PROPOSED SCHEME N-9 – New Construction

The scheme calls for phased demolition of the existing building, construction of modular structures and construction of the new school structure. The single story structures housing the Media Center, Administration and Pre-K classrooms will be designed to receive a future one story vertical addition.

## SUBSTRUCTURE

### Foundations

Based on the foundations of the existing structure, the columns of the proposed structure would bear on reinforced concrete spread footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft.-0 in. below grade. With the assumed bearing capacity of the soil of 2 tons/sf, a typical interior footing would be 8 ft. – 0 in. x 8 ft. - 0 in. x 24 in. deep and the typical exterior footings would be 7 ft. x 7 ft. x 24 in. deep in the one and two story areas. Typical interior footings at the interface with the Gymnasium and other interior spaces would be 9 ft. x 9 ft. x 24 in. deep. Typical exterior footings for the Gymnasium would be 7 ft. – 0 in. x 7 ft. – 0 in. x 24 in. deep. The single story structure will be designed to receive a future one story vertical addition. The exterior foundation walls would be 14 in. to 16 in. thick, reinforced cast-in-place concrete walls on 24 to 36 in. wide continuous reinforced concrete strip footings around the perimeter of the building extending a minimum of 4 ft. – 0 in. below finished grade.

### Slabs-on-Grade

Based on the existing school construction, the lowest level of the proposed structure would be a 5 in. thick concrete slab-on-grade reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 8 in. of compacted granular structural fill and a base course of 8 in. of compacted gravel.

## SUPERSTRUCTURE

### Floor Construction

#### Typical Floor Construction

A 5 ¼ in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. The weight of the structural steel is estimated to be 13 psf for the typical framing.

### Roof Construction

#### Typical Roof Construction

The roof construction would be galvanized, corrugated 1 ½ in. deep, Type 'B' metal roof deck spanning between wide flange steel beams and girders. At locations of roof supported mechanical equipment, a concrete slab will be provided similar to the typical supported slab. The weight of the structural steel is estimated to be 13 psf.

#### Typical Single Story Roof Construction

The roof construction of this portion of the structure would be the typical floor construction as it would be designed to receive a future one story vertical addition.

### Low Roof Structure

The roof would be a continuation of the adjacent floor and would be similar to the typical floor construction of 5 ¼ in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. This roof will be supporting the mechanical units. The units would be screened by a screen comprised of structural steel posts and beams. The weight of the structural steel is estimated to be 15 psf.

### Gymnasium Roof Framing

The roof construction would be acoustic, galvanized, corrugated 3 in. deep, Type 'NA' metal roof deck spanning between long span steel joists. The weight of the steel joists and structural steel framing is estimated to be 13 psf.

## VERTICAL FRAMING ELEMENTS

### Columns

Columns will be hollow structural steel columns. Typical columns would be HSS 8 x 8 columns and the columns at the double story spaces at the Gymnasium and Cafeteria would be HSS 12 x 12.

### Lateral Load-Resisting System

The typical lateral load resisting system for the structure would be ordinary concentric braced frames comprised of HSS structural steel members.

# PROPOSED SCHEME AR-2 - Renovation and Addition

The proposed scheme calls for phased renovation, demolition and construction of new additions. The proposed additions are one and two stories and will house all of the Academic Spaces, Cafeteria, Media Center, etc. The existing core spaces, including the Gymnasium and the Auditorium will be renovated. The first phase calls for the demolition of the two south wings and the construction of new modular classrooms to temporarily house some of the students. The next phase calls for the construction of the two story addition. The third phase calls the demolition of the third south wing; and the fourth phase calls for the construction of the single story addition. Phase five calls for demolition of the rest of the academic spaces, except for the core spaces which include the gymnasium and the auditorium. The remaining existing structure will also be renovated in this phase. The single story portion of the addition will be designed to receive a future single story vertical addition. The modular classrooms will be demolished in the last phase.

## PRIMARY STRUCTURAL CODE ISSUES RELATED TO THE EXISTING STRUCTURE

If any repairs, renovations, additions or change of occupancy or use are made to the existing structure, a check for compliance with 780 CMR, Chapter 34 “Existing Structures” (Massachusetts Amendments to The International Existing Building Code 2015) of the Massachusetts Amendments to the International Building Code 2015 (IBC 2015) and reference code “International Existing Building Code 2015” (IEBC 2015) is required. The intent of the IEBC and the related Massachusetts Amendments to IEBC is to provide alternative approaches to alterations, repairs, additions and/or a change of occupancy or use without requiring full compliance with the code requirements for new construction.

The IEBC provides three compliance methods for the repair, alteration, change of use or additions to an existing structure. Compliance is required with only one of the three compliance alternatives. Once the compliance alternative is selected, the project will have to comply with all requirements of that particular method. The requirements from the three compliance alternatives cannot be applied in combination with each other.

The three compliance methods are as follows:

1. Prescription Compliance Method.
2. Work Area Compliance Method.
3. Performance Compliance Method.

### Comment

The approach is to evaluate the compliance requirements for each of the three methods and select the method that would yield the most cost effective solution for the structural scope of the project. The selection of the compliance method may have to be re-evaluated after the impact of the selected method is understood and after analyzing the compliance requirements of the other disciplines, Architectural, Mechanical, Fire Protection, Electrical and Plumbing.

Since portions of the existing building are considered un-reinforced masonry bearing wall structures, the analysis and reinforcement of the existing structure would be governed by the requirements of Appendix A1 "Seismic Strengthening Provisions for Un-reinforced Masonry Bearing Wall Buildings" in the IEBC.

## 1. PRESCRIPTIVE COMPLIANCE METHOD

In this method, compliance with Chapter 3 of the IEBC is required. As part of the scope of this report, the extent of the compliance requirements identified are limited to the structural requirements of this chapter.

### Additions

Based on the project scope, the following structural issues have to be addressed:

- All additions should comply with the code requirements for new construction in the IBC.
- For additions that are not structurally independent of the existing structure, the existing structure and its addition, acting as a single structure, shall meet the requirements of the code for new construction for resisting lateral loads, except for the existing lateral load carrying structural elements whose demand-capacity ratio is not increased by more than 10 percent, these elements can remain unaltered.
- Any existing gravity, load-carrying structural element for which an addition or its related alterations causes an increase in the design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.

### Alterations

- Any existing gravity, load-carrying structural element for which an addition or its related alterations causes an increase in the design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.
- For alterations that would increase the design lateral loads or cause a structural irregularity or decrease the capacity of any lateral load carrying structural element, the structure of the altered building shall meet the requirements of the code for new construction, except for the existing lateral load carrying structural elements whose demand-capacity ratio is not increased by more than 10 percent, these elements can remain unaltered.

## 2. WORK AREA COMPLIANCE METHOD

In this method, compliance with Chapter 5 through 13 of the IEBC is required. As part of the scope of this report, the extent of the compliance requirements identified are limited to the structural requirements of these chapters.
In this method, the extent of alterations has to be classified into LEVELS OF WORK based on the scope and extent of the alterations to the existing structure. The LEVEL OF WORK can be classified into LEVEL 1, LEVEL 2 or LEVEL 3 Alterations. In addition, there are requirements that have to be satisfied for additions to the existing structure.

The extent of the renovations (includes Architectural, FP and MEP renovations) for this project will exceed 50 percent of the aggregate area of the building, thus the LEVEL OF WORK for this project would be classified as LEVEL 3 Alterations. This would require compliance with provision of Chapter 7, 8 and 9 of the IEBC. The scope of the project includes new additions to the existing structure; this would trigger compliance with provisions in Chapter 11 of the IEBC.

### Level 3 Alterations

- Any existing gravity, load-carrying structural element for which an alteration causes an increase in the design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.
- For alterations where more than 30 percent of the total floor area and roof areas of the building or structure have been or proposed to be involved in structural alterations within a 12 month period, the evaluation and analysis shall demonstrate that the altered building complies with the full design wind loads as per the code requirements for new construction and with reduced IBC level seismic forces.
- For alterations where not more than 30 percent of the total floor and roof areas of the building are involved in structural alterations within a 12 month period, the evaluation and analysis shall demonstrate that the altered building or structure complies with the loads at the time of the original construction or the most recent substantial alteration (more than 30 percent of total floor and roof area). If these alterations increase the seismic demand-capacity ratio on any structural element by more than 10 percent, that particular structural element shall comply with reduced IBC level seismic forces.
- For alterations that involve structural alterations to more than 30 percent of the total floor and roof area of the building within a 12 month period, the evaluation and analysis shall demonstrate that the altered building structure complies with IBC for wind loading and with reduced IBC level seismic forces.
- For alterations where more than 25 percent of the roof is replaced for buildings assigned to seismic design category B, C, D, E or F, all un-reinforced masonry walls shall be anchored to the roof structure and un-reinforced masonry parapets shall be braced to the roof structure.

### Additions

- All additions shall comply with the requirements for the code for new construction in the IBC.
- Any existing gravity, load-carrying structural element for which an addition or its related alterations cause an increase in design gravity load of more than 5 percent shall be strengthened, supplemented or replaced.
- For additions that are not structurally independent of the existing structure, the existing structure and its addition, acting as a single structure, shall meet the requirements of the code for new construction in the IBC for resisting wind loads and IBC Level Seismic

Forces (may be lower than loads from the Code for New Construction in the IBC), except for small additions that would not increase the lateral force story shear in any story by more than 10 percent cumulative. In this case, the existing lateral load resisting system can remain unaltered.

### 3. PERFORMANCE COMPLIANCE METHOD

Following the requirements of this method for the alterations and additions may be onerous on the project because this method requires that the altered existing structure and the additions meet the requirements for the code for new construction in the IBC.

## PARTICULAR REQUIREMENTS OF COMPLIANCE METHODS

For our project, in order to meet compliance with one of the two compliance methods "Prescriptive Compliance Method" or the "Work Area Compliance Method", we have to address the following:

### 1. PRESCRIPTIVE COMPLIANCE METHOD

#### Additions

The proposed additions will be designed structurally independent of the existing structure, thus, would not impart any additional lateral loads on the existing structure.

If the proposed alterations are such that the alterations increase the design lateral loads on the existing building or cause any structural irregularity of decrease the lateral load carrying capacity of the building, the structure of the altered building shall meet the requirements of the Code for New Construction in the IBC.

If the proposed additions increase the design gravity load on portions of the existing roof members, these members would have to be reinforced and this incidental structural alteration of the existing structure would have to be accounted for in the scope of the alterations to the existing school and would trigger requirements for alterations.

#### Alterations

Alterations that would increase the design gravity loads by more than 5 percent on any structural members would have to be reinforced.

If the proposed alterations of the structure increase the effective seismic weight on the existing structure due to the greater snow loads from the drifted snow against any proposed addition, or, by addition of equipment on the roof, the increase of the effective seismic weight from the drifted snow and the equipment would require that the existing lateral load resisting system comply with the requirements of the Code for New Construction in the IBC and it would increase the demand-capacity ratio on certain structural elements of the existing lateral load resisting system.

# 2. WORK AREA COMPLIANCE METHOD

## Level 3 Alterations

If the proposed structural alterations of the existing structure are less than 30 percent of the total floor and roof areas of the existing structure, we have to demonstrate that the altered structure complies with the loads applicable at the time of the original construction and that the seismic demand-capacity ratio is not increased by more than 10 percent on any existing structural element. Those structural elements whose seismic demand-capacity ratio is increased by more than 10 percent shall comply with reduced IBC level seismic forces. The percentage increase in seismic demand-capacity ratio on any particular structural element from the added snowdrift load against the proposed addition would be fairly low, thus, this would not have any major impact on the existing lateral load resisting system, though we would have to verify that the increase in seismic demand-capacity ratio on any of those particular structural elements is not greater than 10 percent.

If the proposed structural alterations of the existing structure exceed 30 percent of the total floor and roof areas of the existing structure, we have to demonstrate that the altered structure complies with the IBC for wind loading and with reduced IBC level seismic forces.

Existing anchorage of all unreinforced masonry walls have to be evaluated. If the existing anchorage of the walls is deficient, the tops of the masonry walls will require new connections to the structure.

## Additions

The proposed additions will be designed structurally independent of the existing structure; thus, it would not impart any additional lateral loads on the existing structure.

## Comment

The compliance requirements of the two methods, in most respects, are very similar. The Work Area Compliance Method would trigger anchorage of un-reinforced masonry walls, if re-roofing of the existing structure is included as part of the scope for this project. The Prescriptive Compliance Method would require that the existing lateral load resisting system meet the requirements of the code for new construction of the IBC, even for small increases of design lateral loads. We are required to comply with requirements of Appendix A1 of IEBC for either method, which requires anchorage of all existing masonry walls. Based on this, we would recommend the Work Area Compliance Method for the project.

## Summary of Renovations to the existing structure

Based on the scope of the proposed scheme for renovations of the existing school, we have determined that the existing structure would essentially have to comply with the Code for New Construction which would require the addition of new lateral load resisting elements such as structural steel braced beams on masonry shear walls throughout the floor plates at every level. All of the un-reinforced masonry walls are required to be anchored to the floor and roof structure and all of the roof diaphragms have to be reinforced, to resist uplift loads per the Code for New Construction. The addition of braces will require modifications to the existing column foundations

at the brace locations and will require the addition of new piles. At the locations of existing slabs-on-grade, new tie beams will be required to connect the existing column foundations.

# PROPOSED ADDITIONS

## SUBSTRUCTURE

### Foundations

Based on the foundations of the existing structure, the columns of the proposed additions would bear on reinforced concrete footings and the perimeter foundation walls would bear on continuous reinforced concrete strip footings extending at least 4 ft. – 0 in. below grade. With the assumed bearing capacity of the soil of 2 tons/sf, a typical interior footing would be 8 ft. - 0 in. x 8 ft. - 0 in. x 24 in. deep and a typical exterior footing would be 7 ft. x 7 ft. x 24 in. in both the two story and single story additions. The exterior foundation walls would be 14 to 16 in. thick reinforced cast-in-place concrete walls in 24 to 36 in. wide x 12 in. deep continuous reinforced concrete strip footings around the perimeter of the additions extending a minimum of 4 ft. - 0 in. below finished grade.

### Slabs-on-Grade

Based on the existing school construction, the lowest level of the proposed additions would be a 5 in. thick concrete slab-on-grade reinforced with welded wire fabric over a vapor barrier on 2 in. thick rigid insulation on 8 in. of compacted granular structural fill and a base course of 8 in. of compacted gravel.

## SUPERSTRUCTURE

### Floor Construction

#### Typical Floor Construction

Typical floor construction would be a 5 ¼ in. light weight concrete composite metal deck slab reinforced with welded wire fabric on wide flange steel beams spanning between steel girders and columns. The weight of the structural steel is estimated to be 13 psf for the typical framing.

### Roof Construction

#### Typical Roof Construction

The roof construction would be galvanized, corrugated 1 ½ in. deep, Type 'B' metal roof deck spanning between wide flange steel beams and girders. At locations of roof supported mechanical equipment, a concrete slab will be provided similar to the typical supported slab. The weight of the structural steel is estimated to be 13 psf.

#### Typical Single Story Roof Construction

The roof construction of this portion of the addition would be the typical floor construction as it would be designed to receive a future one story vertical addition.

## Vertical Framing Elements

### Columns

Columns will be hollow structural steel columns. Typical columns would be HSS 8 x 8 columns and the columns at the gymnasium would be HSS 12 x 12.

### Lateral Load-Resisting System

The typical lateral load resisting system would be concentric braced frames comprised of HSS structural steel members.

# PROPOSED SCHEME R-1 – Renovation Only

The proposed scheme will require repairs and only minor renovations and upgrades to the existing school triggered by requirements for compliance with the International Existing Building Code. All of the proposed renovations will essentially be Architectural in nature and will require no major reconfiguration of the structure. The proposed scheme requires replacement of all mechanical equipment, and renovations related to ADA requirements.

### PRIMARY STRUCTURAL CODE ISSUES RELATED TO THE EXISTING STRUCTURE

Based on the proposed scope, we would recommend following the compliance requirements of the Prescriptive Compliance Method since it will be the most cost effective method for this proposed scheme. If there is no reconfiguration of demising walls or spaces, then there is no requirement to clip masonry walls, since the work area as defined in the International Existing Building Code is less than 50% of the aggregate floor area of the building

# PROPOSED STRUCTURAL SCHEME

The proposed scheme does not call for any reconfiguration of the existing structure. The structural scope is essentially what is triggered by following the compliance requirements of the Prescriptive Compliance Method.

Based on the scope of the proposed scheme, no structural upgrades are triggered or required.

The replacement mechanical units can be supported on the existing framing, if the proposed units are lighter in weight than the existing units. Some of the mechanical equipment may be required to be supported on dunnage platforms. Allow for costs for reinforcement of the roof structure as a percentage of the cost of the mechanical units.

For the renovations related to ADA requirements, new ramps will be required on grade and on supported floors, it is possible that a new elevator may be required. The ramps on grade will be a minimum of 5” thick slab-on-grade. For the ramps on supported floor, the existing framing would require to be reinforced.

Manchester Memorial Elementary School
Manchester, MA
J#745 004 00.00
L#59488/Page 1/January 16, 2018

# HVAC SYSTEMS

## NARRATIVE REPORT
## ADDITION/RENOVATION AR-2

The following is the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for ***LEED for Schools v4*** where indicated on this narrative.

1. CODES

All work installed under Division 230000 shall comply with the State of Massachusetts Building Code and all local, IBC and IMC 2015, IECC 2015 Energy Code, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

3. BASIS OF DESIGN: (MASS CODE)

Project weather and Code temperature values are listed herein based on weather data values as determined from ASHRAE weather data tables and the International Energy Conservation Code.

Outside: Winter 7 deg. F, Summer 88 deg. F DB 74 deg. F WB

Inside: 68 deg. F +/- 2 deg F for heating, 75 deg. F +/- 2 deg F (55% RH) for cooling for areas with air conditioning. Unoccupied temperature setback will be provided.

Ventilation air: In all cases ASHRAE guide 62.1-2010 and the International Mechanical Code will be met as a minimum for outdoor airflow and ventilation. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

4. SYSTEM DESCRIPTION

A. Central Heating Plant: ***LEED for Schools v4 Credit EA Minimum Energy Performance and Optimize Energy Performance***

Heating for the entire building will be through the use of a high efficiency natural gas fired condensing boiler plant.

The new Boiler Plant shall be provided with (3) 1,500 MBH output boilers and (2) end suction base mounted pumps with a capacity of 300 gpm each and will be located in the Mechanical room. In addition to new boilers and pumps, new hot water accessories including air separators and expansion tanks shall be provided. Boilers will each have a capacity of approximately 50% of the total hot water heating load.

The Boiler Plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel piping system. The Boiler Plant shall supply a maximum hot water temperature of 160 deg F on a design heating day and the hot water supply water temperature will be adjusted downward based on an outside temperature reset schedule to improve the overall operating efficiency of the Power Plant. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency.

Combustion air for each boiler will be directly ducted to each boiler through a galvanized ductwork distribution system. Venting from each boiler shall be through a separate double wall aluminized stainless steel (AL29-4C) vent system and shall discharge approximately 12 feet above the roof level. Final venting height will depend on the location of building intake air locations and adjacent roofs.

B. Central Cooling Plant: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management***

A High Efficiency Central Chilled Water Cooling Plant consisting of a roof or grade mounted, outdoor, high-efficiency, air cooled chiller and primary and standby chilled water pumps with VFDs, accessories, controls, and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building.

The High Efficiency Central Chilled Water Cooling Plant shall consist of a roof mounted, 20 ton outdoor, high-efficiency, air cooled chiller, primary and standby chilled water pumps with VFDs, each with a capacity of 55 gpm, accessories, controls, and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building.

C. Classroom Heating, Ventilation, and Air-Conditioning (General Classrooms, Art & Music, Team Commons, SPED): ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

It is proposed that a new air conditioning displacement ventilation system shall be provided to provide spatial tempering and ventilation to the Classroom areas. New rooftop air handling units with 100% outside air economizer, supply and return air fans with VFDs, energy recovery wheels, gas-fired heating sections with modulating gas valve, DX cooling and hot gas reheat system and MERV 13 filtration will be provided to serve a new dehumidification displacement ventilation system. Each classroom shall be provided with a variable volume (VAV) terminal box with combination temperature, humidity, and CO2 sensor controls. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the classroom. As VAV boxes modulate, the supply and return air fans associated Variable Frequency Drives (VFD) of the rooftop units will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans.

Each classroom will be provided with two individual wall mounted displacement diffusing units between 400 and 500 CFM each (depending on room size). Return air will be drawn back to the units by ceiling return air registers located within the classroom and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Supplemental hot water ceiling mounted radiant heating panels will be provided along exterior walls.

It is estimated that the following Rooftop air handling equipment will be required to serve the Classroom areas:

- Two (2) high efficiency packaged gas-fired heating, DX cooling energy recovery rooftop air handling units with a capacity of 13,000 CFM (44 Tons Cooling, 425 MBH Heating) serving the General Classrooms, SPED, and Support areas.
- One (1) high efficiency packaged gas-fired heating, DX cooling energy recovery rooftop air handling unit with a capacity of 2,300 CFM, (8 Tons Cooling, 75 MBH Heating) to serve the Art/Music Classrooms.

D. Gymnasium: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Gymnasium and Physical Education areas will be served by (1) one rooftop air handling unit of the recirculation design with 100% outside air economizer providing air conditioning via displacement ventilation. The unit will be approximately 7,000 CFM and will include supply and return fans with VFDs, 230 MBH output gas fired heating section with modulating capacity control, 24 ton DX cooling with hot-gas reheat, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct system dropping to wall mounted displacement diffusing units throughout the space. As levels of carbon dioxide drop, generally relating to a reduction in population, a variable frequency drive located in the rooftop unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm.
Return air will be drawn back to the air handling unit by a ceiling level return air registers. Hot water radiant heating panels will be provided along exterior walls.

E. Auditorium: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Gymnasium and Physical Education areas will be served by (1) one rooftop air handling unit of the recirculation design with 100% outside air economizer providing air conditioning via displacement ventilation. The unit will be approximately 3,000 CFM and will include supply and return fans with VFDs, 115 MBH output gas fired heating section with modulating capacity control, 10 ton DX cooling with hot-gas reheat, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct system dropping to wall mounted displacement diffusing units throughout the space. As levels of carbon dioxide drop, generally relating to a reduction in population, a variable frequency drive located in the rooftop unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm.
Return air will be drawn back to the air handling unit by a ceiling level return air registers. Hot water radiant heating panels will be provided along exterior walls.

F. Administration, Nurse, Guidance Areas, and Media Center: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

Spatial heating and air-conditioning for the Administration areas will be served by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the Boiler and Chilled Water Power Plants.

The air handling unit will be approximately 1,500 CFM and will include supply and return fan with VFDs, 60 MBH output gas-fired heating section with modulating capacity control, MERV 13 filtration, 5 ton DX cooling with hot-gas reheat, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

G. Cafeteria, Stage, Teachers Dining: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

Spatial heating and dehumidification for the Cafeteria and Teacher's Dining Room will be served by (1) one rooftop air handling unit of the recirculation design with 100% outside air economizer providing air conditioning via displacement ventilation.

The unit will be approximately 5,300 CFM and will include supply and return fans with VFDs, 205 MBH output gas fired heating section with modulating capacity control, 18 ton DX cooling with hot-gas reheat, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct system dropping to wall mounted displacement diffusing units throughout the space.

As levels of carbon dioxide drop, generally relating to a reduction in population, a variable frequency drive located in the rooftop unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air handling unit by a ceiling level return air registers. Hot water ceiling mounted radiant heating panels will be provided along exterior walls.

H. Kitchen (Make-Up Air): ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Kitchen areas shall be provided with new kitchen exhaust air fan and make-up air rooftop unit. The Kitchen will be heated by a roof mounted air handling unit with 370 MBH output gas-fired heating furnace with modulating capacity control and MERV 13 filtration with approximately 4,500 CFM capacity.

A variable volume kitchen exhaust hood control system consisting of kitchen exhaust stack temperature and smoke density sensors, supply and exhaust fan variable speed drives and associated controller will be provided by the kitchen equipment vendor. This system installation shall be field installed and coordinated with the ATC and Electrical Contractors.

I. Kitchen and Custodial Support Areas: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, & IAQ Assessment***

The Kitchen and Custodial support areas will be heated and ventilated by a rooftop heating and ventilation unit. The unit will be approximately 3,000 CFM and will include supply and return fans with VFDs, 130 MBH output gas-fired heating section with modulating capacity control, and MERV 13 filtration. Storage areas will be heated by radiation heating equipment. Horizontal type unit heaters will heat areas adjacent to the Loading Dock. All Custodial closets will be exhausted by exhaust air fan systems.

J. Lobby, Corridor, and Entry Way Heating:

New hot water convectors, cabinet unit heaters, and fin tube radiation heating equipment shall be installed to provide heating to building entry way and stairwell areas. Corridors shall be ventilated from adjacent air handling unit systems. Main Corridor and Lobby areas shall be heated and dehumidified by the displacement ventilation systems.

K. Utility Areas:

Utility areas will be provided with exhaust air fan systems for ventilation, and will typically be heated with horizontal type ceiling suspended unit heaters.

The Main Electric Rooms, IDF rooms and Elevator Machine Rooms will be air conditioned by high efficiency ductless AC cooling units.

L. Testing, Adjusting, Balancing & Commissioning:

All new HVAC systems shall be tested, adjusted, balanced and commissioned as part of the project scope.

M. Automatic Temperature Controls – Building Energy Management System:

A new DDC (direct digital control) Automatic Temperature Control and Building Energy Management System shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (fuel, gas, water).

5. TESTING REQUIREMENTS

A. The Mechanical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Boiler plant system
- Chilled water plant system
- Air handling unit systems including all rooftop units, indoor air handling systems and exhaust air systems
- Terminal heating and cooling devices
- Automatic temperature control and building energy management system

B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

6. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Mechanical Contractor shall provide operation and maintenance manuals to the owner.

7. RECORD DRAWINGS AND CONTROL DOCUMENTS

When the project is completed, an as-built set of drawings, showing all mechanical system requirements from contract and addendum items will be provided to the owner.

8. COMMISSIONING

The building project shall include commissioning of all HVAC equipment & Automatic Temperature Control Systems; commissioning specifications will be prepared by the Commissioning Agent once that entity has been hired by MSBA.

Manchester Memorial Elementary School
Manchester, MA
J#745 004 00.00
L#59489/Page 1/January 16, 2018

# HVAC SYSTEMS

## NARRATIVE REPORT
## NEW CONSTRUCTION N-1

The following is the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for ***LEED for Schools v4*** where indicated on this narrative.

1. CODES

   All work installed under Division 230000 shall comply with the State of Massachusetts Building Code and all local, IBC and IMC 2015, IECC 2015 Energy Code, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

3. BASIS OF DESIGN: (MASS CODE)

   Project weather and Code temperature values are listed herein based on weather data values as determined from ASHRAE weather data tables and the International Energy Conservation Code.

   Outside: Winter 7 deg. F, Summer 88 deg. F DB 74 deg. F WB

   Inside: 68 deg. F +/- 2 deg F for heating, 75 deg. F +/- 2 deg F (55% RH) for cooling for areas with air conditioning. Unoccupied temperature setback will be provided.

   Ventilation air: In all cases ASHRAE guide 62.1-2010 and the International Mechanical Code will be met as a minimum for outdoor airflow and ventilation. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

4. SYSTEM DESCRIPTION

A. Central Heating Plant: ***LEED for Schools v4 Credit EA Minimum Energy Performance and Optimize Energy Performance***

Heating for the entire building will be through the use of a high efficiency natural gas fired condensing boiler plant.

The new Boiler Plant shall be provided with (3) 1,500 MBH output boilers and (2) end suction base mounted pumps with a capacity of 300 gpm each and will be located in the Mechanical room. In addition to new boilers and pumps, new hot water accessories including air separators and expansion tanks shall be provided. Boilers will each have a capacity of approximately 50% of the total hot water heating load.

The Boiler Plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel piping system. The Boiler Plant shall supply a maximum hot water temperature of 160 deg F on a design heating day and the hot water supply water temperature will be adjusted downward based on an outside temperature reset schedule to improve the overall operating efficiency of the Power Plant. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency.

Combustion air for each boiler will be directly ducted to each boiler through a galvanized ductwork distribution system. Venting from each boiler shall be through a separate double wall aluminized stainless steel (AL29-4C) vent system and shall discharge approximately 12 feet above the roof level. Final venting height will depend on the location of building intake air locations and adjacent roofs.

B. Central Cooling Plant: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management***

A High Efficiency Central Chilled Water Cooling Plant consisting of a roof or grade mounted, outdoor, high-efficiency, air cooled chiller and primary and standby chilled water pumps with VFDs, accessories, controls, and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building.

The High Efficiency Central Chilled Water Cooling Plant shall consist of a roof mounted, 20 ton outdoor, high-efficiency, air cooled chiller, primary and standby chilled water pumps with VFDs, each with a capacity of 55 gpm, accessories, controls, and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building.

C. Classroom Heating, Ventilation, and Air-Conditioning (General Classrooms, Art & Music, Team Commons, SPED): ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

It is proposed that a new air conditioning displacement ventilation system shall be provided to provide spatial tempering and ventilation to the Classroom areas. New rooftop air handling units with 100% outside air economizer, supply and return air fans with VFDs, energy recovery wheels, gas-fired heating sections with modulating gas valve, DX cooling and hot gas reheat system and MERV 13 filtration will be provided to serve a new dehumidification displacement ventilation system. Each classroom shall be provided with a variable volume (VAV) terminal box with combination temperature, humidity, and CO2 sensor controls. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the classroom. As VAV boxes modulate, the supply and return air fans associated Variable Frequency Drives (VFD) of the rooftop units will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans.

Each classroom will be provided with two individual wall mounted displacement diffusing units between 400 and 500 CFM each (depending on room size). Return air will be drawn back to the units by ceiling return air registers located within the classroom and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Supplemental hot water ceiling mounted radiant heating panels will be provided along exterior walls.

It is estimated that the following Rooftop air handling equipment will be required to serve the Classroom areas:

- Four (4) high efficiency packaged gas-fired heating, DX cooling energy recovery rooftop air handling units with a capacity of 7,500 CFM (25 Tons Cooling, 290 MBH Heating) serving the General Classrooms, SPED, and Support areas.
- One (1) high efficiency packaged gas-fired heating, DX cooling energy recovery rooftop air handling unit with a capacity of 2,300 CFM, (8 Tons Cooling, 75 MBH Heating) to serve the Art/Music Classrooms.

D. Gymnasium: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Gymnasium and Physical Education areas will be served by (1) one rooftop air handling unit of the recirculation design with 100% outside air economizer providing air conditioning via displacement ventilation. The unit will be approximately 7,200 CFM and will include supply and return fans with VFDs, 275 MBH output gas fired heating section with modulating capacity control, 24 ton DX cooling with hot-gas reheat, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct system dropping to wall mounted displacement diffusing units throughout the space. As levels of carbon dioxide drop, generally relating to a reduction in population, a variable frequency drive located in the rooftop unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm.
Return air will be drawn back to the air handling unit by a ceiling level return air registers. Hot water radiant heating panels will be provided along exterior walls.

E. Administration, Nurse, Guidance Areas, and Media Center: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

Spatial heating and air-conditioning for the Administration areas will be served by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the Boiler and Chilled Water Power Plants.

The air handling unit will be approximately 2,100 CFM and will include supply and return fan with VFDs, 80 MBH output gas-fired heating section with modulating capacity control, MERV 13 filtration, 7 ton DX cooling with hot-gas reheat, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

F. Cafeteria, Stage, Teachers Dining: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

Spatial heating and dehumidification for the Cafeteria and Teacher's Dining Room will be served by (1) one rooftop air handling unit of the recirculation design with 100% outside air economizer providing air conditioning via displacement ventilation.

The unit will be approximately 5,200 CFM and will include supply and return fans with VFDs, 205 MBH output gas fired heating section with modulating capacity control, 18 ton DX cooling with hot-gas reheat, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct system dropping to wall mounted displacement diffusing units throughout the space.

As levels of carbon dioxide drop, generally relating to a reduction in population, a variable frequency drive located in the rooftop unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air handling unit by a ceiling level return air registers. Hot water ceiling mounted radiant heating panels will be provided along exterior walls.

G. Kitchen (Make-Up Air): ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Kitchen areas shall be provided with new kitchen exhaust air fan and make-up air rooftop unit. The Kitchen will be heated by a roof mounted air handling unit with 370 MBH output gas-fired heating furnace with modulating capacity control and MERV 13 filtration with approximately 4,500 CFM capacity.

A variable volume kitchen exhaust hood control system consisting of kitchen exhaust stack temperature and smoke density sensors, supply and exhaust fan variable speed drives and associated controller will be provided by the kitchen equipment vendor. This system installation shall be field installed and coordinated with the ATC and Electrical Contractors.

H. Kitchen and Custodial Support Areas: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, & IAQ Assessment***

The Kitchen and Custodial support areas will be heated and ventilated by a rooftop heating and ventilation unit. The unit will be approximately 3,000 CFM and will include supply and return fans with VFDs, 130 MBH output gas-fired heating section with modulating capacity control, and MERV 13 filtration. Storage areas will be heated by radiation heating equipment. Horizontal type unit heaters will heat areas adjacent to the Loading Dock. All Custodial closets will be exhausted by exhaust air fan systems.

I. Lobby, Corridor, and Entry Way Heating:

New hot water convectors, cabinet unit heaters, and fin tube radiation heating equipment shall be installed to provide heating to building entry way and stairwell areas. Corridors shall be ventilated from adjacent air handling unit systems. Main Corridor and Lobby areas shall be heated and dehumidified by the displacement ventilation systems.

J. Utility Areas:

Utility areas will be provided with exhaust air fan systems for ventilation, and will typically be heated with horizontal type ceiling suspended unit heaters.

The Main Electric Rooms, IDF rooms and Elevator Machine Rooms will be air conditioned by high efficiency ductless AC cooling units.

K. Testing, Adjusting, Balancing & Commissioning:

All new HVAC systems shall be tested, adjusted, balanced and commissioned as part of the project scope.

L. Automatic Temperature Controls – Building Energy Management System:

A new DDC (direct digital control) Automatic Temperature Control and Building Energy Management System shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (fuel, gas, water).

5. TESTING REQUIREMENTS

A. The Mechanical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Boiler plant system
- Chilled water plant system
- Air handling unit systems including all rooftop units, indoor air handling systems and exhaust air systems
- Terminal heating and cooling devices
- Automatic temperature control and building energy management system

B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

6. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Mechanical Contractor shall provide operation and maintenance manuals to the owner.

7. RECORD DRAWINGS AND CONTROL DOCUMENTS

When the project is completed, an as-built set of drawings, showing all mechanical system requirements from contract and addendum items will be provided to the owner.

8. COMMISSIONING

The building project shall include commissioning of all HVAC equipment & Automatic Temperature Control Systems; commissioning specifications will be prepared by the Commissioning Agent once that entity has been hired by MSBA.

Manchester Memorial Elementary School
Manchester, MA
J#745 004 00.00
L#59490/Page 1/January 16, 2018

# HVAC SYSTEMS

## NARRATIVE REPORT
## NEW CONSTRUCTION N-3

The following is the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for ***LEED for Schools v4*** where indicated on this narrative.

1. CODES

   All work installed under Division 230000 shall comply with the State of Massachusetts Building Code and all local, IBC and IMC 2015, IECC 2015 Energy Code, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

3. BASIS OF DESIGN: (MASS CODE)

   Project weather and Code temperature values are listed herein based on weather data values as determined from ASHRAE weather data tables and the International Energy Conservation Code.

   Outside: Winter 7 deg. F, Summer 88 deg. F DB 74 deg. F WB

   Inside: 68 deg. F +/- 2 deg F for heating, 75 deg. F +/- 2 deg F (55% RH) for cooling for areas with air conditioning. Unoccupied temperature setback will be provided.

   Ventilation air: In all cases ASHRAE guide 62.1-2010 and the International Mechanical Code will be met as a minimum for outdoor airflow and ventilation. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

4. SYSTEM DESCRIPTION

A. Central Heating Plant: ***LEED for Schools v4 Credit EA Minimum Energy Performance and Optimize Energy Performance***

Heating for the entire building will be through the use of a high efficiency natural gas fired condensing boiler plant.

The new Boiler Plant shall be provided with (3) 1,500 MBH output boilers and (2) end suction base mounted pumps with a capacity of 300 gpm each and will be located in the Mechanical room. In addition to new boilers and pumps, new hot water accessories including air separators and expansion tanks shall be provided. Boilers will each have a capacity of approximately 50% of the total hot water heating load.

The Boiler Plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel piping system. The Boiler Plant shall supply a maximum hot water temperature of 160 deg F on a design heating day and the hot water supply water temperature will be adjusted downward based on an outside temperature reset schedule to improve the overall operating efficiency of the Power Plant. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency.

Combustion air for each boiler will be directly ducted to each boiler through a galvanized ductwork distribution system. Venting from each boiler shall be through a separate double wall aluminized stainless steel (AL29-4C) vent system and shall discharge approximately 12 feet above the roof level. Final venting height will depend on the location of building intake air locations and adjacent roofs.

B. Central Cooling Plant: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management***

A High Efficiency Central Chilled Water Cooling Plant consisting of a roof or grade mounted, outdoor, high-efficiency, air cooled chiller and primary and standby chilled water pumps with VFDs, accessories, controls, and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building.

The High Efficiency Central Chilled Water Cooling Plant shall consist of a roof mounted, 20 ton outdoor, high-efficiency, air cooled chiller, primary and standby chilled water pumps with VFDs, each with a capacity of 55 gpm, accessories, controls, and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building.

C. Classroom Heating, Ventilation, and Air-Conditioning (General Classrooms, Art & Music, Team Commons, SPED): ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

It is proposed that a new air conditioning displacement ventilation system shall be provided to provide spatial tempering and ventilation to the Classroom areas. New rooftop air handling units with 100% outside air economizer, supply and return air fans with VFDs, energy recovery wheels, gas-fired heating sections with modulating gas valve, DX cooling and hot gas reheat system and MERV 13 filtration will be provided to serve a new dehumidification displacement ventilation system. Each classroom shall be provided with a variable volume (VAV) terminal box with combination temperature, humidity, and CO2 sensor controls. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the classroom. As VAV boxes modulate, the supply and return air fans associated Variable Frequency Drives (VFD) of the rooftop units will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans.

Each classroom will be provided with two individual wall mounted displacement diffusing units between 400 and 500 CFM each (depending on room size). Return air will be drawn back to the units by ceiling return air registers located within the classroom and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Supplemental hot water ceiling mounted radiant heating panels will be provided along exterior walls.

It is estimated that the following Rooftop air handling equipment will be required to serve the Classroom areas:

- Four (4) high efficiency packaged gas-fired heating, DX cooling energy recovery rooftop air handling units with a capacity of 7,800 CFM (26 Tons Cooling, 300 MBH Heating) serving the General Classrooms, SPED, and Support areas.

D. Gymnasium: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Gymnasium and Physical Education areas will be served by (1) one rooftop air handling unit of the recirculation design with 100% outside air economizer providing air conditioning via displacement ventilation. The unit will be approximately 7,200 CFM and will include supply and return fans with VFDs, 275 MBH output gas fired heating section with modulating capacity control, 24 ton DX cooling with hot-gas reheat, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct system dropping to wall mounted displacement diffusing units throughout the space. As levels of carbon dioxide drop, generally relating to a reduction in population, a variable frequency drive located in the rooftop unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm.
Return air will be drawn back to the air handling unit by ceiling level return air registers. Hot water radiant heating panels will be provided along exterior walls.

E. Administration, Nurse, Guidance Areas, and Media Center: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

Spatial heating and air-conditioning for the Administration areas will be served by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the Boiler and Chilled Water Power Plants.

The air handling unit will be approximately 2,100 CFM and will include supply and return fan with VFDs, 80 MBH output gas-fired heating section with modulating capacity control, MERV 13 filtration, 7 ton DX cooling with hot-gas reheat, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

F. Cafeteria, Stage, Teachers Dining: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

Spatial heating and dehumidification for the Cafeteria and Teacher's Dining Room will be served by (1) one rooftop air handling unit of the recirculation design with 100% outside air economizer providing air conditioning via displacement ventilation.

The unit will be approximately 5,200 CFM and will include supply and return fans with VFDs, 205 MBH output gas fired heating section with modulating capacity control, 18 ton DX cooling with hot-gas reheat, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct system dropping to wall mounted displacement diffusing units throughout the space.

As levels of carbon dioxide drop, generally relating to a reduction in population, a variable frequency drive located in the rooftop unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air handling unit by a ceiling level return air registers. Hot water ceiling mounted radiant heating panels will be provided along exterior walls.

G. Kitchen (Make-Up Air): ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Kitchen areas shall be provided with new kitchen exhaust air fan and make-up air rooftop unit. The Kitchen will be heated by a roof mounted air handling unit with 370 MBH output gas-fired heating furnace with modulating capacity control and MERV 13 filtration with approximately 4,500 CFM capacity.

A variable volume kitchen exhaust hood control system consisting of kitchen exhaust stack temperature and smoke density sensors, supply and exhaust fan variable speed drives and associated controller will be provided by the kitchen equipment vendor. This system installation shall be field installed and coordinated with the ATC and Electrical Contractors.

H. Kitchen and Custodial Support Areas: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, & IAQ Assessment***

The Kitchen and Custodial support areas will be heated and ventilated by a rooftop heating and ventilation unit. The unit will be approximately 3,000 CFM and will include supply and return fans with VFDs, 130 MBH output gas-fired heating section with modulating capacity control, and MERV 13 filtration. Storage areas will be heated by radiation heating equipment. Horizontal type unit heaters will heat areas adjacent to the Loading Dock. All Custodial closets will be exhausted by exhaust air fan systems.

I. Lobby, Corridor, and Entry Way Heating:

New hot water convectors, cabinet unit heaters, and fin tube radiation heating equipment shall be installed to provide heating to building entry way and stairwell areas. Corridors shall be ventilated from adjacent air handling unit systems. Main Corridor and Lobby areas shall be heated and dehumidified by the displacement ventilation systems.

J. Utility Areas:

Utility areas will be provided with exhaust air fan systems for ventilation, and will typically be heated with horizontal type ceiling suspended unit heaters.

The Main Electric Rooms, IDF rooms and Elevator Machine Rooms will be air conditioned by high efficiency ductless AC cooling units.

K. Testing, Adjusting, Balancing & Commissioning:

All new HVAC systems shall be tested, adjusted, balanced and commissioned as part of the project scope.

L. Automatic Temperature Controls – Building Energy Management System:

A new DDC (direct digital control) Automatic Temperature Control and Building Energy Management System shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (fuel, gas, water).

5. TESTING REQUIREMENTS

A. The Mechanical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Boiler plant system
- Chilled water plant system
- Air handling unit systems including all rooftop units, indoor air handling systems and exhaust air systems
- Terminal heating and cooling devices
- Automatic temperature control and building energy management system

B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

6. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Mechanical Contractor shall provide operation and maintenance manuals to the owner.

7. RECORD DRAWINGS AND CONTROL DOCUMENTS

When the project is completed, an as-built set of drawings, showing all mechanical system requirements from contract and addendum items will be provided to the owner.

8. COMMISSIONING

The building project shall include commissioning of all HVAC equipment & Automatic Temperature Control Systems; commissioning specifications will be prepared by the Commissioning Agent once that entity has been hired by MSBA.

Manchester Memorial Elementary School
Manchester, MA
J#745 004 00.00
L#59491/Page 1/January 16, 2018

# HVAC SYSTEMS

## NARRATIVE REPORT
## NEW CONSTRUCTION N-9

The following is the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for ***LEED for Schools v4*** where indicated on this narrative.

1. CODES

   All work installed under Division 230000 shall comply with the State of Massachusetts Building Code and all local, IBC and IMC 2015, IECC 2015 Energy Code, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

3. BASIS OF DESIGN: (MASS CODE)

   Project weather and Code temperature values are listed herein based on weather data values as determined from ASHRAE weather data tables and the International Energy Conservation Code.

   Outside: Winter 7 deg. F, Summer 88 deg. F DB 74 deg. F WB

   Inside: 68 deg. F +/- 2 deg F for heating, 75 deg. F +/- 2 deg F (55% RH) for cooling for areas with air conditioning. Unoccupied temperature setback will be provided.

   Ventilation air: In all cases ASHRAE guide 62.1-2010 and the International Mechanical Code will be met as a minimum for outdoor airflow and ventilation. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

4. SYSTEM DESCRIPTION

A. Central Heating Plant: ***LEED for Schools v4 Credit EA Minimum Energy Performance and Optimize Energy Performance***

Heating for the entire building will be through the use of a high efficiency natural gas fired condensing boiler plant.

The new Boiler Plant shall be provided with (3) 1,500 MBH output boilers and (2) end suction base mounted pumps with a capacity of 300 gpm each and will be located in the Mechanical room. In addition to new boilers and pumps, new hot water accessories including air separators and expansion tanks shall be provided. Boilers will each have a capacity of approximately 50% of the total hot water heating load.

The Boiler Plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel piping system. The Boiler Plant shall supply a maximum hot water temperature of 160 deg F on a design heating day and the hot water supply water temperature will be adjusted downward based on an outside temperature reset schedule to improve the overall operating efficiency of the Power Plant. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency.

Combustion air for each boiler will be directly ducted to each boiler through a galvanized ductwork distribution system. Venting from each boiler shall be through a separate double wall aluminized stainless steel (AL29-4C) vent system and shall discharge approximately 12 feet above the roof level. Final venting height will depend on the location of building intake air locations and adjacent roofs.

B. Central Cooling Plant: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management***

A High Efficiency Central Chilled Water Cooling Plant consisting of a roof or grade mounted, outdoor, high-efficiency, air cooled chiller and primary and standby chilled water pumps with VFDs, accessories, controls, and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building.

The High Efficiency Central Chilled Water Cooling Plant shall consist of a roof mounted, 20 ton outdoor, high-efficiency, air cooled chiller, primary and standby chilled water pumps with VFDs, each with a capacity of 55 gpm, accessories, controls, and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building.

C. Classroom Heating, Ventilation, and Air-Conditioning (General Classrooms, Art & Music, Team Commons, SPED): ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

It is proposed that a new air conditioning displacement ventilation system shall be provided to provide spatial tempering and ventilation to the Classroom areas.
New rooftop air handling units with 100% outside air economizer, supply and return air fans with VFDs, energy recovery wheels, gas-fired heating sections with modulating gas valve, DX cooling and hot gas reheat system and MERV 13 filtration will be provided to serve a new dehumidification displacement ventilation system. Each classroom shall be provided with a variable volume (VAV) terminal box with combination temperature, humidity, and CO2 sensor controls. The controls will reduce outside air as allowed maintaining a maximum of 800 PPM while providing sufficient ventilation to meet the required heating or cooling load of the classroom. As VAV boxes modulate, the supply and return air fans associated Variable Frequency Drives (VFD) of the rooftop units will adjust the fan speed based on system static pressure, reducing the energy consumed by the fans.

Each classroom will be provided with two individual wall mounted displacement diffusing units between 400 and 500 CFM each (depending on room size). Return air will be drawn back to the units by ceiling return air registers located within the classroom and will be routed back to the rooftop unit by a galvanized sheet metal return air ductwork distribution system. Supplemental hot water ceiling mounted radiant heating panels will be provided along exterior walls.

It is estimated that the following Rooftop air handling equipment will be required to serve the Classroom areas:

- Four (4) high efficiency packaged gas-fired heating, DX cooling energy recovery rooftop air handling units with a capacity of 7,800 CFM (26 Tons Cooling, 300 MBH Heating) serving the General Classrooms, SPED, and Support areas.

D. Gymnasium: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Gymnasium and Physical Education areas will be served by (1) one rooftop air handling unit of the recirculation design with 100% outside air economizer providing air conditioning via displacement ventilation. The unit will be approximately 7,200 CFM and will include supply and return fans with VFDs, 275 MBH output gas fired heating section with modulating capacity control, 24 ton DX cooling with hot-gas reheat, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct system dropping to wall mounted displacement diffusing units throughout the space. As levels of carbon dioxide drop, generally relating to a reduction in population, a variable frequency drive located in the rooftop unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm.
Return air will be drawn back to the air handling unit by a ceiling level return air registers. Hot water radiant heating panels will be provided along exterior walls.

E. Administration, Nurse, Guidance Areas, and Media Center: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

Spatial heating and air-conditioning for the Administration areas will be served by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the Boiler and Chilled Water Power Plants.

The air handling unit will be approximately 2,100 CFM and will include supply and return fan with VFDs, 80 MBH output gas-fired heating section with modulating capacity control, MERV 13 filtration, 7 ton DX cooling with hot-gas reheat, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

F. Cafeteria, Stage, Teachers Dining: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

Spatial heating and dehumidification for the Cafeteria and Teacher's Dining Room will be served by (1) one rooftop air handling unit of the recirculation design with 100% outside air economizer providing air conditioning via displacement ventilation.

The unit will be approximately 5,200 CFM and will include supply and return fans with VFDs, 205 MBH output gas fired heating section with modulating capacity control, 18 ton DX cooling with hot-gas reheat, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct system dropping to wall mounted displacement diffusing units throughout the space.

As levels of carbon dioxide drop, generally relating to a reduction in population, a variable frequency drive located in the rooftop unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm. Return air will be drawn back to the air handling unit by a ceiling level return air registers. Hot water ceiling mounted radiant heating panels will be provided along exterior walls.

G. Kitchen (Make-Up Air): ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Kitchen areas shall be provided with new kitchen exhaust air fan and make-up air rooftop unit. The Kitchen will be heated by a roof mounted air handling unit with 370 MBH output gas-fired heating furnace with modulating capacity control and MERV 13 filtration with approximately 4,500 CFM capacity.

A variable volume kitchen exhaust hood control system consisting of kitchen exhaust stack temperature and smoke density sensors, supply and exhaust fan variable speed drives and associated controller will be provided by the kitchen equipment vendor. This system installation shall be field installed and coordinated with the ATC and Electrical Contractors.

H. Kitchen and Custodial Support Areas: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, & IAQ Assessment***

The Kitchen and Custodial support areas will be heated and ventilated by a rooftop heating and ventilation unit. The unit will be approximately 3,000 CFM and will include supply and return fans with VFDs, 130 MBH output gas-fired heating section with modulating capacity control, and MERV 13 filtration. Storage areas will be heated by radiation heating equipment. Horizontal type unit heaters will heat areas adjacent to the Loading Dock. All Custodial closets will be exhausted by exhaust air fan systems.

I. Lobby, Corridor, and Entry Way Heating:

New hot water convectors, cabinet unit heaters, and fin tube radiation heating equipment shall be installed to provide heating to building entry way and stairwell areas. Corridors shall be ventilated from adjacent air handling unit systems. Main Corridor and Lobby areas shall be heated and dehumidified by the displacement ventilation systems.

J. Utility Areas:

Utility areas will be provided with exhaust air fan systems for ventilation, and will typically be heated with horizontal type ceiling suspended unit heaters.

The Main Electric Rooms, IDF rooms and Elevator Machine Rooms will be air conditioned by high efficiency ductless AC cooling units.

K. Testing, Adjusting, Balancing & Commissioning:

All new HVAC systems shall be tested, adjusted, balanced and commissioned as part of the project scope.

L. Automatic Temperature Controls – Building Energy Management System:

A new DDC (direct digital control) Automatic Temperature Control and Building Energy Management System shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (fuel, gas, water).

5. TESTING REQUIREMENTS

A. The Mechanical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Boiler plant system
- Chilled water plant system
- Air handling unit systems including all rooftop units, indoor air handling systems and exhaust air systems
- Terminal heating and cooling devices
- Automatic temperature control and building energy management system

B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

6. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Mechanical Contractor shall provide operation and maintenance manuals to the owner.

7. RECORD DRAWINGS AND CONTROL DOCUMENTS

When the project is completed, an as-built set of drawings, showing all mechanical system requirements from contract and addendum items will be provided to the owner.

8. COMMISSIONING

The building project shall include commissioning of all HVAC equipment & Automatic Temperature Control Systems; commissioning specifications will be prepared by the Commissioning Agent once that entity has been hired by MSBA.

Manchester Memorial Elementary School
Manchester, MA
J#745 004 00.00
L#59492/Page 1/January 16, 2018

# HVAC SYSTEMS

## NARRATIVE REPORT
## RENOVATION R-1

The following is the HVAC system narrative, which defines the scope of work and capacities of the HVAC system as well as the Basis of Design. The HVAC systems shall be designed and constructed for ***LEED for Schools v4*** where indicated on this narrative.

1. CODES

   All work installed under Division 230000 shall comply with the State of Massachusetts Building Code and all local, IBC and IMC 2015, IECC 2015 Energy Code, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   The work of Division 230000 is described within the narrative report. The HVAC project scope of work shall consist of providing new HVAC equipment and systems as described here within. All new work shall consist of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Heating, Ventilating and Air Conditioning work and all items incidental thereto, including commissioning and testing.

3. BASIS OF DESIGN: (MASS CODE)

   Project weather and Code temperature values are listed herein based on weather data values as determined from ASHRAE weather data tables and the International Energy Conservation Code.

   Outside: Winter 7 deg. F, Summer 88 deg. F DB 74 deg. F WB

   Inside: 68 deg. F +/- 2 deg F for heating, 75 deg. F +/- 2 deg F (55% RH) for cooling for areas with air conditioning. Unoccupied temperature setback will be provided.

   Ventilation air: In all cases ASHRAE guide 62.1-2010 and the International Mechanical Code will be met as a minimum for outdoor airflow and ventilation. All occupied areas will be designed to maintain 800 PPM carbon dioxide maximum.

4. SYSTEM DESCRIPTION

A. Central Heating Plant: ***LEED for Schools v4 Credit EA Minimum Energy Performance and Optimize Energy Performance***

Heating for the entire building will be through the use of a high efficiency natural gas fired condensing boiler plant.

The new Boiler Plant shall be provided with (3) 1,600 MBH output boilers and (2) end suction base mounted pumps with a capacity of 320 gpm each and will be located in the Mechanical room. In addition to new boilers and pumps, new hot water accessories including air separators and expansion tanks shall be provided. Boilers will each have a capacity of approximately 50% of the total hot water heating load.

The Boiler Plant will supply heating hot water to heating equipment and systems located throughout the building through a two-pipe fiberglass insulated schedule 40 black steel piping system. The Boiler Plant shall supply a maximum hot water temperature of 160 deg F on a design heating day and the hot water supply water temperature will be adjusted downward based on an outside temperature reset schedule to improve the overall operating efficiency of the Power Plant. Primary and standby end suction base mounted pumps will be provided with variable frequency drives for variable volume flow through the water distribution system for improved energy efficiency.

Combustion air for each boiler will be directly ducted to each boiler through a galvanized ductwork distribution system. Venting from each boiler shall be through a separate double wall aluminized stainless steel (AL29-4C) vent system and shall discharge approximately 12 feet above the roof level. Final venting height will depend on the location of building intake air locations and adjacent roofs.

B. Central Cooling Plant: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management***

A High Efficiency Central Chilled Water Cooling Plant consisting of a roof or grade mounted, outdoor, high-efficiency, air cooled chiller and primary and standby chilled water pumps with VFDs, accessories, controls, and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building.

The High Efficiency Central Chilled Water Cooling Plant shall consist of a roof mounted, 70 ton outdoor, high-efficiency, air cooled chiller, primary and standby chilled water pumps with VFDs, each with a capacity of 180 gpm, accessories, controls, and steel and copper piping distribution system shall be provided to serve chilled water cooling HVAC equipment located throughout the building.

C. Classroom/ Administration/ Cafeteria/ Media Center Heating, Ventilation, and Air-Conditioning (General Classrooms, Art & Music, Team Commons, SPED): ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

Due to the lack of ceiling space in these existing building areas, it is proposed that spatial heating and air-conditioning for the Administration areas will be provided by horizontal ceiling concealed type ducted 4-pipe heating and cooling active chilled beam induction units with hot water and chilled water for the induction unit system provided by the individual hot water and chilled water central recirculation piping system communicating with the Boiler and Chilled Water Power Plants.

The air handling unit will include supply and return fan with VFDs, gas-fired heating section with modulating capacity control, MERV 13 filtration, DX cooling with hot-gas reheat, and exhaust air energy recovery wheel. Supply air ventilation will be provided to each space that will satisfy building code requirements based on population.

.

It is estimated that the following Rooftop air handling equipment will be required to serve the Classroom areas:

- Five (5) high efficiency packaged gas-fired heating, DX cooling energy recovery rooftop air handling units with a capacity of 3,000 CFM (10 Tons Cooling, 115 MBH Heating)

D. Gymnasium: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Gymnasium and Physical Education areas will be served by (1) replacement indoor air handling unit of the recirculation design with 100% outside air economizer providing air conditioning via a standard over-head distribution system. The unit will be approximately 6,000 CFM and will include supply and return fans with VFDs, Dual Energy recovery wheels, 325 MBH output hot water heating coil with modulating valve control, 20 ton chilled water cooling coil with automatic open/ close valve control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM.

Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct system located high in the space. As levels of carbon dioxide drop, generally relating to a reduction in population, a variable frequency drive located in the rooftop unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm.
Return air will be drawn back to the air handling unit by a low-wall return air registers. Hot water radiant heating panels will be provided along exterior walls.

E. Auditorium/ Stage: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Gymnasium and Physical Education areas will be served by (1) replacement indoor air handling unit of the recirculation design with 100% outside air economizer providing air conditioning via a standard over-head distribution system. The unit will be approximately 3,000 CFM and will include supply and return fans with VFDs, Dual Energy recovery wheels, 160 MBH output hot water heating coil with modulating valve control, 10 ton chilled water cooling coil with automatic open/ close valve control, MERV 13 filtration, and carbon dioxide controls which will reduce outside air as allowed maintaining a maximum of 800 PPM. Supply air ventilation will be provided to the space through an exposed galvanized steel supply duct system located high in the space. As levels of carbon dioxide drop, generally relating to a reduction in population, a variable frequency drive located in the rooftop unit will modulate to reduce airflow and ventilation while always maintaining a maximum of 800 ppm.
Return air will be drawn back to the air handling unit by a low-wall return air registers. Hot water radiant heating panels will be provided along exterior walls.

F. Kitchen (Make-Up Air): ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance, & Fundamental Refrigerant Management; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, IAQ Assessment, & Thermal Comfort***

The Kitchen areas shall be provided with new kitchen exhaust air fan and make-up air rooftop unit. The Kitchen will be heated by a roof mounted air handling unit with 370 MBH output gas-fired heating furnace with modulating capacity control and MERV 13 filtration with approximately 4,500 CFM capacity.

A variable volume kitchen exhaust hood control system consisting of kitchen exhaust stack temperature and smoke density sensors, supply and exhaust fan variable speed drives and associated controller will be provided by the kitchen equipment vendor. This system installation shall be field installed and coordinated with the ATC and Electrical Contractors.

G. Kitchen and Custodial Support Areas: ***LEED for Schools v4 Credit EA Minimum Energy Performance, Optimize Energy Performance; IEQ Minimum IAQ Performance, Minimum Acoustical Performance, Enhanced IAQ Strategies, Construction IAQ Management Plan, & IAQ Assessment***

The Kitchen and Custodial support areas will be heated and ventilated by a rooftop heating and ventilation unit. The unit will be approximately 3,000 CFM and will include supply and return fans with VFDs, 130 MBH output gas-fired heating section with modulating capacity control, and MERV 13 filtration. Storage areas will be heated by radiation heating equipment. Horizontal type unit heaters will heat areas adjacent to the Loading Dock. All Custodial closets will be exhausted by exhaust air fan systems.

H. Lobby, Corridor, and Entry Way Heating:

New hot water convectors, cabinet unit heaters, and fin tube radiation heating equipment shall be installed to provide heating to building entry way and stairwell areas. Corridors shall be ventilated from adjacent air handling unit systems. Main Corridor and Lobby areas shall be heated and dehumidified by the displacement ventilation systems.

I. Utility Areas:

Utility areas will be provided with exhaust air fan systems for ventilation, and will typically be heated with horizontal type ceiling suspended unit heaters.

The Main Electric Rooms, IDF rooms and Elevator Machine Rooms will be air conditioned by high efficiency ductless AC cooling units.

J. Testing, Adjusting, Balancing & Commissioning:

All new HVAC systems shall be tested, adjusted, balanced and commissioned as part of the project scope.

K. Automatic Temperature Controls – Building Energy Management System:

A new DDC (direct digital control) Automatic Temperature Control and Building Energy Management System shall be installed to control and monitor building HVAC systems. Energy metering shall be installed to monitor the energy usage of building HVAC systems and utilities (fuel, gas, water).

5. TESTING REQUIREMENTS

A. The Mechanical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Boiler plant system
- Chilled water plant system
- Air handling unit systems including all rooftop units, indoor air handling systems and exhaust air systems
- Terminal heating and cooling devices
- Automatic temperature control and building energy management system

B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

6. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Mechanical Contractor shall provide operation and maintenance manuals to the owner.

7. RECORD DRAWINGS AND CONTROL DOCUMENTS

When the project is completed, an as-built set of drawings, showing all mechanical system requirements from contract and addendum items will be provided to the owner.

8. COMMISSIONING

The building project shall include commissioning of all HVAC equipment & Automatic Temperature Control Systems; commissioning specifications will be prepared by the Commissioning Agent once that entity has been hired by MSBA.

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Manchester, MA
J#745 004 00.00
L#59473/Page 1/January 16, 2018

## ELECTRICAL SYSTEMS

## NARRATIVE REPORT
## ADDITION/RENOVATION AR-2

The following is the Electrical Systems narrative, which defines the scope of work and capacities of the Power and Lighting System, as well as, the Basis of Design. The Electrical Systems shall be designed and constructed for ***LEED*** where indicated on this narrative.

1. CODES

   All work installed under Section 260000 shall comply with the Massachusetts State Building Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   The work of Section 260000 is as described in this Narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Electrical work and all items incidental thereto, including commissioning and testing.

3. DESIGN PARAMETERS

| | |
|---|---|
| High Voltage: | 277/480 Volt |
| Low Voltage: | 120/208 Volt |
| Phase: | 3 Phase, 4 Wire |
| Amperage: | 1,000 Amps |
| KW: | 646 |

4. SEQUENCE OF OPERATIONS AND INTERACTIONS

   A. Classroom and Corridor lighting will be controlled via “addressable relays”, which is achieved through programming networked controls. The control of the relays will be by automatic means, such as an occupancy sensor in each classroom. The system will have a BacNet gateway and will be interfaced with the DDC control system for scheduled functions. The controllability shall be in conformance with credit ***LEED credit IEQC 6.1.***

   B. Exterior lighting will be controlled by photocell “ON” and “scheduled” for “OFF” operation. The parking area lighting will be controlled by “zones” with dimmable capability.

   C. Emergency and Exit lighting will be run through life safety panels to be “ON” during normal power conditions, as well as, power outage conditions. The emergency lighting system will have time control so that lights are “ON” only when building is occupied.

5. DESCRIPTION OF THE SYSTEMS

A. Electrical Distribution System:

1. Service ratings are designed for a connected load of 10 watts/s.f. The service capacity will be sized for 1,000 amperes at 277/480 volt, 3∅, 4wire with 100% rated main breaker. The switchboard bus will be rated for 1,200 amperes to allow for future photovoltaics. A new pad mounted transformer will be provided with new primary and secondary services. The vault mounted transformer and all associated switchgear will be removed. New lighting and power panels will be provided to accommodate respective loads. The equipment will be located in dedicated rooms or closets.

2. The building connected electrical load estimate is based on the preliminary building systems design:

| **Load Type** | **KVA** |
|---|---|
| Site lighting | 4 KVA |
| HVAC Loads (including chiller and pumps, RTUs, MAUs, exhaust fans, etc.) | 238 KVA |
| Boilers and Pumps | 22 KVA |
| Interior Lighting Load | 79 KVA |
| Classrooms, Labs, Office Power | 158 KVA |
| Kitchen (full-service) | 50 KVA |
| Miscellaneous Power | 35 KVA |
| Elevator | 30 KVA |
| Auditorium Lighting | 30 KVA |
| **Total Connected Load** | **646 KVA** |

B. Interior Lighting System:

1. Interior lighting illumination levels will meet the IES recommended values for applicable activity type, be in compliance with the IECC 2012 energy allowances and LEED for Schools control requirements.

**PROPOSED ILLUMINATION LEVELS**

| Location | Average Illumination Levels |
|---|---|
| Classrooms | 30-35 FC |
| Offices, Conference Rooms, Library | 30-35 FC |
| Kitchen | 40-50 FC |
| Gymnasium | 50 FC |
| Cafeteria | 30-35 FC |
| Corridors | 20-25 FC |
| Utility and Storage Rooms | 20-25 FC |

2. Classroom lighting fixtures will consist of a combination of recessed and pendant mounted direct /indirect luminaries with LED lamps and electronic dimmable drivers. The fixtures will be pre-wired for continuous dimming control where natural daylight is available and also for multi-level switching. Occupancy and daylight dimming sensors will be provided in each classroom.

3. Office lighting fixtures will consist of recessed mounted direct LED luminaries and electronic drivers for dual-level switching. Offices on the perimeter with windows will have daylight dimming controls similar to classrooms.

   In general, lighting power density will be 30-40% less than ASHRAE 90.1-2010. The power density reduction relates to ***LEED credit EAC.1.***

4. Lighting levels will be approximately 30-foot candles in classrooms and offices. The daylight dimming foot-candle level will be in compliance with ***MA-LEED credit IEQC 6.1.***

5. Gymnasium lighting will be comprised of direct fixtures with LED lamps and electronic drivers. The fixtures will be provided with clear lens and protective wire guards. The light level will be designed for approximately 30-foot candles. Multi-level switching will be provided.

   Daylight dimming will be provided within 15 feet of skylights or glazing. Daylight dimming controls will be similar in operation to classrooms.

6. Corridor lighting will be comprised of recessed acrylic fixtures with LED lamps and electronic drivers. The Corridor light level will be designed for approximately 20 foot candles. Corridor lighting will be on time clock control and only “ON” during occupied hours.

7. Cafeteria lighting will be pendant direct/indirect fixtures with LED lamps and electronic drivers. The light levels will be designed for approximately 30-foot candles. Daylighting controls will be provided on perimeter light fixtures with 15 feet of glazing

8. Stage and Auditorium theatrical lights with connector strips and a dimming system will be provided for performances. House lighting in Auditorium will be dimmable LED and controlled by the theatrical dimming system.

9. Kitchen and Servery lighting will consist of recessed 2’x4’ acrylic lensed gasketed troffers with aluminum frame doors with LED lamps and electronic drivers. Light levels will be approximately 50-foot candles.

10. Media Center lighting will consist of recessed direct fixtures with LED lamps and electronic drivers. Light levels will be approximately 30-foot candles.

11. Each area will be locally switched and designed for multi-level controls. Each Classroom, Office space, and Toilet room will have occupancy sensors to turn lights off when unoccupied.

12. Daylight dimming sensors will be installed in each room where natural light is available for continuous dimming of light fixtures. The control system will be in accordance with ***LEED credit IEQC 6.1.***

13. The entire school will be controlled with an automatic lighting control system for programming of interior and exterior lights “on and off”. Lighting control system will be interfaced with DDC system.

C. Emergency Lighting System:

1. An exterior 80 kW, 100 KVA, 277/480 Volt, 3 phase, 4 wire diesel fired exterior emergency generator with sound attenuated enclosure will be provided. Light fixtures and LED Exit signs will be installed to serve all egress areas such as Corridors, Intervening Spaces, Toilets, Stairs, and Exit discharge exterior doors. The Administration area lighting will be connected to the emergency generator.

2. The generator will include fire safety systems, boilers and circulating pumps, elevator, kitchen refrigeration, and communications and security systems.

D. Site Lighting System: ***LEED Credit SSC8***

1. Fixtures for area lighting will be pole mounted cut-off ‘LED’ luminaries in the parking area and roadways. Pole heights will be 20 feet. The exterior lighting will be connected to the automatic lighting control system for photocell “ON” and timed “OFF” operation. The site lighting fixtures will be dark sky compliant. The illumination level will be 0.5fc for parking areas in accordance with Illuminating Engineering Society.

2. Building perimeter will be ‘LED’ wall mounted cut-off fixtures over exterior doors for Exit discharge.

E. Wiring Devices:

1. Each classroom will have a minimum of (2) duplex receptacles per teaching wall and (2) double duplex receptacles on dedicated circuits at classroom computer workstations. The teacher’s workstation will have a double duplex receptacle also on a dedicated circuit.

2. Office areas will generally have (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided.

3. Corridors will have a cleaning receptacle at approximately 25-40 foot intervals.

4. Exterior weatherproof receptacles with lockable enclosures will be installed at exterior doors.

5. A system of computer grade panelboards with double neutrals and surge protective devices will be provided for receptacle circuits.

6. Surface mounted raceways will be provided within renovated areas where raceways cannot be concealed.

F. Fire Alarm System:

1. A fire alarm and detection system will be provided with battery back-up. The system will be of the addressable type where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms.

2. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways.

3. The sprinkler system will be supervised for water flow and tampering with valves.

4. Speaker/strobes will be provided in egress ways, classrooms, assembly spaces, open areas, and other large spaces. Strobe only units will be provided in single toilets and conference rooms.

5. Manual pull stations will be provided at Exit discharge doors and at each egress stairwell not located at grade level.

6. The system will be remotely connected to automatically report alarms to fire department via an approved method by the fire department.

7. The generator status panel shall be located at the fire command center.

G. Uninterruptible Power Supply (UPS):

1. An 18 kW, three (3) phase centralized UPS system will be provided with seven minutes of battery back-up.

2. The system will provide conditioned power to sensitive electronic loads, telecommunication systems, bridge over power interruptions of short duration and allow an orderly shutdown of servers and communication systems during a prolonged power outage.

3. The UPS system will also be connected to the stand-by generator.

H. Lightning Protection System:

1. A system of lightning protection devices will be provided.

2. The lightning protection equipment will include air terminals, roof and down conductors, conduits, fasteners, connectors, ground rods, etc.

3. The facility will be issued a UL Master Label Certificate.

I. Renewable Energy System:

1. Provisions will be provided for future roof-mounted Photovoltaic System.

J. Two-Way Communications System:

1. A Two-Way Communications System will be provided at the elevator lobbies that do not have grade access.

K. Distribution Antennae System (DAS):

1. A public safety radio distributed antenna system (DAS) which consists of bi-directional amplifiers (BDA), donor antennas, coverage antennas, coax cable, coax connectors, splitters, combiners and couplers. These devices will be used as part of a system for in-building public safety 2-way radio system communication for first responders.

6. SITE UTILITIES

The incoming services including electric, fire alarm, telephone, cable TV, and fiber will be underground. An exterior pad mounted transformer will be provided by the utility company.

7. CCTV

A Closed-Circuit TV system will consist of computer servers with image software, computer monitors and IP based closed circuit TV cameras. The head end server will be located in the head end (MDF) room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders (SAN) will record all cameras and store this information for 45 days at 30 images per second (virtual real time).

The location of the cameras is generally on exterior building perimeter. The exterior cameras are fixed type.

The system will fully integrate with the access control system to allow viewing of events from a single alarm viewer. Camera images and recorded video will be linked to the access system to allow retrieval of video that is associated with an event.

8. INTRUSION SYSTEM

An Intrusion System will consist of security panel, keypads, motion detectors and door contacts. The system is addressable which means that each device will be identified when an alarm occurs. The system is designed so that each perimeter classroom with grade access will have dual tech sensors along the exterior wall and corridors, door contacts at each exterior door.

The system will include a digital transmitter to summons the central station in the event of an alarm condition.

The Intrusion System will be connected to the automated lighting control system to automatically turn on lighting upon an alarm.

9. CARD ACCESS (PROPRIETARY)

A Card Access System includes a card access controller, door controllers and proximity readers/keypads. Proximity readers will be located at various locations. Each proximity reader will have a distinctive code to identify the user and a log will be kept in memory. The log within the panel can be accessed through a computer. The existing S2 System will be utilized. Expansion of this system will be proprietary.

The alarm condition will also initiate real time recording on the integrated CCTV System. The system may be programmed with graphic maps allowing the end-user to quickly identify alarm conditions and lock/unlock doors.

The system is modular and may be easily expanded to accommodate any additional devices.

10. TESTING REQUIREMENTS

A. The Electrical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Lighting and Power Panels for correct phase balance.
- Emergency Generator.
- Lighting Control System (Interior and Exterior).
- Fire Alarm System.
- Uninterruptible Power System, UPS.
- Lightning Protection System.
- Security System

B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

11. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Electrical Contractor shall provide Operation and Maintenance Manuals to the Owner.

12. RECORD DRAWINGS AND CONTROL DOCUMENTS

When the project is completed, an As-Built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

13. COMMISSIONING

The project shall be commissioned per Commissioning Section of the specifications.

14. PHASING

The Work will be constructed in phases to provide the least possible interference to the activities of the existing School.

Manchester Memorial Elementary School
Manchester, MA
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L#59475/Page 1/January 16, 2018

## ELECTRICAL SYSTEMS

## NARRATIVE REPORT
## NEW CONSTRUCTION N-1

The following is the Electrical Systems narrative, which defines the scope of work and capacities of the Power and Lighting System, as well as, the Basis of Design. The Electrical Systems shall be designed and constructed for ***LEED*** where indicated on this narrative.

1. CODES

   All work installed under Section 260000 shall comply with the Massachusetts State Building Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   The work of Section 260000 is as described in this Narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Electrical work and all items incidental thereto, including commissioning and testing.

3. DESIGN PARAMETERS

| | |
|---|---|
| High Voltage: | 277/480 Volt |
| Low Voltage: | 120/208 Volt |
| Phase: | 3 Phase |
| Amperage: | 1,200 Amps |
| KW: | 671 |

4. SEQUENCE OF OPERATIONS AND INTERACTIONS

   A. Classroom and Corridor lighting will be controlled via “addressable relays”, which is achieved through programming networked controls. The control of the relays will be by automatic means, such as an occupancy sensor in each classroom. The system will have a BacNet gateway and will be interfaced with the DDC control system for scheduled functions. The controllability shall be in conformance with credit ***LEED credit IEQC 6.1.***

   B. Exterior lighting will be controlled by photocell “ON” and “scheduled” for “OFF” operation. The parking area lighting will be controlled by “zones” with dimmable capability.

   C. Emergency and Exit lighting will be run through life safety panels to be “ON” during normal power conditions, as well as, power outage conditions. The emergency lighting system will have time control so that lights are “ON” only when building is occupied.

5. DESCRIPTION OF THE SYSTEMS

A. Electrical Distribution System:

1. Service ratings are designed for a connected load of 10 watts/s.f. The service capacity will be sized for 1,200 amperes at 277/480 volt, 3∅, 4wire with 80% rated main breaker. The switchboard bus will be rated for 1,600 amperes to allow for future photovoltaics. A new pad mounted transformer will be provided with new primary and secondary services. The vault mounted transformer and all associated switchgear will be removed. New lighting and power panels will be provided to accommodate respective loads. The equipment will be located in dedicated rooms or closets.

2. The building connected electrical load estimate is based on the preliminary building systems design:

| **Load Type** | **KVA** |
|---|---|
| Site lighting | 4 KVA |
| HVAC Loads (including chiller and pumps, RTUs, MAUs, exhaust fans, etc.) | 250 KVA |
| Boilers and Pumps | 22 KVA |
| Interior Lighting Load | 80 KVA |
| Classrooms, Labs, Office Power | 170 KVA |
| Kitchen (full-service) | 50 KVA |
| Miscellaneous Power | 35 KVA |
| Elevator | 30 KVA |
| Auditorium Lighting | 30 KVA |
| **Total Connected Load** | **671 KVA** |

B. Interior Lighting System:

1. Interior lighting illumination levels will meet the IES recommended values for applicable activity type, be in compliance with the IECC 2012 energy allowances and LEED for Schools control requirements.

**PROPOSED ILLUMINATION LEVELS**

| Location | Average Illumination Levels |
|---|---|
| Classrooms | 30-35 FC |
| Offices, Conference Rooms, Library | 30-35 FC |
| Kitchen | 40-50 FC |
| Gymnasium | 50 FC |
| Cafeteria | 30-35 FC |
| Corridors | 20-25 FC |
| Utility and Storage Rooms | 20-25 FC |

2. Classroom lighting fixtures will consist of a combination of recessed and pendant mounted direct /indirect luminaries with LED lamps and electronic dimmable drivers. The fixtures will be pre-wired for continuous dimming control where natural daylight is available and also for multi-level switching. Occupancy and daylight dimming sensors will be provided in each classroom.

3. Office lighting fixtures will consist of recessed mounted direct LED luminaries and electronic drivers for dual-level switching. Offices on the perimeter with windows will have daylight dimming controls similar to classrooms.

   In general, lighting power density will be 30-40% less than ASHRAE 90.1-2010. The power density reduction relates to ***LEED credit EAC.1.***

4. Lighting levels will be approximately 30-foot candles in classrooms and offices. The daylight dimming foot-candle level will be in compliance with ***MA-LEED credit IEQC 6.1.***

5. Gymnasium lighting will be comprised of direct fixtures with LED lamps and electronic drivers. The fixtures will be provided with clear lens and protective wire guards. The light level will be designed for approximately 30-foot candles. Multi-level switching will be provided.

   Daylight dimming will be provided within 15 feet of skylights or glazing. Daylight dimming controls will be similar in operation to classrooms.

6. Corridor lighting will be comprised of recessed acrylic fixtures with LED lamps and electronic drivers. The Corridor light level will be designed for approximately 20-foot candles. Corridor lighting will be on time clock control and only “ON” during occupied hours. The Corridor lighting will be dual-level controlled by schedule.

7. Cafeteria lighting will be pendant direct/indirect fixtures with LED lamps and electronic drivers. The light levels will be designed for approximately 30-foot candles. Daylighting controls will be provided on perimeter light fixtures with 15 feet of glazing

8. Stage and Auditorium theatrical lights with connector strips and a dimming system will be provided for performances. House lighting in Auditorium will be dimmable LED and controlled by the theatrical dimming system.

9. Kitchen and Servery lighting will consist of recessed 2’x4’ acrylic lensed gasketed troffers with aluminum frame doors with LED lamps and electronic drivers. Light levels will be approximately 50-foot candles.

10. Media Center lighting will consist of recessed direct fixtures with LED lamps and electronic drivers. Light levels will be approximately 30-foot candles.

11. Each area will be locally switched and designed for multi-level controls. Each Classroom, Office space, and Toilet room will have occupancy sensors to turn lights off when unoccupied.

12. Daylight dimming sensors will be installed in each room where natural light is available for continuous dimming of light fixtures. The control system will be in accordance with ***LEED credit IEQC 6.1.***

13. The entire school will be controlled with an automatic lighting control system for programming of interior and exterior lights "on and off". Lighting control system will be interfaced with DDC system.

C. Emergency Lighting System:

1. An exterior 100 kW, 125 KVA, 277/480 Volt, 3 phase, 4 Wire diesel fired exterior emergency generator with sound attenuated enclosure will be provided. Light fixtures and LED Exit signs will be installed to serve all egress areas such as Corridors, Intervening Spaces, Toilets, Stairs, and Exit discharge exterior doors. The Administration area lighting will be connected to the emergency generator.

2. The generator will include fire safety systems, boilers and circulating pumps, elevator, kitchen refrigeration, and communications and security systems.

D. Site Lighting System: ***LEED Credit SSC8***

1. Fixtures for area lighting will be pole mounted cut-off 'LED' luminaries in the parking area and roadways. Pole heights will be 20 feet. The exterior lighting will be connected to the automatic lighting control system for photocell "ON" and timed "OFF" operation. The site lighting fixtures will be dark sky compliant. The illumination level will be 0.5fc for parking areas in accordance with Illuminating Engineering Society.

2. Building perimeter will be 'LED' wall mounted cut-off fixtures over exterior doors for Exit discharge.

E. Wiring Devices:

1. Each classroom will have a minimum of (2) duplex receptacles per teaching wall and (2) double duplex receptacles on dedicated circuits at classroom computer workstations. The teacher's workstation will have a double duplex receptacle also on a dedicated circuit.

2. Office areas will generally have (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided.

3. Corridors will have a cleaning receptacle at approximately 25-40-foot intervals.

4. Exterior weatherproof receptacles with lockable enclosures will be installed at exterior doors.

5. A system of computer grade panelboards with double neutrals and surge protective devices will be provided for receptacle circuits.

6. Surface mounted raceways will be provided within renovated areas where raceways cannot be concealed.

F. Fire Alarm System:

1. A fire alarm and detection system will be provided with battery back-up. The system will be of the addressable type where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms.

2. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways.

3. The sprinkler system will be supervised for water flow and tampering with valves.

4. Speaker/strobes will be provided in egress ways, classrooms, assembly spaces, open areas, and other large spaces. Strobe only units will be provided in single toilets and conference rooms.

5. Manual pull stations will be provided at Exit discharge doors and at each egress stairwell not located at grade level.

6. The system will be remotely connected to automatically report alarms to fire department via an approved method by the fire department.

7. The generator status panel shall be located at the fire command center.

G. Uninterruptible Power Supply (UPS):

1. An 18 kW, three (3) phase centralized UPS system will be provided with seven minutes of battery back-up.

2. The system will provide conditioned power to sensitive electronic loads, telecommunication systems, bridge over power interruptions of short duration and allow an orderly shutdown of servers and communication systems during a prolonged power outage.

3. The UPS system will also be connected to the stand-by generator.

H. Lightning Protection System:

1. A system of lightning protection devices will be provided.

2. The lightning protection equipment will include air terminals, roof and down conductors, conduits, fasteners, connectors, ground rods, etc.

3. The facility will be issued a UL Master Label Certificate.

I. Renewable Energy System:

1. Provisions will be provided for future roof-mounted Photovoltaic System.

J. Two-Way Communications System:

1. A Two-Way Communications System will be provided at the elevator lobbies that do not have grade access.

K. Distribution Antennae System (DAS):

1. A public safety radio distributed antenna system (DAS) which consists of bi-directional amplifiers (BDA), donor antennas, coverage antennas, coax cable, coax connectors, splitters, combiners and couplers. These devices will be used as part of a system for in-building public safety 2-way radio system communication for first responders.

6. SITE UTILITIES

The incoming services including electric, fire alarm, telephone, cable TV, and fiber will be underground. An exterior pad mounted transformer will be provided by the utility company.

7. CCTV

A Closed-Circuit TV system will consist of computer servers with image software, computer monitors and IP based closed circuit TV cameras. The head end server will be located in the head end (MDF) room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders (SAN) will record all cameras and store this information for 45 days at 30 images per second (virtual real time).

The location of the cameras is generally on exterior building perimeter. The exterior cameras are fixed type.

The system will fully integrate with the access control system to allow viewing of events from a single alarm viewer. Camera images and recorded video will be linked to the access system to allow retrieval of video that is associated with an event.

8. INTRUSION SYSTEM

An intrusion system will consist of security panel, keypads, motion detectors and door contacts. The system is addressable which means that each device will be identified when an alarm occurs. The system is designed so that each perimeter classroom with grade access will have dual tech sensors along the exterior wall and corridors, door contacts at each exterior door.

The system will include a digital transmitter to summons the central station in the event of an alarm condition.

The intrusion system will be connected to the automated lighting control system to automatically turn on lighting upon an alarm.

9. CARD ACCESS (PROPRIETARY)

A card access system includes a card access controller, door controllers and proximity readers/keypads. Proximity readers will be located at various locations. Each proximity reader will have a distinctive code to identify the user and a log will be kept in memory. The log within the panel can be accessed through a computer. The existing S2 System will be utilized. Expansion of this system will be proprietary.

The alarm condition will also initiate real time recording on the integrated CCTV System. The system may be programmed with graphic maps allowing the end-user to quickly identify alarm conditions and lock/unlock doors.

The system is modular and may be easily expanded to accommodate any additional devices.

10. TESTING REQUIREMENTS

A. The Electrical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Lighting and Power Panels for correct phase balance.
- Emergency Generator.
- Lighting Control System (Interior and Exterior).
- Fire Alarm System.
- Uninterruptible Power System, UPS.
- Lightning Protection System.
- Security system

B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

11. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Electrical Contractor shall provide Operation and Maintenance Manuals to the Owner.

12. RECORD DRAWINGS AND CONTROL DOCUMENTS

When the project is completed, an As-Built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

13. COMMISSIONING

The project shall be commissioned per Commissioning Section of the specifications.

14. PHASING

The Work will be constructed in phases to provide the least possible interference to the activities of the existing School.

Manchester Memorial Elementary School
Manchester, MA
J#745 004 00.00
L#59476/Page 1/January 16, 2018

## ELECTRICAL SYSTEMS

## NARRATIVE REPORT
## NEW CONSTRUCTION N-3

The following is the Electrical Systems narrative, which defines the scope of work and capacities of the Power and Lighting System, as well as, the Basis of Design. The Electrical Systems shall be designed and constructed for ***LEED*** where indicated on this narrative.

1. CODES

   All work installed under Section 260000 shall comply with the Massachusetts State Building Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   The work of Section 260000 is as described in this Narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Electrical work and all items incidental thereto, including commissioning and testing.

3. DESIGN PARAMETERS

| | |
|---|---|
| High Voltage: | 277/480 Volt |
| Low Voltage: | 120/208 Volt |
| Phase: | 3 Phase |
| Amperage: | 1,200 Amps |
| KW: | 671 |

4. SEQUENCE OF OPERATIONS AND INTERACTIONS

   A. Classroom and Corridor lighting will be controlled via “addressable relays”, which is achieved through programming networked controls. The control of the relays will be by automatic means, such as an occupancy sensor in each classroom. The system will have a BacNet gateway and will be interfaced with the DDC control system for scheduled functions. The controllability shall be in conformance with credit ***LEED credit IEQC 6.1.***

   B. Exterior lighting will be controlled by photocell “ON” and “scheduled” for “OFF” operation. The parking area lighting will be controlled by “zones” with dimmable capability.

   C. Emergency and Exit lighting will be run through life safety panels to be “ON” during normal power conditions, as well as, power outage conditions. The emergency lighting system will have time control so that lights are “ON” only when building is occupied.

5. DESCRIPTION OF THE SYSTEMS

A. Electrical Distribution System:

1. Service ratings are designed for a connected load of 10 watts/s.f. The service capacity will be sized for 1,200 amperes at 277/480 volt, 3∅, 4wire with 80% rated main breaker. The switchboard bus will be rated for 1,600 amperes to allow for future photovoltaics. A new pad mounted transformer will be provided with new primary and secondary services. The vault mounted transformer and all associated switchgear will be removed. New lighting and power panels will be provided to accommodate respective loads. The equipment will be located in dedicated rooms or closets.

2. The building connected electrical load estimate is based on the preliminary building systems design:

| **Load Type** | **KVA** |
|---|---|
| Site lighting | 4 KVA |
| HVAC Loads (including chiller and pumps, RTUs, MAUs, exhaust fans, etc.) | 250 KVA |
| Boilers and Pumps | 22 KVA |
| Interior Lighting Load | 80 KVA |
| Classrooms, Labs, Office Power | 170 KVA |
| Kitchen (full-service) | 50 KVA |
| Miscellaneous Power | 35 KVA |
| Elevator | 30 KVA |
| Auditorium Lighting | 30 KVA |
| **Total Connected Load** | **671 KVA** |

B. Interior Lighting System:

1. Interior lighting illumination levels will meet the IES recommended values for applicable activity type, be in compliance with the IECC 2012 energy allowances and LEED for Schools control requirements.

**PROPOSED ILLUMINATION LEVELS**

| Location | Average Illumination Levels |
|---|---|
| Classrooms | 30-35 FC |
| Offices, Conference Rooms, Library | 30-35 FC |
| Kitchen | 40-50 FC |
| Gymnasium | 50 FC |
| Cafeteria | 30-35 FC |
| Corridors | 20-25 FC |
| Utility and Storage Rooms | 20-25 FC |

2. Classroom lighting fixtures will consist of a combination of recessed and pendant mounted direct /indirect luminaries with LED lamps and electronic dimmable drivers. The fixtures will be pre-wired for continuous dimming control where natural daylight is available and also for multi-level switching. Occupancy and daylight dimming sensors will be provided in each classroom.

3. Office lighting fixtures will consist of recessed mounted direct LED luminaries and electronic drivers for dual-level switching. Offices on the perimeter with windows will have daylight dimming controls similar to classrooms.

   In general, lighting power density will be 30-40% less than ASHRAE 90.1-2010. The power density reduction relates to ***LEED credit EAC.1.***

4. Lighting levels will be approximately 30-foot candles in classrooms and offices. The daylight dimming foot-candle level will be in compliance with ***MA-LEED credit IEQC 6.1.***

5. Gymnasium lighting will be comprised of direct fixtures with LED lamps and electronic drivers. The fixtures will be provided with clear lens and protective wire guards. The light level will be designed for approximately 30-foot candles. Multi-level switching will be provided.

   Daylight dimming will be provided within 15 feet of skylights or glazing. Daylight dimming controls will be similar in operation to classrooms.

6. Corridor lighting will be comprised of recessed acrylic fixtures with LED lamps and electronic drivers. The Corridor light level will be designed for approximately 20-foot candles. Corridor lighting will be on time clock control and only “ON” during occupied hours. The Corridor lighting will be dual-level controlled by schedule.

7. Cafeteria lighting will be pendant direct/indirect fixtures with LED lamps and electronic drivers. The light levels will be designed for approximately 30-foot candles. Daylighting controls will be provided on perimeter light fixtures with 15 feet of glazing

8. Stage and Auditorium theatrical lights with connector strips and a dimming system will be provided for performances. House lighting in Auditorium will be dimmable LED and controlled by the theatrical dimming system.

9. Kitchen and Servery lighting will consist of recessed 2’x4’ acrylic lensed gasketed troffers with aluminum frame doors with LED lamps and electronic drivers. Light levels will be approximately 50-foot candles.

10. Media Center lighting will consist of recessed direct fixtures with LED lamps and electronic drivers. Light levels will be approximately 30-foot candles.

11. Each area will be locally switched and designed for multi-level controls. Each Classroom, Office space, and Toilet room will have occupancy sensors to turn lights off when unoccupied.

12. Daylight dimming sensors will be installed in each room where natural light is available for continuous dimming of light fixtures. The control system will be in accordance with ***LEED credit IEQC 6.1.***

13. The entire school will be controlled with an automatic lighting control system for programming of interior and exterior lights "on and off". Lighting control system will be interfaced with DDC system.

C. Emergency Lighting System:

1. An exterior 100 kW, 125 KVA, 277/480 Volt, 3 phase, 4 Wire diesel fired exterior emergency generator with sound attenuated enclosure will be provided. Light fixtures and LED Exit signs will be installed to serve all egress areas such as Corridors, Intervening Spaces, Toilets, Stairs, and Exit discharge exterior doors. The Administration area lighting will be connected to the emergency generator.

2. The generator will include fire safety systems, boilers and circulating pumps, elevator, kitchen refrigeration, and communications and security systems.

D. Site Lighting System: ***LEED Credit SSC8***

1. Fixtures for area lighting will be pole mounted cut-off 'LED' luminaries in the parking area and roadways. Pole heights will be 20 feet. The exterior lighting will be connected to the automatic lighting control system for photocell "ON" and timed "OFF" operation. The site lighting fixtures will be dark sky compliant. The illumination level will be 0.5fc for parking areas in accordance with Illuminating Engineering Society.

2. Building perimeter will be 'LED' wall mounted cut-off fixtures over exterior doors for Exit discharge.

E. Wiring Devices:

1. Each classroom will have a minimum of (2) duplex receptacles per teaching wall and (2) double duplex receptacles on dedicated circuits at classroom computer workstations. The teacher's workstation will have a double duplex receptacle also on a dedicated circuit.

2. Office areas will generally have (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided.

3. Corridors will have a cleaning receptacle at approximately 25-40-foot intervals.

4. Exterior weatherproof receptacles with lockable enclosures will be installed at exterior doors.

5. A system of computer grade panelboards with double neutrals and surge protective devices will be provided for receptacle circuits.

6. Surface mounted raceways will be provided within renovated areas where raceways cannot be concealed.

F. Fire Alarm System:

1. A fire alarm and detection system will be provided with battery back-up. The system will be of the addressable type where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms.

2. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways.

3. The sprinkler system will be supervised for water flow and tampering with valves.

4. Speaker/strobes will be provided in egress ways, classrooms, assembly spaces, open areas, and other large spaces. Strobe only units will be provided in single toilets and conference rooms.

5. Manual pull stations will be provided at Exit discharge doors and at each egress stairwell not located at grade level.

6. The system will be remotely connected to automatically report alarms to fire department via an approved method by the fire department.

7. The generator status panel shall be located at the fire command center.

G. Uninterruptible Power Supply (UPS):

1. An 18 kW, three (3) phase centralized UPS system will be provided with seven minutes of battery back-up.

2. The system will provide conditioned power to sensitive electronic loads, telecommunication systems, bridge over power interruptions of short duration and allow an orderly shutdown of servers and communication systems during a prolonged power outage.

3. The UPS system will also be connected to the stand-by generator.

H. Lightning Protection System:

1. A system of lightning protection devices will be provided.

2. The lightning protection equipment will include air terminals, roof and down conductors, conduits, fasteners, connectors, ground rods, etc.

3. The facility will be issued a UL Master Label Certificate.

I. Renewable Energy System:

1. Provisions will be provided for future roof-mounted Photovoltaic System.

J. Two-Way Communications System:

1. A Two-Way Communications System will be provided at the elevator lobbies that do not have grade access.

K. Distribution Antennae System (DAS):

1. A public safety radio distributed antenna system (DAS) which consists of bi-directional amplifiers (BDA), donor antennas, coverage antennas, coax cable, coax connectors, splitters, combiners and couplers. These devices will be used as part of a system for in-building public safety 2-way radio system communication for first responders.

6. SITE UTILITIES

The incoming services including electric, fire alarm, telephone, cable TV, and fiber will be underground. An exterior pad mounted transformer will be provided by the utility company.

7. CCTV

A Closed-Circuit TV system will consist of computer servers with image software, computer monitors and IP based closed circuit TV cameras. The head end server will be located in the head end (MDF) room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders (SAN) will record all cameras and store this information for 45 days at 30 images per second (virtual real time).

The location of the cameras is generally on exterior building perimeter. The exterior cameras are fixed type.

The system will fully integrate with the access control system to allow viewing of events from a single alarm viewer. Camera images and recorded video will be linked to the access system to allow retrieval of video that is associated with an event.

8. INTRUSION SYSTEM

An intrusion system will consist of security panel, keypads, motion detectors and door contacts. The system is addressable which means that each device will be identified when an alarm occurs. The system is designed so that each perimeter classroom with grade access will have dual tech sensors along the exterior wall and corridors, door contacts at each exterior door.

The system will include a digital transmitter to summons the central station in the event of an alarm condition.

The intrusion system will be connected to the automated lighting control system to automatically turn on lighting upon an alarm.

9. CARD ACCESS (PROPRIETARY)

A card access system includes a card access controller, door controllers and proximity readers/keypads. Proximity readers will be located at various locations. Each proximity reader will have a distinctive code to identify the user and a log will be kept in memory. The log within the panel can be accessed through a computer. The existing S2 System will be utilized. Expansion of this system will be proprietary.

The alarm condition will also initiate real time recording on the integrated CCTV System. The system may be programmed with graphic maps allowing the end-user to quickly identify alarm conditions and lock/unlock doors.

The system is modular and may be easily expanded to accommodate any additional devices.

10. TESTING REQUIREMENTS

A. The Electrical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Lighting and Power Panels for correct phase balance.
- Emergency Generator.
- Lighting Control System (Interior and Exterior).
- Fire Alarm System.
- Uninterruptible Power System, UPS.
- Lightning Protection System.
- Security system

B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

11. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Electrical Contractor shall provide Operation and Maintenance Manuals to the Owner.

12. RECORD DRAWINGS AND CONTROL DOCUMENTS

When the project is completed, an As-Built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

13. COMMISSIONING

The project shall be commissioned per Commissioning Section of the specifications.

14. PHASING

The Work will be constructed in phases to provide the least possible interference to the activities of the existing School.

Manchester Memorial Elementary School
Manchester, MA
J#745 004 00.00
L#59478/Page 1/January 16, 2018

# ELECTRICAL SYSTEMS

## NARRATIVE REPORT
## NEW CONSTRUCTION N-9

The following is the Electrical Systems narrative, which defines the scope of work and capacities of the Power and Lighting System, as well as, the Basis of Design. The Electrical Systems shall be designed and constructed for ***LEED*** where indicated on this narrative.

1. CODES

   All work installed under Section 260000 shall comply with the Massachusetts State Building Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   The work of Section 260000 is as described in this Narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Electrical work and all items incidental thereto, including commissioning and testing.

3. DESIGN PARAMETERS

| | |
|---|---|
| High Voltage: | 277/480 Volt |
| Low Voltage: | 120/208 Volt |
| Phase: | 3 Phase |
| Amperage: | 1,200 Amps |
| KW: | 671 |

4. SEQUENCE OF OPERATIONS AND INTERACTIONS

   A. Classroom and Corridor lighting will be controlled via “addressable relays”, which is achieved through programming networked controls. The control of the relays will be by automatic means, such as an occupancy sensor in each classroom. The system will have a BacNet gateway and will be interfaced with the DDC control system for scheduled functions. The controllability shall be in conformance with credit ***LEED credit IEQC 6.1.***

   B. Exterior lighting will be controlled by photocell “ON” and “scheduled” for “OFF” operation. The parking area lighting will be controlled by “zones” with dimmable capability.

   C. Emergency and Exit lighting will be run through life safety panels to be “ON” during normal power conditions, as well as, power outage conditions. The emergency lighting system will have time control so that lights are “ON” only when building is occupied.

5. DESCRIPTION OF THE SYSTEMS

A. Electrical Distribution System:

1. Service ratings are designed for a connected load of 10 watts/s.f. The service capacity will be sized for 1,200 amperes at 277/480 volt, 3∅, 4wire with 80% rated main breaker. The switchboard bus will be rated for 1,600 amperes to allow for future photovoltaics. A new pad mounted transformer will be provided with new primary and secondary services. The vault mounted transformer and all associated switchgear will be removed. New lighting and power panels will be provided to accommodate respective loads. The equipment will be located in dedicated rooms or closets.

2. The building connected electrical load estimate is based on the preliminary building systems design:

| **Load Type** | **KVA** |
|---|---|
| Site lighting | 4 KVA |
| HVAC Loads (including chiller and pumps, RTUs, MAUs, exhaust fans, etc.) | 250 KVA |
| Boilers and Pumps | 22 KVA |
| Interior Lighting Load | 80 KVA |
| Classrooms, Labs, Office Power | 170 KVA |
| Kitchen (full-service) | 50 KVA |
| Miscellaneous Power | 35 KVA |
| Elevator | 30 KVA |
| Auditorium Lighting | 30 KVA |
| **Total Connected Load** | **671 KVA** |

B. Interior Lighting System:

1. Interior lighting illumination levels will meet the IES recommended values for applicable activity type, be in compliance with the IECC 2012 energy allowances and LEED for Schools control requirements.

**PROPOSED ILLUMINATION LEVELS**

| Location | Average Illumination Levels |
|---|---|
| Classrooms | 30-35 FC |
| Offices, Conference Rooms, Library | 30-35 FC |
| Kitchen | 40-50 FC |
| Gymnasium | 50 FC |
| Cafeteria | 30-35 FC |
| Corridors | 20-25 FC |
| Utility and Storage Rooms | 20-25 FC |

2. Classroom lighting fixtures will consist of a combination of recessed and pendant mounted direct /indirect luminaries with LED lamps and electronic dimmable drivers. The fixtures will be pre-wired for continuous dimming control where natural daylight is available and also for multi-level switching. Occupancy and daylight dimming sensors will be provided in each classroom.

3. Office lighting fixtures will consist of recessed mounted direct LED luminaries and electronic drivers for dual-level switching. Offices on the perimeter with windows will have daylight dimming controls similar to classrooms.

   In general, lighting power density will be 30-40% less than ASHRAE 90.1-2010. The power density reduction relates to ***LEED credit EAC.1.***

4. Lighting levels will be approximately 30-foot candles in classrooms and offices. The daylight dimming foot-candle level will be in compliance with ***MA-LEED credit IEQC 6.1.***

5. Gymnasium lighting will be comprised of direct fixtures with LED lamps and electronic drivers. The fixtures will be provided with clear lens and protective wire guards. The light level will be designed for approximately 30-foot candles. Multi-level switching will be provided.

   Daylight dimming will be provided within 15 feet of skylights or glazing. Daylight dimming controls will be similar in operation to classrooms.

6. Corridor lighting will be comprised of recessed acrylic fixtures with LED lamps and electronic drivers. The Corridor light level will be designed for approximately 20-foot candles. Corridor lighting will be on time clock control and only “ON” during occupied hours. The Corridor lighting will be dual-level controlled by schedule.

7. Cafeteria lighting will be pendant direct/indirect fixtures with LED lamps and electronic drivers. The light levels will be designed for approximately 30-foot candles. Daylighting controls will be provided on perimeter light fixtures with 15 feet of glazing

8. Stage and Auditorium theatrical lights with connector strips and a dimming system will be provided for performances. House lighting in Auditorium will be dimmable LED and controlled by the theatrical dimming system.

9. Kitchen and Servery lighting will consist of recessed 2’x4’ acrylic lensed gasketed troffers with aluminum frame doors with LED lamps and electronic drivers. Light levels will be approximately 50-foot candles.

10. Media Center lighting will consist of recessed direct fixtures with LED lamps and electronic drivers. Light levels will be approximately 30-foot candles.

11. Each area will be locally switched and designed for multi-level controls. Each Classroom, Office space, and Toilet room will have occupancy sensors to turn lights off when unoccupied.

12. Daylight dimming sensors will be installed in each room where natural light is available for continuous dimming of light fixtures. The control system will be in accordance with ***LEED credit IEQC 6.1.***

13. The entire school will be controlled with an automatic lighting control system for programming of interior and exterior lights "on and off". Lighting control system will be interfaced with DDC system.

C. Emergency Lighting System:

1. An exterior 100 kW, 125 KVA, 277/480 Volt, 3 phase, 4 Wire diesel fired exterior emergency generator with sound attenuated enclosure will be provided. Light fixtures and LED Exit signs will be installed to serve all egress areas such as Corridors, Intervening Spaces, Toilets, Stairs, and Exit discharge exterior doors. The Administration area lighting will be connected to the emergency generator.

2. The generator will include fire safety systems, boilers and circulating pumps, elevator, kitchen refrigeration, and communications and security systems.

D. Site Lighting System: ***LEED Credit SSC8***

1. Fixtures for area lighting will be pole mounted cut-off 'LED' luminaries in the parking area and roadways. Pole heights will be 20 feet. The exterior lighting will be connected to the automatic lighting control system for photocell "ON" and timed "OFF" operation. The site lighting fixtures will be dark sky compliant. The illumination level will be 0.5fc for parking areas in accordance with Illuminating Engineering Society.

2. Building perimeter will be 'LED' wall mounted cut-off fixtures over exterior doors for Exit discharge.

E. Wiring Devices:

1. Each classroom will have a minimum of (2) duplex receptacles per teaching wall and (2) double duplex receptacles on dedicated circuits at classroom computer workstations. The teacher's workstation will have a double duplex receptacle also on a dedicated circuit.

2. Office areas will generally have (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided.

3. Corridors will have a cleaning receptacle at approximately 25-40-foot intervals.

4. Exterior weatherproof receptacles with lockable enclosures will be installed at exterior doors.

5. A system of computer grade panelboards with double neutrals and surge protective devices will be provided for receptacle circuits.

6. Surface mounted raceways will be provided within renovated areas where raceways cannot be concealed.

F. Fire Alarm System:

1. A fire alarm and detection system will be provided with battery back-up. The system will be of the addressable type where each device will be identified at the control panel and remote annunciator by device type and location to facilitate search for origin of alarms.

2. Smoke detectors will be provided in open areas, corridors, stairwells and other egress ways.

3. The sprinkler system will be supervised for water flow and tampering with valves.

4. Speaker/strobes will be provided in egress ways, classrooms, assembly spaces, open areas, and other large spaces. Strobe only units will be provided in single toilets and conference rooms.

5. Manual pull stations will be provided at Exit discharge doors and at each egress stairwell not located at grade level.

6. The system will be remotely connected to automatically report alarms to fire department via an approved method by the fire department.

7. The generator status panel shall be located at the fire command center.

G. Uninterruptible Power Supply (UPS):

1. An 18 kW, three (3) phase centralized UPS system will be provided with seven minutes of battery back-up.

2. The system will provide conditioned power to sensitive electronic loads, telecommunication systems, bridge over power interruptions of short duration and allow an orderly shutdown of servers and communication systems during a prolonged power outage.

3. The UPS system will also be connected to the stand-by generator.

H. Lightning Protection System:

1. A system of lightning protection devices will be provided.

2. The lightning protection equipment will include air terminals, roof and down conductors, conduits, fasteners, connectors, ground rods, etc.

3. The facility will be issued a UL Master Label Certificate.

I. Renewable Energy System:

1. Provisions will be provided for future roof-mounted Photovoltaic System.

J. Two-Way Communications System:

1. A Two-Way Communications System will be provided at the elevator lobbies that do not have grade access.

K. Distribution Antennae System (DAS):

1. A public safety radio distributed antenna system (DAS) which consists of bi-directional amplifiers (BDA), donor antennas, coverage antennas, coax cable, coax connectors, splitters, combiners and couplers. These devices will be used as part of a system for in-building public safety 2-way radio system communication for first responders.

6. SITE UTILITIES

The incoming services including electric, fire alarm, telephone, cable TV, and fiber will be underground. An exterior pad mounted transformer will be provided by the utility company.

7. CCTV

A Closed-Circuit TV system will consist of computer servers with image software, computer monitors and IP based closed circuit TV cameras. The head end server will be located in the head end (MDF) room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders (SAN) will record all cameras and store this information for 45 days at 30 images per second (virtual real time).

The location of the cameras is generally on exterior building perimeter. The exterior cameras are fixed type.

The system will fully integrate with the access control system to allow viewing of events from a single alarm viewer. Camera images and recorded video will be linked to the access system to allow retrieval of video that is associated with an event.

8. INTRUSION SYSTEM

An intrusion system will consist of security panel, keypads, motion detectors and door contacts. The system is addressable which means that each device will be identified when an alarm occurs. The system is designed so that each perimeter classroom with grade access will have dual tech sensors along the exterior wall and corridors, door contacts at each exterior door.

The system will include a digital transmitter to summons the central station in the event of an alarm condition.

The intrusion system will be connected to the automated lighting control system to automatically turn on lighting upon an alarm.

9. CARD ACCESS (PROPRIETARY)

A card access system includes a card access controller, door controllers and proximity readers/keypads. Proximity readers will be located at various locations. Each proximity reader will have a distinctive code to identify the user and a log will be kept in memory. The log within the panel can be accessed through a computer. The existing S2 System will be utilized. Expansion of this system will be proprietary.

The alarm condition will also initiate real time recording on the integrated CCTV System. The system may be programmed with graphic maps allowing the end-user to quickly identify alarm conditions and lock/unlock doors.

The system is modular and may be easily expanded to accommodate any additional devices.

10. TESTING REQUIREMENTS

A. The Electrical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Lighting and Power Panels for correct phase balance.
- Emergency Generator.
- Lighting Control System (Interior and Exterior).
- Fire Alarm System.
- Uninterruptible Power System, UPS.
- Lightning Protection System.
- Security system

B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

11. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Electrical Contractor shall provide Operation and Maintenance Manuals to the Owner.

12. RECORD DRAWINGS AND CONTROL DOCUMENTS

When the project is completed, an As-Built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

13. COMMISSIONING

The project shall be commissioned per Commissioning Section of the specifications.

14. PHASING

The Work will be constructed in phases to provide the least possible interference to the activities of the existing School.

Manchester Memorial Elementary School
Manchester, MA
J#745 004 00.00
L#59479/Page 1/January 16, 2018

## ELECTRICAL SYSTEMS

## NARRATIVE REPORT
## RENOVATION R-1

The following is the Electrical Systems narrative, which defines the scope of work and capacities of the Power and Lighting System, as well as, the Basis of Design. The Electrical Systems shall be designed and constructed for ***LEED*** where indicated on this narrative.

1. CODES

   All work installed under Section 260000 shall comply with the Massachusetts State Building Code and all local, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   The work of Section 260000 is as described in this Narrative. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Electrical work and all items incidental thereto, including commissioning and testing.

3. DESIGN PARAMETERS

| | |
|---|---|
| High Voltage: | 277/480 Volt |
| Low Voltage: | 120/208 Volt |
| Phase: | 3 Phase, 4 Wire |
| Amperage: | 1,000 Amps |
| KW: | 524 |

4. SEQUENCE OF OPERATIONS AND INTERACTIONS

   A. Classroom and Corridor lighting will be controlled via “addressable relays”, which is achieved through programming networked controls. The control of the relays will be by automatic means, such as an occupancy sensor in each classroom. The system will have a BacNet gateway and will be interfaced with the DDC control system for scheduled functions. The controllability shall be in conformance with credit ***LEED credit IEQC 6.1.***

   B. Exterior lighting will be controlled by photocell “ON” and “scheduled” for “OFF” operation. The parking area lighting will be controlled by “zones” with dimmable capability.

   C. Emergency and Exit lighting will be run through life safety panels to be “ON” during normal power conditions, as well as, power outage conditions. The emergency lighting system will have time control so that lights are “ON” only when building is occupied.

5. DESCRIPTION OF THE SYSTEMS

   A. Electrical Distribution System:

      1. Service ratings are designed for a connected load of 10 watts/s.f. The service capacity will be sized for 1,000 amperes at 277/480 volt, 3∅, 4wire with 80% rated main breaker. The switchboard bus will be rated for 1,200 amperes to allow for future photovoltaics. A new pad mounted transformer will be provided with

new primary and secondary services. The vault mounted transformer and all associated switchgear will be removed. New lighting and power panels will be provided to accommodate respective loads. The equipment will be located in dedicated rooms or closets.

2. The building connected electrical load estimate is based on the preliminary building systems design:

| Load Type | KVA |
|---|---|
| Site lighting | 4 KVA |
| HVAC Loads (including chiller and pumps, RTUs, MAUs, exhaust fans, etc.) | 200 KVA |
| Boilers and Pumps | 22 KVA |
| Interior Lighting Load | 66 KVA |
| Classrooms, Labs, Office Power | 132 KVA |
| Kitchen (full-service) | 50 KVA |
| Miscellaneous Power | 20 KVA |
| Auditorium Lighting | 30 KVA |
| **Total Connected Load** | **524 KVA** |

B. Interior Lighting System:

1. Interior lighting illumination levels will meet the IES recommended values for applicable activity type, be in compliance with the IECC 2012 energy allowances and LEED for Schools control requirements.

**PROPOSED ILLUMINATION LEVELS**

| Location | Average Illumination Levels |
|---|---|
| Classrooms | 30-35 FC |
| Offices, Conference Rooms, Library | 30-35 FC |
| Kitchen | 40-50 FC |
| Gymnasium | 50 FC |
| Cafeteria | 30-35 FC |
| Corridors | 20-25 FC |
| Utility and Storage Rooms | 20-25 FC |

2. Classroom lighting fixtures will consist of a combination of recessed and pendant mounted direct /indirect luminaries with LED lamps and electronic dimmable drivers. The fixtures will be pre-wired for continuous dimming control where natural daylight is available and also for multi-level switching. Occupancy and daylight dimming sensors will be provided in each classroom.

3. Office lighting fixtures will consist of recessed mounted direct LED luminaries and electronic drivers for dual-level switching. Offices on the perimeter with windows will have daylight dimming controls similar to classrooms.

   In general, lighting power density will be 30-40% less than ASHRAE 90.1-2010. The power density reduction relates to ***LEED credit EAC.1.***

4. Lighting levels will be approximately 30-foot candles in classrooms and offices. The daylight dimming foot-candle level will be in compliance with ***MA-LEED credit IEQC 6.1.***

5. Gymnasium lighting will be comprised of direct fixtures with LED lamps and electronic drivers. The fixtures will be provided with clear lens and protective wire guards. The light level will be designed for approximately 30-foot candles. Multi-level switching will be provided.

   Daylight dimming will be provided within 15 feet of skylights or glazing. Daylight dimming controls will be similar in operation to classrooms.

6. Corridor lighting will be comprised of recessed acrylic fixtures with LED lamps and electronic drivers. The Corridor light level will be designed for approximately 20-foot candles. Corridor lighting will be on time clock control and only “ON” during occupied hours.

7. Cafeteria lighting will be pendant direct/indirect fixtures with LED lamps and electronic drivers. The light levels will be designed for approximately 30-foot candles. Daylighting controls will be provided on perimeter light fixtures with 15 feet of glazing

8. Stage and Auditorium theatrical lights with connector strips and a dimming system will be provided for performances. House lighting in Auditorium will be dimmable LED and controlled by the theatrical dimming system.

9. Kitchen and Servery lighting will consist of recessed 2’x4’ acrylic lensed gasketed troffers with aluminum frame doors with LED lamps and electronic drivers. Light levels will be approximately 50-foot candles.

10. Media Center lighting will consist of recessed direct fixtures with LED lamps and electronic drivers. Light levels will be approximately 30-foot candles.

11. Each area will be locally switched and designed for multi-level controls. Each Classroom, Office space, and Toilet Room will have occupancy sensors to turn lights off when unoccupied.

12. Daylight dimming sensors will be installed in each room where natural light is available for continuous dimming of light fixtures. The control system will be in accordance with ***LEED credit IEQC 6.1.***

13. The entire school will be controlled with an automatic lighting control system for programming of interior and exterior lights “on and off”. Lighting control system will be interfaced with DDC system.

C. Emergency Lighting System:

1. An exterior 75 kW, 93.75 KVA, 277/480 Volt, 3 phase, 4 wire diesel fired exterior emergency generator with sound attenuated enclosure will be provided. Light fixtures and LED Exit signs will be installed to serve all egress areas such as Corridors, Intervening Spaces, Toilets, Stairs, and Exit discharge exterior doors. The Administration area lighting will be connected to the emergency generator.

2. The generator will include fire safety systems, boilers and circulating pumps, kitchen refrigeration, communications and security systems.

D. Site Lighting System: ***LEED Credit SSC8***

1. Fixtures for area lighting will be pole mounted cut-off 'LED' luminaries in the parking area and roadways. Pole heights will be 20 feet. The exterior lighting will be connected to the automatic lighting control system for photocell "ON" and timed "OFF" operation. The site lighting fixtures will be dark sky compliant. The illumination level will be 0.5fc for parking areas in accordance with Illuminating Engineering Society.

2. Building perimeter will be 'LED' wall mounted cut-off fixtures over exterior doors for Exit discharge.

E. Wiring Devices:

1. Each classroom will have a minimum of (2) duplex receptacles per teaching wall and (2) double duplex receptacles on dedicated circuits at classroom computer workstations. The teacher's workstation will have a double duplex receptacle also on a dedicated circuit.

2. Office areas will generally have (1) duplex outlet per wall. At each workstation a double duplex receptacle will be provided.

3. Corridors will have a cleaning receptacle at approximately 25-40 foot intervals.

4. Exterior weatherproof receptacles with lockable enclosures will be installed at exterior doors.

5. A system of computer grade panelboards with double neutrals and surge protective devices will be provided for receptacle circuits.

6. Surface mounted raceways will be provided within renovated areas where raceways cannot be concealed.

F. Fire Alarm System:

1. The existing Fire Alarm System will be reused.

2. New devices will be added and existing devices relocated to accommodate construction. Existing devices will require protection throughout construction.

3. Additional programming and testing will be required.

4. The existing panel and associated equipment will be rewired to be fed from emergency power.

5. The generator status panel shall be located at the fire alarm control panel.

G. Uninterruptible Power Supply (UPS):

1. A 12 kW, three (3) phase centralized UPS system will be provided with seven minutes of battery back-up.

2. The system will provide conditioned power to sensitive electronic loads, telecommunication systems, bridge over power interruptions of short duration and allow an orderly shutdown of servers and communication systems during a prolonged power outage.

3. The UPS system will also be connected to the stand-by generator.

H. Lightning Protection System:

1. A system of lightning protection devices will be provided.

2. The lightning protection equipment will include air terminals, roof and down conductors, conduits, fasteners, connectors, ground rods, etc.

3. The facility will be issued a UL Master Label Certificate.

I. Renewable Energy System:

1. Provisions will be provided for future roof-mounted Photovoltaic System.

J. Distribution Antennae System (DAS):

1. A public safety radio distributed antenna system (DAS) which consists of bi-directional amplifiers (BDA), donor antennas, coverage antennas, coax cable, coax connectors, splitters, combiners and couplers. These devices will be used as part of a system for in-building public safety 2-way radio system communication for first responders.

6. SITE UTILITIES

The incoming services including electric, fire alarm, telephone, cable TV, and fiber will be underground. An exterior pad mounted transformer will be provided by the utility company.

7. CCTV

A Closed-Circuit TV system will consist of computer servers with image software, computer monitors and IP based closed circuit TV cameras. The head end server will be located in the head end (MDF) room and will be rack mounted. The system can be accessed from any PC within the facility or externally via an IP address. Each camera can be viewed independently. The network video recorders (SAN) will record all cameras and store this information for 45 days at 30 images per second (virtual real time).

The location of the cameras is generally on the exterior building perimeter. The exterior cameras are fixed type.

The system will fully integrate with the access control system to allow viewing of events from a single alarm viewer. Camera images and recorded video will be linked to the access system to allow retrieval of video that is associated with an event.

8. INTRUSION SYSTEM

An Intrusion System will consist of security panel, keypads, motion detectors and door contacts. The system is addressable which means that each device will be identified when an alarm occurs. The system is designed so that each perimeter classroom with grade access will have dual tech sensors along the exterior wall and corridors, door contacts at each exterior door.

The system will include a digital transmitter to summons the central station in the event of an alarm condition.

The Intrusion System will be connected to the automated lighting control system to automatically turn on lighting upon an alarm.

9. CARD ACCESS (PROPRIETARY)

A card access system includes a card access controller, door controllers and proximity readers/keypads. Proximity readers will be located at various locations. Each proximity reader will have a distinctive code to identify the user and a log will be kept in memory. The log within the panel can be accessed through a computer. The existing S2 System will be utilized. Expansion of this system will be proprietary.

The alarm condition will also initiate real time recording on the integrated CCTV System. The system may be programmed with graphic maps allowing the end-user to quickly identify alarm conditions and lock/unlock doors.

The system is modular and may be easily expanded to accommodate any additional devices.

10. TESTING REQUIREMENTS

A. The Electrical Contractor shall provide testing of the following systems with the Owner and Owner's Representative present:

- Lighting and Power Panels for correct phase balance.
- Emergency Generator.
- Lighting Control System (Interior and Exterior).
- Fire Alarm System.
- Uninterruptible Power System, UPS.
- Lightning Protection System.
- Security System

B. Testing reports shall be submitted to the Engineer for review and approval before providing to the Owner.

11. OPERATION MANUALS AND MAINTENANCE MANUALS

When the project is completed, the Electrical Contractor shall provide Operation and Maintenance Manuals to the Owner.

12. RECORD DRAWINGS AND CONTROL DOCUMENTS

When the project is completed, an As-Built set of drawings, showing all lighting and power requirements from contract and addendum items, will be provided to the Owner.

13. COMMISSIONING

The project shall be commissioned per Commissioning Section of the specifications.

14. PHASING

The Work will be constructed in phases to provide the least possible interference to the activities of the existing School. Modular classrooms will be utilized and will require separate services from the utility company.

Manchester Memorial Elementary School
Manchester, MA
J#745 004 00.00
L#59462/Page 1/January 16, 2018

**PLUMBING SYSTEMS**

**NARRATIVE REPORT**
**ADDITION/RENOVATION AR-2**

The following is the Plumbing system narrative, which defines the scope of work and capacities of the Plumbing system as well as the Basis of Design. The Plumbing Systems shall be designed and constructed for ***LEED for Schools*** where indicated on this narrative.

1. CODES

   A. All work installed under Section 220000 shall comply with the MA Building Code, MA Plumbing Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Plumbing work and all items incidental thereto, including commissioning and testing.

3. GENERAL

   A. The Plumbing Systems that will serve the project are cold water, hot water, sanitary waste and vent system, grease waste system, storm drain system, and natural gas.

   B. The Building will be serviced by Municipal water and Municipal sewer system.

   C. All Plumbing in the building will conform to Accessibility Codes and to Water Conserving sections of the Plumbing Code.

4. DRAINAGE SYSTEM

   A. Soil, Waste, and Vent piping system is provided to connect to all fixtures and equipment. System runs from 10 feet outside building and terminates with stack vents through the roof.

   B. A separate Grease Waste System starting with connection to an exterior concrete grease interceptor running thru the kitchen and servery area fixtures and terminating with a vent terminal through the roof. Point of use grease interceptors are to be provided at designated kitchen fixtures. The grease interceptor is provided under Division 33 scope.

   C. Storm Drainage system is provided to drain all roofs with roof drains piped through the building to a point of 10 feet outside the building.

   D. Drainage system piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type ‘L’ copper.

E. In existing building to remain, existing drainage piping may be reused if adequately sized for intended use. Integrity of existing piping will be confirmed via video inspection.

5. WATER SYSTEM

A. New 4-inch domestic water service from the municipal water system will be provided. A meter and backflow preventer will be provided.

B. Cold water distribution main is provided. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.

C. Domestic hot water heating will be provided with a combination of gas fired, high efficiency, condensing water heater (400,000 BTUH input), with separate storage tank (250 gallon). System is to be equipped with thermostatically controlled mixing devices to control water temperature to the fixtures.

D. A pump will re-circulate hot water from the piping system. Water temperature will be 120 deg. to serve general use fixtures. A 140 deg. F hot water will be supplied to the kitchen dishwasher.

E. Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high-density fiberglass.

6. GAS SYSTEM

A. Natural gas service will be provided for the building and will serve the boilers, domestic water heaters, kitchen cooking equipment, roof top equipment and generator.

B. Gas piping will be Schedule 40 black steel pipe with threaded gas pattern malleable fittings for 2 in. and under and butt-welded fittings for 2-1/2 in. and larger.

7. FIXTURES ***LEED for Schools Credit WEp1 & WEc3***

A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.

B. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.

C. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, or Eljer, or equal. Supports shall be Zurn, Smith, Josam, or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.

D. Fixtures shall be as scheduled on drawings.

1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Electrically hard-wired, sensor operated 1.28 gallon per flush-flush valve.

2. Urinal: High efficiency 0.13 gallon per flush urinal, wall hung, vitreous china. Electrically hard-wired, sensor operated 0.13 gallon per flush-flush valve.

3. Lavatory: Wall hung/countertop ADA lavatory with 0.35 GPM metering mixing faucet. Electrically hard-wired, sensor faucet.

4. Sink: MAAB/ADA stainless steel countertop sink with gooseneck faucet and 0.5 GPM aerator.

5. Drinking Fountain: Barrier free hi-low wall mounted electric water cooler, stainless steel basin with bottle filling station.

6. Janitor Sink: 24 x 24 x 10 Terrazo mop receptor Stern-Williams or equal.

8. DRAINS

A. Drains are cast iron, caulked outlets, nickaloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead flashings to bond 9 in. in all directions. Drains shall be Smith, Zurn, Josam, or equal.

9. VALVES

A. Locate all valves to isolate all parts of the system. Shutoff valves 3 in. and smaller shall be ball valves, solder end or screwed, Apollo, or equal.

10. INSULATION

A. All water piping shall be insulated with snap-on fiberglass insulation Type ASJ-SSL, equal to Johns Manville Micro-Lok HP.

11. CLEANOUTS

A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.

12. ACCESS DOORS

A. Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.

13. WATER HEATER

A. Gas fired, high efficiency, condensing water heater (400,000 BTUH input), with separate storage tank (250 gallon).

Manchester Memorial Elementary School
Manchester, MA
J#745 004 00.00
L#59464/Page 1/January 16, 2018

**PLUMBING SYSTEMS**

**NARRATIVE REPORT**
**RENOVATION R-1**

The following is the Plumbing system narrative, which defines the scope of work and capacities of the Plumbing system as well as the Basis of Design. The Plumbing Systems shall be designed and constructed for ***LEED for Schools*** where indicated on this narrative.

1. CODES

   A. All work installed under Section 220000 shall comply with the MA Building Code, MA Plumbing Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Plumbing work and all items incidental thereto, including commissioning and testing.

3. GENERAL

   A. The Plumbing Systems that will serve the project are cold water, hot water, sanitary waste and vent system, grease waste system, storm drain system, and natural gas.

   B. The Building will be serviced by Municipal water and Municipal sewer system.

   C. All Plumbing in the building will conform to Accessibility Codes and to Water Conserving sections of the Plumbing Code.

4. DRAINAGE SYSTEM

   A. Soil, Waste, and Vent piping system is provided to connect to all new fixtures and equipment. System runs shall connect to existing drainage systems in the building.

   B. A separate Grease Waste System starting with connection to an exterior concrete grease interceptor running thru the kitchen and servery area fixtures and terminating with a vent terminal through the roof. Point of use grease interceptors are to be provided at designated kitchen fixtures. The grease interceptor is provided under Division 33 scope.

   C. Existing roof drains shall be replaced with new. New drains shall connect to existing drainage piping in the building.

   D. Drainage system piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type ‘L’ copper.

   E. Existing drainage piping shall be video inspected to confirm integrity condition.

5. WATER SYSTEM

A. Existing 4-inch domestic water service shall remain. A meter and backflow preventer will be provided.

B. All existing domestic water piping will be demolished back to the service location.

C. New cold-water distribution main shall be provided. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.

D. Domestic hot water heating will be provided with a combination of gas fired, high efficiency, condensing water heater (400,000 BTUH input), with separate storage tank (250 gallon). System is to be equipped with thermostatically controlled mixing devices to control water temperature to the fixtures.

E. A pump will re-circulate hot water from the piping system. Water temperature will be 120 deg. to serve general use fixtures. A 140 deg. F hot water will be supplied to the kitchen dishwasher.

F. Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high-density fiberglass.

6. GAS SYSTEM

A. Natural gas service will be provided for the building and will serve the boilers, domestic water heaters, kitchen cooking equipment, roof top equipment and generator.

B. Gas piping will be Schedule 40 black steel pipe with threaded gas pattern malleable fittings for 2 in. and under and butt-welded fittings for 2-1/2 in. and larger.

7. FIXTURES ***LEED for Schools Credit WEp1 & WEc3***

A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.

B. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.

C. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, or Eljer, or equal. Supports shall be Zurn, Smith, Josam, or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.

D. Fixtures shall be as scheduled on drawings.

1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Electrically hard-wired, sensor operated 1.28 gallon per flush-flush valve.

2. Urinal: High efficiency 0.13 gallon per flush urinal, wall hung, vitreous china. Electrically hard-wired, sensor operated 0.13 gallon per flush-flush valve.

3. Lavatory: Wall hung/countertop ADA lavatory with 0.35 GPM metering mixing faucet. Electrically hard-wired, sensor faucet.

4. Sink: MAAB/ADA stainless steel countertop sink with gooseneck faucet and 0.5 GPM aerator.

5. Drinking Fountain: Barrier free hi-low wall mounted electric water cooler, stainless steel basin with bottle filling station.

6. Janitor Sink: 24 x 24 x 10 Terrazo mop receptor Stern-Williams or equal.

8. DRAINS

A. Drains are cast iron, caulked outlets, nickaloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead flashings to bond 9 in. in all directions. Drains shall be Smith, Zurn, Josam, or equal.

9. VALVES

A. Locate all valves to isolate all parts of the system. Shutoff valves 3 in. and smaller shall be ball valves, solder end or screwed, Apollo, or equal.

10. INSULATION

A. All water piping shall be insulated with snap-on fiberglass insulation Type ASJ-SSL, equal to Johns Manville Micro-Lok HP.

11. CLEANOUTS

A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.

12. ACCESS DOORS

A. Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.

13. WATER HEATER

A. Gas fired, high efficiency, condensing water heater (400,000 BTUH input), with separate storage tank (250 gallon).

Manchester Memorial Elementary School
Manchester, MA
J#745 004 00.00
L#59465/Page 1/January 16, 2018

**PLUMBING SYSTEMS**

**NARRATIVE REPORT**
**NEW CONSTRUCTION N-1**

The following is the Plumbing system narrative, which defines the scope of work and capacities of the Plumbing system as well as the Basis of Design. The Plumbing Systems shall be designed and constructed for ***LEED for Schools*** where indicated on this narrative.

1. CODES

   A. All work installed under Section 220000 shall comply with the MA Building Code, MA Plumbing Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Plumbing work and all items incidental thereto, including commissioning and testing.

3. GENERAL

   A. The Plumbing Systems that will serve the project are cold water, hot water, sanitary waste and vent system, grease waste system, storm drain system, and natural gas.

   B. The Building will be serviced by Municipal water and Municipal sewer system.

   C. All Plumbing in the building will conform to Accessibility Codes and to Water Conserving sections of the Plumbing Code.

4. DRAINAGE SYSTEM

   A. Soil, Waste, and Vent piping system is provided to connect to all fixtures and equipment. System runs from 10 feet outside building and terminates with stack vents through the roof.

   B. A separate Grease Waste System starting with connection to an exterior concrete grease interceptor running thru the kitchen and servery area fixtures and terminating with a vent terminal through the roof. Point of use grease interceptors are to be provided at designated kitchen fixtures. The grease interceptor is provided under Division 33 scope.

   C. Storm Drainage system is provided to drain all roofs with roof drains piped through the building to a point of 10 feet outside the building.

   D. Drainage system piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type ‘L’ copper.

5. WATER SYSTEM

A. New 4-inch domestic water service from the municipal water system will be provided. A meter and backflow preventer will be provided.

B. Cold water distribution main is provided. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.

C. Domestic hot water heating will be provided with a combination of gas fired, high efficiency, condensing water heater (400,000 BTUH input), with separate storage tank (250 gallon). System is to be equipped with thermostatically controlled mixing devices to control water temperature to the fixtures.

D. A pump will re-circulate hot water from the piping system. Water temperature will be 120 deg. to serve general use fixtures. A 140 deg. F hot water will be supplied to the kitchen dishwasher.

E. Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high-density fiberglass.

6. GAS SYSTEM

A. Natural gas service will be provided for the building and will serve the boilers, domestic water heaters, kitchen cooking equipment, roof top equipment and generator.

B. Gas piping will be Schedule 40 black steel pipe with threaded gas pattern malleable fittings for 2 in. and under and butt-welded fittings for 2-1/2 in. and larger.

7. FIXTURES ***LEED for Schools Credit WEp1 & WEc3***

A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.

B. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.

C. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, or Eljer, or equal. Supports shall be Zurn, Smith, Josam, or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.

D. Fixtures shall be as scheduled on drawings.

1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Electrically hard-wired, sensor operated 1.28 gallon per flush-flush valve.

2. Urinal: High efficiency 0.13 gallon per flush urinal, wall hung, vitreous china. Electrically hard-wired, sensor operated 0.13 gallon per flush-flush valve.

3. Lavatory: Wall hung/countertop ADA lavatory with 0.35 GPM metering mixing faucet. Electrically hard-wired, sensor faucet.

4. Sink: MAAB/ADA stainless steel countertop sink with gooseneck faucet and 0.5 GPM aerator.

5. Drinking Fountain: Barrier free hi-low wall mounted electric water cooler, stainless steel basin with bottle filling station.

6. Janitor Sink: 24 x 24 x 10 Terrazo mop receptor Stern-Williams or equal.

8. DRAINS

A. Drains are cast iron, caulked outlets, nickaloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead flashings to bond 9 in. in all directions. Drains shall be Smith, Zurn, Josam, or equal.

9. VALVES

A. Locate all valves to isolate all parts of the system. Shutoff valves 3 in. and smaller shall be ball valves, solder end or screwed, Apollo, or equal.

10. INSULATION

A. All water piping shall be insulated with snap-on fiberglass insulation Type ASJ-SSL, equal to Johns Manville Micro-Lok HP.

11. CLEANOUTS

A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.

12. ACCESS DOORS

A. Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.

13. WATER HEATER

A. Gas fired, high efficiency, condensing water heater (400,000 BTUH input), with separate storage tank (250 gallon).

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**PLUMBING SYSTEMS**

**NARRATIVE REPORT**
**NEW CONSTRUCTION N-3**

The following is the Plumbing system narrative, which defines the scope of work and capacities of the Plumbing system as well as the Basis of Design. The Plumbing Systems shall be designed and constructed for ***LEED for Schools*** where indicated on this narrative.

1. CODES

   A. All work installed under Section 220000 shall comply with the MA Building Code, MA Plumbing Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Plumbing work and all items incidental thereto, including commissioning and testing.

3. GENERAL

   A. The Plumbing Systems that will serve the project are cold water, hot water, sanitary waste and vent system, grease waste system, storm drain system, and natural gas.

   B. The Building will be serviced by Municipal water and Municipal sewer system.

   C. All Plumbing in the building will conform to Accessibility Codes and to Water Conserving sections of the Plumbing Code.

4. DRAINAGE SYSTEM

   A. Soil, Waste, and Vent piping system is provided to connect to all fixtures and equipment. System runs from 10 feet outside building and terminates with stack vents through the roof.

   B. A separate Grease Waste System starting with connection to an exterior concrete grease interceptor running thru the kitchen and servery area fixtures and terminating with a vent terminal through the roof. Point of use grease interceptors are to be provided at designated kitchen fixtures. The grease interceptor is provided under Division 33 scope.

   C. Storm Drainage system is provided to drain all roofs with roof drains piped through the building to a point of 10 feet outside the building.

   D. Drainage system piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type ‘L’ copper.

5. WATER SYSTEM

A. New 4-inch domestic water service from the municipal water system will be provided. A meter and backflow preventer will be provided.

B. Cold water distribution main is provided. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.

C. Domestic hot water heating will be provided with a combination of gas fired, high efficiency, condensing water heater (400,000 BTUH input), with separate storage tank (250 gallon). System is to be equipped with thermostatically controlled mixing devices to control water temperature to the fixtures.

D. A pump will re-circulate hot water from the piping system. Water temperature will be 120 deg. to serve general use fixtures. A 140 deg. F hot water will be supplied to the kitchen dishwasher.

E. Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high-density fiberglass.

6. GAS SYSTEM

A. Natural gas service will be provided for the building and will serve the boilers, domestic water heaters, kitchen cooking equipment, roof top equipment and generator.

B. Gas piping will be Schedule 40 black steel pipe with threaded gas pattern malleable fittings for 2 in. and under and butt-welded fittings for 2-1/2 in. and larger.

7. FIXTURES ***LEED for Schools Credit WEp1 & WEc3***

A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.

B. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.

C. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, or Eljer, or equal. Supports shall be Zurn, Smith, Josam, or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.

D. Fixtures shall be as scheduled on drawings.

1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Electrically hard-wired, sensor operated 1.28 gallon per flush-flush valve.

2. Urinal: High efficiency 0.13 gallon per flush urinal, wall hung, vitreous china. Electrically hard-wired, sensor operated 0.13 gallon per flush-flush valve.

3. Lavatory: Wall hung/countertop ADA lavatory with 0.35 GPM metering mixing faucet. Electrically hard-wired, sensor faucet.

4. Sink: MAAB/ADA stainless steel countertop sink with gooseneck faucet and 0.5 GPM aerator.

5. Drinking Fountain: Barrier free hi-low wall mounted electric water cooler, stainless steel basin with bottle filling station.

6. Janitor Sink: 24 x 24 x 10 Terrazo mop receptor Stern-Williams or equal.

8. DRAINS

A. Drains are cast iron, caulked outlets, nickaloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead flashings to bond 9 in. in all directions. Drains shall be Smith, Zurn, Josam, or equal.

9. VALVES

A. Locate all valves to isolate all parts of the system. Shutoff valves 3 in. and smaller shall be ball valves, solder end or screwed, Apollo, or equal.

10. INSULATION

A. All water piping shall be insulated with snap-on fiberglass insulation Type ASJ-SSL, equal to Johns Manville Micro-Lok HP.

11. CLEANOUTS

A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.

12. ACCESS DOORS

A. Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.

13. WATER HEATER

A. Gas fired, high efficiency, condensing water heater (400,000 BTUH input), with separate storage tank (250 gallon).

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**PLUMBING SYSTEMS**

**NARRATIVE REPORT**
**NEW CONSTRUCTION N-9**

The following is the Plumbing system narrative, which defines the scope of work and capacities of the Plumbing system as well as the Basis of Design. The Plumbing Systems shall be designed and constructed for ***LEED for Schools*** where indicated on this narrative.

1. CODES

   A. All work installed under Section 220000 shall comply with the MA Building Code, MA Plumbing Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Plumbing work and all items incidental thereto, including commissioning and testing.

3. GENERAL

   A. The Plumbing Systems that will serve the project are cold water, hot water, sanitary waste and vent system, grease waste system, storm drain system, and natural gas.

   B. The Building will be serviced by Municipal water and Municipal sewer system.

   C. All Plumbing in the building will conform to Accessibility Codes and to Water Conserving sections of the Plumbing Code.

4. DRAINAGE SYSTEM

   A. Soil, Waste, and Vent piping system is provided to connect to all fixtures and equipment. System runs from 10 feet outside building and terminates with stack vents through the roof.

   B. A separate Grease Waste System starting with connection to an exterior concrete grease interceptor running thru the kitchen and servery area fixtures and terminating with a vent terminal through the roof. Point of use grease interceptors are to be provided at designated kitchen fixtures. The grease interceptor is provided under Division 33 scope.

   C. Storm Drainage system is provided to drain all roofs with roof drains piped through the building to a point of 10 feet outside the building.

   D. Drainage system piping will be service weight cast iron piping; hub and spigot with gaskets for below grade; no hub with gaskets, bands and clamps for above grade 2 in. and larger. Waste and vent piping 1-1/2 in. and smaller will be type ‘L’ copper.

5. WATER SYSTEM

A. New 4-inch domestic water service from the municipal water system will be provided. A meter and backflow preventer will be provided.

B. Cold water distribution main is provided. Non-freeze wall hydrants with integral back flow preventers are provided along the exterior of the building.

C. Domestic hot water heating will be provided with a combination of gas fired, high efficiency, condensing water heater (400,000 BTUH input), with separate storage tank (250 gallon). System is to be equipped with thermostatically controlled mixing devices to control water temperature to the fixtures.

D. A pump will re-circulate hot water from the piping system. Water temperature will be 120 deg. to serve general use fixtures. A 140 deg. F hot water will be supplied to the kitchen dishwasher.

E. Water piping will be type 'L' copper with wrot copper sweat fittings, silver solder or press-fit system. All piping will be insulated with 1 in. thick high-density fiberglass.

6. GAS SYSTEM

A. Natural gas service will be provided for the building and will serve the boilers, domestic water heaters, kitchen cooking equipment, roof top equipment and generator.

B. Gas piping will be Schedule 40 black steel pipe with threaded gas pattern malleable fittings for 2 in. and under and butt-welded fittings for 2-1/2 in. and larger.

7. FIXTURES ***LEED for Schools Credit WEp1 & WEc3***

A. Furnish and install all fixtures, including supports, connections, fittings, and any incidentals to make a complete installation.

B. Fixtures shall be the manufacturer's guaranteed label trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.

C. Vitreous china and acid resisting enameled fixtures, including stops, supplies and traps shall be of one manufacturer by Kohler, American Standard, or Eljer, or equal. Supports shall be Zurn, Smith, Josam, or equal. All fixtures shall be white. Faucets shall be Speakman, Chicago, or equal.

D. Fixtures shall be as scheduled on drawings.

1. Water Closet: High efficiency toilet, 1.28 gallon per flush, wall hung, vitreous china, siphon jet. Electrically hard-wired, sensor operated 1.28 gallon per flush-flush valve.

2. Urinal: High efficiency 0.13 gallon per flush urinal, wall hung, vitreous china. Electrically hard-wired, sensor operated 0.13 gallon per flush-flush valve.

3. Lavatory: Wall hung/countertop ADA lavatory with 0.35 GPM metering mixing faucet. Electrically hard-wired, sensor faucet.

4. Sink: MAAB/ADA stainless steel countertop sink with gooseneck faucet and 0.5 GPM aerator.

5. Drinking Fountain: Barrier free hi-low wall mounted electric water cooler, stainless steel basin with bottle filling station.

6. Janitor Sink: 24 x 24 x 10 Terrazo mop receptor Stern-Williams or equal.

8. DRAINS

A. Drains are cast iron, caulked outlets, nickaloy strainers, and in waterproofed areas and roofs shall have galvanized iron clamping rings with 6 lb. lead flashings to bond 9 in. in all directions. Drains shall be Smith, Zurn, Josam, or equal.

9. VALVES

A. Locate all valves to isolate all parts of the system. Shutoff valves 3 in. and smaller shall be ball valves, solder end or screwed, Apollo, or equal.

10. INSULATION

A. All water piping shall be insulated with snap-on fiberglass insulation Type ASJ-SSL, equal to Johns Manville Micro-Lok HP.

11. CLEANOUTS

A. Cleanouts shall be full size up to 4 in. threaded bronze plugs located as indicated on the drawings and/or where required in soil and waste pipes.

12. ACCESS DOORS

A. Furnish access doors for access to all concealed parts of the plumbing system that require accessibility. Coordinate types and locations with the Architect.

13. WATER HEATER

A. Gas fired, high efficiency, condensing water heater (400,000 BTUH input), with separate storage tank (250 gallon).

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# FIRE PROTECTION SYSTEMS

## NARRATIVE REPORT
## ADDITION/RENOVATION AR-2

The following is the Fire Protection system narrative, which defines the scope of work and capacities of the Fire Protection system, as well as, the Basis of Design.

1. CODES

   A. All work installed under Section 210000 shall comply with the MA Building Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Fire Protection work and all items incidental thereto, including commissioning and testing.

3. GENERAL

   A. In accordance with the provisions of Massachusetts General Law, a commercial building of greater than 7,500 s.f. which undergoes major renovation and building addition must be protected with an automatic sprinkler system.

4. DESCRIPTION

   A. The existing fire service and existing partial automatic sprinkler system shall be demolished in its entirety.

   B. The existing building and addition will be served by a new 6-inch fire service, double check valve assembly, wet alarm valve complete with electric bell, and fire department connection meeting local thread standards.

   C. System will be an automatic sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 s.f. as required by NFPA 13-2013.

   D. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain.

   E. All areas of the building, including all finished and unfinished spaces, combustible concealed spaces, all electrical rooms and closets will be sprinklered.

   F. All sprinkler heads will be quick response, pendent in hung ceiling areas and upright in unfinished areas.

5. BASIS OF DESIGN

   A. The mechanical rooms, kitchen, and storage rooms are considered Ordinary Hazard Group 1. All other areas are considered light hazard.

B. Required Design Densities:

| | |
|---|---|
| Light Hazard Areas = | 0.10 GPM over 1,500 s.f. |
| Ordinary Hazard Group 1 = | 0.15 GPM over 1,500 s.f. |

C. Sprinkler spacing (max.):

| | |
|---|---|
| Light Hazard Areas = | 225 s.f. |
| Ordinary Hazard Areas = | 130 s.f. |

D. A flow test must be performed to confirm Municipal water system capacity.

6. PIPING

A. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler/standpipe piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe.

7. FITTINGS

A. Fittings on fire service piping, 2 in. and larger, shall be Victaulic Fire Lock Ductile Iron Fittings conforming to ASTM A-536 with integral grooved shoulder and back stop lugs and grooved ends for use with Style 009-EZ or Style 005 couplings. Branch line fittings shall be welded or shall be Victaulic 920/920N Mechanical Tees. Schedule 10 pipe shall be roll grooved. Schedule 40 pipe, where used with mechanical couplings, shall be roll grooved and shall be threaded where used with screwed fittings. Fittings for threaded piping shall be malleable iron screwed sprinkler fittings.

8. JOINTS

A. Threaded pipe joints shall have an approved thread compound applied on male threads only. Teflon tape shall be used for threads on sprinkler heads. Joints on piping, 2 in. and larger, shall be made up with Victaulic, or equal, Fire Lock Style 005, rigid coupling of ductile iron and pressure responsive gasket system for wet sprinkler system as recommended by manufacturer.

9. DOUBLE CHECK VALVE ASSEMBLY

A. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two spare sets of gaskets and repair kits.

B. Double check valve detector assembly shall be of one of the following:

1. Watts Series 757-OSY
2. Wilkins 350A-OSY
3. Conbraco Series 4S-100
4. Or equal

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# FIRE PROTECTION SYSTEMS

## NARRATIVE REPORT
## NEW CONSTRUCTION N-1

The following is the Fire Protection system narrative, which defines the scope of work and capacities of the Fire Protection system, as well as, the Basis of Design.

1. CODES

   A. All work installed under Section 210000 shall comply with the MA Building Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Fire Protection work and all items incidental thereto, including commissioning and testing.

3. GENERAL

   A. In accordance with the provisions of the Massachusetts Building Code, a school building of greater than 12,000s.f. must be protected with an automatic sprinkler system.

4. DESCRIPTION

   A. The new building will be served by a new 6-inch fire service, double check valve assembly, wet alarm valve complete with electric bell, and fire department connection meeting local thread standards.

   B. System will be an automatic sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 s.f. as required by NFPA 13-2013.

   C. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain.

   D. All areas of the building, including all finished and unfinished spaces, combustible concealed spaces, all electrical rooms and closets will be sprinklered.

   E. All sprinkler heads will be quick response, pendent in hung ceiling areas and upright in unfinished areas.

5. BASIS OF DESIGN

   A. The mechanical rooms, kitchen, and storage rooms are considered Ordinary Hazard Group 1. All other areas are considered light hazard.

   B. Required Design Densities:

| | |
|---|---|
| Light Hazard Areas | 0.10 GPM over 1,500 s.f. |
| Ordinary Hazard Group 1 | 0.15 GPM over 1,500 s.f. |

C. Sprinkler spacing (max.):

| | |
|---|---|
| Light Hazard Areas: | 225 s.f. |
| Ordinary Hazard Areas: | 130 s.f. |

D. A flow test must be performed to confirm Municipal water system capacity.

6. PIPING

A. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler/standpipe piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe.

7. FITTINGS

A. Fittings on fire service piping, 2 in. and larger, shall be Victaulic Fire Lock Ductile Iron Fittings conforming to ASTM A-536 with integral grooved shoulder and back stop lugs and grooved ends for use with Style 009-EZ or Style 005 couplings. Branch line fittings shall be welded or shall be Victaulic 920/920N Mechanical Tees. Schedule 10 pipe shall be roll grooved. Schedule 40 pipe, where used with mechanical couplings, shall be roll grooved and shall be threaded where used with screwed fittings. Fittings for threaded piping shall be malleable iron screwed sprinkler fittings.

8. JOINTS

A. Threaded pipe joints shall have an approved thread compound applied on male threads only. Teflon tape shall be used for threads on sprinkler heads. Joints on piping, 2 in. and larger, shall be made up with Victaulic, or equal, Fire Lock Style 005, rigid coupling of ductile iron and pressure responsive gasket system for wet sprinkler system as recommended by manufacturer.

9. DOUBLE CHECK VALVE ASSEMBLY

A. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two spare sets of gaskets and repair kits.

B. Double check valve detector assembly shall be of one of the following:

1. Watts Series 757-OSY
2. Wilkins 350A-OSY
3. Conbraco Series 4S-100
4. Or equal

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# FIRE PROTECTION SYSTEMS

## NARRATIVE REPORT
## NEW CONSTRUCTION N-9

The following is the Fire Protection system narrative, which defines the scope of work and capacities of the Fire Protection system, as well as, the Basis of Design.

1. CODES

   A. All work installed under Section 210000 shall comply with the MA Building Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Fire Protection work and all items incidental thereto, including commissioning and testing.

3. GENERAL

   A. In accordance with the provisions of the Massachusetts Building Code, a school building of greater than 12,000s.f. must be protected with an automatic sprinkler system.

4. DESCRIPTION

   A. The new building will be served by a new 6-inch fire service, double check valve assembly, wet alarm valve complete with electric bell, and fire department connection meeting local thread standards.

   B. System will be an automatic sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 s.f. as required by NFPA 13-2013.

   C. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain.

   D. All areas of the building, including all finished and unfinished spaces, combustible concealed spaces, all electrical rooms and closets will be sprinklered.

   E. All sprinkler heads will be quick response, pendent in hung ceiling areas and upright in unfinished areas.

5. BASIS OF DESIGN

   A. The mechanical rooms, kitchen, and storage rooms are considered Ordinary Hazard Group 1. All other areas are considered light hazard.

   B. Required Design Densities:

| | |
|---|---|
| Light Hazard Areas | 0.10 GPM over 1,500 s.f. |
| Ordinary Hazard Group 1 | 0.15 GPM over 1,500 s.f. |

C. Sprinkler spacing (max.):

| | |
|---|---|
| Light Hazard Areas: | 225 s.f. |
| Ordinary Hazard Areas: | 130 s.f. |

D. A flow test must be performed to confirm Municipal water system capacity.

6. PIPING

A. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler/standpipe piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe.

7. FITTINGS

A. Fittings on fire service piping, 2 in. and larger, shall be Victaulic Fire Lock Ductile Iron Fittings conforming to ASTM A-536 with integral grooved shoulder and back stop lugs and grooved ends for use with Style 009-EZ or Style 005 couplings. Branch line fittings shall be welded or shall be Victaulic 920/920N Mechanical Tees. Schedule 10 pipe shall be roll grooved. Schedule 40 pipe, where used with mechanical couplings, shall be roll grooved and shall be threaded where used with screwed fittings. Fittings for threaded piping shall be malleable iron screwed sprinkler fittings.

8. JOINTS

A. Threaded pipe joints shall have an approved thread compound applied on male threads only. Teflon tape shall be used for threads on sprinkler heads. Joints on piping, 2 in. and larger, shall be made up with Victaulic, or equal, Fire Lock Style 005, rigid coupling of ductile iron and pressure responsive gasket system for wet sprinkler system as recommended by manufacturer.

9. DOUBLE CHECK VALVE ASSEMBLY

A. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two spare sets of gaskets and repair kits.

B. Double check valve detector assembly shall be of one of the following:

1. Watts Series 757-OSY
2. Wilkins 350A-OSY
3. Conbraco Series 4S-100
4. Or equal

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# FIRE PROTECTION SYSTEMS

## NARRATIVE REPORT
## RENOVATION R-1

The following is the Fire Protection system narrative, which defines the scope of work and capacities of the Fire Protection system, as well as, the Basis of Design.

1. CODES

   A. All work installed under Section 210000 shall comply with the MA Building Code and all state, county, and federal codes, laws, statutes, and authorities having jurisdiction.

2. DESIGN INTENT

   A. All work is new and consists of furnishing all materials, equipment, labor, transportation, facilities, and all operations and adjustments required for the complete and operating installation of the Fire Protection work and all items incidental thereto, including commissioning and testing.

3. GENERAL

   A. In accordance with the provisions of Massachusetts General Law, a commercial building of greater than 7,500 s.f. which undergoes a major renovation must be protected with an automatic sprinkler system.

4. DESCRIPTION

   A. The existing fire service and existing partial automatic sprinkler system shall be demolished in its entirety.

   B. The existing building will be served by a new 6-inch fire service, double check valve assembly, wet alarm valve complete with electric bell, and fire department connection meeting local thread standards.

   C. System will be an automatic sprinkler system with control valve assemblies to limit the sprinkler area controlled to less than 52,000 s.f. as required by NFPA 13-2013.

   D. Control valve assemblies shall consist of a supervised shutoff valve, check valve, flow switch and test connection with drain.

   E. All areas of the building, including all finished and unfinished spaces, combustible concealed spaces, all electrical rooms and closets will be sprinklered.

   F. All sprinkler heads will be quick response, pendent in hung ceiling areas and upright in unfinished areas.

5. BASIS OF DESIGN

   A. The mechanical rooms, kitchen, and storage rooms are considered Ordinary Hazard Group 1. All other areas are considered light hazard.

B. Required Design Densities:

| | |
|---|---|
| Light Hazard Areas = | 0.10 GPM over 1,500 s.f. |
| Ordinary Hazard Group 1 = | 0.15 GPM over 1,500 s.f. |

C. Sprinkler spacing (max.):

| | |
|---|---|
| Light Hazard Areas = | 225 s.f. |
| Ordinary Hazard Areas = | 130 s.f. |

D. A flow test must be performed to confirm Municipal water system capacity.

6. PIPING

A. Sprinkler piping 1-1/2 in. and smaller shall be ASTM A-53, Schedule 40 black steel pipe. Sprinkler/standpipe piping 2 in. and larger shall be ASTM A-135, Schedule 10 black steel pipe.

7. FITTINGS

A. Fittings on fire service piping, 2 in. and larger, shall be Victaulic Fire Lock Ductile Iron Fittings conforming to ASTM A-536 with integral grooved shoulder and back stop lugs and grooved ends for use with Style 009-EZ or Style 005 couplings. Branch line fittings shall be welded or shall be Victaulic 920/920N Mechanical Tees. Schedule 10 pipe shall be roll grooved. Schedule 40 pipe, where used with mechanical couplings, shall be roll grooved and shall be threaded where used with screwed fittings. Fittings for threaded piping shall be malleable iron screwed sprinkler fittings.

8. JOINTS

A. Threaded pipe joints shall have an approved thread compound applied on male threads only. Teflon tape shall be used for threads on sprinkler heads. Joints on piping, 2 in. and larger, shall be made up with Victaulic, or equal, Fire Lock Style 005, rigid coupling of ductile iron and pressure responsive gasket system for wet sprinkler system as recommended by manufacturer.

9. DOUBLE CHECK VALVE ASSEMBLY

A. Double check valve assembly shall be MA State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two spare sets of gaskets and repair kits.

B. Double check valve detector assembly shall be of one of the following:

1. Watts Series 757-OSY
2. Wilkins 350A-OSY
3. Conbraco Series 4S-100
4. Or equal

# Civil Narrative Report

The following is the civil site systems narrative for the Manchester Memorial Elementary School in Manchester-by-the-Sea, MA in order to define the scope of work for the current site, for a new school through either a new building or a renovation/ addition. This study's focus is on the current site located at 43 Lincoln Street.

## 1. SOIL EROSION

A. Contractor shall be responsible for applying for a NPDES Permit, and complying with the approved Storm Water Pollution Prevention Plan (SWPPP) as developed by the Owners/ Civil Engineer.

B. The Contractor shall implement all soil erosion and sediment control devices prior to excavation within the site.

C. The following erosion control principles shall apply to the land grading and construction phases:
   1. Stripping of vegetation, grading, or other soil disturbance shall be done in a manner which will minimize soil erosion.
   2. Whenever feasible, natural vegetation shall be retained and protected.
   3. Extent of area which is exposed and free of vegetation and duration of its exposure shall be kept within practical limits.
   4. Drainage provisions shall accommodate increased runoff resulting from modifications of soil and surface conditions during and after development or disturbance. Such provisions shall be in addition to existing requirements.
   5. Sediment shall be retained on-site.
   6. Erosion control devices shall be installed as early as possible in the construction sequence prior to the start of clearing and grubbing operations and excavation work

D. Siltsack® will be manufactured to fit the opening of the catch basin or drop inlet. Siltsack® will have the following features: two dump straps attached at the bottom to facilitate the emptying of Siltsack®; Siltsack® shall have lifting loops as an integral part of the system to be used to lift Siltsack® from the basin; Siltsack® shall have a restraint cord approximately halfway up the sack to keep the sides away from the catch basin walls, this yellow cord is also a visual means of indicating when the sack should be emptied.

E. Siltation fence and Straw bales shall be used as around the perimeter of the limit of work and uphill of any wetlands or sensitive areas.
   1. Straw bales for construction of erosion control devices shall be new, firm, wire- or nylon-bound livestock feedgrade
   2. Geotextile Fabric shall consist of long-chain synthetic polymers, composed of at least 85% by weight polylefins, polyesters, or polymides. They shall be formed into a network such that the filaments or yarns retain dimensional stability relative to each other, including selvedes.

F. Construction Entrance: The Construction entrance shall be a minimum of 50-feet in length and 20-feet wide and shall be indicated on the site plan
   1. Filter fabric shall conform to Section 311100(2.2)(A) (without wire-bound woodroll fence).
   2. Stone shall be clean, crushed stone, with a ranging from 1 ½" to 2 ½" in size.
   3. Top dressing shall be clean, 2" crushed stone

## 2. EXISTING UTILITY REMOVAL & SITE PREP

A. Prior to the start of construction, the contractor shall locate in the field all existing utilities within the limit of work to be demolished.

B. Remove and/or abandon existing site utilities improvements within the limit of work line as indicated. Include the following:
   1. Miscellaneous utilities (electric, telephone, gas, etc.)
   2. Water service and their appurtenances.
   3. Storm drainage and their appearances.
   4. Sanitary sewer and their appearances.

C. Remove existing paving, including base material, as required to accommodate new construction. Saw cut existing paving in neat, straight lines to provide uniform, even transition from new to adjacent existing work

D. Salvaged items shall include granite curbing, suitable topsoil, and fill materials and other materials indicated to be saved and/or re-used

## 3. WATER UTILITIES

A. Manchester Water Department:
   1. The Contractor shall notify the Manchester Water Department sufficiently in advance of connecting new main to existing main. All work and materials shall be subject to approval by the Manchester Water Department and shall conform to the applicable Town's Specifications.
   2. The Contractor shall be responsible for making all arrangements with the Town and paying all fees associated with the water system installation.

B. Ductile Iron Pipe and Pipe Fittings:
   1. Ductile iron (DI) pipe for water mains shall be designed in accordance with ANSI/AWWA C150/A21.50 and shall be manufactured in accordance with ANSI/AWWA C151/A21.51. Unless otherwise indicated or specified, ductile iron pipe shall be at least thickness Class 52.
      a. DI pipe shall be push-on joint type.
      b. DI fittings shall conform to ANSI/AWWA C110, and shall be of a-pressure classification at least equal to that of the pipe with which they are used.
      c. Gaskets shall conform to ANSI/AWWA Clll/A21.114
      d. Inside of pipe and fittings shall be given a cement lining and bituminous seal coat in accordance with ANSI/AWWA C104/A21.4. The outside of pipe and fittings shall be coated with a standard bituminous coating conforming to ANSI/AWWA C151/A21.51 and C110, respectively.
      e. Pipe for use with sleeve-type couplings shall be as specified above except that the ends shall be plain (without bells or beads). The ends shall be cast or machined at right angles to the axis.

C. Valves and Valve Boxes:
   1. Gate valve shall be iron body, bronze mounted, double disc, conforming to ANSI/AWWA C500. Gate valve shall be designed for a minimum working pressure of 250 lbs. per sq. in. and a minimum test pressure of 500 lbs. per sq. in. It shall be resilient seated and epoxy coated.

2. Tapping sleeve and valve shall consist of a split cast iron sleeve tee with mechanical joint ends on the main and a flange on the branch, and a tapping type gate valve with one flange and one mechanical joint end. Valve shall conform to the requirements specified above for gate valve. The Contractor shall be responsible for verifying the outside diameter of the pipe to be tapped. Valve shall have oversized seat to permit the use of full size cutters.
3. Tapping sleeve and valve and gate valve shall be approved by the Manchester Water Department and the Architect.

D. Embedment Materials:
1. Ductile iron water pipe shall be backfilled with materials defined in 02300 Earthwork as Processed Gravel, with a maximum size of 2" sieve in lieu of the 3" specified.

E. Hydrants:
1. Hydrant shall conform to AWWA C502 and local governmental authorities having jurisdiction. Hydrant shall be positive automatic drain type to prevent freezing, and shall have one 4-1/2 in. pumper and two 2-1/2 in. hose connections. Main valve opening shall be 5-1/4 in. and valve shall open to right (clockwise). Inlet connection shall be 6 in., mechanical joint.
2. Hydrant shall be approved by the Town of Manchester Water Department.
3. Color and type of hydrant shall match Town of Manchester standard.

F. New Construction:
1. A new 8-inch water main loop will be provided around the proposed building.
2. The building will be fed by a 4-inch domestic water line.
3. The building will be serviced by a 6-inch fire protection line.
4. Fire hydrants should be provided every 300-feet around the proposed building.

G. Renovation:
1. MEP to determine if the current water service will be sufficient for renovated building.
2. Additional fire hydrants may be required.
3. A 6- inch fire protection line may need to be added and/or upgraded.

## 4. SANITARY SEWERAGE UTILITIES

A. PVC Pipe and Fittings:
1. Polyvinyl chloride (PVC) pipe shall conform to ASTM D 3430, SDR 35. Fittings shall conform to ASTM D 3417.

B. Cast Iron Pipe:

1. Piping between sewer stub at building, and manhole shall be extra heavy, cast iron, hub and spigot type conforming to ASTM A 74, or hub-type conforming to CISPI 301.
   a. Joints for hub and spigot type shall be either poured lead type, or rubber gasketed type, conforming to ASTM C 564.
   b. Joints for no hub-type shall be made with hubless joint connectors.

C. Manholes:
1. Sewer manholes shall be precast concrete construction.

2. Precast concrete manholes shall conform to ASTM C 478, and shall be similar to those manufactured by Concrete Systems, Inc., Hudson, NH; Superior Concrete Co., Inc., Auburn, ME; or approved equal.

    a. Sections shall have tongue and groove joints.
    b. Joints between sections shall be made with preformed rubber gaskets conforming to ASTM C 443.
    c. Each section shall have no more than two suitable lifting holes or cast-in lifting devices.
    d. Precast base shall be manufactured with wall openings to receive the ends of pipes which are to be connected to the structure.
    e. Pipe openings in base shall be minimum size required to receive pipe, and shall be accurately set to conform to the required line and grade.

3. Pipe shall be joined to precast base using either "Lock Joint Flexible Manhole Sleeve", manufactured by Lock Joint Concrete Pipe, Interpace Corporation, Parsippany, NJ 07054, or "Press Wedge II", manufactured by Press-Seal Gasket Corporation, Fort Wayne, IN 46808.
4. Manholes shall have shaped brick inverts.
5. Manhole steps shall be extruded aluminum, conforming to Fed. Spec. QQ-A-200/8, or Polypropylene plastic reinforced with 3/8 in. diameter steel rod, as manufactured by M. A. Industries, Inc., Peachtree Town, GA 30269; Aluminum Company of America, Pittsburgh, PA; New Jersey Aluminum Co., New Brunswick, NJ; or approved equal.

    a. Steps shall be drop-front, anti-skid design, 12 in. wide. Projection of front edge of step shall be greater than or equal to 5 in. from manhole wall.
    b. Steps shall be embedded 4 in. into manhole wall. Those portions of aluminum steps to be embedded in manhole wall shall receive a heavy coat of heavybodied bituminous paint. Coating shall be thoroughly dry before steps are embedded in manhole.
    c. Steps in precast sections shall be embedded at time of casting.

6. Access risers shall be designed to safely withstand an AASHTO H-20 loading.
7. Manholes shall be designed to safely withstand an AASHTO H-20 loading, as specified in the AASHTO Specifications.

D. Grease Trap:
1. Grease trap shall be a precast concrete structure with and internal volume of not less than 5,500 gallons, a liquid depth of 4′-0″ and shall meet the following:
    a. Concrete shall be 5,000 PSI minimum after 28 days
    b. All reinforcement per ASTM C1227-93
    c. Designed for H-20 loading
    d. Watertight structure with tongue and groove joints sealed with butyle resin
    e. Exterior: Bituminous coating, 2 coats.
    f. Wall thickness 6″ minimum.
    g. 6″ diameter inlet and outlet

E. Holding Tank (Science Waste):
1. Holding tanks shall be a precast concrete structure with and internal volume of not less than 4,000 gallons, a liquid depth of 4′-0″ and shall meet the following:
    a. Shall be constructed in tandem with a secondary holding tank.

b. Designed for H-20 loading.
c. Does not leak through its sides, bottom, seams or top.
d. In compliance with 314 CMR 18.08.

F. Castings:
1. All frames and covers shall be cast iron, heavy duty, conforming to ASTM A 48, Class 35 and shall be designed to safely withstand an AASHTO H-20 loading.
2. All frames and covers shall be of uniform quality, free from blow holes, shrinkage, distortion or other defects. They shall be smooth and well cleaned by shotblasting and fit together in a satisfactory manner. Round frames, a riser (manhole) frame and cover shall have a circular clear opening of 24 inches and a total frame weight of at least 475 lbs. with the word "SEWER" centered on the cover in 3 inch high letters.
3. All frames and covers shall conform to the Massachusetts Department of Public Works Specifications M8.03.0 and be approved by the Architect.
4. Castings shall have shop applied, coal-tar-pitch varnish coating, thoroughly covering all metal.

G. New Construction:
1. The sanitary waste system shall discharge to the existing municipal sewer system.

H. Renovation:
1. All existing grease traps and science waste tanks should be replaced.

## 5. STORM DRAINAGE UTILITIES

A. Manholes, Area Drains, WQU, and Catch Basins
1. Drain manholes and catch basins shall be precast concrete or concrete unit masonry construction, at the Contractor's option.
2. Precast concrete manholes and catch basins shall conform to ASTM C 478

3. Manholes and catch basins shall be designed to safely withstand an AASHTO H-20 loading, as specified in the AASHTO Specifications.
4. Area drains shall be 18" Nyloplast inline drainage inlets as indicated on the contract drawings and referenced within the contract specifications. The surface drainage inlets shall be as manufactured by Nyloplast a division Advanced Drainage Systems, or approved equal. Inline drain shall be manufacture from PVC pipe stock and formed to provide a watertight connection with the specified pipe system
5. Water Quality Units:
   a. The separator shall be circular and constructed from pre-cast concrete circular riser and slab components. The internal fiberglass insert shall be bolted and sealed watertight inside the reinforced concrete component. The separator shall be capable to be used as a bend or junction structure within the stormwater drainage system.
   b. All precast concrete sections shall be designed and manufactured to a minimum live load of AASHTO HS-20 truck loading or greater based on local regulatory specifications.
   c. The treatment device shall be capable of removing 80 percent of the average annual total suspended solids (TSS) load without scouring previously captured pollutants.

B. Infiltration Chambers:

1. Infiltration chambers shall be parabolic storage chambers as manufactured by Cultec, or approved equal.
   a. H-20 loading required
   b. Outlets and inlets to fit 18″, 12″, 10″, 8″, 6″, and 4″ diameter pipes

C. Embedment Materials:
1. Embedment materials shall consist of compacted processed gravel as specified in Section 02300, Earthwork, with a maximum size of 2″ sieve in lieu of the 3″ maximum size listed.
2. Double washed stone: Stone used as part of the stormwater detention system shall be ½″-2″ double washed stone. A sample is to be provided to the Engineer for approval prior to installation.

D. Castings:
1. All frames and covers shall be cast iron, heavy duty, conforming to ASTM A 48, Class 35 and shall be designed to safely withstand an AASHTO H-20 loading.
2. All frames and grates shall be of uniform quality, free from blow holes, shrinkage, distortion or other defects. They shall be smooth and well cleaned by shotblasting and fitted together in a satisfactory manner. Round frames and covers shall have a continuously machined bearing surface to prevent rocking and rattling.
3. All frames and covers shall conform to the Massachusetts Department of Public Works Specifications M 8.03.0 and be approved by the Town of Manchester-by-the-Sea and the Architect.
4. Castings shall have a shop-applied coal-tar-pitch varnish coating, thoroughly covering all metal.
5. Manhole frame and cover shall have a circular clear opening of 24 inches and a total frame and cover weight of at least 250 lbs. with the word "DRAIN" centered on the cover in 3" high letters.
6. Catch basin frame and grate shall have a square clear opening of 23.75 inches and a total frame and grate weight of at least 420 lbs. Grate openings shall be suited for bicycle type traffic.
   a. Catch basin frame at curb shall have 3 flanges. All other catch basin frames shall have 4 flanges.

E. Oil Interceptor Hood:
1. All proposed catch basins shall be constructed with an oil interceptor hood

F. PVC Pipe and Fittings (Non-Pressure):
1. Polyvinyl chloride (PVC) non-pressure pipe for gravity drainage shall conform to ASTM D 3034, SDR 35 minimum wall thickness or ASTM D 1785, Schedule 40 when specified on the Drawings.
2. Pipe shall be bell-and-spigot type, furnished in standard lengths of 12′-6".
3. Bell end shall be an integral wall section with solid cross section rubber ring, factory assembled.
4. Spigot end shall be beveled to ensure proper insertion. Spigot end shall be imprinted with an "assembly stripe", to which the bell end of the mated pipe will extend upon proper jointing of the two pipes.
5. Rubber rings shall conform to ASTM D 3212.

6. Pipe ends shall permit checking of the rings with a feeler gauge to ensure their proper location in the coupling grooves.
7. PVC fittings shall be bell-and-spigot type compatible with the pipe.
8. Perforations, when applicable, shall be 5/8" holes on 5 inch centers in two rows 120 degrees apart.
9. Cleanouts, outside the building, shall be threaded cleanouts compatible with the pipe. Cleanout shall be cast iron at grade or 4" below grade, as specified on the drawings.

G. High Density Polyethylene Pipe and Fittings:
1. High Density Polyethylene (HDPE) Pipe and fittings shall conform to AASHTO designations M294 and M252 and ASTM D3350. HDPE pipe shall be designated as AASHTO Type 'S' and shall have a full circular cross-ssection, with an outer corrugated pipe wall and an essentially smooth inner wall (waterway). The HDPE pipe shall be as manufactured by Advanced Drainage Systems N-12 IB WT (water-tight) pipe, or approved equal.
2. HDPE perforated pipe shall conform to AASHTO M294 and MP7-97 Class II perforations.

H. Backflow Preventer:
1. Back flow preventer shall be Series Tideflex TF-1 as manufactured by Red Valve Company.

I. Double Washed Stone:
1. Stone used as part of the stormwater detention system shall be ½"-2" double washed stone. A sample is to be provided to the Engineer for approval prior to installation.

J. Pea Gravel

1. Pea gravel shall clean, bank run gravel with stone sizes conforming to No. 6 stone as specified by ASTM D448. Not more than 0.5% of satisfactory material passing a No. 200 Sieve will be allowed to adhere to the stone

K. New Construction and/or renovation:

1. The proposed building & site development would most likely increase both the peak rate and total runoff from the site, as it is increasing the site's impervious area. Any new drainage system would need to comply with the DEP Stormwater Management Policy.
2. A Low Impact Development (LID) approach can be utilized to allow for the full development of the site while minimizing hydrological impact and maintaining the site's hydrological functions. The following are some stormwater management strategies utilizing the LID approach:
   a. Rain Gardens
   b. Bioretention areas
   c. Sediment forebays
   d. Constructed Stormwater Wetlands

**6. PARKING LAYOUT, SURFACING MATERIALS**

A. Parking spaces are to be designed with a minimum of 9-feet by 20-feet and be clearly painted

B. Required parking shall be either on the same premises as the activity it serves, or located within 300 feet of the building entrance on a separate parcel, not separated by a street having right-of-way width of 60 feet or more, and in a zoning district allowing the activity it serves

C. Parking lots containing (5) or more parking spaces shall have at least one (1) tree per five (5) parking spaces, such trees to be located either within the lot or within (5') feet of it. Such trees shall be at least two (2") inches trunk diameter, with not less than forty (40) square feet of unpaved soil or other permeable surface area per tree.

D. At least five (5%) percent of the interior of any parking lot having twenty (20) or more spaces shall be maintained with landscaping, including trees, in plots of at least four (4') feet in width.

E. Areas paved with bituminous concrete shall consist of 12" dense grade gravel overlaid by a 2-1/2 inch binder course and a 2 inch wearing course of bituminous.

F. Walkways shall be concrete.

G. Curbing to granite and/or concrete to be provided along pavement edge of driveways, parking lots, and loading areas.

H. ADA and MAAB Compliance: Special attention is to be given to compliance with the Americans with Disabilities Act (ADA) and the requirements of the Massachusetts Architectural Access Board (MAAB).

1. Slopes: All Walkways (as defined by Section 22.1 of 521 CMR) shall be graded to a maximum 4.8%. The cross pitch (perpendicular to travel) for all walkways and paths shall be constructed at 1.5%. The slope of all ramps and side slopes of handicap curb cuts as defined by Section 21.1 of 521 CMR shall be constructed at 8.3% maximum. Ramps (as defined in section 24.1 of 521 CMR) shall be constructed to a maximum slope of 8.3%. Accessible Parking Spaces and loading zones (as defined by Section 23.0 of 521 CMR) shall be level with a surface slope not exceeding 1.9% in all directions.
2. The Contractor is to assume that all grades in pedestrian paths of travel shall be verified/checked with a 2-foot electronic "Smart Level".

## COST ESTIMATES

Below is the Summary of Preliminary Design Pricing for the Final Evaluation of Options. The data provided in Table 1 is based on the designer's cost estimator V.J. Associates' Feasibility study cost estimate. The OPM provided an independent cost estimate through their professional cost estimator, PM&C and the two cost estimates were reconciled. Uniformat Level 2 data for both cost estimates is included in the Appendix.

**Table 1 - Summary of Preliminary Design Pricing**

| Option (Description) | Total Gross Square Feet | Square Feet of Renovated Space (cost*/sf) | Square Feet of New Construction (cost*/sf) | Site, Building Takedown, Haz Mat. Cost * | Estimated Total Construction** (cost*/sf) | Estimated Total Project Costs |
|---|---|---|---|---|---|---|
| Option R-1 (Code Upgrade Repair) | 66,573 sf | 66,573 sf<br>$356.69 /sf | 0 sf<br>$0.00 /sf | $2,982,700 | $26,728,455<br>$401.49 /sf | $35,770,000 |
| Option AR-2 (Addition/Renovation) | 91,100 sf | 21,200 sf<br>$356.69 /sf | 69,900 sf<br>$465.97 /sf | $3,701,884 | $43,836,918<br>$481.20 /sf | $55,760,000 |
| Option N-1 (New) | 88,900 sf | 0 sf<br>$0.00 /sf | 88,900 sf<br>$454.32 /sf | $4,494,261 | $44,883,333<br>$504.87 /sf | $57,000,000 |
| **Option N-3 (New) *** ** | **82,800 sf** | **0 sf<br>$0.00 /sf** | **82,800 sf<br>$484.17 /sf** | **$4,416,120** | **$44,505,251<br>$537.50 /sf** | **$55,560,000** |
| Option N-9 (New) | 87,700 sf | 0 sf<br>$0.00 /sf | 87,700 sf<br>$511.98 /sf | $4,406,219 | $49,306,956<br>$562.22 /sf | $62,610,000 |

** Marked up Construction Costs*
*** Does not include Construction Contingency*
**** District's Preferred Solution*

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# PREFERRED SOLUTION

SECTION 3.3.4

4

### 3.3.4 – PREFERRED SOLUTION

- Executive Summary
- Educational Program
- Preferred Solution Space Summary
- Space Summary Variations
- Sustainability Scorecard
- Sustainability Goals Letter
- Conceptual Floor and Site Plans
- Estimate of Total Project Budget / Construction Cost
- Proposed Project Design and Construction Schedule

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## 3.3.4 – EXECUTIVE SUMMARY

At their February 1, 2018 meeting, the Manchester Memorial School Building Committee voted to pursue Option N-3, a new school building on the current Memorial School site after considering nine new school options which occupied various areas of the site and multiple building layout configurations. This vote was followed up by a vote of the Manchester-Essex Regional School Committee on February 13, 2018 to also approve Option N-3 and to authorize the Designer and OPM to submit the Preferred Schematic Report to the MSBA.

Option N-3 is a grade Pre-K thru 5 (335 students) Option as a phased, new building located on the existing Memorial School site. This Option assumes that the new school would be a two story, 82,200sf building with a footprint of approximately 56,900sf (remainder of the square footage would be second floor classroom space). This option would allow for additional vehicular circulation and parking on site while maintaining the existing traffic patterns. Pedestrian access to the building would be enhanced and new play areas and outdoor learning environments would be created.

This Option requires the District to acquire approximately six (6) modular classrooms to accommodate students which would be displaced by the demolition of a portion of one classroom wing while the remaining Memorial students would remain in the existing school for the duration of the first phase of construction. Once the new, two story classroom wing is complete, all students would move into the new space while the new core spaces and site improvements are constructed.

The Preferred Solution supports the goals identified in the Visioning Sessions and the Educational Program. In working with the District through numerous educational visioning workshops and design reviews, this building plan was developed to address all of the identified goals of the project. The important issues included six Guiding Principles – they are:

1. Classic, Not Trendy
2. Whole Child Focus
3. Neighborhood School
4. Cooperative & Collaborative
5. Outdoor Space & Sustainability
6. Flexible and Adaptable

These Guiding principles have been incorporated into the Preferred Solution and embody and reinforce the Priority Design patterns that were discussed at the various workshops. Retaining the existing site for the new school maintains the neighborhood school concept and the ability to provide separated access to the Community oriented spaces allows clear, controlled access for the public. The variety of spaces and the distribution of the various room types support the idea of collaborative learning environments from the standpoints of students and staff. This organizational framework has been

structured to build upon in the subsequent upcoming phases and as the Town considers the Preferred Solution further, the Design Team will clearly look to continue to incorporate all of the Guiding Principles as details within the building design.

A criteria matrix which outlines the design criteria evaluated and the associated ratings for each of the concepts is included in the Appendix. In summary, the Committee's consensus was that Option N-3 best met the project criteria and best supported the educational vision outlined in the District's overall plan for its schools.

## UPDATED EDUCATIONAL PROGRAM

After receiving comments from the MSBA on the Preliminary Design Program, responses were submitted and the Educational Program was updated to reflect the adjustments that were made.

The Updated Educational Program (dated February 21, 2018) is included on the following pages.

# Manchester Essex Memorial School Education Program

*Educating all students, instilling a passion for life-long learning, and encouraging both local and global citizenship!*



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**Introduction**

The Manchester Essex Regional School District is consistently and proudly among the highest-performing districts in the state. MERSD is an inclusive school district; as such, we are a collaborative culture that welcomes all members into our learning community. Recognizing that students share more similarities than differences, our learning community respects each individual's unique contributions. It is expected that all adults share the responsibility for providing every student with access to and participation in high quality education.

MERSD proudly works to educate each child from his/her own readiness level in order to facilitate the intellectual, social and emotional growth process. There are many measures of success, and we are committed to helping each individual child achieve his/her potential. In addition to a robust core curriculum that balances high expectations for student achievement with the needs of the whole child, we offer specialty programming and a variety of twenty-first century learning opportunities, such as: elementary foreign language; Integrated Pre-Kindergarten; specialized learning programs for students with dyslexia, autism spectrum disorders, and developmental delays; STEM coursework in coding, engineering, project based environmental studies, FIRST Robotics, Project Adventure; award winning arts and music programs; and, state champion athletic teams.

In collaboration with David Stephen from New Vista Design, MERSD engaged in a two-day Educational Visioning workshop. Through this process, thirty teachers, parents and administrators gathered to learn reflect on or current practice and challenge our assumptions about how education could look in the future. Through a series of collaborative exercises we uncovered common themes that will serve as guiding principles for our design team JCJ Architecture. These design principles support our district and school core values and established instructional methodologies that are grounded in active student centered learning. It is our hope that the design process will yield an educational facility that is timeless in style but flexible and adaptable to the ever evolving curriculum and instruction program.

## MERSD Curriculum Delivery Methods and Practice

The Manchester Memorial Elementary School employs a broad- range of teaching methodologies that strive to balance the best of progressive methodology with tried and true approaches. Our curriculum and instructional program are designed to support our District mission, vision and core values.

***MERSD, in partnership with its communities, will provide 21st Century educational opportunities and resources so that all students can achieve academic excellence, realize their highest potential, and succeed as responsible citizens in a global society.***

| |
|---|
| **Whole Child**<br>We believe schools must establish a safe environment conducive to the development of the whole child, which extends beyond the academic core to include experiential learning, the arts, cultural awareness, and physical and emotional well-being. |
| **Student Achievement**<br>We believe that challenging academic standards and differentiated instruction encourage all students to excel and become confident, engaged learners who achieve their potential at different rates and on different paths. |
| **Climate**<br>We believe our schools must create an environment of respect and appreciation for individual and cultural differences and instill a passion for responsible social action, both locally and globally. |
| **Community Partnerships**<br>We believe that providing a quality education for our children is a shared responsibility, fostered by partnerships among the schools, families, businesses and the community at-large. |
| **Resources**<br>We believe our district should provide appropriate resources in order for students to achieve our stated vision and mission. |

To that end, we provide a rigorous core curriculum that is grounded in a rich program of experiential and exploratory learning experience, designed to utilize an interdisciplinary approach, and to create connections between learning and the real world. It is our intent that through this process we can create deeper more meaningful learning as well as expose students to a broad range of experiences that may help them to identify areas of interest or strength and form the foundations for the development of individual pathways to success.

Overall, MERSD elementary level curriculum and instruction is delivered through heterogeneously grouped inclusive classrooms in which elementary classroom teacher responsible for the delivery of all core content instruction. All classroom lessons are differentiated based on formative assessment data and whole group, small group, and individual work is integrated into all lessons with an increasing number of lessons relying on anywhere, anytime access to technology. In addition to general differentiated instruction, students receive a variety of support services that are provided through inclusion and push-in services whenever possible.

## Organization of Learning at Memorial School

**School Scheduling Method**

MERSD adheres the philosophy that small class size supports our goal of student centered, hands-on differentiated instruction. As such, the MERSD School Committee has established class size benchmarks that serve as the first building block of the scheduling process.

| Grade | Class Size Benchmark |
|---|---|
| K | 17-19 |
| 1 | 17-19 |
| 2 | 18-20 |
| 3 | 18-20 |
| 4 | 19-22 |
| 5 | 19-22 |

Students and teachers are clustered into grade-level cohorts. This is a challenge with our current school building as the number of grade level sections is fluid and ever changing. We have had grade levels of 2, 3, and 4 sections in the past. The bubble classes travel through the grades year after year necessitating the need for some sort of flexible classroom and classroom neighborhood design.

**Sample Grade 5 Student Schedule**

| | Monday | Tuesday | Wednesday | Thursday | Friday |
|---|---|---|---|---|---|
| 8:25-8:45 | Morning Meeting | | | | |
| 8:45-9:30 | Writing Workshop | Writing Workshop | Writing Workshop | Math | Writing Workshop |
| 9:30-10:15 | Math | Math | Math | Math | Math |
| 10:15-11:00 | | | Foreign Language | Library | |
| 11:00-11:45 | Music | Art | P.E. | Technology | Reading Workshop |
| 11:45-12:30 | Reading Workshop | Reading Workshop | Reading Workshop | Reading Workshop | Reading Workshop |
| 12:30-1:15 | Lunch/Recess | | | | |
| 1:15-2:200 | Reading Workshop | Reading Workshop | Reading Workshop | Reading Workshop | Reading Workshop |
| 2:00-2:45 | Science/Social Studies | Science/Social Studies | Science/Social Studies | Science/Social Studies | Science/Social Studies |

Manchester Memorial Elementary School (MMES) is currently structured in a 5-day schedule. The week has (8) forty minute class blocks of 45 minutes each. Each class in grades K-5 has the following specialist classes scheduled each week:

| Class | Meeting Frequency | Current Location |
|---|---|---|
| Wellness | Twice Weekly | Gym |
| Visual Arts | Once Weekly | Art Room |
| Music | Once Weekly | Music Room |
| Foreign Language | Once Weekly | Foreign Language Classroom |
| Library/Research | Once Weekly | Library |
| Technology/Engineering | Once Weekly | Tech Lab |
| Instrumental Music Lessons | Individual | Music Room / Stage |

These time blocks are set at the beginning of the scheduling process so that the rest of the schedule can be worked around them. The specialist classes are scheduled across the grade level when possible to maximize common planning time. These blocks are strategically placed so that Response to Intervention (RtI) blocks can be set along with lunch and recess to ensure that teachers have large blocks of time for instruction. Once the specialists lunch/recess, and RtI blocks are established, classroom teachers schedule their subjects around the blocks that are already booked. The PK-5 classrooms are all self-contained so that classroom teachers have the flexibility to extend or shorten a lesson based on the needs of the students.

**Core Values**

Character education is an important component of the PBIS model at MMES. Students are provided with direct character instruction at school-wide meetings where they learn from staff and peers what each of our core values looks like in different aspects of the school. Our core values are:

| | |
|---|---|
| H | Honesty |
| E | Effort |
| A | Acceptance |
| R | Respect/Responsibility |
| T | Thoughtfulness |

Due to the nature of our regularly scheduled school-wide meetings, a large gathering space for 450 people is needed. In that space, a large projector and sound system is needed. This currently takes place in the gym. Throughout the building, display boards (digital preferred) are needed to post reminders to our students of our core values. By making learning both visible and connected, we believe that the building will help to promote discovery, exploration and joy in learning.



## Academic Program Description & Space Needs Considerations

The program title may change over time, our educational philosophy and methodology will require that future program considerations will also be based on differentiated, hands-on, and experiential learning strategies that require space for movement, demonstration, and small group work. We have provided summaries of each of the core content and program areas, and grade level curriculum guides can be found in Appendix A. Through the Education Visioning process we identified the following principles that guide our practice and align with our District Core Values as well as our District and School Improvement Plans. (See Appendix B)

**Whole Child Focus**
**Hands-on and Experiential**
**Flexible and Adaptable**
**Cooperative and Collaborative**
**Sustainable**
**Community School**

**Core Academic Program**

- **English Language Arts/Literacy:** MMES implements a Standards-based Balanced Literacy approach rooted in evidence-based strategies and techniques. This includes strong multisensory decoding instruction phonics instruction (Open Court), guided reading, and written language instruction. *Currently the District uses Open Court Resources phonics and Write Steps as our writing program K-5. Both these resources are outdated and currently under review. In the Spring of 2019, MERSD will be adopting new materials to support our elementary Balanced Literacy program. Changes in resource materials will not impact program pedagogy and delivery methods.* Guided reading groups, silent reading, and book talks allow students to think critically and share their ideas about text. Students read fiction, nonfiction and poetry to refine decoding skills, increase fluency, and further develop comprehension and vocabulary. Through class discussions, written work, and project-based learning, students develop an appreciation and understanding of a variety of genres. Writing is an integral component of our program as students write in all curriculum areas. The Writer's Workshop process employs both large and small group instruction and promotes conferencing and sharing of feedback.

  This approach requires instructional technology and a large teaching space for whole group instruction along with spaces for multiple small breakout groups. Classrooms utilize an externally located "leveled library" along with smaller classroom libraries. For more readily accessible leveled books, it is proposed to have 3 small "leveled libraries" located in the vicinity of the grades that utilize them (K/1, 2/3, 4/5).

- **Mathematics**
  MMES implements Everyday Mathematics which supports hands-on inquiry based mathematics instruction. It is our goal for students to become confident problem-solvers who value and enjoy

math. The program uses a variety of manipulatives to support conceptual understanding and development of math practices.

Implementation requires instructional technology and a large teaching space for whole group instruction along with spaces for multiple small breakout groups. Sufficient storage space is needed for the manipulatives along with instructional technology tools.

- **Science**
  Science curriculum is delivered using the Know Atom program. The Know Atom Program is engineered to connect students to the many areas that science reaches through a hands-on experiential approach. Students relate concepts through Scientific Inquiry by generating data in experiments and testing prototypes built using Engineering Design. This includes a great number of materials and hands-on experiences, including projects that students develop and add to over time.

  This instruction requires instructional technology and a large teaching space for whole group instruction along with spaces for multiple small breakout groups. Sufficient storage space is needed for the curricular materials and on-going student projects.

  As part of the science program, MERSD is committed to environmental awareness and sustainability. To that end we have instituted a K-12 learning strand dedicated to instruction and promotion of environmental education. Our program begins with hands-on experiential learning at the elementary level and culminates in a project based high school pathway that leads to "green" diploma recognition. Through our outdoor vegetable gardens, greenhouse, and an outdoor classroom, the MMES learning community engages in collaborative hands-on activities, such as spring planting and the fall farmer's market, that are designed to promote environmental awareness. Additionally, our school's Zen garden and Friendship garden promote an appreciation of nature and the environment, support our social emotional goals, and provide opportunity for outdoor lessons. In all, we have four outdoor learning spaces including the greenhouse.

  In the design of renovated or new building, MERSD plans to extend its successful technology and engineering program from the middle-high school down to the elementary school. We anticipate being able to engage all elementary students in creative problem solving through engineering design and the application of science and math to technical challenges. Student projects ranging from a few weeks to a month or more with a variety of complexity are invaluable to supporting student inquiry and application. Having materials at hand and a variety of technologies to invent with ensures that the district has a vertically-aligned approach to its technology and engineering program.

  STEM laboratory space(s) with large workstations, appropriate worktables, safety equipment, and ample storage is needed to continue to expand this program to elementary students and more advanced projects. *The intention is for the space to be used a team flex space for STEAM related instruction, Maker exploration, and project work. Team leaders will create a weekly use*

*and duty schedules and ensure that the supplies and materials within are maintained. Additionally this space will be used for small group presentation/demonstration if enrichment programs.*

- **Social Studies**
  The goal of the social studies program is to prepare students to become civic-minded responsible citizens of society by helping them to understand and appreciate the diversity and commonality of people. Project-based learning experiences that are developmentally-appropriate, meaningful, and of interest to students help to develop a deeper appreciation of the complexities of cultures and societies.

  This approach requires instructional technology and a large teaching space for whole group instruction along with spaces for multiple small breakout groups.

**Additional General Space Needs Considerations for Core Academic Program**

- Ample and flexible space to support differentiated instruction, whole group, small group, and individual instruction.
- Shared space between classrooms in grade level clusters for large group gatherings and presentations.
- Flexible furniture options - ease of movement and reconfiguration.
- Technology infrastructure to support anytime anywhere technology use.
- Doors between classrooms to facilitate grade level collaboration and teaming.
- Adequate storage for classroom and project materials.
- Sinks in each classroom to support active and project-based learning. *One large sink is needed in each general- and special-education classroom for cleanup of projects. Younger grades (PK-1) need large, deep sinks that are at student height or equipped with steps so that students can access them. The art classroom needs multiple, large and deep sinks at young students' height (or steps to access) in multiple locations in the room (perhaps 2-3 sink stations).*
- Adjacent breakout spaces to support small group work and enrichment.
- Opportunities to extend learning beyond classroom walls and maximize use of adjacent hallway and breakout spaces.
- Classroom amplification systems (currently in use all classrooms).
- Access to adjacent outdoor learning opportunities when possible.
- Connectivity to adjacent classroom neighborhoods/hubs with shared resources such as a learning commons, breakout rooms, branch libraries, Special Education classrooms, and bathrooms.

**Exploratory & Experiential Learning**

1. **Enrichment**
   Math Enrichment – Our math explorers program is designed to help students realize their mathematical potential through real-world problem solving and collaboration. Math projects range from a few weeks to a month or more depending on the complexity.

   Academic Extensions – Through a collaborative relationship with the Memorial PTO, MMES students are exposed to wide variety of in school field trips and enrichment activities designed to provide hands-on high interest curriculum extensions. These activities range from medium (grade level - sixty students) to large groupings (whole school – three hundred fifty students). Currently these activities are held in the auditorium or gymnasium depending on size and nature of the program.

   Aquarium Program **-** MMES has a large salt-water (live reef) aquarium in the main lobby to greet guests as they enter the building. This aquarium has become the heart of the school and is utilized often throughout the year by students and teachers. For example, our art teacher does lessons where the students draw or paint aspects of the aquarium. Additionally, we have had after-school workshops for students interested in learning about this type of specialized eco-system. Often times, our special education staff and counseling access this resource to help students calm down when upset, anxious, or nervous. *The saltwater aquarium is a focal point for the building and also brings the "sea life" themed murals throughout the hallways to life. The murals were painted by a local artist to visually tie in our core values with sea life to reflect our Manchester-by-the-Sea roots. Staff has used the aquarium for art projects, creative writing projects, and science enrichment lessons throughout the years. Our student services staff also uses it on a daily basis for movement breaks and to help anxious students relax. We plan to continue to use it as a focal point, relaxation tool, art/writing subject, and science enrichment tool in coming years.*

2. **Performing Arts Program**
   General Music, Instrumental Music, Drama, and Chorus are all offerings that our students engage in throughout the school year. Students receive 45 minutes of instruction in general music weekly and instrumental lessons are provided in a pull-out model throughout the day along with before/after-school band, chorus, and musical practices. The goal of the music program is to prepare children to become musical in three ways: "Tuneful, Beatful, and Artful." Our students experience music through singing, listening, playing instruments, dancing, moving, responding, improvising, communicating, reading, and performing at levels which are age and grade appropriate. Our music education program is rooted in Dr. Howard Gardner's theory of Multiple Intelligences which provides many pathways to learning.

A general music classroom is required along with a large performance area and small group rehearsal room.

**3. Physical Education Program**

In keeping with our efforts to address the needs of the whole child, physical education is delivered in a wellness model. Wellness encompasses physical education and health concepts. Students participate in Wellness twice weekly, and the curriculum is designed to promote life-long, healthy habits including exercise, nutrition, and self-care. To meet the needs of a variety of learners, the curriculum focuses on personal skill development in terms of refining fundamental movement patterns associated with a variety of small games, modified sports, dance and rhythm, and gymnastics. As such, a gymnasium equipped with basic classroom features (i.e. interactive board, sound amplification system, etc.) is required. The gym should have divider (sound-proof wall) that subdivides it into two teaching stations. *Currently our adaptive PE program is housed at the Essex Elementary School to support our SWING (Students with Intensive Integrated Needs) program. We do not anticipate moving this program to the Memorial Elementary School.*

As part of the Physical Education program, students also participate in Project Adventure. Project Adventure is a K-12 hands-on experiential curriculum that promotes key social emotional skills: cooperation, trust, communication, conflict resolution, teamwork, safety, respect, caring and consideration, self-esteem, leadership, creativity, risk-taking, goal setting, and the ability to "think out of the box". Project Adventure is a key component of the District's Health & Wellness program and social emotional curriculum; however, MMES has been limited in its ability to implement programing due to the constraints of the site and physical plant. It is our goal to fully implement Project Adventure into the Memorial School curriculum. This will require low/medium/high Project Adventure elements in the gymnasium and outdoors.

**4. Play**

MMES is committed to play as component of the overall educational program. Through our commitment to balancing whole child needs and strong achievement, we are engaged in a variety of activities to promote the social emotional health of or students.

> *Recess promotes social and emotional learning and development for children by offering them a time to engage in peer interactions in which they practice and role play essential social skills. This type of activity, under adult supervision, extends teaching in the classroom to augment the school's social climate. Through play at recess, children learn valuable communication skills, including negotiation, cooperation, sharing, and problem solving as well as coping skills, such as perseverance and self-control. These skills become fundamental, lifelong personal tools. Recess offers a child a necessary, socially structured means for managing stress. By adapting and adjusting to the complex school environment, children augment and extend their cognitive development in the classroom. (American Academy of Pediatrics).*

MMES offers students multiple periods for recess throughout the day. There is a 15 minute recess before school along with a recess period at lunchtime. Most grades also have an additional recess at some point throughout the day. We currently have 2 age-appropriate playgrounds and a turf field for recess/PE. There is a large blacktop area that can be plowed so

that students can go outdoors for recess on snowy days. These are important aspects of our current building that we would like to have in the new building.

Differentiated play structures are needed so that younger students and older students have an age-appropriate area/structure to play. Additionally, an area that can be plowed should be available so that recess can take place during the snowy months along with an area that is covered so that students can play outdoors on rainy days. Often times, the weather is too stormy or cold to go outdoors, so a large, indoor area to hold inside recess on those days is necessary.

**5. Literacy, Technology, Engineering & Computer Science**

MMES strives to provide foundational digital information literacy skills that will allow students to easily adapt to an ever-changing world. Currently, MMES provides integrated Technology/Engineering and Library programs. The curriculum provides students with hands-on experience with multiple technology platforms and tools while at the same time instilling a love of reading and appreciation of traditional print media found in traditional library programs. Introductory coding and other engineering concepts are explored in this program. Utilizing 21st century skills to promote learning via information and technology, the goal of our program is to help our students become critical thinkers, effective problem solvers and creative collaborators.

Going forward, the MMES Library, Technology, and Engineering Program will be designed to support the school community's academic and personal educational needs and interests. Building off of our current model, collaboration across all disciplines and full integration of technology is assumed as an integral part of our 21st Century Skills model. The Library, Technology, and Engineering Center will serve as a learner-laboratory that supports, extends and differentiates MMES curriculum (K-5) with the district-wide goal of developing future-ready graduates. With the implementation of a school-wide 1:1 anywhere, any time (not sure what this means ) learning model, the Library, Technology, and Engineering Center will serve as the information hub and community gathering space, and project center in our school.

*We currently have a dedicated 1.0 School Librarian that is charged with oversight of the learning commons/library. Additionally we have a 1.0 Technology Integration Specialist charged with oversight of the technology lab. While the two programs are scheduled separately, there are a number of interdisciplinary projects that the two staff members collaborate on together so proximity is important. It is important that the technology center and learning commons are a shared space with defined but fluid work areas.*

*We also envision this space to be a community gathering area that can serve medium to large groups of students and adults. It is requested that the space is flexible enough to feel spacious enough for community gatherings and presentations but yet warm and welcoming to smaller group activities.*

**Space Needs Considerations for Learning Commons**

6. Flex Technology/Library space for creative projects and interdisciplinary workspace that encompasses separate Library and Technology classrooms connected by a Lib-Tech Collaborative space for inter-disciplinary projects.
7. Moveable/flexible technology devices for students and teachers to promote collaborative work and enhance learning across the school building and within the classroom.
8. Moveable furniture
9. Theater staging/amphitheater for teacher presentations/reader's corner
10. Interchangeable tables on wheels to accommodate multiple class sizes
11. Quiet reading spaces/furniture available during lessons for unscheduled library patrons
12. Moveable whiteboard walls for student displays/lessons
13. Digital bulletin boards to display student work

**14. Visual Arts Program**

A variety of mediums are explored in this program including pottery (kiln), paint, ink, clay, recycled art, etc. Students also study influential artists and art history in this program. The majority of the work that students engage in is hands-on exploratory work that promotes creative thinking.

It is important to provide multiple venues for the display and exhibition of student art work throughout the building. Additionally, providing some transparency and views into art rooms and project areas where students and teachers are engaging in active and creative learning, will help to promote MERSD's Core Values of educating the whole child.

Due to the nature of the variety of materials used, adequate and flexible storage is required. Large, durable workspaces and ample, flexible storage is needed. Multiple, large sink areas that can handle the disposal of paint, clay, etc. are also needed. Typical classroom technologies including a kiln and a camera-fed demonstration area are required for the program as designed currently.

- **World Languages**

The World Language program provides an opportunity for students to acquire proficiency in Spanish and in French as well as to explore the cultures where those languages are spoken. The program strives to develop student proficiency in the four skills of reading, writing, listening and speaking in the target language with special emphasis on communication.

This program is delivered by integrating role playing, technology, and projects. This requires instructional technology and a large teaching space for whole group instruction along with spaces for multiple small breakout groups. *The District is not requesting a language lab set-up and does not foresee associated technology support. Currently the District provides exploratory foreign language instruction for elementary students and would like to provide dedicated classroom space for the program. Should financial resources be available in the future the program would be expanded to be provide more intensive instructions.*

**15. Special Education – Inclusion**

The special education program at Memorial serves students with a range of needs the majority of whom qualify as moderate special needs students and access a combination of inclusion and pull out services. The moderate special needs program includes inclusion supports for students as well as separate instruction individually and in small groups (up to 8 students) for reading, written language, and math. Currently, moderate special education teachers and the speech and language pathologist share a classroom with dividers. There is one small room for separate instruction in a quieter space.

As of 2017-2018, the moderate needs staff will comprise two special education teachers, two tutors, and one teaching assistant. Separate spaces are needed for the teachers and tutors to deliver instruction in quiet locations. At least two of these spaces will need to accommodate up to 8 students, a teacher desk, and technology. The remaining two spaces will be staffed by a teacher or tutor with up to 4 students. Each of these spaces should be located near classrooms neighborhoods. *Upper grades (3-5) will likely continue to require space for small group math and/or writing. These spaces would need to provide seating and desks/tables for up to 6 students. There is a possibility that sessions will run concurrently. As a result, 2 of these spaces are needed. These can double as liaison offices/work spaces/small group instruction for other services. Each room should be large enough for a liaison and a teaching assistant to work with students.*

**16. Special Education - Specialized Programs**

*The following specialized classes need classroom space: SAIL (2 half size classrooms, small additional sensory room); IRWL (2 full size classrooms with ability to section off reading tutorial space for 2 teachers and 2 students); Preschool (at least 2 classrooms)*

*Of these programs, IRWL is fully self-contained. SAIL students access a combination of inclusion, small group instruction, and tutorials. There is at least one staff member in the classroom working with a student or students throughout the day.*

- **IRWL:** The Intensive Reading and Written Language (IRWL) program for students with dyslexia will expand to two cohorts next year, a grade 3 group and a grade 4/5 group. Cohorts comprise 6-8 students with two teachers. The program currently has a dedicated

classroom with a teacher, reading specialist, and tutor for the 4/5 program. Individual reading tutorials are delivered within the program and there are typically up to four divided spaces within a larger classroom. Longer term, the program plans to expand to include a grade 2/3 cohort.

In looking ahead for the IRWL program, there is a need for dedicated 2/3 and 4/5 classroom spaces with flexibility for division into smaller cohorts as well as 2 dedicated quiet spaces per classroom for individual reading tutorials. These IRWL rooms utilize technology routinely, including multiple active boards for use when the cohort is divided into small groups. Ideally, these rooms will be located in close proximity to each other and well as their grade level classroom neighborhoods.

- **SAIL** The Social and Academic Integrated Learning program provides inclusion support, wraparound services, and individual and small group instruction for students with autism spectrum disorders and social emotional disabilities. SAIL serves students in grades K-5. The current location is in the grade 1 and 2 wing. Since students spend substantial time in the inclusion setting, one room is shared by all students in the program. Students in the SAIL program present with sensory and behavioral needs. There is currently no space nearby to take a sensory break or utilize de-escalation strategies.

  In planning for the SAIL program, two classrooms are recommended in order to split the cohort in compliance with DESE guidelines (48 month age range limit per educational grouping) and locate student cohorts closer to their grade level classroom neighborhoods. These rooms need space for small group and individual instruction. In addition, each SAIL classroom needs an additional smaller room as a sensory break and de-escalation space for students.

  In addition to the aforementioned needs, the Memorial School has historically served students with hearing impairments and requires ongoing use of sound panels in targeted classrooms as well as school-wide use of amplification devices. These needs are currently being addressed and the new building must continue to support students in this manner. The building currently has stairs that cannot be navigated by students with mobility challenges and this issue must be addressed in the building project.

**Kindergarten & Pre-Kindergarten**

- **Kindergarten**

The MMES Kindergarten program is a full-day, non-tuition program. Space for cooperative learning is required along with a great deal of storage space for materials. Kindergarten classrooms currently have their own child-sized bathrooms and it is requested that this be included in the new building. Due to the nature of the work in this program, ample flexible storage is required along with an area for creative free play. Students need an area to gather for instruction (i.e. small amphitheater in the room) along with multiple breakout areas.

- **Pre-Kindergarten**

The MERSD currently offers a district-wide integrated preschool program housed at Memorial School in Manchester. The preschool typically serves a total of 20-30 students through a two day program for three year olds and a three day program for four year olds. The student cohort comprises tuition paying peer pals and students with disabilities. The program runs from 8:30am-12:30pm e to space constraints, the current program is limited in size. It is part of the district's vision to provide greater access to Pre-School by expanding the program to all residents with young children ages 3-4. An assessment of demographic data, leads us to conclude that we should anticipate enrollment to average between 45 to 65 students.

The preschool curriculum is delivered in whole group and center based learning (6 centers), including play centers with a mid-room divider, a low sink designed for children's access, lunch/snack area, cubbies for student clothing and lunchboxes, and an outdoor playground. The current location has abundant natural lighting. The preschool is outfitted with sound panels and an amplification system for students with hearing impairments. There is a student bathroom with low toilets and room for portable potty seats. A storage space with a window is used for multiple purposes, including small group and individual speech and language therapy. This space is alternately used for changing students who wear diapers.

Students in the preschool receive speech and language, occupational therapy, and physical therapy services. These services are delivered in whole class, small group, and individual sessions. For other individual therapies, students receive services in a separate space within the room or transition to another location.

In the near future, the preschool hours will expand to full day in an effort to better serve the needs of working parents. The addition of day care during after school hours is under consideration. Creation of four preschool classroom spaces will allow for further expansion of enrollment. Within each space, there will need to be space for six small group centers, circle time, meals, therapy groups, and a diaper changing area, a bathroom, and classroom sink use. Space for individual therapies is needed unless these rooms are in close proximity to the preschool within the new building. The classroom requires a tiled area for meals/snacks and art projects. Play and circle time areas must be carpeted. One of the six center spaces will be designated as a quiet area for reading. A large storage closet and ample shelving in the classroom are critical for reducing visual clutter and maintaining classroom supplies. Access to a separate, quiet room for sensory needs and/or de-escalation is recommended.

The use of sound panels, amplification system, and carpeting will need to continue in the new space to accommodate hearing impaired children. Wheelchair access and ramps between the preschool and other locations within the elementary school are necessary to address ADA compliance. Playground equipment must be handicapped accessible. *Occupational and physical therapy requires a space that can house specialized equipment such as swings, mats, a work table, and a trampoline. The space can be shared by the two providers, who each will need room for a desk.*

*We will need three small tutorial spaces for reading tutors and speech and language, who see students throughout the day. These services are not anticipated to change to push in.*

## Organization of the School

**Administrative**
The school is led by a single administrator (Principal) and is supported by 2 secretaries, a school psychologist, a special education team chairperson, a school adjustment counselor, and a school nurse. These staff members work very closely together and would benefit from being a part of an administrative suite or close proximity. There are no proposed changes to this structure as it is an effective model.

Students and teachers are clustered into grade-level cohorts. This is a challenge with our current school building as the number of grade level sections is fluid and ever changing. We have had grade levels of 2, 3, and 4 sections in the past. The bubble classes travel through the grades year after year necessitating the need for some sort of flexible classroom and classroom neighborhood design.

**Counseling & Support Services**
MMES provides support to students in the form of school psychology and school adjustment counselor support. These two critical staff members should have an office area that is integrated into the main office suite with the nurse. The spaces should be large enough for the staff to work with a group of 6-8 students.

**Health Services**
The overarching framework for any school health program is illustrated in the MA DPH School Health Manual and provides the roadmap for districts to follow in meeting its obligations to provide health education and services to its students; as with all roadmaps, there are different paths available to achieve objectives. The goal of health Services is to provide to appraise, protect, and promote student health, facilitate attendance, ensure access and referral to community primary care providers and other youth-serving agencies, foster use of primary care services, prevent and control disease and other health problems, and provide emergency care and educational and counseling opportunities. Both semi-private and private areas are needed for this service area. The health suite should be equipped with modern tools needed to meet state mandates (eye/ear testing) and respond to a wide range of daily health and injury needs. This office area should be integrated in to the main office suite with access to administration and the general school population.

**Teacher Planning**
"The most promising strategy for sustained, substantive school improvement is developing the ability of school personnel to function as professional learning communities." (DuFour) To that end, MERSD engages in a teacher-centered process for continual improvement. To achieve this have dedicate time and resources to provide opportunities for professionals to collaborate and plan together as means of promoting data analysis, best practices and innovation in teaching and learning. Teachers at each grade level and department have common planning time 5 days a week and extended Wednesdays provide additional time for training, collaboration and curriculum development. MMES would benefit from adult friendly common workspaces for planning, grade level meetings, professional development, and full staff meetings/gatherings. *Our master schedule is built to maximize common planning time among classroom teachers. Specialist classes provide prep time for our classroom teachers so we do our best to schedule an entire grade's specialists at the same time for common planning purposes. We have after-*

*school common planning time (collaboration) once a month where classroom teachers, specialists, and special education staff can collaborate on grade-specific topics.*

**Lunch Programs**
MMES has a cafeteria where 6 lunch periods take place (roughly 22 minutes each). It is a full kitchen that implements scratch cooking along with warming/premade/prepackaged items.

Increased scratch cooking and farm to table options are proposed. We currently have 11 vegetable garden beds and the food grown by students is integrated into the menu. *We plan to continue to have one grade eat lunch at a time in the cafeteria and then go out to recess (or vice versa). Grade level pairings (one goes to recess and one has lunch…then switch) change each year based on the master schedule. Since they are not having lunch together nor at recess together, the pairings can be flexible from year to year.*

**Transportation Policies**
MMES has 2 school buses, which service roughly 100+ students. The rest of the students walk, bike, or are picked up by car. It is imperative that the new design take traffic logistics into account as the number of cars at drop off and pick up is quite high. Currently, the carline backs up onto the street causing safety issues.

There is a footbridge that crosses the main road (Lincoln St.) to connect our campus to the MS/HS campus. It has been closed for some time and could potentially be taken into consideration in this project.

For dismissal procedures, it would be helpful if the gymnasium or cafeteria was located near the parent pickup area for cars.

**Security and Visual Access Requirements**
It is highly preferred to have one central entrance/exit for staff and students to enter the building. One large parking lot adjacent to the main entrance is preferred. Currently we do not have enough parking for all of our staff and only 4 visitor spaces.

The entrance should be equipped with a two-stage entrance where folks can enter a vestibule to be buzzed into the office before entering the main building. There should be an adjacent receptionist desk to check guests in efficiently and in a welcoming manner. The grounds and building should be outfitted with a reliable video monitoring system that can be accessed remotely from a smart phone, tablet, or computer.

**Community Resource**
MMES is a valued community resource. In addition to housing the MERSD Manchester elementary program, MMES serves as a hub of community activity running programing seven days per week 7:00am – 9:00pm weekdays and 9:00am – 9:00pm on weekends.

- MMES serves as the home of the Manchester Parks and Recreation after school program along with their “Summer Playground” program. Consistent with our core value of community partnerships, MMES enjoys a collaborative relationship with the he Manchester Parks &

Recreation program. The program provides before and after school care programs for MMES students, as well as, release day, vacation, and summer programing for families. It is our intention to continue this relationship in the new facility and work cooperatively with the town to provide adequate and updated space to support their program needs. *It is assumed that cost of Parks and Recreation facilities will be carried by the Town of Manchester separate from the total project cost shared by both Essex and Manchester.*

- MMES facilities are regularly used and needed to fulfill the overall District Program.
  - The gymnasium is regularly used for the Middle High School basketball program.
  - The tennis courts are both part of the District-wide physical education program and serve as the main practice/play venue for the Middle High School tennis team.
  - Brook street field is also part of both the physical education program and the Middle High School athletics program providing a field space for soccer, field hockey, lacrosse, and football.

- MMES is the site of Manchester annual town meeting and currently the only polling location in town. It is our understanding the town would like to continue to use the facility for community gatherings once the new facility has been completed. Voting requires areas that can be segregated from the rest of the building with handicap accessibility. A moveable wall in the gym that can be locked would allow voting and Wellness classes to take place at the same time.

MERSD requires a safe and secure building for both the school and town. Designing appropriate traffic flow and parking should be considerations in this project, as currently community events that take place during the school day are disruptive to the academic program. Consideration should be given to the facilitation of community access to areas of the building that include the gym, cafeteria, auditorium, and other community use spaces as appropriate to prevent disruption to the student schedule.



## Appendix A
## Elementary Curriculum Overviews

## WELCOME TO MERSD!

This brochure contains a brief description of the subjects that your child will study in third grade. It is designed to provide you with a general overview of the content and skills which are taught throughout the year.

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Ms. Sarah Wolf

## MANCHESTER ESSEX REGIONAL SCHOOL DISTRICT

# 3RD GRADE CURRICULUM OVERVIEW



Essex Elementary School
12 Story Street
Essex, MA 01929

Memorial Elementary School
43 Lincoln Street
Manchester, MA 01944

# Manchester Essex Regional School District (MERSD)

## Language Arts

Our balanced approach to literacy instruction uses quality literature as the basis for instruction. Small guided reading groups, silent reading, and book talks allow students to think critically and share their ideas about text. Students begin to make text-to-text and text-to-self connections as they read. This year we are continuing with *WriteSteps Writing* which incorporates the best elements of 6 Traits, Writer's Workshop, Bloom's Taxonomy, Multiple Intelligences and Cooperative Learning.

## Mathematics

The goal of the *Everyday Mathematics* program is for students to become confident problem-solvers who value and enjoy math. In 3rd grade, students focus on the following domains: operations and algebraic thinking, number and operations in base ten, number and operations in fractions, geometry, measurement and data.

## Science

The *KnowAtom Program* is engineered to connect students to the many areas that science reaches. Students relate concepts through the Scientific Method by generating data in experiments and testing prototypes built with the Engineering Design Process. Sample units include: food chain, electricity and engineering bridges.

## Social Studies

Students continue to be prepared to become responsible citizens of society by learning to understand and appreciate the diversity and commonality of people. Sample units include: Wampanoag Indians, Pilgrims, Revolutionary War, Massachusetts history, and local history.

## Music

The goal of the music program is to prepare children to become musical in three ways: "Tuneful, Beatful, and Artful." Our students experience music through singing, listening, playing instruments, dancing, moving, responding, improvising, communicating, reading, and performing at levels which are age and grade appropriate. Our music education program is rooted in Dr. Howard Gardner's theory of Multiple Intelligences which provides many pathways to learning.

## Library

Students become increasingly more independent in their use of the library and learn to identify the publisher, call number, and the index of a book. Students are introduced to the Dewey system of classification and the Big 6 research strategy is applied to all research projects. By working with the Technology department, students are able to utilize progressive online research tools.

## Foreign Language

Drawing on conversational Spanish that may already be known, students are encouraged to use Spanish in more meaningful contexts. Dialogues and skits are increasingly oriented toward specific social situations like making requests and describing oneself. Spanish is spoken and heard in class as much as possible, especially in the context of classroom routines. Students are also challenged to connect what they are learning in their regular math curriculum to Spanish language by solving basic math problems in Spanish.

## Art

Students continue to design and create a portfolio for their work and also continue to develop their skills of reflection and sharing their reasons for their artistic decisions. A variety of media are used in order for students to cut complex shapes, apply adhesives, clearly mix colors, and create drawings with more detail.

## Physical Education

Third grade students become more proficient in motor skill development and general body management. They also experience a general increase in muscular strength, endurance, flexibility, agility, balance, and gross motor coordination. The physical education classroom environment provides for an increased focus on the development of self-reliance and self-directed skills. Emphasis is placed on working independently and on-task for extended periods of time. Activities are designed to allow all students to develop efficient, effective, and expressive movement skills.

## Technology

Our 3rd grade students deepen their understanding of drawing software by planning a house in Google SketchUp. They further develop their writing skills with a Town symbols project in Kidspiration. They learn new research skills and begin to meet ethics standards by identifying their sources in their state projects. Using formulated spreadsheets, students learn how to enter data and revise their estimates to mathematical challenges.

## WELCOME TO MERSD!

This brochure contains a brief description of the subjects that your child will study in first grade. It is designed to provide you with a general overview of the content and skills which are taught throughout the year.

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Ms. Sarah Wolf

## MANCHESTER ESSEX REGIONAL SCHOOL DISTRICT

# 1ST GRADE CURRICULUM OVERVIEW



Essex Elementary School
12 Story Street
Essex, MA 01929

Memorial Elementary School
43 Lincoln Street
Manchester, MA 01944

# Manchester Essex Regional School District (MERSD)

## Language Arts

Our balanced approach to literacy instruction uses quality literature as the basis for instruction in comprehension, decoding, writing, grammar and spelling. First graders read with friends, work in guided reading groups, and listen to teachers read aloud to them. Phonics instruction is delivered using an explicit and systematic program. Spelling competency develops over time and is influenced by one's experience with language and direct spelling instruction. This year we are continuing with *WriteSteps Writing* which incorporates the best elements of 6 Traits, Writer's Workshop, Bloom's Taxonomy, Multiple Intelligences and Cooperative Learning.

## Mathematics

The goal of the *Everyday Mathematics* program is for students to become confident problem-solvers who value and enjoy math. Key features of the program include problem solving for real life situations, developing readiness through hands-on activities, and skill mastery through games. In 1st grade, students focus on the following domains: operations and algebraic thinking, number and operations in base ten, geometry and measurement/data.

## Social Studies

The goal of the social studies program is to prepare students to become responsible citizens of society by helping them to understand and appreciate the diversity and commonality of people. Units of study in 1st grade include: U.S. Symbols, Tall Tales, families, goods/services, and maps.

## Science

Our science program provides a foundation and understanding of scientific topics through the acquisition of scientific knowledge, the development of thinking skills, and the application of the scientific method. The units of study in first grade are life cycles, Lego Engineering, states of matter, tide pools and seasons.

## Music

The goal of the music program is to prepare children to become musical in three ways: "Tuneful, Beatful, and Artful." Our students experience music through singing, listening, playing instruments, dancing, moving, responding, improvising, communicating, reading, and performing at levels which are age and grade appropriate. Our music education program is rooted in Dr. Howard Gardner's theory of Multiple Intelligences which provides many pathways to learning.

## Technology

In 1st grade students begin to organize data and create digital graphs with the Graph Club program. Students practice their research skills and culminate their research projects with simple Podcasts. They also learn more about Internet safety through a series of games and lessons. Throughout the year students expand their knowledge of multiple applications and online resources which are integrated into the classroom curriculum.

## Physical Education

The physical education curriculum for first grade continues to emphasize the development of fundamental motor skills. Though endurance is still developing, students' activities are characterized by alternating degrees of high and low intensity. Instruction provides opportunities for problem solving, exploration, and questioning and also provides for high levels of participation and success.

## Library

Children learn about authors, titles, illustrators, and to identify the parts of the book. First graders practice listening and viewing skills in the library and participate in discussions about books. Students learn that materials have a specific arrangement and that an electronic card catalog is used to locate materials. The Super 3 research strategy is developed and students continue to learn about the importance of using multiple sources and how to avoid plagiarism.

## Art

Using the elements of art and principles of design, students use a variety of media in developing fine motor skills (cut and glue, form geometric shapes, adhere one medium to another). Students learn primary and secondary colors and begin to control, mix, and apply paint. They also begin to make aesthetic decisions during the process and to reflect upon their work and share their thoughts with others.

## Foreign Language

Students are introduced to basic conversational Spanish by singing songs and playing games. Relying on predictable routines and the repetitive use of classroom language over time helps to build familiarity as students begin their study of a foreign language.

## WELCOME TO MERSD!

This brochure contains a brief description of the subjects that your child will study in second grade. It is designed to provide you with a general overview of the content and skills which are taught throughout the year.

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Ms. Sarah Wolf

## MANCHESTER ESSEX REGIONAL SCHOOL DISTRICT

# 2ND GRADE CURRICULUM OVERVIEW



Essex Elementary School
12 Story Street
Essex, MA 01929

Memorial Elementary School
43 Lincoln Street
Manchester, MA 01944

# Manchester Essex Regional School District (MERSD)

## Language Arts

Our balanced approach to literacy instruction uses quality literature as the basis for instruction in phonics, writing, grammar, and spelling. Phonics instruction is also delivered using a systematic program. Students listen to teachers read aloud, they read independently and with a friend, and work in both large and small instructional groups. Children are taught decoding and comprehension strategies through direct instruction. Writing is an integral component of our program as students learn to write in all curriculum areas. This year we are continuing with *WriteSteps Writing* which incorporates the best elements of 6 Traits, Writer's Workshop, Bloom's Taxonomy, Multiple Intelligences and Cooperative Learning.

## Mathematics

The goal of the *Everyday Mathematics* program is for students to become confident problem-solvers who value and enjoy math. Some of the key features of the program include providing problem-solving experiences in real-life contexts, promoting practice through meaningful activities and games, and providing a spiral curriculum ensuring that children encounter and apply concepts over time. In 2nd grade, students focus on the following domains: operations and algebraic thinking, number and operations in base ten, geometry, measurement and data.

## Science

The science program provides our students with the foundation and understanding of scientific topics through the acquisition of scientific knowledge, the development of thinking skills, and the application of the scientific method. Units of study in second grade include: the life cycle of a butterfly, the water cycle, soil, plants/seeds, ecology, robotics, and the seasons.

## Social Studies

The social studies program focuses on preparing students to be responsible citizens in society by teaching them to understand and appreciate the diversity and commonality of people. Topics explored include: maps and globes, civics and government, buyers and sellers, calendars, timelines, and folktales from around the world.

## Technology

Students continue to focus on technology that is centered on classroom curriculum. They expand their knowledge of Kidpix, Graph Club and Neighborhood Map Machine. Students research physical geography through mapping websites and create Enhanced Podcasts to share their knowledge of continents. Responsible use of the computer lab, laptops, and the Internet is emphasized.

## Music

The goal of the music program is to prepare children to become musical in three ways: "Tuneful, Beatful, and Artful." Our students experience music through singing, listening, playing instruments, dancing, moving, responding, improvising, communicating, reading, and performing at levels which are age and grade appropriate. Our music education program is rooted in Dr. Howard Gardner's theory of Multiple Intelligences which provides many pathways to learning.

## Physical Education

The second grade curriculum emphasizes the refinement of fundamental motor skills. Students continue to exhibit steady growth and begin to demonstrate a greater ability to maintain attention. Students are encouraged to maintain moderate-to-vigorous activity for longer periods of time and have opportunities to explore the relationship of activity to fitness and well-being. Instruction includes situations in which students apply skills and concepts in more complex games, dances, and gymnastic activities and perform skills in simple combinations.

## Library

Students become increasingly familiar with the different types of literature that are available to them in the library and to distinguish between fiction and non-fiction. The Super 3 research strategy is further developed and students begin to use multiple sources as they conduct initial research.

## Foreign Language

Students learn basic conversational Spanish by singing songs and playing games. The class is conducted in Spanish as much as possible, relying on predictable routines and repetitive use of classroom language over time to build familiarity. Students relate what they are learning in math and science to more sophisticated use of the language as they read literature in Spanish.

## Art

Students begin the process of developing and maintaining a portfolio of work. The development of fine motor skills continues as students mix and control paint. The aesthetic decision making process continues as well as a beginning understanding of major artists.

## WELCOME TO MERSD!

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Ms. Caroline Weld
Ms. Sarah Wolf

## MANCHESTER ESSEX REGIONAL SCHOOL DISTRICT

# 3RD GRADE CURRICULUM OVERVIEW



Essex Elementary School
12 Story Street
Essex, MA 01929

Memorial Elementary School
43 Lincoln Street
Manchester, MA 01944

# Manchester Essex Regional School District (MERSD)

## Language Arts

Our balanced approach to literacy instruction uses quality literature as the basis for instruction. Small guided reading groups, silent reading, and book talks allow students to think critically and share their ideas about text. Students begin to make text-to-text and text-to-self connections as they read. This year we are continuing with *WriteSteps Writing* which incorporates the best elements of 6 Traits, Writer's Workshop, Bloom's Taxonomy, Multiple Intelligences and Cooperative Learning.

## Mathematics

The goal of the *Everyday Mathematics* program is for students to become confident problem-solvers who value and enjoy math. In 3rd grade, students focus on the following domains: operations and algebraic thinking, number and operations in base ten, number and operations in fractions, geometry, measurement and data.

## Science

The *KnowAtom Program* is engineered to connect students to the many areas that science reaches. Students relate concepts through the Scientific Method by generating data in experiments and testing prototypes built with the Engineering Design Process. Sample units include: food chain, electricity and engineering bridges.

## Social Studies

Students continue to be prepared to become responsible citizens of society by learning to understand and appreciate the diversity and commonality of people. Sample units include: Wampanoag Indians, Pilgrims, Revolutionary War, Massachusetts history, and local history.

## Music

The goal of the music program is to prepare children to become musical in three ways: "Tuneful, Beatful, and Artful." Our students experience music through singing, listening, playing instruments, dancing, moving, responding, improvising, communicating, reading, and performing at levels which are age and grade appropriate. Our music education program is rooted in Dr. Howard Gardner's theory of Multiple Intelligences which provides many pathways to learning.

## Library

Students become increasingly more independent in their use of the library and learn to identify the publisher, call number, and the index of a book. Students are introduced to the Dewey system of classification and the Big 6 research strategy is applied to all research projects. By working with the Technology department, students are able to utilize progressive online research tools.

## Foreign Language

Drawing on conversational Spanish that may already be known, students are encouraged to use Spanish in more meaningful contexts. Dialogues and skits are increasingly oriented toward specific social situations like making requests and describing oneself. Spanish is spoken and heard in class as much as possible, especially in the context of classroom routines. Students are also challenged to connect what they are learning in their regular math curriculum to Spanish language by solving basic math problems in Spanish.

## Art

Students continue to design and create a portfolio for their work and also continue to develop their skills of reflection and sharing their reasons for their artistic decisions. A variety of media are used in order for students to cut complex shapes, apply adhesives, clearly mix colors, and create drawings with more detail.

## Physical Education

Third grade students become more proficient in motor skill development and general body management. They also experience a general increase in muscular strength, endurance, flexibility, agility, balance, and gross motor coordination. The physical education classroom environment provides for an increased focus on the development of self-reliance and self-directed skills. Emphasis is placed on working independently and on-task for extended periods of time. Activities are designed to allow all students to develop efficient, effective, and expressive movement skills.

## Technology

Our 3rd grade students deepen their understanding of drawing software by planning a house in Google SketchUp. They further develop their writing skills with a Town symbols project in Kidspiration. They learn new research skills and begin to meet ethics standards by identifying their sources in their state projects. Using formulated spreadsheets, students learn how to enter data and revise their estimates to mathematical challenges.

## WELCOME TO MERSD!

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Ms. Sarah Wolf

## MANCHESTER ESSEX REGIONAL SCHOOL DISTRICT

# 4TH GRADE CURRICULUM OVERVIEW



Essex Elementary School
12 Story Street
Essex, MA 01929

Memorial Elementary School
43 Lincoln Street
Manchester, MA 01944

# Manchester Essex Regional School District (MERSD)

## Language Arts

Guided reading groups, silent reading, and book talks allow students to think critically and share their ideas about text. Students read fiction, non-fiction, poetry, and biographies to refine decoding skills, increase fluency, and further develop comprehension and vocabulary. Through class discussions, written work, and projects, students develop an appreciation and understanding of a variety of genres. Writing is an integral component of our program as students learn to write in all curriculum areas. This year we are continuing with *WriteSteps Writing* which incorporates the best elements of 6 Traits, Writer's Workshop, Bloom's Taxonomy, Multiple Intelligences and Cooperative Learning.

## Mathematics

The goal of the *Everyday Mathematics* program is for students to become confident problem-solvers who value and enjoy math. In 4th grade, students focus on the following domains: operations and algebraic thinking, number and operations in base ten, number and operations in fractions, geometry, measurement and data.

## Science

The *KnowAtom Program* is engineered to connect students to the many areas that science reaches. Students relate concepts through the Scientific Method by generating data in experiments and testing prototypes built with the Engineering Design Process. Sample units include: measuring matter, life cycles and magnetic fields.

## Social Studies

Students begin to develop a deeper appreciation of the complexities of cultures and societies by learning about countries of North America. Specific areas of study include: North America geography, culture and heritage, and the environment of U.S. regions, Canada, Mexico, Central America, and the Caribbean.

## Physical Education

To address the interests of all students, the fourth-grade curriculum focuses on personal skill development in terms of refining fundamental movement patterns associated with a variety of small games, modified sports, dance and rhythm, and gymnastics. The curriculum provides students with opportunities to develop positive attitudes toward physical education. The instructional environment provides equal opportunities for boys and girls to participate in individual, partner, and small-group activities. This instructional setting allows students to further refine self-reliance skills and begin to participate in partner-based cooperative situations. Group dynamic concepts are also explored during instruction.

## Music

The goal of the music program is to prepare children to become musical in three ways: "Tuneful, Beatful, and Artful." Our students experience music through singing, listening, playing instruments, dancing, moving, responding, improvising, communicating, reading, and performing at levels which are age and grade appropriate. Our music education program is rooted in Dr. Howard Gardner's theory of Multiple Intelligences which provides many pathways to learning.

## Library

Students learn to make independent use of the library to complete class assignments. Students are able to make regular use of the reference collection as they answer questions, search for background information, and as a starting point for research topics. The Big 6 research strategy continues to be applied to all research projects. Students learn the importance of evaluating and synthesizing information as well as proper citation of all sources.

## Foreign Language

Students expand their vocabulary to describe themselves and their surroundings in greater detail. The amount of Spanish used in class increases as students read, write, speak and listen to the target language. Projects and skits require creative use of the Spanish vocabulary learned in class.

## Technology

Our 4th grade students learn to develop international weather data in spreadsheets and produce comparative graphs, create multimedia slide shows to present research, and maintain file organization in a personal folder on a network server. Basic keyboarding skills are introduced and reinforced both in computer classes and utilizing laptops in their classroom.

## Art

Students explore art making with a variety of materials to create both two and three-dimensional art forms. The curriculum also contains information about artists, art styles, and art from around the world. Students practice talking about their own art and the art of others. Finally, through activities in the art room, students discuss why art is valued.

## WELCOME TO MERSD!

This brochure contains a brief description of the subjects that your child will study in fifth grade. It is designed to provide you with a general overview of the content and skills which are taught throughout the year.

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Ms. Sarah Wolf

## MANCHESTER ESSEX REGIONAL SCHOOL DISTRICT

# 5TH GRADE CURRICULUM OVERVIEW



Essex Elementary School
12 Story Street
Essex, MA 01929

Memorial Elementary School
43 Lincoln Street
Manchester, MA 01944

# Manchester Essex Regional School District (MERSD)

## Language Arts

Guided reading groups, silent reading, and book talks allow students to think critically and share their ideas about text. Students read fiction, nonfiction and poetry to refine decoding skills, increase fluency, and further develop comprehension and vocabulary. Through class discussions, written work, and projects, students develop an appreciation and understanding of a variety of genres. Writing is an integral component of our program as students write in all curriculum areas. This year we are continuing with *WriteSteps Writing* which incorporates the best elements of 6 Traits, Writer's Workshop, Bloom's Taxonomy, Multiple Intelligences and Cooperative Learning.

## Mathematics

The goal of the *Everyday Mathematics* program is for students to become confident problem-solvers who value and enjoy math. In 5th grade, students focus on the following domains: operations and algebraic thinking, number and operations in base ten, number and operations in fractions, the number system, geometry, measurement and data.

## Science

The *KnowAtom Program* is engineered to connect students to the many areas that science reaches. Students relate concepts through the Scientific Method by generating data in experiments and testing prototypes built with the Engineering Design Process. Sample units include: moons/tides, conservation and designing a roller coaster.

## Social Studies

Project-based learning experiences that are developmentally-appropriate, meaningful, and of interest to students help to develop a deeper appreciation of the complexities of cultures and societies. Units of study include: the Age of Exploration, Colonization of North America, Colonial Growth, Pre-Revolutionary War, Revolutionary War, and the Constitution.

## Physical Education

The fifth-grade curriculum focuses on individual skill refinement through an increased amount of practice time in more complex game and sport situations. Students also participate in Project Adventure where learning about cooperation, trust, communication, conflict resolution, teamwork, safety, respect, caring and consideration, self-esteem, leadership, creativity, risk-taking, goal setting, and the ability to "think out of the box" is enhanced.

## Technology

At this level, students consolidate basic technology skills and learn new applications of these skills. Students solve an Internet safety mystery, work with simple animation, develop citation skills using a web-based subscription service that requires login and password, and create more sophisticated multimedia presentations integrated with their classroom studies.

## Library

Students make independent use of the library to complete class assignments. Information obtained from the electronic card catalog can be interpreted well enough for students to develop bibliographies using NoodleTools. Students use the Big 6 research strategy for their research projects, and learn to utilize progressive online research tools.

## Art

The standards for grade five enable students to use their knowledge and skills to synthesize information, thus allowing them to produce and respond to works of art. Emphasis is on communication of personal values and beliefs in art appreciation and production. Study relates to art produced by different cultures. Students gain fluency in the use and understanding of the elements of art and the principles of design as they relate to artistic expression and communication.

## Music

The goal of the music program is to prepare children to become musical in three ways: "Tuneful, Beatful, and Artful." Our students experience music through singing, listening, playing instruments, dancing, moving, responding, improvising, communicating, reading, and performing at levels which are age and grade appropriate. Our music education program is rooted in Dr. Howard Gardner's theory of Multiple Intelligences which provides many pathways to learning.

## Foreign Language

Students are encouraged to compare language patterns and derivatives as they learn French and Spanish. Instruction is increasingly geared toward using basic conversation skills in more creative ways and expanding vocabulary with the use of resources such as literature, music, and Internet sites that relate to foreign language learning.

## Appendix B
## District Improvement Plan

# Manchester Essex Regional Schools
# District Improvement Plan Three Year Plan
# 2017-2019

| **Whole Child** | | |
|---|---|---|
| ***Goal 1: Develop and articulate a Pre K-12 social emotional program strand.*** | | |
| **Strategies** | **Resources & Responsibilities** | **Deliverables**<br>**Measures of Implementation Documentation** |
| Research, pilot, and implement curricula, programs, and strategies that promote Universal Design for Learning (UDL), Positive Behavioral Intervention Supports (PBIS), and Social Emotional Learning (SEL). | Superintendent in collaboration with<br>▪ Director of Curriculum & Technology<br>▪ Director of Student Services<br>▪ Principals<br>▪ Teacher leaders<br><br>Resources: ASCD Whole Child Assessment Tools, New England League of Middle Schools (NELMS) | FY 17<br>▪ Conduct the ASCD Whole Child needs assessment PreK-5 (Spring)<br>▪ Conduct NELMS MS Needs Assessment<br>▪ Implement UDL-Disability Awareness Training K-5<br>▪ Identify the district's K-12 SEL expectations/recommendations<br>▪ Review current 6-12 Health/Wellness program<br>▪ Launch High School Wellness Program<br><br>FY18<br>▪ Implement Disability Awareness Training 6-12<br>▪ Create district document identifying the UDL, PBIS, and SEL<br>▪ Identify the school/grade-span programmatic elements<br>▪ Research and pilot programs to support school-based elements<br>▪ Pilot and assess comprehensive health/wellness curriculum (6-12)<br><br>FY19<br>▪ Implementation of PBIS @ MS & HS<br>▪ Implementation of a comprehensive health/wellness curriculum (6-12) |
| Review program design, structural/resource organization and utilization to ensure optimal impact on whole child/student achievement | Superintendent in collaboration with<br>▪ Director of Curriculum & Technology<br>▪ Director of Student Services<br>▪ Principals<br>▪ Teacher leaders<br><br>Resources: Teachers 21, | FY 17<br>▪ NELMS Assessment MS<br>▪ Develop school-based NELMS Action Plan<br>▪ HS Schedule Development/Training<br>▪ Elementary Special Education Program Review<br>▪ Development of District-wide homework guidelines<br><br>FY18<br>▪ Implementation of NELMS Action Plan Year 1<br>▪ MS Special Education Program Review<br>▪ HS Schedule Implementation |

| | | |
|---|---|---|
| | EDCO Collaborative, New England League of Middle Schools (NELMS), New England Association of Secondary Schools (NEASC), MA Department of Elementary and Secondary Education | ▪ Assess district-wide counseling needs<br>▪ Implementation of District-wide homework guidelines<br><br>FY19<br>▪ Implementation of NELMS Action Plan Year 2<br>▪ HS Special Education Program Review<br>▪ HS Schedule Review<br>▪ Begin NEASC Self-Assessment<br>▪ DESE Coordinated Program Review |
| **Student Achievement** | | |
| ***Goal 1: Articulate and document vertical curriculum planning.*** | | |
| **Strategies** | **Resources & Responsibilities** | **Deliverables**<br>**Measures of Implementation Documentation** |
| Assess current units and revise units of study to incorporate the principles of Understanding by Design (UbD) and the backwards design process. | Director of Curriculum & Technology in collaboration with building Principals.<br>With Support from<br>▪ Department Chairs<br>▪ Teachers<br><br>Resources: ASCD, Teachers 21, Regional school partners | FY17<br>▪ Develop implementation plan for training staff in Understanding By Design<br>▪ Coordinate and define differentiated UbD trainings to staff across schools<br>▪ Implement UbD trainings 6-12<br>▪ Create UbD guidelines for the district<br>▪ Identify regional curriculum review partners and implement for Health/Wellness review.<br>▪ Coordinate timelines for school-based unit analysis and unit revision K-12<br><br>FY18<br>▪ Review UbD implementation<br>▪ Implement UbD trainings as needed<br>▪ Review and adjust timelines as needed<br>▪ Implement curriculum articulation (Aspen)<br><br>FY19<br>▪ Review UbD implementation<br>▪ Implement UbD trainings as needed<br>▪ Review and adjust timelines as needed<br>▪ Implement curriculum articulation (Aspen)<br>▪ Begin to use Curriculum Review partners for planned reviews: ELA/Art/Music/Health Wellness |
| Research, develop, and implement curricula | | FY17 |

| | | |
|---|---|---|
| and supports that promote critical thinking and 21st century skills including: problem solving, collaboration and communication, creativity and innovation, contextual, information, and media literacy skills. | Director of Curriculum & Technology in collaboration with building Principals.<br>With Support from<br>▪ Department Chairs<br>▪ Elementary Curriculum Coordinators<br>▪ K-12 Teachers<br><br>Resources: Teachers 21, EDCO Collaborative, New England League of Middle Schools (NELMS), New England Association of Secondary Schools (NEASC), MA Department of Elementary and Secondary Education | ▪ Conduct district assessment of current practices for implementation of critical thinking and 21st century skills (use NEASC/DESE Creativity & Innovation Rubrics)<br>▪ Research and identify 21st century skills for implementation<br>▪ Identify areas/content/grade for skill implementation<br>▪ Coordinate age-school range for skill training implementation<br>▪ Establish regional partnership for curriculum review in support of building 21st century skills<br><br>FY18<br>▪ Train teachers on identified skills and implement into written and taught Curriculum<br>▪ Develop K-12 21st century skill continuum for MERSD<br>▪ Highlight 21st century skills within the written grade-level or content curriculum<br>▪ Begin to use Curriculum Review partners for planned reviews: ELA/Art/Music/Health Wellness<br><br>FY 19<br>▪ Collect data and feedback from stakeholders on 21st century skill development<br>▪ Adjust and implement changes to K-12 structure as needed<br>▪ |
| Identify and implement strategies and methods for providing individualized learning. | Director of Curriculum & Technology in collaboration with Principals | FY18<br>▪ Research available structures to support individualized learning and the development of Individualized Student Learning Plans (ILP).<br>▪ Create supplemental opportunities for accelerated students plan)<br>▪ Develop and pilot structure for RtI implementation at the Middle School<br>FY19<br>▪ Develop a flexible secondary curriculum continuum for math.<br>▪ Research opportunities for dual enrollment, virtual high school, IB, Pre-AP and AP courses<br>▪ Develop and pilot structure for RtI implementation at the High School |

***Goal 2: Talent Development to develop and retain exceptional teachers.***

| **Strategies** | **Deliverables<br>Measures of Implementation<br>Documentation** | **Resources & Responsibilities** |
|---|---|---|
| Improve and expand teacher mentoring, coaching, and training. | Superintendent and Director of Curriculum & Technology in collaboration with building Principals. | FY 17<br>▪ Update Mentor Program to meet 2015 state expectations<br>▪ Review and identify areas for reorganization of<br>o New Teacher Induction program |

| | | |
|---|---|---|
| | With Support from<br>▪ Department Chairs<br>▪ Teachers<br><br>Resources: Grant Funding & district budget | ▪ Write and publish Mentor Handbook<br>▪ Established best practices and opportunities for professional growth (Ex. peer coaching, looking at student work, learning community models, teacher instructional rounds)<br><br><u>FY18</u><br>▪ Develop system to measure efficacy and return on investment of targeted training and implemented programs. |
| **Climate** | | |
| ***Goal 1:*** **Institutionalize a philosophy of inclusion, tolerance and cultural awareness both locally and globally.** | | |
| **Strategies** | **Resources & Responsibilities** | **Deliverables**<br>**Measures of Implementation Documentation** |
| Establish expectations and educate staff about benchmarks for successful inclusive practices PK-12. | Superintendent and Director of Curriculum & Technology in collaboration with building Principals<br>Director of Student Services | <u>FY17</u><br>▪ Training Partnership w/ Jessica Minahan @ MS to develop practices for teaching challenging students and redefining TAT procedures<br>▪ Pilot Understanding Differences @ Grade 3<br><br><u>FY18</u><br>▪ Understanding Differences @ Grade 4<br><br><u>FY19</u><br>▪ Understanding Differences @ Grade 5 |
| Implement Foreign Exchange Program at MERHS. | Superintendent & MERHS Principal | <u>FY17</u><br>▪ Complete partnership with Educatius<br>▪ Prepare and file necessary documentation<br><br><u>FY18</u><br>▪ Admit first students |

| | | |
|---|---|---|
| ***Goal 2: Implement programming that enhances our organizations cultural proficiency and promotes respect and appreciation for individual and cultural differences.*** | | |
| Dedicate staff professional development time to improve understanding of diverse groups. | Superintendent in collaboration with<br>▪ Director of Curriculum & Technology<br>▪ Director of Student Services<br>▪ Principals | FY17<br>▪ Disability awareness training<br>▪ Transgender awareness and policy development<br>▪ Onsite SEI (Sheltered English Immersion) Course for staff |
| **Community Partnerships** | | |
| ***Goal 1: Improve school to home communication by implementing proactive school based outreach.*** | | |
| **Strategies** | **Resources & Responsibilities** | **Deliverables**<br>**Measures of Implementation Documentation** |
| Promote positive/proactive school home communication | Superintendent in collaboration with Directors & Principals | FY17<br>▪ Develop a communication plan<br>▪ Establish a Social Media promotion team<br>▪ Launch new website and mobile app<br>▪ Develop a communications chart, identifying methods and expectations for school to home / home to school communication.<br>▪ Partner with School Committee to establish community school partnership to address Youth Risk Behavior Survey (YRBS) findings "ME Cares"<br><br>FY18<br>▪ All teacher webpages migrated to google/blackboard format |
| **Resources** | | |
| ***Goal 1: Manage resources efficiently and innovate to support education program quality within confines of Proposition 2.5.*** | | |
| **Strategies** | **Responsibilities** | **Deliverables**<br>**Measures of Implementation Documentation** |
| Continue on path to full funding of OPEB (Other Post Retirement Benefits) liability. | Director of Finance & Operations in collaboration with the | FY17<br>▪ Establish funding process through SRBTF (State Retirement Board Trust Fund) |

| | | |
|---|---|---|
| | Superintendent with support from:<br>▪ School Committee<br>▪ ME Teacher's Association (META)<br>▪ Town Finance Committees & Taxpayers<br>▪ Legal counsel and industry analysts | ▪ Establish protocol for reporting on PRIM returns and district contributions<br><br>FY18<br>▪ Obtain independent actuarial valuation study to quantify OPEB liability and chart funding progress<br>▪ Draft multi-year funding plan to close remaining gap to full funding<br><br>FY19<br>▪ Inclusion of full gap funding in budget request |
| Maintain multi-year budgeting process that assesses long-term financial threats and opportunities facing MERSD. | Superintendent; Director of Finance & Operations in collaboration with the School Committee Sub-Committee for Finance | FY17<br>▪ Establish a formal forecast schedule.<br><br>FY18<br>▪ Utilized zero-based budget model<br>▪ Present framework for comprehensive, long-term capital/infrastructure funding plan<br><br>FY19<br>▪ Long-term capital/infrastructure needs fully imbedded into multi-year operating budget |
| Establish a multi-year process for assessing fee-based programs. | | FY17<br>▪ Role of third party management of food service.<br>▪ Partner with School Committee to assess current fee structure for Pre-K, Athletics, Food Service, Transportation and Building Use. |
| Identify cost-saving measures that can free up internal funding for best-possible use. | Director of Finance & Operations in collaboration with the Superintendent with support from:<br>▪ Directors/Principals | Documented savings/reinvestment from internal departments and program restructurings. |
| ***Goal 2: Create an organizational structure and develop effective internal processes to meet the needs of students, employees, families and taxpayers*** | | |
| **Strategies** | **Resources & Responsibilities** | **Deliverables**<br>**Measures of Implementation Documentation** |

| | | |
|---|---|---|
| Document MERSD Central Office procedures to ensure sustainable practices regardless of personnel in place. | Superintendent in collaboration with<br>▪ Director Finance & Operations<br>▪ Director C&T<br>▪ Dir. Student Services<br>▪ CO Staff | FY17<br>▪ Financial Policies Manual<br>▪ Fraud Risk assessment to establish best practices protocols<br>▪ Job Descriptions – Support Staff<br><br>FY18<br>▪ Central office operations manual<br>▪ Job Descriptions- Licensed Staff<br>FY19<br>▪ System of annual review of organizational structures and efficiencies and impact on broader goals. |
| ***Goal 3: Raise quality of educational facility conditions to match quality MERSD's educational program*** | | |
| **Strategies** | **Resources & Responsibilities** | **Deliverables**<br>**Measures of Implementation Documentation** |
| Apply multi-year budgeting process to facility, maintenance and asset replacement needs. | Director of Finance & Operations in collaboration with the Superintendent and School Committee Sub-Committee for Finance and Facilities Manager | FY17<br>▪ District-wide preventative maintenance plan outlining routine maintenance program for day-to-day building/grounds needs, including budget, calendar and staffing/contractor needs<br>▪ Essex Elementary medium/long-term facility planning process to address needs and timeline prior to major renovation<br><br>FY18<br>▪ District-wide capital plan including spending and revenue projections<br><br>FY19<br>▪ Facilities condition index for MS/HS |
| | | |

## Appendix C

## Education Visioning Notes

Manchester Essex Regional School District

# Manchester Memorial Elementary School

## Educational Visioning Workshop Overview and Notes

During the months of September and October, 2017, the Manchester-Essex Regional School District (MERSD) Educational Working Group (EWG), a group of approximately 30 MERSD administrative leaders, teachers, administrators, students, parents, and community partners, participated in an Educational Visioning Workshops run by New Vista Design and JCJ Architecture. The workshop was a collaborative session structured to inform Manchester Memorial Elementary School (MMES) facility design process. Participants were led through a step-by-step visioning process aimed at capturing their best thinking about MERSD's current and future educational goals and priorities, and connecting them to best practices and possibilities in innovative school facility design.



On September 25, 2017, the MERSD EWG participated in **Educational Visioning Workshop One** and explored the following topics:

- Priority Goals for the renovated/new facility
- Future Ready Teaching and Learning Practices that are being influenced by differentiated instructional approaches and emerging digital technologies
- 21st Century Learning Goals that distill the group's best thinking with regard to MERSD's current and future educational programming and priorities
- Strengths, Challenges, Opportunities, and Goals (SCOG Analysis) associated with MERSD's current academic programs as well as the vision for its new facility
- 21st Century Design Patterns that innovative schools throughout the country have put into practice in order to make their forward-thinking learning goals come alive on the level of facility design

On October 23, 2017, the MERSD EWG participated in **Educational Visioning Workshop Two** and explored the following topics:

- Guiding Principles 1.0 for design of the renovated/new facility
- Blue Sky Ideas for the renovated/new facility
- Key Spaces and Adjacencies for the new facility
- Bubble and Adjacency Diagramming for the renovated/new facility

The following pages offer a summary of notes taken and information gathered during each workshop. If you would like to add comments or ideas to this evolving narrative please contact Christina Shefferman at cshefferman@DoreandWhittier.com

**Note**: The agendas for Educational Visioning Workshops One and Two can be found at the end of this document.

Manchester Memorial Elementary School

**Educational Visioning**

**Workshop One Notes**

September 25, 2017

Manchester Essex Regional School District

# Priority Goals

The following list of priority goals for the design of the renovated and/or new Manchester Memorial Elementary School was recorded during the participant introduction section of the Educational Working Group's (EWG) Workshop One that took place on September 25, 2017. The EWG is a group of approximately 30 MERSD administrative leaders, teachers, administrators, students, parents, and community partners. Individual participant's priorities have been grouped thematically.

**Flexibility and Collaboration:**

- Designing a space that allows and encourages teachers to evolve
- Flexibility / support
- Teaching practices
- Space that promotes collaboration flexibility - collaboration
- Collaboration space/nooks within the classroom
- Areas for entire grades to meet
- Collaboration for teachers/students
- Space and opportunities
- Be mindful of grades purchasing furniture
- Relevance and engagement
- ED program and building
- Promote student motivation and interest
- Flexibility for staff and students
- Make teacher space less of "an anchor"
- Space for students to decompress
- Areas for small group instruction
- 21st Century Learning - change and flexibility throughout
- Flexibility of personnel
- Thoughtful layout / dispersal of staff
- Promote collaboration across specials
- Team member interconnectivity

**STEM (Science, Technology, Engineering and Math)**

- Support STEM instruction within classrooms and across grade levels
- Prepare for technology we don't even know about yet
- Mobile technology – projection
- Permanent science lab - set up with science equipment - make it real
- Evolving technology
- STEM & STEAM space
- Flexible technology - can grow and move from room to room
- Spaces for other technology
- Flexible seating in relationship with technology
- Sustainable classroom - connect to science

**Special Education**

- District-wide program expansion
  - IRWL - SAIL programs
  - Calming space for students
  - Flexibility for pre-school to expand and grow
  - Space for larger meetings (10-12)
- Provide two classrooms for the SAIL program
- Provide an Opportunity Center/Cool Down Area
- Small Quiet Rooms
- Special Ed Services - small room/nooks that have technology

**Outdoor Access and Movement**

- Easy access to gardens
- Strong connection to nature and environment
- Safe utdoor learning spaces
- Movement breaks - adaptive space

**Safe and Welcoming**

- Address safety considerations
- Handicapped Access
- Child scale

Manchester Essex Regional School District

# Priority Goals (Continued)

**Flexible Classrooms**

- Think about flexible classroom space
- Enough room for 25 students, so they don't trip over each other
- Address storage problem for materials/boots/backpacks

**Community Access**

- Community space for concerts, etc.
    - Parking

**Thoughtful Design**

- Consider costs
- Not too trendy - current but not too current
- Timelessness in aesthetics of building
- Areas for group learning
- Location of early child near specialists
- As little disruption during building process
- Larger storage (i.e. staging for drama)
    - Ways of integrating community use
    - Support extra-curricular community use
    - A project people will vote for
- Environmentally sound - sustainable
    - Spaces for the arts: music, visual arts, drama
    - Promote creativity
- Make sure that we look closely at number of students we are designing for
- Minimize disruption to learning during process
- Timeless - flexible functional modern space
- Flexible spaces for growth
- Parking/traffic
- 25-50 person conference space
- Big library - promotes multi-use
- Unisex bathroom(s)
- Additional bathrooms (with or without doors)
- Avoid major issues after building opens
- Differentiation by vertical need (i.e. spaces in later grades that get kids ready for middle school)
- Pre-school expansion



Manchester Essex Regional School District

# 21st Century Learning Goals 2.0

The following set of priority "21st Century Learning Goals 2.0 for Manchester Essex Regional School District elementary school students was adapted from the Educational Working Group's (EWG's) original brainstorm and refined during Workshop Two. These Learning Goals were created for the purpose of helping to focus educational goals and connect them to design priorities. They are not meant to replace, but rather complement, MERSD's Core Values of: **Whole Child** teaching and learning; a focus on **Student Achievement**; respectful school **Climate**; the fostering of **Community Partnerships**; and the provision of appropriate **Resources**.




## Curiosity and Imagination

- Creative Thinking and Risk Taking
- Agility and Adaptability
- Inventive Thinking
- Creative Problem Solving
- Joyful Learning
- Love of Learning
- Self and Discovery
- Play
- Design

## Citizenship and Ethics

- Social Emotional Learning
- Civic Mindedness
- Empathy and Perspective
- Community Leadership
- Global and Personal
- Social Reasoning

## Higher Order Thinking

- Critical Thinking
- Project Based Learning
- Cognitive Reasoning
- Learning to Learn
- Engineering Design (Practical and Tactile)
- Disciplined Thinking and Self-Direction

## Communication & Collaboration

- Interpersonal Skills
- Teaming
- Digital Literacy

Manchester Essex Regional School District

# Manchester Memorial Elementary School and MERSD Programs and Culture

The following notes describe elements of school culture, as well as present and future educational priorities within the Manchester Memorial Elementary School and MERSD that were brainstormed by the Educational Working Group (EWT) during Visioning Workshop One. The EWG is a group of approximately 30 MERSD administrative leaders, teachers, administrators, students, parents, and community partners.

- **Special Programs Include**
  - Pre-school for both communities
  - Tutorials - in addition to small group
  - Testing
  - OT/PT/SPEECH

- **IRWL (Intensive Reading and Written Language)**
  - 2 Cohort spaces
  - Tutorial space

- **SAIL (Social and Academic Integrated Learning)**
  - 2 Cohort spaces
  - Calming room

- **The MMES building is used as community building**
  - Afternoon - Parks and Recreation
  - Before -
    - Gym
    - Playground
    - Cafeteria
    - Sometimes classrooms for clubs
    - Art room
  - Weekend practice schedule
  - Saturday/Sunday Summer Camp
  - Auditorium for GS/BS (350)
  - Families do organic play dates on playground - formal/informal
  - Field in back
  - Voting
  - All rooms have amplification
  - Good technology for integration
  - Town meeting (Spring/Fall) in gym
  - Facilities rental for community events - gym, auditorium, parking rental lot
  - Tennis courts use by community
  - Zen garden
  - Sister school in Japan

- **The Green Team**
  - Is very popular with grades 4-5 especially
  - They have 2 garden beds plus a Friendship Garden
  - There is a district focus on sustainability
  - The MS/HS is a sustainable building
  - Recycling and composting program
  - There is a Greenhouse but they struggle with its use
  - Whole child enrichment
  - Reading garden, friendship garden

- **Grade level teacher trainings**
  - Co-located with central area would be good

- **Sufficient place to display student work is important**
  - Salt water fish tank
  - 2D-3D -electronic
  - Also within classroom

- **Pre-School**
  - Sound/acoustic needs
  - Outlets!

# Programs and Culture

- **Educational Technology**
  - Wired
  - Active Digital Portfolios
  - Chrome book and IPAD carts
  - Every classroom with charging station and 25 - 1 to 1

- **Student Ambassadors Group**
  - 5th graders
  - Meet in 5th grade area
  - Collaborate on fundraising project
  - Subcommittees
  - Space for meeting with technology

- **Green screen videos**
  - Feature grade levels and project
  - Student ambassadors do news broadcast type

- **Conference room is good space for meeting**
  - Kids feel important

- **Helpful hornets - 4-5 grade students**
  - Help teachers / photocopies

- **Performing arts**
  - Have chorus
  - Band
  - 5th grade play
  - Instrument lessons
  - Kapok tree
  - 2nd grade performance
  - Field day - on turf/playground
  - Poetry cafe - in cafeteria
  - Grade level music concert
  - Holiday concert
  - Art show
  - 600 people use cafeteria/gym combo

- **Counseling and health suite**
  - Needs to be co-located
  - Time out room

- **Response to Intervention (RTI)**
  - Individualized and small group instruction
  - Guided reading and leveled library
  - Now in faculty room
  - Separated by grade
  - Curated by reading specialist

- **Furniture**
  - Vintage chairs / desks are too large
  - Need high medium and low tables and seating for upper grades
  - Lower school kids like to be on floor (so carpeting is necessary)
  - Reading specialist need space
  - Technology should be accessible
  - Needs to be discrete
  - Could be three small groups

- **Morning Meetings**
  - They gather in circle in classrooms every morning
  - The bigger the kids get the less space they have

- **Everyday Math Program**
  - Requires partnerships
  - Games on floor
  - Collaboration and teamwork
  - Ideally would be great for kids to stand
  - Use of floor
  - Carpeting is important

Manchester Essex Regional School District

# Programs and Culture

- **Know ATOM (Science Program)**
  - Very hands on
  - Need space to make models
  - Has boxes of stuff - need to put somewhere
  - Proximity

- **Guided Reading / Know ATOM / Everyday Math**
  - All of these programs are experiential and hands-on
  - Need for varied spaces:
    - Small group
    - Whole group
    - Student centered
    - Differentiated
    - Hands-on
  - Research based
  - Whole child

- **Civics and Social Studies**
  - Storage and technology is important
  - Specialists
    - Research project in library
  - Capacity for broadband
  - Future expansion

- **Co-Teaching**
  - Room for planning

- **Windows – Control UV Rays?**
  - Control of solar glare
  - Bring in daylight - minimize glare

- **Opportunities for Student Movement**
  - Outdoor
  - Gym (In past, options to use gym are sometimes limited)

- **OT - more centralized and larger**
  - Some smaller versions of OT room in each pod would be good

- **Active PTO brings in lots of enrichment programs - can impact gym use**

- **Whole school enrichment often requires breaking into smaller groups**



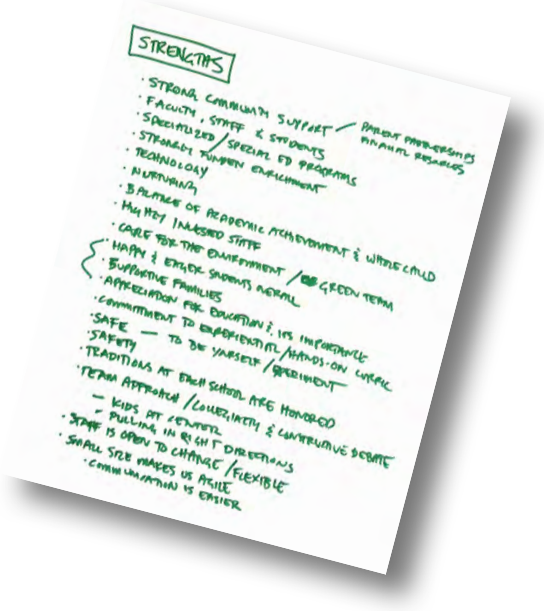


Manchester Essex Regional School District

# SCOG Analysis

The Educational Working Group (EWG) conducted a "SCOG Analysis" of what it sees as the current strengths, challenges, opportunities and goals with regard to MERSD's and Manchester Memorial Elementary School's academic programs and facilities. The EWG is a group of approximately 30 MERSD administrative leaders, teachers, administrators, students, parents, and community partners.

## STRENGTHS




- Strong community support
- Parent partnerships
- Financial resources
- Faculty, staff and students
- Specialized / special ED programs
- Strongly funded enrichment
- Technology
- Nurturing staff
- Balance of academic achievement and whole child orientation
- Highly invested staff
- Care for the environment/Green Team
- Happy and eager students overall
- Supportive families
- Appreciation for education and its importance
- Commitment to experiential/hands-on curriculum
- Safety
- Safe - to be yourself and to experiment
- Traditions at each school are honored
- Team approach/collegiality and constructive debate
- Kids at center
- Pulling in right directions
- Staff is open to change/flexible
- Small size makes us agile
- Communication is easier



Manchester Memorial Elementary School

# Educational Visioning

# Workshop One and Two Notes

September 25 and October 23, 2017

Manchester Essex Regional School District

## SCOG Analysis



### CHALLENGES

- Cultural community - physical implications
- Location and physical set-up
- Embedded in neighborhood
- 2/3 here, 1/3 in Essex
- Putting new buildings in very confined spot
- Lack of diversity
- Merging into a regionalized district from community elementary schools
- Making people aware that we are regionalized at elementary level too
- Scheduling services across school day
- Special Education
- Grouping students by need versus availability
- Finding a good balance between tradition and innovation
- Changing student population
- Fewer come ready to learn
- More with behavioral and social/emotional issues
- Programming for students with multiple different needs in a small district
- Perceived disparity between Memorial & Essex
- A new building will put a spotlight on that
- Feedback from community - Essex/Manchester kids don't "come together" (i.e. tech resources, enrichment)
- Continuity of curriculum
- Decisions making at elementary level
- Respecting traditions while forging a more unified path forward
- Take into account impact on Essex…Parity
- Rounding out scope of curriculum - STEM, civics, social studies
- Planning for a 50-year building when it's hard to know what things will look like in 20



### OPPORTUNITIES & GOALS

- Keep dollars in operational budget for betterment of district
- Define scope of where we want to go at elementary level
- Define practice and tighten our vertical alignment across district
- Increased learning without environmental distractions
- Effectively support varied needs of students
- Look at and learn from neighboring districts who have recently built schools
- Use the space that we have more effectively and efficiently
- Opportunity to do more co-teaching and collaboration
- Design our dream school!
- Build on new technologies
- Sustainability
- Within school/classroom
- Have a fully accessible building
- Strengthen bridge between school district and town
- Help the general town population better understand current issues/school practices and needs
- A more safe and secure building
- Beyond band aids and duct tape
- Free up resources for Essex

### GOALS ADDED DURING OCTOBER 23, 2017 WORKSHOP TWO

- Sustainability within the school and classrooms
- Effective support of students with varied needs
  - Differentiation and inclusion
  - Social emotional learning
  - Response to Intervention (RtI) and Positive Behavioral Interventions and Supports (PBIS)
- Foster Student collaboration
- Flexibility of space to adapt to all types of usage
- Effective storage within classrooms and throughout

Manchester Memorial Elementary School

## Educational Visioning

## Workshop One Notes

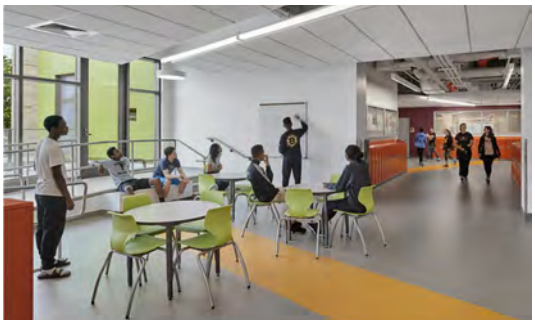
September 25, 2017

Manchester Essex Regional School District

# 21st Century Design Patterns 1.0

The following set of priority "21st Century Design Patterns" for the design of the renovated and/or new Manchester Memorial Elementary School was developed by the Educational Working Group (EWG) during Workshop One. Six teams of five participants each worked to create their own set of priority Design Patterns, after which each team presented to the larger group. Team lists were then displayed in a gallery format and participants were given the opportunity to vote for their top six priority Design Patterns. These are listed below in order of the number of priority votes they received, with each Design Pattern given five base points for appearing on one of the original team lists, and one additional point for each subsequent priority vote.

- Breakout Rooms (43 votes)
  - Dual Purpose
  - Between Classrooms
  - Retractable Walls
  - Accessible from Hallway
- Agile Classrooms (34 votes)
  - Classroom Zones
  - Lots of Natural Light
  - Stations
- Distributed Dining (26 votes)
  - Cyber Dining
  - Cafeteria Zones
  - Dampen Noise and Appear Smaller
- Neighborhoods (24 votes)
  - Clusters of Learning
  - Gathering Spaces/Living Room
- Outdoor Connections (22 votes)
  - Outdoor Spaces
  - Stadium Seating
  - Natural and Flexible









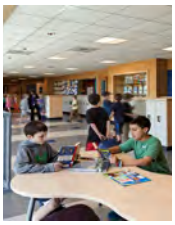


# 21st Century Design Patterns 1.0

(Continued)

- Gathering Hubs (20 votes)
- Visible Learning and Transparency (17 votes)
  - Windows/Garage Doors
- Creative Use of Color (12 votes)
  - Timeless vs. Trendy Color
- Shared Space in Hallway (12 votes)
  - Independent, Small Group, and Whole Class Learning
- Differentiated Entries (12 votes)
  - Younger and Older Cohorts
  - Voting
- Hubs (10 votes)
  - Whole School Meetings
- Traffic Patterns (9 votes)
- Ubiquitous Learning (8 votes)
  - Between Spaces
- Community Resources (8 votes)
  - Centralized Gym and Café
  - Can be Locked Off
- Centralized Specialists (8 votes)
  - Special Ed

















ADDED OCTOBER 23, 2017

- Innovative Storage
  - Low Cabinets with Display on Top
- Transparency/Windows
  - Garage Door Where Appropriate
  - Strategically Placed Windows
- Good Acoustics

# Guiding Design Principles 1.0

The following set of "Guiding Design Principles 1.0" for design of the new and/or renovated Manchester Memorial Elementary School was developed by the Educational Working Group (EWG) during the Educational Visioning Workshop Two that took place on October 23, 2017. Five teams of six participants each worked to create their own set of Guiding Principles, after which each team presented to the larger group. Team lists were then displayed in a gallery format and participants were given the opportunity to vote for their top six priority Guiding Design Principles. These are listed below in order of the number of priority votes they received, with each Guiding Design Principle given six base points for appearing on one of the original team lists, and each subsequent priority vote given one point. Guiding Design Principles offer a framework of educational priorities that prove invaluable in helping stakeholders and design team members to set design goals and focus their work. This first iteration of Guiding Principles may continue to develop as the design process unfolds.

## Flexible and Adaptable (65 votes)

- Inquiry-Based and Hands-On Instruction
- Lab/Maker Space/Project Spaces
- Flexible Space and Furniture
- Authentic Learning Opportunities
- Flexible Thinking and Learning
- Visible Learning

## Whole Child Focus (57 votes)

- Balance Joy of Learning and Higher Order Thinking
- Social Emotional focus with Student Achievement
- Comfortable and Playful
- Problem Solving and Transferable Skills
- Intellectual Engagement
- Citizenship and Ethics
- Growth Mindset
- The Arts

## Neighborhood School (46 votes)

- Controlled Community Access
- Safe, Warm and Welcoming
- Community Resource
- Community Connections
- Community Building
- Hub of the Building

## Cooperative & Collaborative (45 votes)

- 21st Century Skills
- Teacher Collaboration and Teaming
- Student Collaboration
- Opportunities for Learning Together
- Large and Small Group PD

## Outdoor Space & Sustainability (25 votes)

- Building as a Teaching Tool
- Recess and Play
- Kitchen Lab and Gardens
- Learning, Gathering and Community Space
- Nature and Learning (Plants/Science)

## Classic, Not Trendy (22 votes)

- Fits with the Neighborhood
- Flexible Over Time
- Timeless and Non-Institutional
- Warm Tones/Wood

Manchester Essex Regional School District

# Blue Sky Ideas

The following "Blue Sky Ideas" for the design of the renovated and/or new Manchester Memorial Elementary School were brainstormed by the Educational Working Group (EWG) during Workshop Two. Participants each recorded their own Blue Sky Ideas, which have been grouped below by like-spaces and themes. Blue Sky Ideas, though sometimes unattainable, often hold the seeds of more realistic, creative and doable ideas that can inform the design of the facility.

- **Flexible Furniture**
  - Curved shelves on wheels
  - Chairs and tables
  - Teach station
  - Options for types of furniture
  - Meets academic needs
  - Smart/simple storage - hidden
- **Wireless/Mobile Technology**
- **Flexible Spaces Between Classrooms**
  - Differentiation
  - RtI (Response to Intervention)
  - Math Science
  - Shared students in guided reading
- **Onsite Nursery**
  - Mother's room
- **Reading/Learning Nooks**
  - Distributed within dining and library spaces
- **Age Appropriate Playgrounds that Make Sense**
- **Moving Stairwells**
  - i.e. puzzles within building like Harry Potter
  - Slide next to stairway
- **Grades 5-6 Transition Made Explicit**
  - i.e. 5th grade (locked) lockers maybe unlocked
- **Central Classroom with Cubicles for Special ED**
  - Reading tutorials
  - Or in one of Breakout Rooms
- **Central OT Room on Two Levels**
- **Anti-Chamber Before Classrooms**
  - Cubbies
  - Mud room
- **Centrally Located Specials**
  - Near each other
  - Consider traffic patterns
- **Multi-Purpose Wall**
- **Carpeting**
  - Some good qualities, but can be double edge sword
- **Greenhouse Courtyard / Atrium**
  - Near entry
  - Community meeting
- **Music Throughout the Building**
- **Rooftop Classroom**
  - Safe
  - Engaging
  - Circular
  - Like a pod - reflection
  - Everyone can see each other

Manchester Essex Regional School District

# Blue Sky Ideas (Continued)

- **Several Breakout/Teachers Rooms**
  - Near classrooms/bathrooms
- **Weather Station**
- **Examples of Sustainability**
  - Windmill
  - Photo Talks
- **Sinks in Every Classroom**
- **Bathrooms in Every Classroom**
- **Multiple Outdoor Play/Learning**
  - Designed for NE weather
  - Connected to indoor spaces (classrooms, cafeteria)
- **Alternate Play Space for Indoor Recess**
- **Children's Museum Features**
  - Green
  - Friendly
  - Calming
  - Colorful

## Additional Blue Sky Reflections:

**Looks Like a Children's Museum**

- I would love to see a school that looks more like a children's museum than a hospital
- This would be achieved with multi-story open spaces (foyer), skylights, and curved, irregular features
- Outdoor spaces would be connected to corresponding indoor spaces (i.e. cafe/playground, classrooms/outdoor learning spaces)
- The building would have multiple medium-large gathering spaces and dining/library spaces that would be distributed throughout the neighborhoods
- Multiple outdoor play and learning spaces would be designed for New England weather including plowable surfaces and covered area, so that learning can take place outdoor even in the rainy/snowy months!
- Classrooms would have inherent features to promote organization and collaboration between all staff and students
- The design would reflect local culture and values
- The exterior of the building would blend with surroundings
- The interior would be bright, colorful, and welcoming

**SAIL** (Social and Academic Integrated Learning)

- 2 classroom spaces
- Calming opportunity SAIL space
- Special ED. testing/tutorial
- Room with quiet cubicles
- Sign out
- Storage in each classroom
- Warm, welcoming, kid friendly feeling throughout - artwork displayed
- Neighborhood model with special education
- Pull-out spaces that are quiet and not in the hallway
- Community parking (please stop parking in spot #8) :)
- Hub with school nurse, counselor, etc
- Nursing / pumping space for working mothers

**Engaged Learning Spaces**

- Spaces for whole-body/gross motor movement
- Staff collaborating with one another
- "Mother's room" for nursing mothers
- Visible access into conference room
- Room for outside daycare
- Colors that are not "loud" or vibrant
- Staff kitchen/dining
- Aesthetic that looks like a school not a children's museum or prison

Manchester Essex Regional School District

# Blue Sky Ideas (Continued)

### Agile Classrooms
- Multiple spots in a class with overhead technology
- Student cubbies/lockers in classes
- Tutorial spaces for parallel instruction
- Cubicles within a "break out" room
- Sound proof walls
- Areas in a class for small group instruction
- Less distraction, but still in room

### Outdoor Connections
- Big window walls, i.e. cafeteria to playground
- Multiple playgrounds/ age appropriate structures
- Green house
- Plants built-in
- Observatory designated space
- Slides from second level to the cafeteria (thinking about the Google headquarters)
- Cubbies in classrooms rather than hallway lockers
- Tile floors in classrooms (for cleaning)
- Teacher bathrooms easy access (like a little storage room between 2 classrooms in a pod)
- Fun-looking like colorful and interesting shapes rather than everything straight
- Mother's room-nursery school!

### Community Amenities
- Separate Youth Center / Parks Recreation facility
- Additional field space / gym space for community Alewife late night practicing
- Community welcome space / PTO room
- Auditorium for student performance
- Medium size (50) group space

### Spaces that Promote Innovation and Creativity
- Flexible and movable furniture and tods for creation (to build physical and digital products) and collaboration
- Space and resources to enable variety of student projects and creations from engineering and science to math, civics + ELA, to arts and cafeteria ...
- Variation in furniture and functional elements to illustrate myriad ways to fulfill a need or function –
- Different table styles, different door handles, a variety of mechanisms to flush a toilet(s) ...
- Sink and storage on every room for hands-on learning
- Using technology to move beyond the walls to engage community and partnerships

### Varied Spaces
- Learning neighborhoods
- Flexible spaces
- Reading nooks (learning, nooks)
- Natural light-that doesn't impact technology
- Homey furniture
- Blues/teals/calming cool colors
- Sound system
- Multi-purpose walls (white board, magnetic, bulletin)
- Visible to hallway
- Music throughout building for opening and closing
- Gathering spaces throughout building
- Openings to adjoin classrooms
- Visible learning -nice blinds or curtains
- Storage that is efficient and hidden
- Smart simple storage

### Flexible Features
- Flexible space between classrooms to foster collaboration between classrooms, SPED services, RTI, etc.
- Space that would be customized to fit the need of each year and the varied needs of students
- Furniture that can move easily to foster different types of learning and activities
- Bookshelves on wheels to organize, display and partition areas of the room
- Technology that is innovative but long term
- Lockers that make sense! Size appropriate for grade-level and space constraints
- Sink in each room
- Storage

# Blue Sky Ideas (Continued)

### Teacher Teaming



- Teams of teachers closely connected
- Flexible spaces between teachers
- Lots of storage space
- Drawers that accommodate large chart paper and extensive storage for science supplies
- Movable bookshelves and large furniture
- Carping for working floor space
- Multi-purpose wall-tech writing
- Sound system throughout building for quiet/calming music
- Lockers that serve dual purpose
- Usable space/lockers wide enough to fit backpacks
- Warm colors/colors from nature warm wood tones
- furniture that is warm/inviting
- Smart desk solutions - flexible/stores student's materials



### Gathering Spaces

- Space for whole school to gather as a whole
- Space for grade levels to gather as a whole
- Teacher work areas that foster collaboration and communication
- Ability to section off large spaces to make smaller work spaces
- Office area that is welcoming but also promotes confidentiality (i.e. parents not overhearing everything)
- Calming "break" rooms for students
- Natural-teaching opportunities /real-life applications i.e. outdoor garden, sustainability
- Comfortable, varied furniture



### Flow of Space

- Wide hallways
- Nooks in classrooms and hallways
- Quiet areas build into classrooms for student collaboration
- Built-in shelving for classroom library
- Magnetic bulletin boards
- Science lab and place to store science materials
- Irregular shaped rooms, not square
- Amphitheatre/pod for each grade-level
- Calming, sea-inspired color scheme
- Wide drawers to store easel-pad paper (30x24)
- Carpet in classrooms and tile in hallways
- Rooftop classroom space
- High ceilings

Manchester Essex Regional School District

# Whole School Adjacency Diagram



This Whole School adjacency diagram was created by a small group of workshop participants in order to communicate their ideas about space adjacencies for the renovated and/or new building.

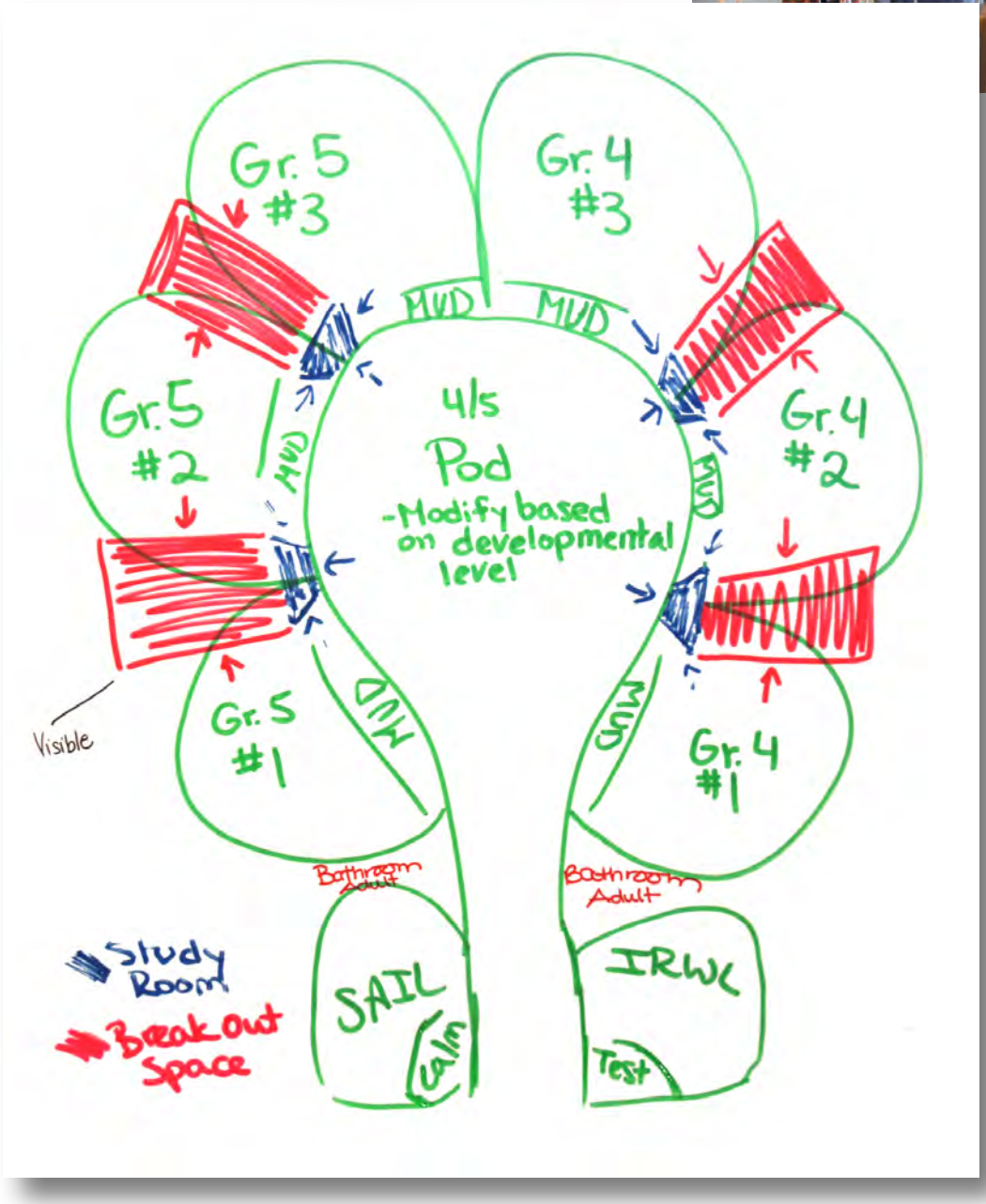


Manchester Essex Regional School District

# Neighborhood/Pod Adjacency Diagram



This Neighborhood/Pod adjacency diagram was created by a small group of workshop participants in order to communicate their ideas about space adjacencies for the renovated and/or new building.

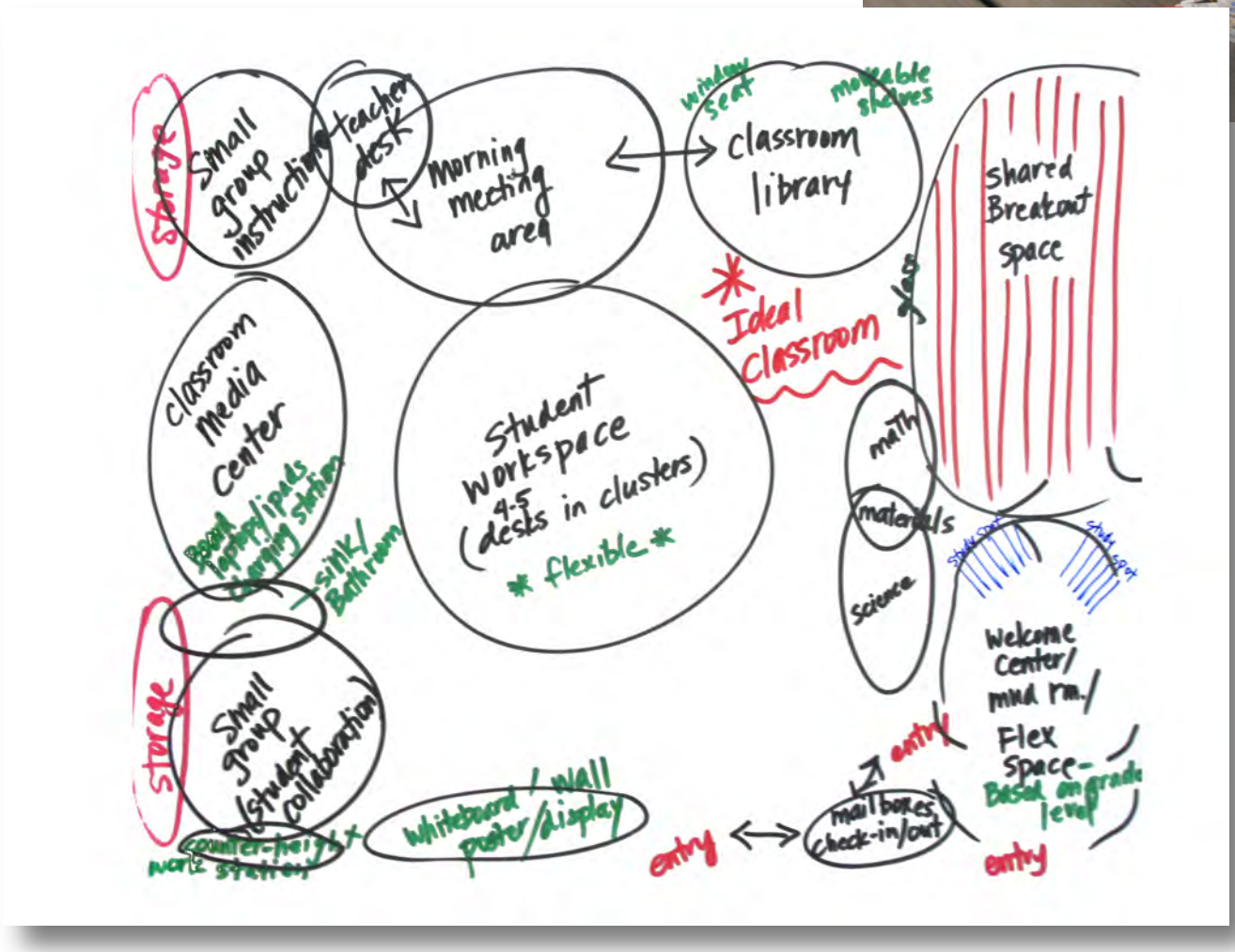


Manchester Essex Regional School District

# (Ideal) Classroom Adjacency Diagram

This Ideal Classroom adjacency diagram was created by a small group of workshop participants in order to communicate their ideas about space adjacencies for the renovated and/or new building.



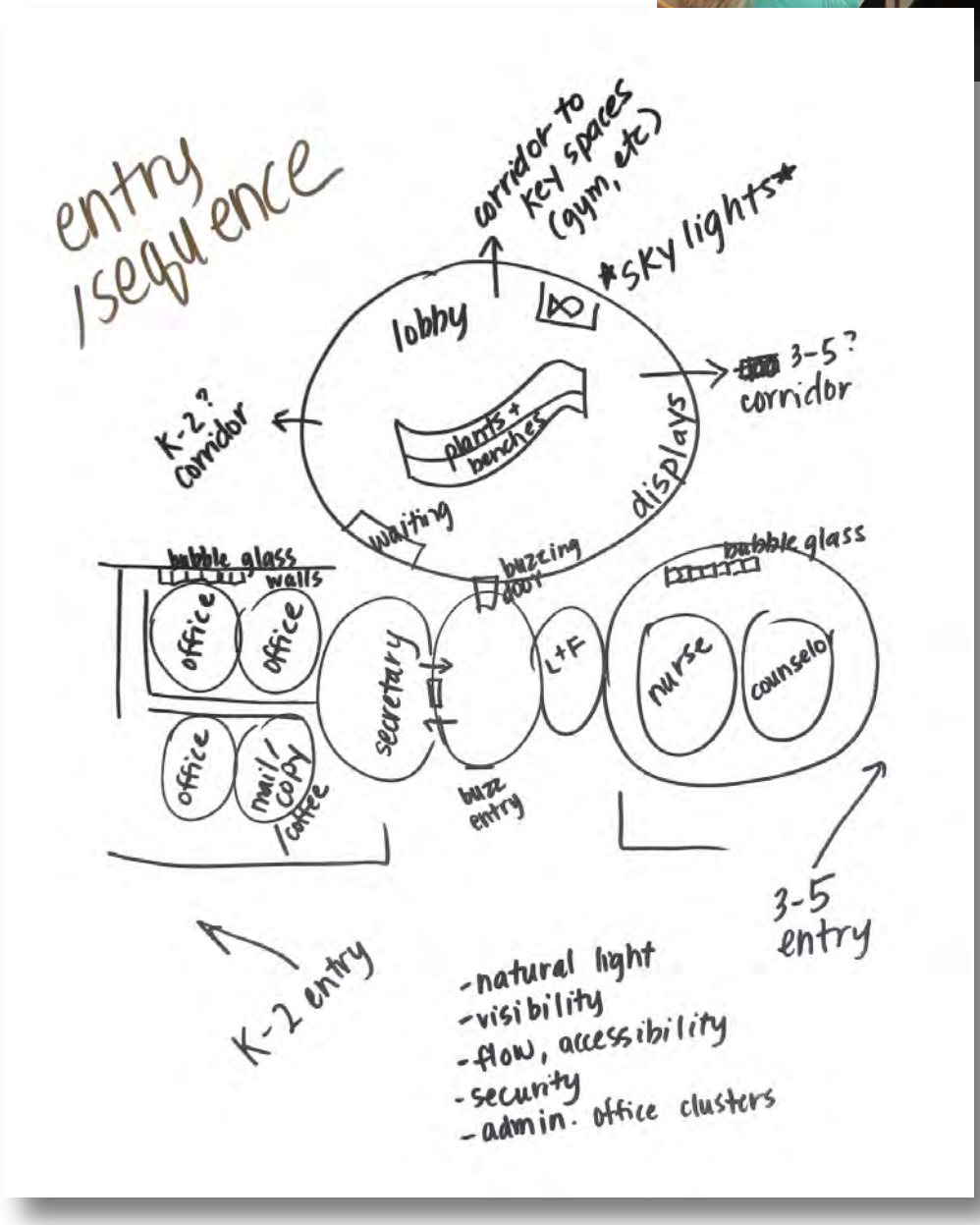


Manchester Essex Regional School District

# Entry Sequence Adjacency Diagram



This Entry Sequence adjacency diagram was created by a small group of workshop participants in order to communicate their ideas about space adjacencies for the renovated and/or new building.

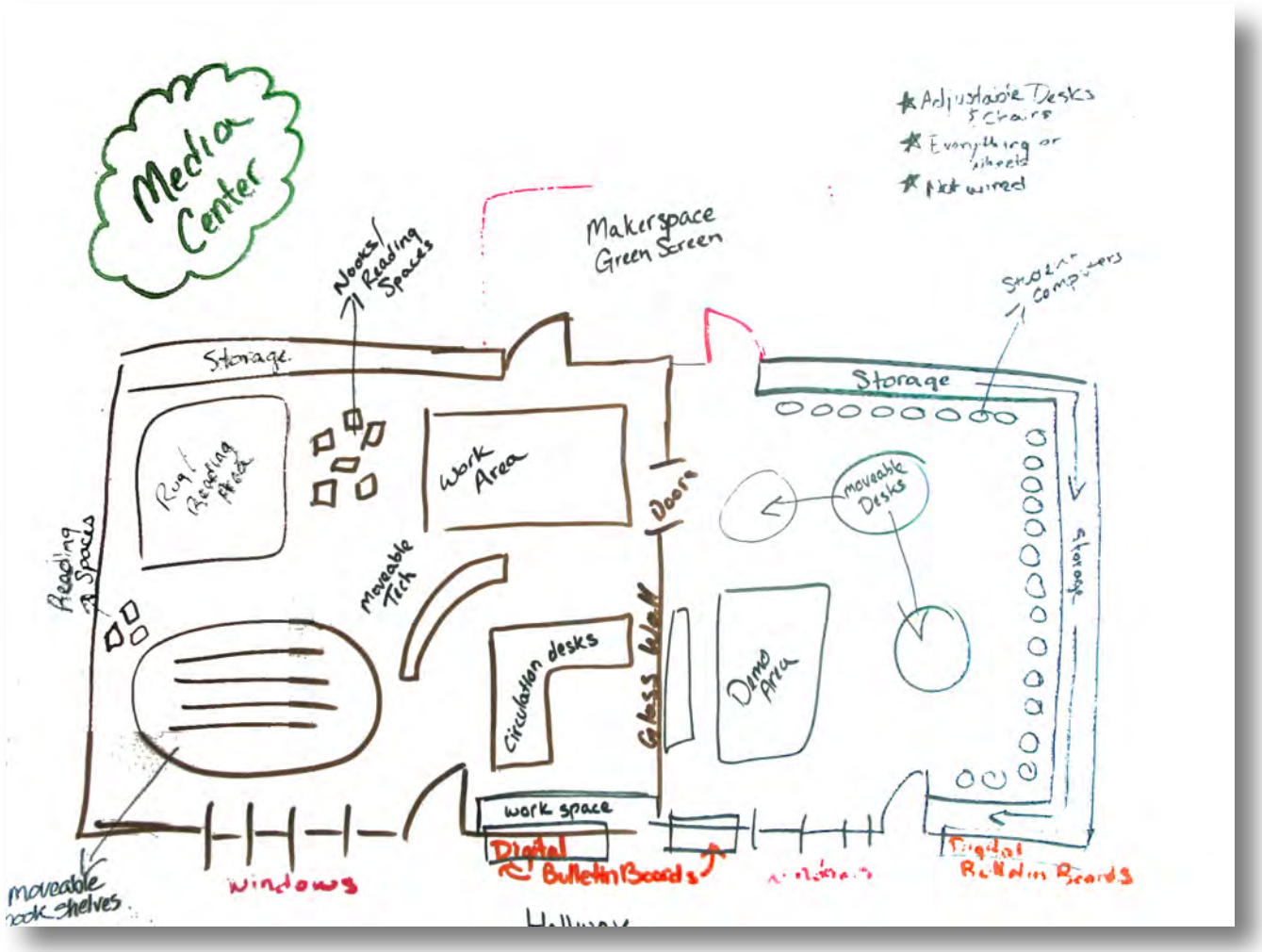


Manchester Essex Regional School District

# Media Center Adjacency Diagram

This Media Center adjacency diagram was created by a small group of workshop participants in order to communicate their ideas about space adjacencies for the renovated and/or new building.



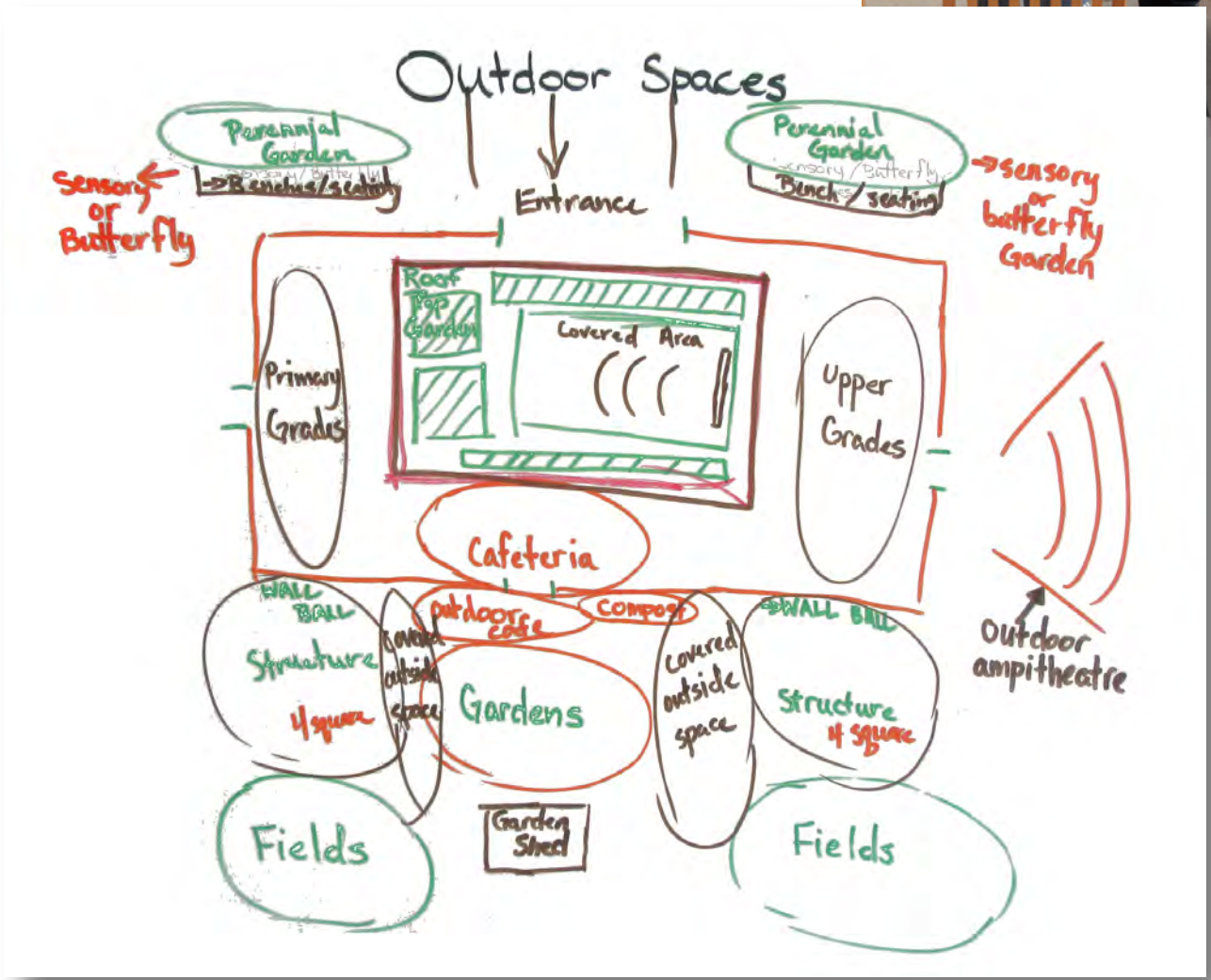


Manchester Essex Regional School District



## Outdoor Spaces Adjacency Diagram

This Outdoor Spaces adjacency diagram was created by a small group of workshop participants in order to communicate their ideas about space adjacencies for the renovated and/or new building.



Manchester Essex Regional School District

## Educational Working Group

# Visioning Workshop One

September 25, 2017

## Agenda

**EXPECTED OUTCOMES: By the end of the session we will have begun to…**

- Share **Priority Goals** for Manchester Essex Regional School District's (MERSD's) elementary school planning process
- Discuss 21st century teaching and learning and identify **21st Century Learning Goals** as connected to current and future best-practices within MERSD and Manchester Memorial Elementary School (MMES)
- Assess MERSD's **Strengths, Challenges, Opportunities, and Goals** with regard to the development of its academic programs and school facilities
- Explore and prioritize a range of architectural **Design Patterns** that will best support 21st century teaching and learning within MERSDs
- Share **Blue Sky Ideas** for the design of the renovated and/or new facility

| Time | Activity | Purpose |
|---|---|---|
| **8:30 – 9:15** | ***Workshop Goals and Introductions***<br>• Workshop overview<br>• The Design Process / Creating a Design Guide<br>• Introductions<br>  ○ Priority Goals for the elementary school planning process | Introduce participants, and clarify agenda and desired outcomes for this workshop. Share some of our priority goals for the renovated and/or new Manchester Memorial Elementary School facility and planning process. |
| **9:15 – 10:45** | ***21st Century Schools***<br>• Interactive Presentation: 21st Century Teaching and Learning<br>• Videos and discussion<br>• Small group review of assorted 21st century learning goals and outcomes and creation of priority listings<br>• Large group prioritization | Identify and discuss elements of 21st century teaching and learning as connected to MERSD's approach to its educational programming.<br><br>Ground our thinking about design guidelines and desired building features in a discussion and exploration of 21st century learning goals for MERSD and MMES |
| **10:45 – 11:00** | **Break** | |

| | | |
|---|---|---|
| **11:00 – 12:00** | ***Manchester Memorial Elementary School Present and Future Educational Priorities***<br>• Brief presentations of essential and innovative school programs and initiatives presently in practice within MMES and MERSD | Identify present and future educational initiatives and programs within MMES and MERSD, and discuss their effect on the design of the renovated and/or new facility. |
| **12:00– 12:30** | **LUNCH** | |
| **12:30 – 1:15** | ***MERSDs SCOG Analysis***<br>• Brainstorm of MERSD's Strengths, Challenges, Opportunities, and Goals | Identify what is presently working well within MERSD, what is challenging, and what opportunities exist with regard to the further development of academic programs and the renovated and/or new MMES facility. |
| **1:15 – 1:45** | ***21st Century School Facility Design Patterns***<br>• Presentation and Q&A | Ground our thinking about design guidelines and desired building features in a discussion and exploration of new school Design Patterns. |
| **1:45– 2:00** | **BREAK** | |
| **2:00 – 2:45** | ***Design Patterns for MERSD and MMES***<br>• Small group review of assorted facility Design Patterns<br>• Creation of priority listings<br>• Large group prioritization | Identify priority Design Patterns for MERSD and MMES's renovated and/or new elementary school. |
| **2:45 – 3:00** | ***Closing and Next Steps***<br>• Next Steps review and Q&A<br>• Blue Sky Ideas (Exit Ticket): What no-holds-barred, over-the-top, budget-is-no-issue idea(s) and/or space(s) would you like to see take shape in the new and/or renovated facility? | Hear from participants about their questions and thoughts. Review next steps for development of our process working together. |

Manchester Essex Regional School District

## Educational Working Group

# Visioning Workshop Two

October 23, 2017

## Agenda

**EXPECTED OUTCOMES: By the end of the session we will have begun to…**

- Review and expand upon the **Learning Goals, SCOG Analysis,** and priority **Design Patterns** for MERSD's renovated and/or new elementary school
- Understand the role that **Guiding Principles** play in setting facility design priorities and intent
- Create a set of **Guiding Principles** and priorities for the design of MERSD's renovated and/or new elementary school
- Generate a listing of **Key Spaces and Desired Adjacencies** for the renovated and/or new facility
- Engage in a **Bubble Diagramming Activity** to identify important spaces and adjacencies within the renovated and/or new school
- Create a listing of **Talking Points** that distill the group's educational vision

| Time | Activity | Purpose |
|---|---|---|
| **8:30 – 9:15** | ***Workshop Goals and WS One Debrief***<br>• Introduction of new members<br>• Review of:<br>  ○ Learning Goals<br>  ○ SCOG Analysis<br>  ○ Priority Design Patterns<br><br>What strikes us? What's missing? | Review today's agenda and debrief the September 25th workshop activities and discuss key themes and takeaways. |
| **9:15– 10:00** | ***Guiding Principles for Design***<br>• Presentation and Q&A | Explore the connections between Guiding Principles and effective school design solutions. |
| **10:00– 10:15** | **BREAK** | |

| | | |
|---|---|---|
| **10:15 – 11:00** | ***Guiding Principles for Design***<br>• Small group review of assorted Guiding Principles and creation of priority listings<br>• Large group sharing and prioritization | Translate our MMES Learning Goals and desired Design Patterns into a listing of priority Guiding Principles for the design of the new and/or renovated facility. |
| **11:00 – 12:00** | ***Key Spaces and Desired Adjacencies***<br>• Individual reflection<br>• Small group discussion<br>• Large group sharing and recording | Share practical and creative design ideas that will help us reach our learning goals, implement desired Design Patterns, and put our newly brainstormed Guiding Principles into practice. |
| **12:00 – 12:45** | **LUNCH** | |
| **12:45 – 2:00** | ***Bubble Diagramming***<br>• Individual and small group diagramming of key spaces and/or desired adjacencies within the new school<br>• Large group sharing | Identify important adjacencies and design ideas that can be explored further in the conceptual design process. |
| **2:00 –2:15** | **BREAK** | |
| **2:15 – 2:50** | ***Community Talking Points Activity***<br>• Individual and small group brainstorming of 3-5 talking points for the school community and larger community that sum up the ideas, inspirations and priorities discussed during our two days of visioning workshops<br>• Large group sharing | Distill main ideas and talking points for communication with MMES and MERSD faculty members, as well as the larger MERSD community of students, parents, community partners and community members. |
| **2:50 –3:00** | ***Closing and Next Steps***<br>• Next Steps review and Q&A | Hear from participants about their questions and thoughts. Review next steps for development of our process working together. |

## PREFERRED SOLUTION SPACE SUMMARY

After receiving comments from the MSBA on the Preliminary Design Program, responses were submitted and the Space Summary was updated to reflect the adjustments that were made. The Space Summary is included on the following pages. There were several categories in the Space Summary that were adjusted to reflect design developments, direct comments from the MSBA on the Preliminary Space Summary (that was originally submitted as part of the PDP), and new discussions by the Committee relative to the proposed organization within the proposed building. These changes are highlighted here:

Medical – The PDP reflected a shower in the medical suite @ 50 nsf

The PSR has moved this element into the gross square footage category.

Total Building Net Floor Area – has decreased (from PDP to PSR) by 50 NSF to 56,974 NSF

Total Building Gross Floor Area – has increased (from PDP to PSR) by 2,030 SF to 82,800 GSF.

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# Manchester Memorial Elementary School - Proposed Space Summary
# OPTION N-3 New School

**Architect Certification**

*I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulations and policies of the Massachusetts School Building Authority to the best of my knowledge and belief. A true statement, made under the penalties of perjury.*

**Name of Architect Firm:** JCJ Architecture

**Name of Principal Architect:** James E. LaPosta Jr. FAIA, LEED AP

**Signature of Principal Architect:**

**Date:** February 21, 2018

| Manchester Memorial Elementary School | Existing Conditions | | | Existing to Remain/Renovated | | | New | | | Total | | | MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines) | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ROOM TYPE | ROOM NFA[1] | # OF RMS | area totals | ROOM NFA[1] | # OF RMS | area totals | ROOM NFA[1] | # OF RMS | area totals | ROOM NFA[1] | # OF RMS | area totals | ROOM NFA[1] | # OF RMS | area totals | Comments |
| **CORE ACADEMIC SPACES** | | 20 | **17,517** | | 0 | **0** | | 24 | **25,500** | | 24 | **25,500** | | **15** | **15,000** | |
| Kindergarten w/ toilet | 930 | 2 | 1,860 | 0 | 0 | - | 1,200 | 3 | 3,600 | 1,200 | 3 | 3,600 | 1,200 | 3 | 3,600 | 1,100 SF min - 1,300 SF max |
| General Classrooms - Grade 1-5 | 850 & 930 | 16 | 14,000 | 0 | 0 | - | 950 | 15 | 14,250 | 950 | 15 | 14,250 | 950 | 12 | 11,400 | 900 SF min - 1,000 SF max |
| Pre-Kindergarten w/ Toilet | 829 | 2 | 1,657 | 0 | 0 | - | 1,200 | 4 | 4,800 | 1,200 | 4 | 4,800 | 0 | 0 | - | |
| Pre-Kindergarten Storage | 0 | 0 | - | 0 | 0 | - | 150 | 3 | 450 | 150 | 3 | 450 | 0 | 0 | - | |
| STEM /Maker Classroom w/ Storage | | | | 0 | 0 | - | 1,200 | 2 | 2,400 | 1,200 | 2 | 2,400 | 0 | 0 | - | |
| **SPECIAL EDUCATION** | | | **3,529** | | | **0** | | | **6,540** | | | **6,540** | | | **4,530** | |
| Self-Contained SPED | 932 | 3 | 2,796 | 0 | 0 | - | 950 | 4 | 3,800 | 950 | 4 | 3,800 | 950 | 3 | 2,850 | Currently SAIL, Literacy & Speech in full CR's |
| Self-Contained SPED - toilet | 0 | 0 | - | 0 | 0 | - | 60 | 4 | 240 | 60 | 4 | 240 | 60 | 3 | 180 | |
| Resource Rooms | 536 | 1 | 536 | 0 | 0 | - | 500 | 4 | 2,000 | 500 | 4 | 2,000 | 500 | 2 | 1,000 | Current OTPT Only |
| Small Group Room / Reading | 197 | 1 | 197 | 0 | 0 | - | 500 | 1 | 500 | 500 | 1 | 500 | 500 | 1 | 500 | 1/2 size Genl. Clrm. |
| | | | | | | - | | | | | | | | | | |
| **ART & MUSIC** | | | **2,096** | | | **0** | | | **2,550** | | | **2,550** | | | **2,500** | |
| Art Classroom - 25 seats | 935 | 1 | 935 | 0 | 0 | - | 1,000 | 1 | 1,000 | 1,000 | 1 | 1,000 | 1,000 | 1 | 1,000 | assumed schedule 2 times / week / student |
| Art Workroom w/ Storage & kiln | 226 | 1 | 226 | 0 | 0 | - | 150 | 1 | 150 | 150 | 1 | 150 | 150 | 1 | 150 | |
| Music Classroom / Large Group - 25-50 seats | 935 | 1 | 935 | 0 | 0 | - | 1,200 | 1 | 1,200 | 1,200 | 1 | 1,200 | 1,200 | 1 | 1,200 | assumed schedule 2 times / week / student |
| Music Practice / Ensemble / Lessons | 0 | 0 | - | 0 | 0 | - | 200 | 1 | 200 | 200 | 1 | 200 | 75 | 2 | 150 | |
| **HEALTH & PHYSICAL EDUCATION** | | | **5,598** | | | **0** | | | **7,900** | | | **7,900** | | | **6,300** | |
| Gymnasium | 5,359 | 1 | 5,359 | 0 | 0 | - | 7,600 | 1 | 7,600 | 7,600 | 1 | 7,600 | 6,000 | 1 | 6,000 | 6000 SF Min. Size |
| Gym Storeroom | 180 | 1 | 180 | 0 | 0 | - | 150 | 1 | 150 | 150 | 1 | 150 | 150 | 1 | 150 | |
| Health Instructor's Office w/ Shower & Toilet | 59 | 1 | 59 | 0 | 0 | - | 150 | 1 | 150 | 150 | 1 | 150 | 150 | 1 | 150 | |
| **MEDIA CENTER** | | | **1,020** | | | **0** | | | **2,178** | | | **2,178** | | | **2,178** | |
| Media Center / Reading Room | 1,020 | 1 | 1,020 | 0 | 0 | - | 2,178 | 1 | 2,178 | 2,178 | 1 | 2,178 | 2,178 | 1 | 2,178 | |
| **DINING & FOOD SERVICE** | | | **4,585** | | | **0** | | | **5,660** | | | **5,660** | | | **5,659** | |
| Cafeteria / Dining | 2,344 | 1 | 2,344 | 0 | 0 | - | 2,513 | 1 | 2,513 | 2,513 | 1 | 2,513 | 2,513 | 1 | 2,513 | 2 seatings - 15SF per seat |
| Stage | 1,216 | 1 | 1,216 | 0 | 0 | - | 1,000 | 1 | 1,000 | 1,000 | 1 | 1,000 | 1,000 | 1 | 1,000 | |
| Chair / Table / Equipment Storage | 0 | 0 | - | 0 | 0 | - | 312 | 1 | 312 | 312 | 1 | 312 | 312 | 1 | 312 | |
| Kitchen | 1,025 | 1 | 1,025 | 0 | 0 | - | 1,635 | 1 | 1,635 | 1,635 | 1 | 1,635 | 1,635 | 1 | 1,635 | 1600 SF for first 300 + 1 SF/student Add'l |
| Staff Lunch Room | 0 | 0 | - | 0 | 0 | - | 200 | 1 | 200 | 200 | 1 | 200 | 200 | 1 | 200 | 20 SF/Occupant |
| **MEDICAL** | | | **465** | | | **0** | | | **510** | | | **510** | | | **510** | |
| Medical Suite Toilet | 23 | 1 | 23 | 0 | 0 | - | 60 | 1 | 60 | 60 | 1 | 60 | 60 | 1 | 60 | |
| Nurses' Office / Waiting Room | 442 | 1 | 442 | 0 | 0 | - | 250 | 1 | 250 | 250 | 1 | 250 | 250 | 1 | 250 | |
| Examination Room / Resting | 0 | 0 | - | 0 | 0 | - | 100 | 2 | 200 | 100 | 2 | 200 | 100 | 2 | 200 | |
| **ADMINISTRATION & GUIDANCE** | | | **2,144** | | | **0** | | | **2,401** | | | **2,401** | | | **2,350** | |
| General Office / Waiting Room / Toilet | 314 | 1 | 314 | 0 | 0 | - | 318 | 1 | 318 | 318 | 1 | 318 | 318 | 1 | 318 | |
| Teachers' Mail and Time Room | 0 | 0 | - | 0 | 0 | - | 100 | 1 | 100 | 100 | 1 | 100 | 100 | 1 | 100 | |
| Duplicating Room | 385 | 1 | 385 | 0 | 0 | - | 150 | 1 | 150 | 150 | 1 | 150 | 150 | 1 | 150 | |
| Records Room | 42 | 1 | 42 | 0 | 0 | - | 110 | 1 | 110 | 110 | 1 | 110 | 110 | 1 | 110 | |
| Principal's Office w/ Conference Area | 150 | 1 | 150 | 0 | 0 | - | 375 | 1 | 375 | 375 | 1 | 375 | 375 | 1 | 375 | |
| Principal's Secretary / Waiting | 0 | 1 | - | 0 | 0 | - | 125 | 1 | 125 | 125 | 1 | 125 | 125 | 1 | 125 | |
| Assistant Principal's Office | 158 | 1 | 158 | 0 | 0 | - | 0 | 0 | - | 0 | 0 | - | 120 | 0 | - | |
| Supervisory / Spare Office | 95 | 1 | 95 | 0 | 0 | - | 120 | 1 | 120 | 120 | 1 | 120 | 120 | 1 | 120 | |
| Guidance Office | 184 | 1 | 184 | 0 | 0 | - | 150 | 1 | 150 | 150 | 1 | 150 | 150 | 1 | 150 | |
| Guidance Storeroom | 0 | 0 | - | 0 | 0 | - | 35 | 1 | 35 | 35 | 1 | 35 | 35 | 1 | 35 | |
| Teachers' Work Room | 253 | 1 | 253 | 0 | 0 | - | 318 | 1 | 318 | 318 | 1 | 318 | 318 | 1 | 318 | |
| Book Storage (Leveled Library) | 200 | 1 | 200 | 0 | 0 | - | 300 | 1 | 300 | 300 | 1 | 300 | 300 | 1 | 300 | |
| Parent/Teacher Conference Room | 363 | 1 | 363 | 0 | 0 | - | 300 | 1 | 300 | 300 | 1 | 300 | 250 | 1 | 250 | |
| **CUSTODIAL & MAINTENANCE** | | | **1,084** | | | **0** | | | **1,935** | | | **1,935** | | | **1,935** | |
| Custodian's Office | | | | 0 | 0 | - | 150 | 1 | 150 | 150 | 1 | 150 | 150 | 1 | 150 | |
| Custodian's Workshop | | | | 0 | 0 | - | 375 | 1 | 375 | 375 | 1 | 375 | 375 | 1 | 375 | |
| Custodian's Storage | | | | 0 | 0 | - | 375 | 1 | 375 | 375 | 1 | 375 | 375 | 1 | 375 | |
| Recycling Room / Trash | 0 | 0 | - | 0 | 0 | - | 400 | 1 | 400 | 400 | 1 | 400 | 400 | 1 | 400 | |
| Receiving and General Supply | 0 | 0 | - | 0 | 0 | - | 212 | 1 | 212 | 212 | 1 | 212 | 212 | 1 | 212 | |
| Storeroom | 1,000 | 1 | 1,000 | 0 | 0 | - | 223 | 1 | 223 | 223 | 1 | 223 | 223 | 1 | 223 | |
| Network / Telecom Room | 84 | 1 | 84 | 0 | 0 | - | 200 | 1 | 200 | 200 | 1 | 200 | 200 | 1 | 200 | |
| **OTHER** | | | **1,800** | | | **0** | | | **1,800** | | | **1,800** | | | **0** | |
| Parks and Recreation Space (Basement) | 1,800 | 1 | 1,800 | 0 | 0 | - | 1,800 | 1 | 1,800 | 1,800 | 1 | 1,800 | | | | |
| Total Building Net Floor Area (NFA) | | | **39,838** | | | **0** | | | **56,974** | | | **56,974** | | | **40,962** | |
| Student Capacity / Enrollment | | | 361 | | | | | | | | | | | | **335** | |
| Total Building Gross Floor Area (GFA)[2] | | (7,641) | 66,573 | | | - | | | **82,800** | | | **82,800** | | | **58,932** | |
| Grossing factor (GFA/NFA) | | | **1.67** | | | **1.45** | | | **1.45** | | | **1.45** | | | **1.44** | |

[2] **Total Building Gross Floor Area (GFA) Includes the entire building gross square footage measured from the outside face of exterior walls**

## SUSTAINABILITY SCORECARD

In December 2017, the Design Team held an initial discussion relative to the Sustainability Goals for this school project. The overarching goal of this workshop was to determine what sustainability elements were important and realistic within the scope of the proposed Memorial School project. The attached Documents reflect those efforts.

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VvS | Architects & Consultants

# LEED v4 for BD+C: Schools
Project Checklist

Project Name: MANCHESTER MEMORIAL ELEMENTARY SCHOOL - OPTON N-1, N-3, N-9
Date: 1/19/2018

| Y | ? | N | | | |
|---|---|---|---|---|---|
| 1 | | | Credit | Integrative Process | 1 |

| 4 | 4 | 7 | **Location and Transportation** | | 15 |
|---|---|---|---|---|---|
| | | | Credit | LEED for Neighborhood Development Location | 15 |
| 1 | | | Credit | Sensitive Land Protection | 1 |
| | | 2 | Credit | High Priority Site | 2 |
| 1 | 1 | 3 | Credit | Surrounding Density and Diverse Uses | 5 |
| | 2 | 2 | Credit | Access to Quality Transit | 4 |
| 1 | | | Credit | Bicycle Facilities | 1 |
| | 1 | | Credit | Reduced Parking Footprint | 1 |
| 1 | | | Credit | Green Vehicles | 1 |

| 6 | 4 | 2 | **Sustainable Site** | | 12 |
|---|---|---|---|---|---|
| Y | | | Prereq | Construction Activity Pollution Prevention | Required |
| Y | | | Prereq | Environmental Site Assessment | Required |
| 1 | | | Credit | Site Assessment | 1 |
| | 2 | | Credit | Site Development - Protect or Restore Habitat | 2 |
| 1 | | | Credit | Open Space | 1 |
| | 2 | 1 | Credit | Rainwater Management | 3 |
| 2 | | | Credit | Heat Island Reduction | 2 |
| 1 | | | Credit | Light Pollution Reduction | 1 |
| | | 1 | Credit | Site Master Plan | 1 |
| 1 | | | Credit | Joint Use of Facilities | 1 |

| 6 | 2 | 4 | **Water Efficiency** | | 12 |
|---|---|---|---|---|---|
| Y | | | Prereq | Outdoor Water Use Reduction | Required |
| Y | | | Prereq | Indoor Water Use Reduction | Required |
| Y | | | Prereq | Building-Level Water Metering | Required |
| 2 | | | Credit | Outdoor Water Use Reduction | 2 |
| 3 | 2 | 2 | Credit | Indoor Water Use Reduction | 7 |
| | | 2 | Credit | Cooling Tower Water Use | 2 |
| 1 | | | Credit | Water Metering | 1 |

| 12 | 10 | 9 | **Energy and Atmospher** | | 31 |
|---|---|---|---|---|---|
| Y | | | Prereq | Fundamental Commissioning and Verification | Required |
| Y | | | Prereq | Minimum Energy Performance | Required |
| Y | | | Prereq | Building-Level Energy Metering | Required |
| Y | | | Prereq | Fundamental Refrigerant Management | Required |
| | 6 | | Credit | Enhanced Commissioning | 6 |

| 5 | 3 | 5 | **Materials and Resource** | | 13 |
|---|---|---|---|---|---|
| Y | | | Prereq | Storage and Collection of Recyclables | Required |
| Y | | | Prereq | Construction and Demolition Waste Management Planning | Required |
| | | 5 | Credit | Building Life-Cycle Impact Reduction | 5 |
| 1 | 1 | | Credit | Building Product Disclosure and Optimization - Environmental Product Declarations | 2 |
| 1 | 1 | | Credit | Building Product Disclosure and Optimization - Sourcing of Raw Materials | 2 |
| 1 | 1 | | Credit | Building Product Disclosure and Optimization - Material Ingredients | 2 |
| 2 | | | Credit | Construction and Demolition Waste Management | 2 |

| 10 | 6 | 0 | **Indoor Environmental Quality** | | 16 |
|---|---|---|---|---|---|
| Y | | | Prereq | Minimum Indoor Air Quality Performance | Required |
| Y | | | Prereq | Environmental Tobacco Smoke Control | Required |
| Y | | | Prereq | Minimum Acoustic Performance | Required |
| 2 | | | Credit | Enhanced Indoor Air Quality Strategies | 2 |
| 3 | | | Credit | Low-Emitting Materials | 3 |
| 1 | | | Credit | Construction Indoor Air Quality Management Plan | 1 |
| 1 | 1 | | Credit | Indoor Air Quality Assessment | 2 |
| 1 | | | Credit | Thermal Comfort | 1 |
| 1 | 1 | | Credit | Interior Lighting | 2 |
| | 3 | | Credit | Daylight | 3 |
| 1 | | | Credit | Quality Views | 1 |
| | 1 | | Credit | Acoustic Performance | 1 |

| 4 | 2 | 0 | **Innovation** | | 6 |
|---|---|---|---|---|---|
| 3 | 2 | | Credit | Innovation | 5 |
| 1 | | | Credit | LEED Accredited Professional | 1 |

| 2 | 1 | 1 | **Regional Priority** | | 4 |
|---|---|---|---|---|---|
| 1 | | | Credit | Regional Priority: Optimize Energy Performance, 8 points min. | 1 |
| | 1 | | Credit | Regional Priority: Site development - protect or restore habitat, 2 points min. | 1 |
| 1 | | | Credit | Regional Priority: Outdoor water use reduction, 2 points min. | 1 |
| | | 1 | Credit | Regional Priority: Specific Credit | 1 |

| 50 | 32 | 28 | **TOTALS** | Possible Points: | 110 |
|---|---|---|---|---|---|

**Certified:** 40 to 49 points, **Silver:** 50 to 59 points, **Gold:** 60 to 79 points, **Platinum:** 80 to 110

| | | | | | |
|---|---|---|---|---|---|
| 9 | 3 | 4 | Credit | Optimize Energy Performance | 16 |
| 1 | | | Credit | Advanced Energy Metering | 1 |
| | | 2 | Credit | Demand Response | 2 |
| | | 3 | Credit | Renewable Energy Production | 3 |
| | 1 | | Credit | Enhanced Refrigerant Management | 1 |
| 2 | | | Credit | Green Power and Carbon Offsets | 2 |

## SUSTAINABILITY GOALS LETTER

The Designer acknowledges the sustainability goals of this proposed project.

JCJARCHITECTURE

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BOSTON@JCJ.COM

AN EMPLOYEE OWNED COMPANY

February 21, 2018

Brittany K. Gomes
Project Coordinator
Massachusetts School Building Authority
40 Broad Street, Suite 500
Boston, MA 02109

Re: Manchester-Essex Regional School District
Manchester memorial Elementary School
Manchester-by-the-Sea, Massachusetts
Preferred Schematic Report
Designer Sustainability Statement
JCJ Project No. B17046.00

Dear Ms. Gomes:

This is an acknowledgement that Manchester-Essex Regional School District has identified a goal of 2% additional reimbursement from the MSBA High Efficiency Green School Program. As their Designer, I have submitted a completed LEED-S version 4 scorecard showing all prerequisites and 50+ attempted points, which will meet that goal.

The scope of work for this project will include the construction elements and performance tasks to achieve this goal, an all subsequent documents, including but not limited to, specifications, drawings, and cost estimates will match the scope o work indicated in the submitted scorecard.

Please contact our office with any questions.

Very truly yours,

James R. LaPosta, Jr., FAIA, LEED AP, MCPPO
Chief Architectural Officer / Principal

Ann Cameron, Co- Chair, Memorial School Committee
Caroline Weld, Co-Chair, Memorial School Committee
Pam Beaudoin, Superintendent, Manchester Regional School District
Avi Urbas, Direct of Finance, Manchester-Essex Regional School District
Jay Pagliarulo, Director of Facilities and Maintenance, Manchester-Essex Regional School Public Schools
Steve Brown, Owner's Project Manager, Dore + Whittier Management Professional
Jim La Posta, FAIA, LEED AP, MCPPO, Designer, JCJ Architecture
Lauren Braren, AIA, LEED AP, Designer/ Project Architect, JCJ Architecture
File B17046.00 / 26

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# Preferred Schematic Sustainability Narrative – N-1, N-3, N-9

The Manchester Memorial Elementary School project in Manchester-by-the-Sea, MA will pursue LEED for Schools v 4 certification. The project team would like to attempt the certification at silver level allowing the district to apply for the additional 2% reimbursement. The strategies and assumptions presented in the attached project scorecard will allow the project to attempt 50+ points, as required for the LEED for Schools v4 Silver level.

During the preliminary sustainability review the project team analyzed both available sustainability certification options: NE-CHPS as well as LEED-S, and it has been concluded that the LEED for Schools v4 would be more beneficial for the project.

LEED for Schools v4 certification is divided into 7 major categories: Integrative Process, Location and Transportation, Sustainable Sites, Water Efficiency, Energy and Atmosphere, Materials and Resources and Indoor Environmental Quality. There are 2 supplementary categories: Innovation in Design as well as Regional Priority.

## Integrative Process

The project implemented the integrative design process from the very beginning. The design team together with the sustainability consultant discussed the project sustainability goals which were then translated into a preliminary LEED scorecard and checklists. The project team intends to organize a green building charrette with all other stakeholders in the upcoming months to further outline the project sustainability goals, as well as to identify the opportunities to achieve synergies across the disciplines and building systems. The next steps include a preparation of a simple energy modeling analysis as well as water budget analysis during the schematic design phase.

## Location and Transportation

The team analyzed the project site and multiple development options and it was concluded that all of them meet the basic LEED requirements. It seems that the site could potentially allow the project to earn between 4-8 points in the LT category. The suburban location limits the amount of public transportation available for the project as well as the availability of basic services. The project is located in a close proximity to single family residential neighborhoods. The project provides school bus transportation to the majority of the student population. The public transport to the site should be improved – currently the site is not within a quarter mile walking distance from a public bus stop while the commuter rail provides limited service.

The project is interested to pursue the bicycling and green vehicles credits. The project will maximize alternative transport opportunities within the site, by providing preferred parking spaces for low emitting vehicles and drop off area for carpools, install an electric vehicle charging station as well as transition to green buses and other school-owned vehicles. Bicycle racks will be provided for students and staff and changing facilities will include showers. The project will promote walking and biking to school among students. The School District is advised to share facilities with the public for complimentary uses to increase the sustainability of the new project.

## Sustainable Sites

The project plans to undertake a number of sustainability strategies in compliance with the LEED for Schools rating system. Many of them will not only enhance the sustainability of the project but also provide quality outdoor spaces/features for the children as well as reduce the impact on the local infrastructure.

The site design will maximize the open space and vegetated areas in order to improve the children's experience as well as protect the natural habitat. Site employed strategies will include stormwater runoff reduction, joint use of facilities as well as avoidance of light pollution by proposed lighting design. The site lighting will be reduced, and will include full cut-off pole lighting, reduced lighting at site perimeter, interior lighting will be automatically shut down after hours. In order to reduce the heat island effect, the project plans to install a white roof. The team is also considering a small green roof for educational purposes, bioswale as well as herb and vegetable garden for students.

## Water Efficiency

The designed vegetation will complement the existing one on site, the selected species will be native or adapted, low maintenance and drought tolerant. This will minimize the need to use harmful chemicals, expenses associated with maintenance as well as unnecessary potable water use for irrigation purposes. The project does not intend to install permanent irrigation system.

Indoor plumbing fixtures will be low flow, including ultra-low flow metering faucets in lavatories and classrooms, low flow kitchen handwashing sinks in the kitchen, low flow showers, low flow kitchen sinks and pre-rinse spray valves, pint urinals and low flow single flush toilets resulting in expecting potable water savings of 35-40%. Children will be educated about the reduced water use practices through signage or educational display.

## Energy and Atmosphere

The building intends to reduce energy usage and associated carbon emissions through architectural and systems design.

"The Piano" N-1 option, is the most compact structure which will be the most favorable with regards to heating and cooling load due to the smallest surface area exposed to the outdoor conditions. It also favorably places all classrooms along the south and west direction maximizing daylight and hence further conserving energy. Placing gym in the center will limit cooling energy loss. The proposed overlook/skylight will provide daylight to the gym and along the main corridor.

"The Hub" N-3 will be optimally sited along the east-west axis to take advantage of passive design opportunities. The added second floor will aid in energy conservation by making the structure more compact

"The Hook" N-9 will allow for maximized south-western exposure for the classrooms, reducing heating loads and energy usage for artificial. Gym, cafeteria and support spaces which may require increased cooling loads were located along the northern site while library and offices were provided daylighting opportunities. Potential solar heat gain will be controlled by overhangs, exterior blinds and/or specialty glazing.

All new construction options will include advanced building envelope, highly efficient mechanical systems, daylight harvesting opportunities, significantly reduced lighting power density and lighting controls.

Energy Efficient Measures for all options Include the following: high efficiency condensing boiler plant with supply temperature reset based on O.A.T., high efficiency central digital scroll air-cooled chiller with VFD/ECM fans, ECM pumps or VFD's, CO2 demand controlled ventilation for all learning spaces, the gym, & cafeteria, VAV & CAV rooftop air handling units with standard efficiency gas-fired furnaces & Air-Cooled DX and VFD's on supply & return fans.

Expected savings will range between 25% - 30% Better than ASHRAE 90.1-2010

The project team will prepare tools that can be used by school during operations phase for analyzing and optimizing energy usage, including the Building Management System for energy efficiency optimization. The integrative design process implemented by the project team will maximize opportunities and synergies between building elements as well as allow for optimizing design and provide operational savings.

The building will be fully commissioned and it's recommended to purchase renewable energy credits to offset its energy usage by renewable sources. It is recommended to prepare a feasibility analysis for the installation of renewable energy on the project site.

## Materials and Resources

The project will be designed and constructed to minimize its impact on the environment. The construction waste will be diverted from landfill. Selected building materials will come from renewable sources, will be regionally sourced to promote local economy and limit CO2 emissions associated with transport, will contain recycled components. Additionally a strong focus will be placed on the content of building materials – ingredients will be analyzed and optimized. The project team will prepare recommendations for recycling opportunities during operational phase.

## Indoor Environmental Quality

The main goal of the project team is to design and construct a healthy and comfortable building which will maximize learning opportunities for the children. Required analysis will be performed to ensure selection of best available solutions for the intent of the building.

All building materials and specified products will be low emitting and tested in accordance with the LEED recommended standards. Lighting and HVAC will be optimized to enhance the occupant comfort. Spaces will be well ventilated to increase cognitive performance. Ample daylighting and high-quality views to nature will ensure the student wellbeing. Implemented construction practices will improve indoor air quality.

## Innovation in Design

The project will utilize numerous innovative solutions including low mercury lighting, educational displays and signage, design for health, improved physical activity and learning opportunities for the children. The team will also propose strategies to be implemented in the operations phase that will increase sustainability of the project, like green cleaning, green building tours, organic landscaping or growing food on-site.

**PREFERRED SOLUTION – SITE PLAN**



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**PREFERRED SOLUTION – FLOOR PLANS**




SECOND FLOOR PLAN




FIRST FLOOR PLAN

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## PREFERRED SOLUTION – CONCEPTUAL PHASING PLANS

For Option N-3, one potential phasing solution consists of; installing approximately 6 modulars to replace the classrooms in the southern end of the western classroom wing of the existing complex. That wing would then be fully demolished and the first phase of a new classroom wing be constructed. Once complete, it would be anticipated that the majority of students would then occupy the classrooms in the first construction. The subsequent phase would see the demolition of the central and eastern wing and Pre-K free standing building. Phase two of the new construction would then be constructed. The final phase would see the demolition of the remaining elements of the existing building. Further discussions with the district may potentially further reduce the number of modulars required.



PHASE ONE



PHASE TWO



PHASE THREE



PHASE FOUR



PHASE FIVE

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## BUDGET OVERVIEW

The Total Project Budget for the preferred option is as follows:

| | |
|---|---|
| Estimated Construction Cost | $ 44,505,250 |
| Estimated Soft Costs | $ 13,305,300 |
| Estimated Total Project Budget | $ 62,610,000 |

## ESTIMATED FUNDING CAPACITY

The Manchester-Essex Regional School District and its two Towns have the capacity to borrow the proposed debt for the project, pending a debt exclusion vote as described below.

## BUDGET STATEMENT

MERSD has completed the attached Budget Statement to accompany its Preferred Schematic Report. In accordance with MSBA's guidance, MERSD has used the three most recent years of data from its End of Year Report (EOYR), which are FY-14 through FY-16. Audited FY-17 data will be available in time for a Budget Statement update during the Schematic Design phase. In instances in which EOYR data fields did not match the MSBA template, MERSD used data from its accounting ledgers, if available. Some expenditure categories in the MSBA template are not tracked by MERSD and in these instances, data was provided on a summary basis only.

At this point in the feasibility process, MERSD is not aware of any budget categories that will change post construction with the exception of debt service. An estimate for new debt service associated with the district's potential share of construction costs for the preferred option has been included in the Budget Statement. MERSD expects to study the potential impact of a new building on its operating budget during the Schematic Design (SD) phase, when more detailed information about a new facility will become available.

## LOCAL APPROVAL PROCESS

The Towns of Essex and Manchester-by-the-Sea expect to place the debt exclusion vote on the November 2018 ballot. The Town Meeting project authorization is anticipated to be scheduled in September for both Towns.

## ESTIMATED IMPACT TO LOCAL PROPERTY TAX

The project costs and its average annual impact on the local property tax on the median home in Essex and the median home in Manchester-by-the-Sea is in development. These estimated cost impacts will be developed using the Feasibility Study cost estimate data and anticipated interest rates.

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## Manchester Memorial Elementary School PSR Submission
## Budget Statement for Preferred Schematic - Expenditures

**As reported on the school district's most recent three end of year information, please updated to the 3 latest fiscal year periods and complete the fields below**

| Category | 2013-2014 FY2014 Staff (FTE) | 2013-2014 FY2014 Budget | 2014-2015 FY2015 Staff (FTE) | 2014-2015 FY2015 Budget | 2015-2016 FY2016 Staff | 2015-2016 FY2016 Budget | Change from Previous Year Staff (FTE) | Change from Previous Year Budget | Post-Constuction Budget Staff | Post-Constuction Budget Budget | New Facility vs. Current Staff (FTE) | New Facility vs. Current Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Salaries** | | | | | | | | | | | | |
| **Administration** | | | | | | | | | | | | |
| Admin. Secretary | 5.50 | 238,762 | 5.50 | 245,095 | 5.50 | 248,733 | 0.00 | 3,638 | 5.50 | 248,733 | 0.00 | - |
| Assistant Principal | 1.00 | 90,461 | 1.00 | 91,818 | 1.00 | 93,420 | 0.00 | 1,602 | 1.00 | 93,420 | 0.00 | - |
| Business Office | 4.20 | 318,453 | 4.20 | 325,854 | 4.20 | 334,531 | 0.00 | 8,677 | 4.20 | 334,531 | 0.00 | - |
| Curriculum Director/Coord. | 1.00 | 119,221 | 1.00 | 121,009 | 1.00 | 123,049 | 0.00 | 2,040 | 1.00 | 123,049 | 0.00 | - |
| Custodians/Maintenance Staff | 9.30 | 437,062 | 5.00 | 282,112 | 3.50 | 197,901 | -1.50 | (84,211) | 3.50 | 197,901 | 0.00 | - |
| Executive Secretary | 0.50 | 29,128 | 0.50 | 29,566 | 0.50 | 30,121 | 0.00 | 555 | 0.50 | 30,121 | 0.00 | - |
| Facilities Manager | 1.00 | 87,209 | 1.00 | 72,551 | 1.00 | 84,625 | 0.00 | 12,074 | 1.00 | 84,625 | 0.00 | - |
| Guidance | 6.00 | 471,659 | 6.00 | 468,242 | 6.20 | 512,971 | 0.20 | 44,729 | 6.20 | 512,971 | 0.00 | - |
| Adjustment Counselor | | | | | | | | | | | | |
| Guidance Counselors | | | | | | | | | | | | |
| Guidance Director | | | | | | | | | | | | |
| Legal | 0.00 | | 0.00 | - | 0.00 | - | 0.00 | - | 0.00 | - | 0.00 | - |
| Nurse | 3.00 | 243,993 | 3.00 | 250,801 | 3.00 | 263,531 | 0.00 | 12,730 | 3.00 | 263,531 | 0.00 | - |
| Other | 0.00 | - | 0.00 | - | 0.00 | - | 0.00 | - | 0.00 | - | 0.00 | - |
| Principal | 4.00 | 473,320 | 4.00 | 471,963 | 4.00 | 470,361 | 0.00 | (1,602) | 4.00 | 470,361 | 0.00 | - |
| Special Education Admin | 2.50 | 210,370 | 2.50 | 215,026 | 2.50 | 218,791 | 0.00 | 3,765 | 2.50 | 218,791 | 0.00 | - |
| Superintendent/Asst. Superintendent | 1.00 | 173,500 | 1.00 | 176,103 | 1.00 | 178,970 | 0.00 | 2,867 | 1.00 | 178,970 | 0.00 | - |
| Transportation | 0.00 | - | 0.00 | - | 0.00 | - | 0.00 | - | 0.00 | - | 0.00 | - |
| Treasurer | 0.15 | 22,853 | 0.15 | 23,196 | 0.15 | 23,769 | 0.00 | 573 | 0.15 | 23,769 | 0.00 | - |
| **Total Administration** | **39.15** | **2,915,991** | **34.85** | **2,773,336** | **33.55** | **2,780,774** | **-1.30** | **7,438** | **33.55** | **2,780,774** | **0.00** | **-** |
| **Instruction - Teaching Services** | | | | | | | | | | | | |
| Arts | | | | | | | | | | | | |
| Business | | | | | | | | | | | | |
| Communications | | | | | | | | | | | | |
| Coping Instructor | | | | | | | | | | | | |
| Culinary Arts | | | | | | | | | | | | |
| ELL | | | | | | | | | | | | |
| English Language | | | | | | | | | | | | |
| Family Consumer Services | | | | | | | | | | | | |
| Foreign Language | | | | | | | | | | | | |
| Health Services | | | | | | | | | | | | |
| History & Social Science | | | | | | | | | | | | |
| Instructional Assistant/Paraprofessionals | | | | | | | | | | | | |
| Library/Media | | | | | | | | | | | | |
| Mathematics | | | | | | | | | | | | |
| MCAS | | | | | | | | | | | | |
| Music | | | | | | | | | | | | |
| Other | | | | | | | | | | | | |
| Physical Education | | | | | | | | | | | | |
| Reading | | | | | | | | | | | | |
| School Adjustment Counselor | | | | | | | | | | | | |
| Science | | | | | | | | | | | | |
| Biology | | | | | | | | | | | | |
| Botany | | | | | | | | | | | | |
| Chemistry | | | | | | | | | | | | |
| Geology | | | | | | | | | | | | |
| Physics | | | | | | | | | | | | |
| Special Education | | | | | | | | | | | | |
| Substitute Teachers | | | | | | | | | | | | |
| Technology | | | | | | | | | | | | |
| Vocational Tech. | | | | | | | | | | | | |
| **Total Instruction - Teaching Services** | **168.85** | **11,314,833** | **164.95** | **11,495,392** | **166.35** | **11,990,033** | **1.40** | **494,641** | **166.35** | **11,990,033** | **0.00** | **-** |
| **Total Salaries Administration & Instruction** | **208.00** | **14,230,824** | **199.80** | **14,268,727** | **199.90** | **14,770,807** | **0.10** | **502,079** | **199.90** | **14,770,807** | **0.00** | **-** |
| **Employee Benefits** | | | | | | | | | | | | |
| **All employee-related fringe (health insurance, retirement etc)** | | **2,887,731** | | **3,346,503** | | **3,408,315** | | **61,812** | | **3,408,315** | | **-** |
| **Materials & Services** | | | | | | | | | | | | |
| **Materials** | | | | | | | | | | | | |
| Audio-Visual Materials | | - | | - | | - | | - | | - | | - |

## Manchester Memorial Elementary School PSR Submission
## Budget Statement for Preferred Schematic - Expenditures

| Category | 2013-2014 FY2014 Staff (FTE) | 2013-2014 FY2014 Budget | 2014-2015 FY2015 Staff (FTE) | 2014-2015 FY2015 Budget | 2015-2016 FY2016 Staff | 2015-2016 FY2016 Budget | Change from Previous Year Staff (FTE) | Change from Previous Year Budget | Post-Constuction Budget Staff | Post-Constuction Budget Budget | New Facility vs. Current Staff (FTE) | New Facility vs. Current Budget |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Culinary Arts Materials | | - | | - | | - | | - | | - | | - |
| General Office Supplies | | - | | - | | - | | - | | - | | - |
| Information technology | | - | | - | | - | | - | | - | | - |
| Hardware | | - | | - | | - | | - | | - | | - |
| Software | | - | | - | | - | | - | | - | | - |
| Library Materials | | - | | - | | - | | - | | - | | - |
| Non info-tech equipment | | - | | - | | - | | - | | - | | - |
| Testing Materials & Supplies | | - | | - | | - | | - | | - | | - |
| Textbooks | | - | | - | | - | | - | | - | | - |
| Vocational Program Materials | | - | | - | | - | | - | | - | | - |
| **Total Materials** | | **745,891** | | **589,504** | | **717,472** | | **127,968** | | **717,472** | | **-** |
| **Services** | | | | | | | | | | | | |
| Athletics | | | | | | | | - | | - | | - |
| Attendance | | - | | - | | - | | - | | - | | - |
| Food Service | | - | | - | | - | | - | | - | | - |
| Health Services | | - | | - | | - | | - | | - | | - |
| Other Student Activities | | - | | - | | - | | - | | - | | - |
| Psychological Services | | - | | - | | - | | - | | - | | - |
| School Security | | - | | - | | - | | - | | - | | - |
| Student Transportation | | 613,798 | | 606,273 | | 546,685 | | (59,588) | | 546,685 | | - |
| **Total Services** | | **1,676,108** | | **1,748,089** | | **1,905,446** | | **-** | | **1,905,446** | | **-** |
| **Total Material & Services** | | **2,421,999** | | **2,337,594** | | **2,622,918** | | **127,968** | | **2,622,918** | | **-** |
| **Facility Costs & Capital Improvements** | | | | | | | | | | | | |
| **Facility Costs** | | | | | | | | | | | | |
| Custodial Supplies | | 69,570 | | 45,977 | | 47,720 | | 1,743 | | 47,720 | | - |
| Electricity | | 205,148 | | 234,832 | | 246,231 | | 11,399 | | 246,231 | | - |
| Heating Oil | | - | | - | | - | | - | | - | | - |
| Maintenance | | | | | | | | | | | | |
| Building Security Maintenance | | - | | - | | - | | - | | - | | - |
| Elevator | | - | | - | | - | | - | | - | | - |
| Equipment Maintenance | | - | | - | | - | | - | | - | | - |
| Exterminating | | - | | - | | - | | - | | - | | - |
| Facility Maintenance | | - | | - | | - | | - | | - | | - |
| Fire Alarm | | - | | - | | - | | - | | - | | - |
| Fire Extinguisher Inspection | | - | | - | | - | | - | | - | | - |
| Generator | | - | | - | | - | | - | | - | | - |
| HVAC Maintenance | | - | | - | | - | | - | | - | | - |
| Other | | - | | - | | - | | - | | - | | - |
| Site Maintenance (Grouds) | | - | | - | | - | | - | | - | | - |
| Technology | | 119,336 | | 219,496 | | 203,621 | | (15,874) | | 203,621 | | - |
| Trash Removal | | 24,105 | | 23,811 | | 25,362 | | 1,551 | | 25,362 | | - |
| Natural Gas | | 157,189 | | 144,973 | | 112,341 | | (32,632) | | 112,341 | | - |
| Snow Removal | | - | | - | | | | - | | - | | - |
| Telephone | | 33,745 | | 38,604 | | 33,653 | | (4,951) | | 33,653 | | - |
| Water/Sewer | | 32,266 | | 40,599 | | 39,131 | | (1,469) | | 39,131 | | - |
| **Total Facility Costs** | | **641,360** | | **748,292** | | **708,059** | | **(40,233)** | | **708,059** | | **-** |
| **Captial Improvements** | | | | | | | | | | | | |
| Captial Improvements | | **139,930** | | **59,531** | | **55,530** | | **(4,001)** | | **55,530** | | **-** |
| **Total Facility Costs & Capital Improvements** | | **781,290** | | **807,822** | | **763,588** | | **(44,234)** | | **763,588** | | **-** |
| **Debt Service** | | | | | | | | | | | | |
| Short-term | | - | | - | | - | | - | | - | | - |
| Long-term | | 2,457,490 | | 2,409,450 | | 2,471,164 | | 61,714 | | 4,876,896.38 | | 2,405,732 |
| **Total Debt Service** | | **2,457,490** | | **2,409,450** | | **2,471,164** | | **61,714** | | **4,876,896** | | **2,405,732** |
| **Total Budget & Staff** | **208.00** | **22,779,334** | **199.80** | **23,170,096** | **199.90** | **24,036,792** | **0** | **709,340** | **200** | **26,442,525** | **0** | **2,405,732** |

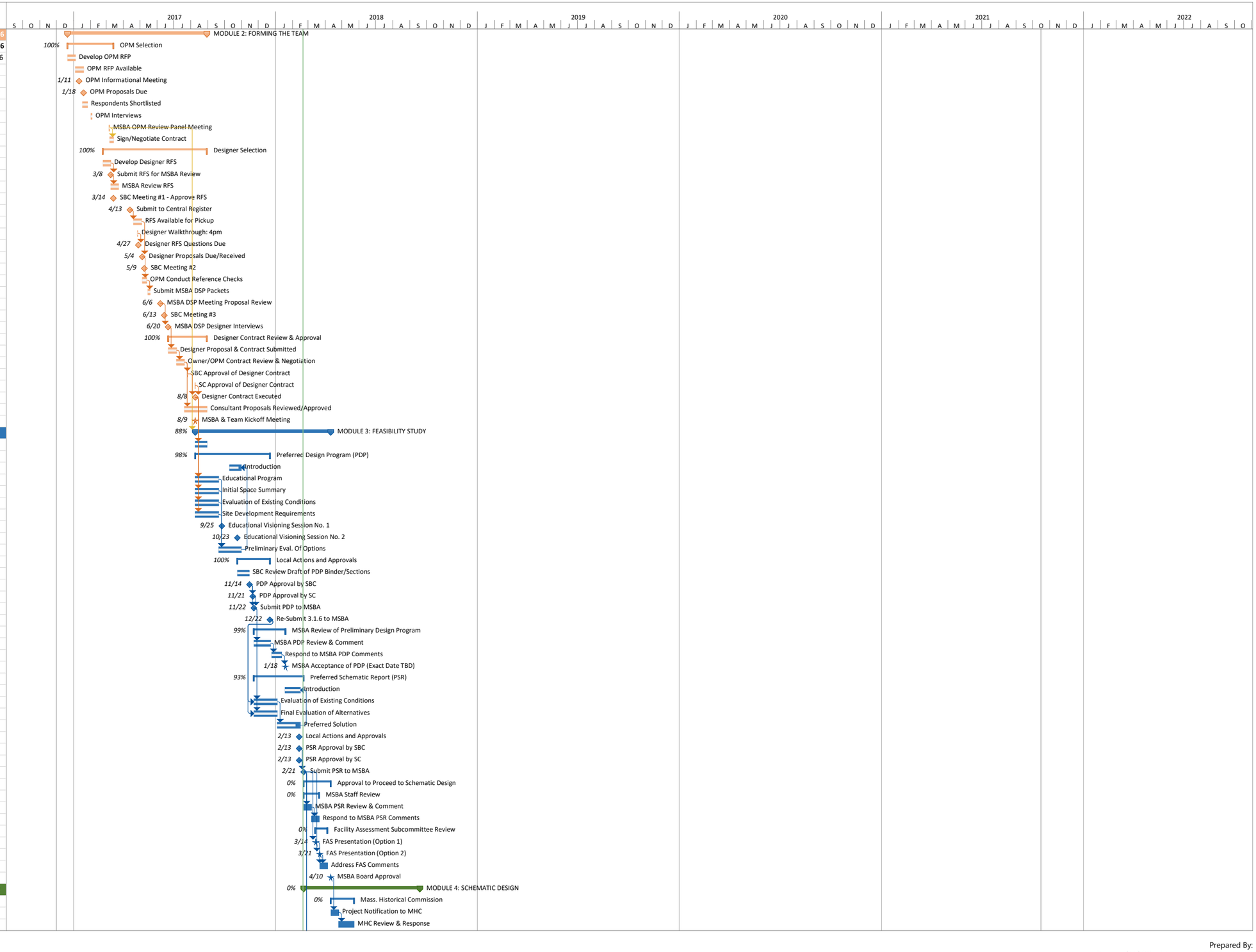
## DESIGN AND CONSTRUCTION SCHEDULE

On the following page is the updated Design and Construction phase schedule as provided by the Owner's Project Manager Dore + Whittier Management Partners

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**MANCHESTER ESSEX REGIONAL SCHOOL DISTRICT**
**- MEMORIAL ELEMENTARY SCHOOL PROJECT -**
Preferred Schematic Report
Module 2-8 Project Schedule

| ID | % Compl | WBS | Task Name | Duration | Start |
|---|---|---|---|---|---|
| 1 | 10... | 2 | MODULE 2: FORMING THE TEAM | 179 days? | Wed 12/21/16 |
| 2 | 10... | 2.1 | **OPM Selection** | **59 days?** | **Wed 12/21/16** |
| 3 | 100% | | Develop OPM RFP | 10 days | Wed 12/21/16 |
| 4 | 100% | | OPM RFP Available | 11 days? | Wed 1/4/17 |
| 5 | 100% | | OPM Informational Meeting | 0 days | Wed 1/11/17 |
| 6 | 100% | | OPM Proposals Due | 1 day | Wed 1/18/17 |
| 7 | 100% | | Respondents Shortlisted | 7 days | Tue 1/17/17 |
| 8 | 100% | | OPM Interviews | 2 days | Wed 2/1/17 |
| 9 | 100% | | MSBA OPM Review Panel Meeting | 1 day | Mon 3/6/17 |
| 10 | 100% | | Sign/Negotiate Contract | 5 days | Tue 3/7/17 |
| 11 | 10... | 2.2 | **Designer Selection** | **133 days** | **Thu 2/23/17** |
| 12 | 100% | | Develop Designer RFS | 10 days | Thu 2/23/17 |
| 13 | 100% | | Submit RFS for MSBA Review | 0 days | Wed 3/8/17 |
| 14 | 100% | | MSBA Review RFS | 10 days | Thu 3/9/17 |
| 15 | 100% | | SBC Meeting #1 - Approve RFS | 0 days | Tue 3/14/17 |
| 16 | 100% | | Submit to Central Register | 0 days | Thu 4/13/17 |
| 17 | 100% | | RFS Available for Pickup | 11 days | Wed 4/19/17 |
| 18 | 100% | | Designer Walkthrough: 4pm | 1 day | Tue 4/25/17 |
| 19 | 100% | | Designer RFS Questions Due | 0 days | Thu 4/27/17 |
| 20 | 100% | | Designer Proposals Due/Received | 0 days | Thu 5/4/17 |
| 21 | 100% | | SBC Meeting #2 | 0 days | Tue 5/9/17 |
| 22 | 100% | | OPM Conduct Reference Checks | 6 days | Fri 5/5/17 |
| 23 | 100% | | Submit MSBA DSP Packets | 4 days | Mon 5/15/17 |
| 24 | 100% | | MSBA DSP Meeting Proposal Review | 0 days | Tue 6/6/17 |
| 25 | 100% | | SBC Meeting #3 | 0 days | Tue 6/13/17 |
| 26 | 100% | | MSBA DSP Designer Interviews | 1 day | Tue 6/20/17 |
| 27 | 100% | | Designer Contract Review & Approval | 49 days | Wed 6/21/17 |
| 28 | 100% | | Designer Proposal & Contract Submitted | 10 days | Wed 6/21/17 |
| 29 | 100% | | Owner/OPM Contract Review & Negotiation | 10 days | Thu 7/6/17 |
| 30 | 100% | | SBC Approval of Designer Contract | 1 day | Tue 7/25/17 |
| 31 | 100% | | SC Approval of Designer Contract | 1 day | Tue 8/8/17 |
| 32 | 100% | | Designer Contract Executed | 0 days | Tue 8/8/17 |
| 33 | 100% | | Consultant Proposals Reviewed/Approved | 29 days | Thu 7/20/17 |
| 34 | 100% | | MSBA & Team Kickoff Meeting | 0 days | Wed 8/9/17 |
| 35 | 88% | 3 | MODULE 3: FEASIBILITY STUDY | 175 days | Wed 8/9/17 |
| 36 | 100% | | OPM Work Plan | 15 days | Wed 8/9/17 |
| 37 | 98% | 3.1 | **Preferred Design Program (PDP)** | **97 days** | **Wed 8/9/17** |
| 38 | 75% | 3.1.1 | Introduction | 15 days | Tue 10/10/17 |
| 39 | 100% | 3.1.2 | Educational Program | 30 days | Wed 8/9/17 |
| 40 | 100% | 3.1.3 | Initial Space Summary | 30 days | Wed 8/9/17 |
| 41 | 100% | 3.1.4 | Evaluation of Existing Conditions | 30 days | Wed 8/9/17 |
| 42 | 100% | 3.1.5 | Site Development Requirements | 30 days | Wed 8/9/17 |
| 43 | 100% | | Educational Visioning Session No. 1 | 1 day | Mon 9/25/17 |
| 44 | 100% | | Educational Visioning Session No. 2 | 1 day | Mon 10/23/17 |
| 45 | 100% | 3.1.6 | Preliminary Eval. Of Options | 29 days | Wed 9/20/17 |
| 46 | 100% | 3.1.7 | Local Actions and Approvals | 43 days | Tue 10/24/17 |
| 47 | 100% | | SBC Review Draft of PDP Binder/Sections | 15 days | Tue 10/24/17 |
| 48 | 100% | | PDP Approval by SBC | 0 days | Tue 11/14/17 |
| 49 | 100% | | PDP Approval by SC | 0 days | Tue 11/21/17 |
| 50 | 100% | | Submit PDP to MSBA | 1 day | Wed 11/22/17 |
| 51 | 100% | | Re-Submit 3.1.6 to MSBA | 0 days | Fri 12/22/17 |
| 52 | 99% | 3.2 | **MSBA Review of Preliminary Design Program** | **41 days** | **Thu 11/23/17** |
| 53 | 100% | | MSBA PDP Review & Comment | 22 days | Thu 11/23/17 |
| 54 | 100% | | Respond to MSBA PDP Comments | 14 days | Mon 12/25/17 |
| 55 | 0% | | MSBA Acceptance of PDP (Exact Date TBD) | 0 days | Thu 1/18/18 |
| 56 | 93% | 3.3 | **Preferred Schematic Report (PSR)** | **64 days** | **Thu 11/23/17** |
| 57 | 100% | 3.3.1 | Introduction | 20 days | Thu 1/18/18 |
| 58 | 100% | 3.3.2 | Evaluation of Existing Conditions | 30 days | Thu 11/23/17 |
| 59 | 100% | 3.3.3 | Final Evaluation of Alternatives | 30 days | Thu 11/23/17 |
| 60 | 75% | 3.3.4 | Preferred Solution | 30 days | Thu 1/4/18 |
| 61 | 100% | 3.3.5 | Local Actions and Approvals | 0 days | Tue 2/13/18 |
| 62 | 100% | | PSR Approval by SBC | 0 days | Tue 2/13/18 |
| 63 | 100% | | PSR Approval by SC | 0 days | Tue 2/13/18 |
| 64 | 0% | | Submit PSR to MSBA | 0 days | Wed 2/21/18 |
| 65 | 0% | 3.4 | **Approval to Proceed to Schematic Design** | **35 days** | **Wed 2/21/18** |
| 66 | 0% | 3.4.1 | MSBA Staff Review | 20 days | Wed 2/21/18 |
| 67 | 0% | | MSBA PSR Review & Comment | 10 days | Wed 2/21/18 |
| 68 | 0% | | Respond to MSBA PSR Comments | 10 days | Wed 3/7/18 |
| 69 | 0% | 3.4.2 | Facility Assessment Subcommittee Review | 16 days | Wed 3/14/18 |
| 70 | 0% | | FAS Presentation (Option 1) | 1 day | Wed 3/14/18 |
| 71 | 0% | | FAS Presentation (Option 2) | 1 day | Wed 3/21/18 |
| 72 | 0% | | Address FAS Comments | 10 days | Thu 3/22/18 |
| 73 | 0% | 3.4.3 | MSBA Board Approval | 1 day | Tue 4/10/18 |
| 74 | 0% | 4 | MODULE 4: SCHEMATIC DESIGN | 150 days | Wed 2/21/18 |
| 75 | 0% | | **Mass. Historical Commission** | **30 days** | **Wed 4/11/18** |
| 76 | 0% | | Project Notification to MHC | 10 days | Wed 4/11/18 |
| 77 | 0% | | MHC Review & Response | 20 days | Wed 4/25/18 |

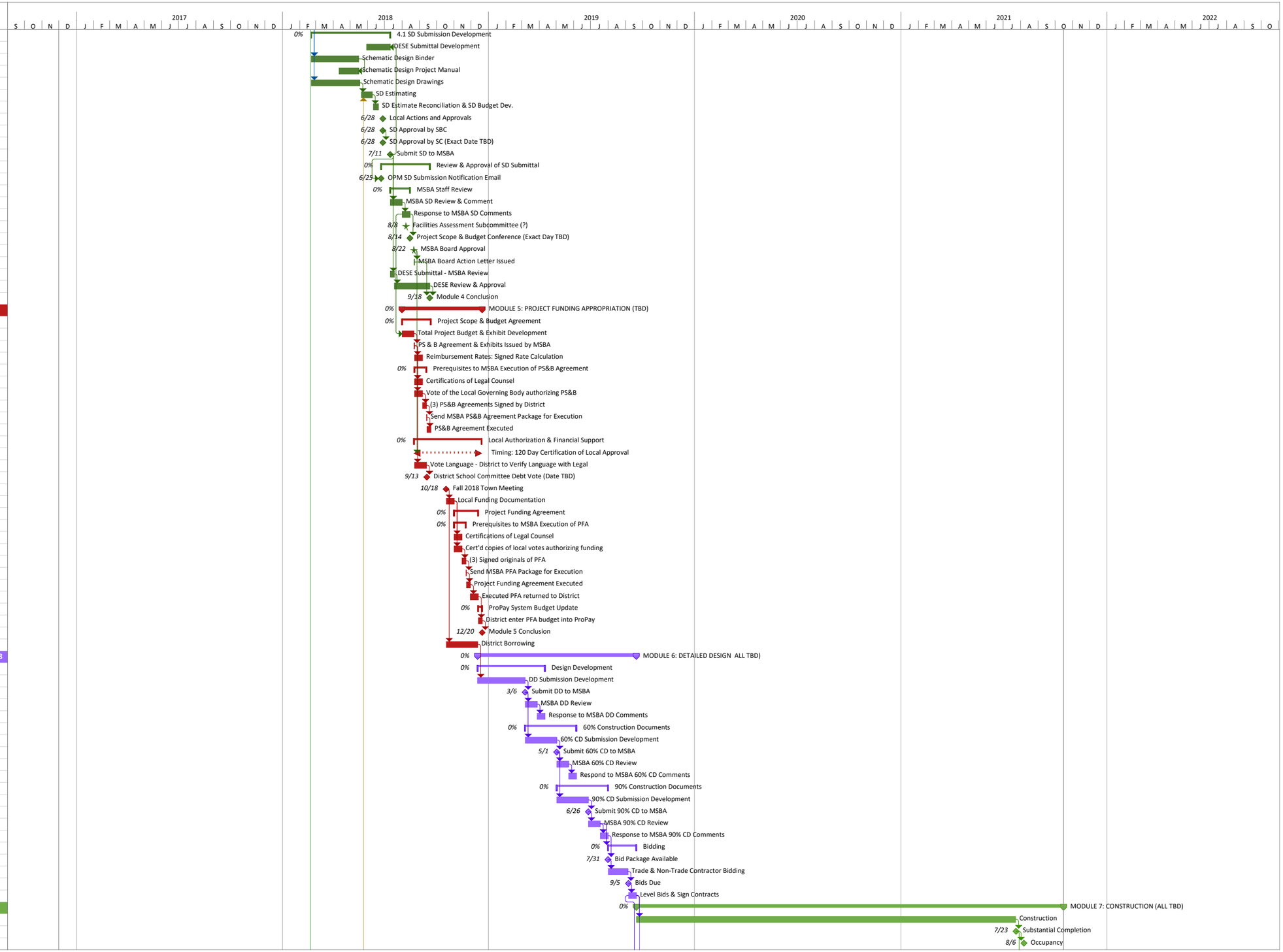





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Dore and Whittier Management Partners, LLC

**MANCHESTER ESSEX REGIONAL SCHOOL DISTRICT**
**- MEMORIAL ELEMENTARY SCHOOL PROJECT -**
Preferred Schematic Report
Module 2-8 Project Schedule

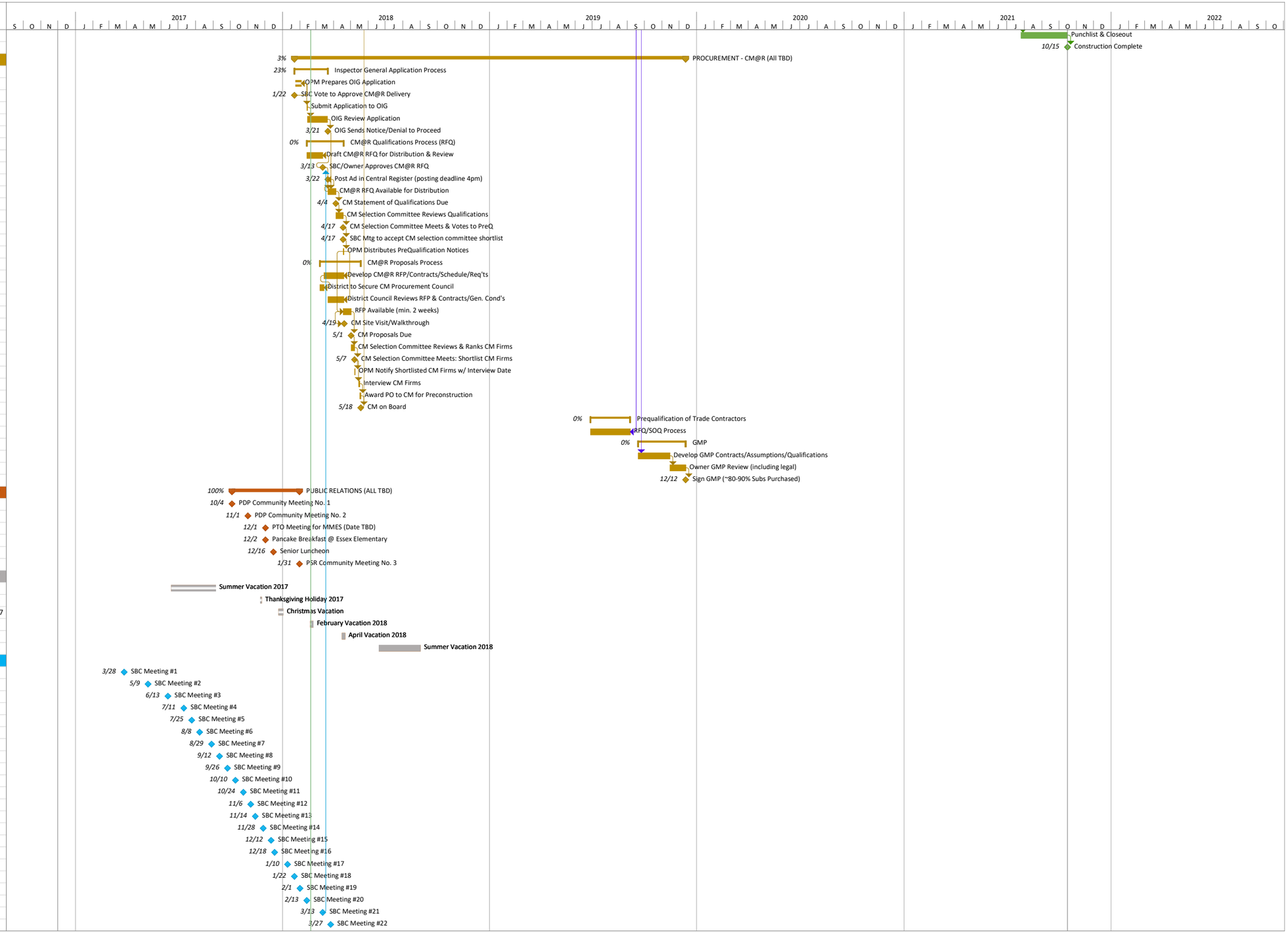
| ID | % Compl | WBS | Task Name | Duration | Start |
|---|---|---|---|---|---|
| 78 | 0% | 4.1 | **4.1 SD Submission Development** | **100 days** | **Wed 2/21/18** |
| 79 | 0% | 4.1.1 | DESE Submittal Development | 30 days | Wed 5/30/18 |
| 80 | 0% | 4.1.2 | Schematic Design Binder | 60 days | Wed 2/21/18 |
| 81 | 0% | 4.1.3 | Schematic Design Project Manual | 25 days | Wed 4/11/18 |
| 82 | 0% | 4.1.4 | Schematic Design Drawings | 62 days | Wed 2/21/18 |
| 83 | 0% | | SD Estimating | 15 days | Mon 5/21/18 |
| 84 | 0% | | SD Estimate Reconciliation & SD Budget Dev. | 7 days | Mon 6/11/18 |
| 85 | 0% | | Local Actions and Approvals | 0 days | Thu 6/28/18 |
| 86 | 0% | | SD Approval by SBC | 0 days | Thu 6/28/18 |
| 87 | 0% | | SD Approval by SC (Exact Date TBD) | 0 days | Thu 6/28/18 |
| 88 | 0% | | Submit SD to MSBA | 0 days | Wed 7/11/18 |
| 89 | 0% | 4.2 | **Review & Approval of SD Submittal** | **62 days** | **Mon 6/25/18** |
| 90 | 0% | | OPM SD Submission Notification Email | 0 days | Mon 6/25/18 |
| 91 | 0% | 4.2.1 | MSBA Staff Review | 25 days | Wed 7/11/18 |
| 92 | 0% | | MSBA SD Review & Comment | 15 days | Wed 7/11/18 |
| 93 | 0% | | Response to MSBA SD Comments | 10 days | Wed 8/1/18 |
| 94 | 0% | 4.2.2 | Facilities Assessment Subcommittee (?) | 0 days | Wed 8/8/18 |
| 95 | 0% | 4.2.3 | Project Scope & Budget Conference (Exact Day TBD) | 0 days | Tue 8/14/18 |
| 96 | 0% | 4.2.4 | MSBA Board Approval | 0 days | Wed 8/22/18 |
| 97 | 0% | | MSBA Board Action Letter Issued | 1 day | Wed 8/22/18 |
| 98 | 0% | | DESE Submittal - MSBA Review | 5 days | Wed 7/11/18 |
| 99 | 0% | | DESE Review & Approval | 9 wks | Wed 7/18/18 |
| 100 | 0% | 4.3 | **Module 4 Conclusion** | **0 days** | **Tue 9/18/18** |
| 101 | 0% | 5 | **MODULE 5: PROJECT FUNDING APPROPRIATION (TBD)** | **102 days?** | **Wed 8/1/18** |
| 102 | 0% | 5.1 | **Project Scope & Budget Agreement** | **37 days?** | **Wed 8/1/18** |
| 103 | 0% | 5.1.1 | Total Project Budget & Exhibit Development | 15 days | Wed 8/1/18 |
| 104 | 0% | | PS & B Agreement & Exhibits Issued by MSBA | 1 day? | Wed 8/22/18 |
| 105 | 0% | 5.1.2 | Reimbursement Rates: Signed Rate Calculation | 10 days | Thu 8/23/18 |
| 106 | 0% | 5.1.10 | Prerequisites to MSBA Execution of PS&B Agreement | 15 days | Thu 8/23/18 |
| 107 | 0% | | Certifications of Legal Counsel | 10 days | Thu 8/23/18 |
| 108 | 0% | | Vote of the Local Governing Body authorizing PS&B | 10 days | Thu 8/23/18 |
| 109 | 0% | | (3) PS&B Agreements Signed by District | 5 days | Thu 9/6/18 |
| 110 | 0% | | Send MSBA PS&B Agreement Package for Execution | 1 day | Thu 9/13/18 |
| 111 | 0% | | PS&B Agreement Executed | 5 days | Fri 9/14/18 |
| 112 | 0% | 5.2 | **Local Authorization & Financial Support** | **86 days?** | **Wed 8/22/18** |
| 113 | 0% | 5.2.2 | Timing: 120 Day Certification of Local Approval | 120 days | Wed 8/22/18 |
| 114 | 0% | 5.2.3 | Vote Language - District to Verify Language with Legal | 15 days | Thu 8/23/18 |
| 115 | 0% | | District School Committee Debt Vote (Date TBD) | 1 day? | Thu 9/13/18 |
| 116 | 0% | | Fall 2018 Town Meeting | 0 days | Thu 10/18/18 |
| 117 | 0% | 5.2.6 | Local Funding Documentation | 10 days | Thu 10/18/18 |
| 118 | 0% | 5.3 | **Project Funding Agreement** | **31 days** | **Thu 11/1/18** |
| 119 | 0% | 5.3.1 | Prerequisites to MSBA Execution of PFA | 15 days | Thu 11/1/18 |
| 120 | 0% | | Certifications of Legal Counsel | 10 days | Thu 11/1/18 |
| 121 | 0% | | Cert'd copies of local votes authorizing funding | 10 days | Thu 11/1/18 |
| 122 | 0% | | (3) Signed originals of PFA | 5 days | Thu 11/15/18 |
| 123 | 0% | | Send MSBA PFA Package for Execution | 1 day | Thu 11/22/18 |
| 124 | 0% | | Project Funding Agreement Executed | 5 days | Fri 11/23/18 |
| 125 | 0% | | Executed PFA returned to District | 10 days | Fri 11/30/18 |
| 126 | 0% | 5.4 | **ProPay System Budget Update** | **5 days** | **Fri 12/14/18** |
| 127 | 0% | | District enter PFA budget into ProPay | 5 days | Fri 12/14/18 |
| 128 | 0% | 5.5 | **Module 5 Conclusion** | **0 days** | **Thu 12/20/18** |
| 129 | 0% | 5.6 | **District Borrowing** | **2 mons** | **Thu 10/18/18** |
| 130 | 0% | 6 | **MODULE 6: DETAILED DESIGN ALL TBD)** | **201 days?** | **Thu 12/13/18** |
| 131 | 0% | 6.1 | **Design Development** | **85 days** | **Thu 12/13/18** |
| 132 | 0% | 6.1.1 | DD Submission Development | 3 mons | Thu 12/13/18 |
| 133 | 0% | 6.1.2 | Submit DD to MSBA | 0 days | Wed 3/6/19 |
| 134 | 0% | 6.1.3 | MSBA DD Review | 3 wks | Thu 3/7/19 |
| 135 | 0% | 6.1.4 | Response to MSBA DD Comments | 2 wks | Thu 3/28/19 |
| 136 | 0% | 6.2 | **60% Construction Documents** | **65 days** | **Thu 3/7/19** |
| 137 | 0% | 6.2.1 | 60% CD Submission Development | 2 mons | Thu 3/7/19 |
| 138 | 0% | 6.2.2 | Submit 60% CD to MSBA | 0 days | Wed 5/1/19 |
| 139 | 0% | 6.2.3 | MSBA 60% CD Review | 3 wks | Thu 5/2/19 |
| 140 | 0% | 6.2.4 | Respond to MSBA 60% CD Comments | 2 wks | Thu 5/23/19 |
| 141 | 0% | 6.3 | **90% Construction Documents** | **65 days** | **Thu 5/2/19** |
| 142 | 0% | 6.3.1 | 90% CD Submission Development | 2 mons | Thu 5/2/19 |
| 143 | 0% | 6.3.2 | Submit 90% CD to MSBA | 0 days | Wed 6/26/19 |
| 144 | 0% | 6.3.3 | MSBA 90% CD Review | 3 wks | Thu 6/27/19 |
| 145 | 0% | 6.3.4 | Response to MSBA 90% CD Comments | 2 wks | Thu 7/18/19 |
| 146 | 0% | 6.4 | **Bidding** | **36 days?** | **Wed 7/31/19** |
| 147 | 0% | 6.4.1 | Bid Package Available | 0 days | Wed 7/31/19 |
| 148 | 0% | 6.4.2 | Trade & Non-Trade Contractor Bidding | 5 wks | Thu 8/1/19 |
| 149 | 0% | 6.4.3 | Bids Due | 1 day? | Thu 9/5/19 |
| 150 | 0% | 6.4.4 | Level Bids & Sign Contracts | 2 wks | Fri 9/6/19 |
| 151 | 0% | 7 | **MODULE 7: CONSTRUCTION (ALL TBD)** | **541 days** | **Fri 9/20/19** |
| 152 | 0% | 7.1 | Construction | 24 mons | Fri 9/20/19 |
| 153 | 0% | | Substantial Completion | 1 day | Fri 7/23/21 |
| 154 | 0% | | Occupancy | 0 days | Fri 8/6/21 |






Prepared By:
Dore and Whittier Management Partners, LLC

| ID | % Compl | WBS | Task Name | Duration | Start |
|---|---|---|---|---|---|
| 155 | 0% | | Punchlist & Closeout | 3 mons | Mon 7/26/21 |
| 156 | 0% | | Construction Complete | 0 days | Fri 10/15/21 |
| 157 | 3% | 8 | **PROCUREMENT - CM@R (All TBD)** | 494 days | Mon 1/22/18 |
| 158 | 23% | 8.1 | **Inspector General Application Process** | 43 days | Mon 1/22/18 |
| 159 | 100% | | OPM Prepares OIG Application | 8 days | Wed 1/24/18 |
| 160 | 100% | | SBC Vote to Approve CM@R Delivery | 0 days | Mon 1/22/18 |
| 161 | 0% | | Submit Application to OIG | 1 day | Tue 2/13/18 |
| 162 | 0% | | OIG Review Application | 25 days | Wed 2/14/18 |
| 163 | 0% | | OIG Sends Notice/Denial to Proceed | 1 day | Wed 3/21/18 |
| 164 | 0% | | **CM@R Qualifications Process (RFQ)** | 47 days | Tue 2/13/18 |
| 165 | 0% | | Draft CM@R RFQ for Distribution & Review | 20 days | Tue 2/13/18 |
| 166 | 0% | | SBC/Owner Approves CM@R RFQ | 0 days | Tue 3/13/18 |
| 167 | 0% | | Post Ad in Central Register (posting deadline 4pm) | 0 days | Thu 3/22/18 |
| 168 | 0% | | CM@R RFQ Available for Distribution | 10 days | Thu 3/22/18 |
| 169 | 0% | | CM Statement of Qualifications Due | 0 days | Wed 4/4/18 |
| 170 | 0% | | CM Selection Committee Reviews Qualifications | 9 days | Thu 4/5/18 |
| 171 | 0% | | CM Selection Committee Meets & Votes to PreQ | 0 days | Tue 4/17/18 |
| 172 | 0% | | SBC Mtg to accept CM selection committee shortlist | 0 days | Tue 4/17/18 |
| 173 | 0% | | OPM Distributes PreQualification Notices | 1 day | Wed 4/18/18 |
| 174 | 0% | 8.3 | **CM@R Proposals Process** | 52 days | Thu 3/8/18 |
| 175 | 0% | | Develop CM@R RFP/Contracts/Schedule/Req'ts | 25 days | Thu 3/15/18 |
| 176 | 0% | | District to Secure CM Procurement Council | 5 days | Thu 3/8/18 |
| 177 | 0% | | District Council Reviews RFP & Contracts/Gen. Cond's | 20 days | Thu 3/22/18 |
| 178 | 0% | | RFP Available (min. 2 weeks) | 10 days | Wed 4/18/18 |
| 179 | 0% | | CM Site Visit/Walkthrough | 0 days | Thu 4/19/18 |
| 180 | 0% | | CM Proposals Due | 0 days | Tue 5/1/18 |
| 181 | 0% | | CM Selection Committee Reviews & Ranks CM Firms | 4 days | Wed 5/2/18 |
| 182 | 0% | | CM Selection Committee Meets: Shortlist CM Firms | 0 days | Mon 5/7/18 |
| 183 | 0% | | OPM Notify Shortlisted CM Firms w/ Interview Date | 1 day | Tue 5/8/18 |
| 184 | 0% | | Interview CM Firms | 2 days | Tue 5/15/18 |
| 185 | 0% | | Award PO to CM for Preconstruction | 2 days | Thu 5/17/18 |
| 186 | 0% | | CM on Board | 0 days | Fri 5/18/18 |
| 187 | 0% | 8.4 | **Prequalification of Trade Contractors** | 50 days | Fri 6/28/19 |
| 188 | 0% | | RFQ/SOQ Process | 50 days | Fri 6/28/19 |
| 189 | 0% | 8.5 | **GMP** | 60 days | Fri 9/20/19 |
| 190 | 0% | | Develop GMP Contracts/Assumptions/Qualifications | 2 mons | Fri 9/20/19 |
| 191 | 0% | | Owner GMP Review (including legal) | 1 mon | Fri 11/15/19 |
| 192 | 0% | | Sign GMP (~80-90% Subs Purchased) | 0 days | Thu 12/12/19 |
| 193 | 10... | PR | **PUBLIC RELATIONS (ALL TBD)** | 85 days | Wed 10/4/17 |
| 194 | 100% | PR.1 | PDP Community Meeting No. 1 | 0 days | Wed 10/4/17 |
| 195 | 100% | PR.2 | PDP Community Meeting No. 2 | 0 days | Wed 11/1/17 |
| 196 | 100% | PR.3 | PTO Meeting for MMES (Date TBD) | 0 days | Fri 12/1/17 |
| 197 | 100% | PR.4 | Pancake Breakfast @ Essex Elementary | 0 days | Sat 12/2/17 |
| 198 | 100% | PR.5 | Senior Luncheon | 0 days | Sat 12/16/17 |
| 199 | 100% | PR.6 | PSR Community Meeting No. 3 | 0 days | Wed 1/31/18 |
| 200 | 51% | CAL | **SCHOOL CALENDAR** | 314 days | Mon 6/19/17 |
| 201 | 100% | CAL.1 | Summer Vacation 2017 | 55 days | Mon 6/19/17 |
| 202 | 100% | CAL.2 | Thanksgiving Holiday 2017 | 2 days | Thu 11/23/17 |
| 203 | 100% | CAL.3 | Christmas Vacation | 6 days | Mon 12/25/17 |
| 204 | 25% | CAL.4 | February Vacation 2018 | 5 days | Mon 2/19/18 |
| 205 | 0% | CAL.5 | April Vacation 2018 | 5 days | Mon 4/16/18 |
| 206 | 0% | CAL.6 | Summer Vacation 2018 | 53 days | Wed 6/20/18 |
| 207 | 0% | M | **MEETINGS** | 259 days | Tue 3/28/17 |
| 208 | 100% | M.1 | SBC Meeting #1 | 0 days | Tue 3/28/17 |
| 209 | 100% | M.2 | SBC Meeting #2 | 0 days | Tue 5/9/17 |
| 210 | 100% | M.3 | SBC Meeting #3 | 0 days | Tue 6/13/17 |
| 211 | 100% | M.4 | SBC Meeting #4 | 0 days | Tue 7/11/17 |
| 212 | 100% | M.5 | SBC Meeting #5 | 0 days | Tue 7/25/17 |
| 213 | 100% | M.6 | SBC Meeting #6 | 0 days | Tue 8/8/17 |
| 214 | 100% | M.7 | SBC Meeting #7 | 0 days | Tue 8/29/17 |
| 215 | 100% | M.8 | SBC Meeting #8 | 0 days | Tue 9/12/17 |
| 216 | 100% | M.9 | SBC Meeting #9 | 0 days | Tue 9/26/17 |
| 217 | 100% | M.10 | SBC Meeting #10 | 0 days | Tue 10/10/17 |
| 218 | 100% | M.11 | SBC Meeting #11 | 0 days | Tue 10/24/17 |
| 219 | 100% | M.12 | SBC Meeting #12 | 0 days | Mon 11/6/17 |
| 220 | 100% | M.13 | SBC Meeting #13 | 0 days | Tue 11/14/17 |
| 221 | 100% | M.14 | SBC Meeting #14 | 0 days | Tue 11/28/17 |
| 222 | 100% | M.15 | SBC Meeting #15 | 0 days | Tue 12/12/17 |
| 223 | 100% | M.16 | SBC Meeting #16 | 0 days | Mon 12/18/17 |
| 224 | 100% | M.17 | SBC Meeting #17 | 0 days | Wed 1/10/18 |
| 225 | 100% | M.18 | SBC Meeting #18 | 0 days | Mon 1/22/18 |
| 226 | 100% | M.19 | SBC Meeting #19 | 0 days | Thu 2/1/18 |
| 227 | 100% | M.20 | SBC Meeting #20 | 0 days | Tue 2/13/18 |
| 228 | 0% | M.21 | SBC Meeting #21 | 0 days | Tue 3/13/18 |
| 229 | 0% | M.22 | SBC Meeting #22 | 0 days | Tue 3/27/18 |



# MEMORANDUM

Re: Manchester Memorial Elementary School
Preliminary Permitting Schedule SCI File # 17136.00

To: Daniel Ruiz, JCJ Architecture

From: Michelle Kayserman January 26, 2018
Stephen Garvin, PE

This memorandum is an outline and estimated time frame regarding the permitting process with the Town of Manchester that will be required for the new building or a renovation addition.

**Conservation Commission (assume 4-6 months)**:
We are anticipating submitting the Notice of Intent in January (as Design Development will start in November/ December 2018) for the preliminary hearing on January with the assumption that permitting may continue through March. It is assumed that there will be up to 3 hearings/ meetings. Hearings are held approximately once a month (every three weeks on Tuesdays). The submission will require plans to be prepared to the level of Design Development at a minimum. Applications must be submitted approximately 2 weeks before hearing date, as per the table below. A Decision will be issued within 21 days of the closing of the public hearing.

| Submission Deadline (at Noon) | Hearing Date |
|---|---|
| November 19, 2018 | December 4, 2018 |
| December 20, 2018 | January 8, 2019 |
| January 14, 2019 | January 29, 2019 |
| February 4, 2019 | February 19, 2019 |

**Planning Board (assume 4-6 months)**:
We are anticipating submitting to planning board for site plan approval in January (as Design Development will start in November/ December 2018) for the preliminary hearing in January with the assumption that permitting may continue through March. It is assumed that there will be up to 3 hearings/ meetings.

As part of the Planning Board submission, other consultants will need to submit plans for the site plan review application. The required plans to be submitted showing landscaping and lighting/ electrical site plans and details are to be provided by the Landscape Architect and the Electrical Engineer.

p:\projects\2017\17136.00 manchester memorial e.s\documents\feasability\17136.00 mmes permitting schedule 1-26-18.doc

**Samiotes Consultants, Inc.**
Civil Engineers + Land Surveyors

20 A Street
Framingham, MA 01701-4102

**T** 508.877.6688
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www.samiotes.com

# LOCAL ACTIONS AND APPROVALS

SECTION 3.3.5

### 3.3.5 – LOCAL ACTIONS AND APPROVAL CERTIFICATION

- List of SBC, Community Forums and School Committee meeting dates
- Agendas, Materials Presented, Certified Meeting Minutes (Organized by Date)
  - November 28, 2017 – SBC Meeting #14
  - December 4, 2017 – MEP Systems Sub-Committee Meeting
  - December 12, 2017 – SBC Meeting #15
  - December 18, 2017 – SBC Meeting #16
  - January 10, 2018 – SBC Meeting #17
  - January 22, 2018 – SBC Meeting #18
  - January 31, 2018 – Community Meeting #3
  - February 1, 2018 – SBC Meeting #19
  - February 13, 2018 – Joint SBC and School Committee Meeting #1
- Signed Local Actions and Approval Certification

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## 3.3.5 – LOCAL ACTIONS AND APPROVAL CERTIFICATION

The Manchester-Essex Regional School District has undergone an extensive and completely transparent review process for the proposed building project. The material has been reviewed by variety of Committees through the open meeting guidelines and local meeting requirements in both Towns. The following pages include copies of the agendas, presentations and minutes from School Building Committee meetings and well as the presentations for the two (2) Community Meeting held on January 31, 2018 as well as the December 4, 2018 MEP Systems Sub-Committee meeting. All of the meetings that occurred as part of the PDP phase are documented in that Phase's report document.

### PRELIMINARY SCHEMATIC REPORT PHASE PROJECT MEETING DATES

- November 28, 2017 – SBC Meeting #14
- December 4, 2017 – MEP Systems Sub-Committee Meeting
- December 12, 2017 – SBC Meeting #15
- December 18, 2017 – SBC Meeting #16
- January 10, 2018 – SBC Meeting #17
- January 22, 2018 – SBC Meeting #18
- January 31, 2018 – Community Meeting #3
- February 1, 2018 – SBC Meeting #19
- February 13, 2018 – Joint SBC and School Committee Meeting #1

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## PRELIMINARY SCHEMATIC REPORT PHASE PROJECT MEETINGS

- November 28, 2017 – SBC Meeting #14
- December 4, 2017 – MEP Systems Sub-Committee Meeting
- December 12, 2017 – SBC Meeting #15
- December 18, 2017 – SBC Meeting #16
- January 10, 2018 – SBC Meeting #17
- January 22, 2018 – SBC Meeting #18
- January 31, 2018 – Community Meeting #3
- February 1, 2018 – SBC Meeting #19
- February 13, 2018 – Joint SBC and School Committee Meeting #1

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# AGENDA

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 11/28/2017 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | C.Shefferman |

1. Call to Order
2. Previous Topics & Approval of November 14, 2017 Meeting Minutes
   - 7.11 Site: Swing Space Availability (P. Beaudoin)
   - 8.8 Choose date for tour; Contact schools schedule tour (P. Beaudoin/JCJ/DWMP)
   - 9.3 Revised Samiotes Proposal (JCJ)
   - 13.9.2 MEP WG Schedule Meeting (MEP WG)
3. Invoices and Commitments for Approval (DWMP)
4. Working Group Update (DWMP)
5. Budget Update (ALL)
6. Schedule/Look Ahead (ALL)
7. Design Update (JCJ)
8. Next Meeting(s)
9. Other Topics Not Reasonably Anticipated 48 hours prior to Meeting
10. Public Comments
11. Adjourn

MANAGEMENT PARTNERS, LLC

PROJECT MANAGERS
ARCHITECTS

Newburyport, MA 01950
260 Merrimac Street Bldg 7
978.499.2999 ph
978.499.2944 fax

www.doreandwhittier.com

# Manchester Memorial Elementary School

## Feasibility Phase - SBC Meeting #14

November 28, 2017



## TODAY'S AGENDA

*Project Update*

*The Preliminary Schematic Report Phase*

*Evaluating the Options*

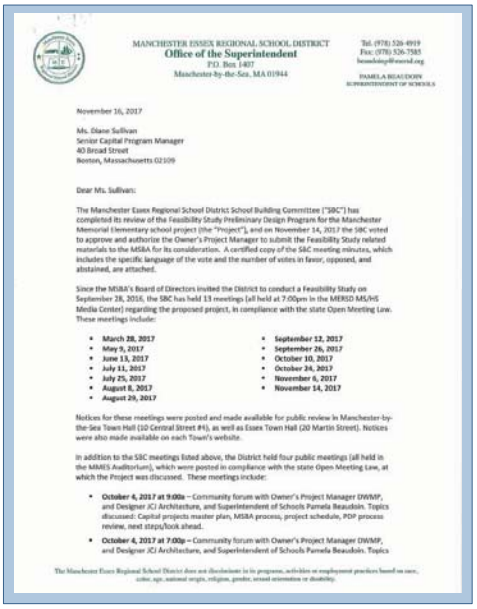
## TODAY'S AGENDA






## PROJECT UPDATE

# The PDP Submission



MANCHESTER ESSEX REGIONAL SCHOOL DISTRICT
**Office of the Superintendent**
P.O. Box 1407
Manchester-by-the-Sea, MA 01944

Tel. (978) 526-4919
Fax: (978) 526-7585
beaudoinp@mersd.org

PAMELA BEAUDOIN
SUPERINTENDENT OF SCHOOLS

November 16, 2017

Ms. Diane Sullivan
Senior Capital Program Manager
40 Broad Street
Boston, Massachusetts 02109

Dear Ms. Sullivan:

The Manchester Essex Regional School District School Building Committee ("SBC") has completed its review of the Feasibility Study Preliminary Design Program for the Manchester Memorial Elementary school project (the "Project"), and on November 14, 2017 the SBC voted to approve and authorize the Owner's Project Manager to submit the Feasibility Study related materials to the MSBA for its consideration. A certified copy of the SBC meeting minutes, which includes the specific language of the vote and the number of votes in favor, opposed, and abstained, are attached.

Since the MSBA's Board of Directors invited the District to conduct a Feasibility Study on September 28, 2016, the SBC has held 13 meetings (all held at 7:00pm in the MERSD MS/HS Media Center) regarding the proposed project, in compliance with the state Open Meeting Law. These meetings include:

- **March 28, 2017**
- **May 9, 2017**
- **June 13, 2017**
- **July 11, 2017**
- **July 25, 2017**
- **August 8, 2017**
- **August 29, 2017**
- **September 12, 2017**
- **September 26, 2017**
- **October 10, 2017**
- **October 24, 2017**
- **November 6, 2017**
- **November 14, 2017**

Notices for these meetings were posted and made available for public review in Manchester-by-the-Sea Town Hall (10 Central Street #4), as well as Essex Town Hall (20 Martin Street). Notices were also made available on each Town's website.

In addition to the SBC meetings listed above, the District held four public meetings (all held in the MMES Auditorium), which were posted in compliance with the state Open Meeting Law, at which the Project was discussed. These meetings include:

- **October 4, 2017 at 9:00a** – Community forum with Owner's Project Manager DWMP, and Designer JCJ Architecture, and Superintendent of Schools Pamela Beaudoin. Topics discussed: Capital projects master plan, MSBA process, project schedule, PDP process review, next steps/look ahead.
- **October 4, 2017 at 7:00p** – Community forum with Owner's Project Manager DWMP, and Designer JCJ Architecture, and Superintendent of Schools Pamela Beaudoin. Topics

The Manchester Essex Regional School District does not discriminate in its programs, activities or employment practices based on race, color, age, national origin, religion, gender, sexual orientation or disability.



discussed: Capital projects master plan, MSBA process, project schedule, PDP process review, and next steps/look ahead.

- **November 1, 2017 at 9:00a** – Community forum with Owner's Project Manager DWMP, and Designer JCJ Architecture, and Superintendent of Schools Pamela Beaudoin. Topics discussed: Capital projects master plan, MSBA process update, project schedule, PDP process review, PDP site & building options review, next steps/look ahead.
- **November 1, 2017 at 7:00p** – Community forum with Owner's Project Manager DWMP, and Designer JCJ Architecture, and Superintendent of Schools Pamela Beaudoin. Topics discussed: Capital projects master plan, MSBA process update, project schedule, PDP process review, PDP site & building options review, next steps/look ahead.

The presentation materials for each meeting, meeting minutes, and summary materials related to the Project are available locally for public review by visiting the school district's website:

**www.mersd.org > quick links > Building Committee**
(www.mersd.org/domain/767)

To the best of my knowledge and belief, each of the meetings listed above complied with the requirements of the Open Meeting Law, M.G.L. c. 30A, §§ 18-25 and 940 CMR 29 *et seq.*

If you have any questions or require any additional information, please contact the Owner's Project Manager, Dore & Whittier Management Partners, at (978) 498-2999.

By signing this Local Action and Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete, and accurate.

By: _____
Title: Chief Executive Officer
Date: 11/21/17

By signing this Local Action and Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete, and accurate.

By: _____
Title: Superintendent of Schools
Date: 11/21/17

By signing this Local Action and Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete, and accurate.

By: _____
Title: Chair of the School Committee
Date: 11/21/17

## PROJECT UPDATE

# The PDP Submission

*The MSBA Now Reviews the Submission*

*Expecting MSBA's Comments in approx. 3 week*

*(Just before or Just after December Holidays)*

*Our Response Back is Due 2 Weeks after Receipt of Comments*



## TODAY'S AGENDA

*The Preliminary Schematic Report Phase*

*(PSR)*

## Preliminary Schematic Report Phase Goals

*The Goal is to Identify a Singular Preferred Scheme by the End of the Phase*



THE PSR PHASE

## How Do We Get There?

- *Establish Common Evaluation Criteria*
- *Apply the Criteria to Test Schemes*
- *Eliminate Non-Viable Schemes*
- *Develop Variant Schemes as Applicable*
- *Identify A Short-List of Schemes for Estimating*
- *Review Costs for the Short-List Schemes*
- *Select a Singular Preferred Scheme for Submission*

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS
JCJARCHITECTURE

## THE PSR PHASE

### Preliminary Schematic Report Milestones

*1/10 – Select Short List of Schemes for Estimating*

*2/5 – Review Cost Estimates*

*2/13 – Approve PSR at Joint SBC/ SC Meeting*

*2/21 – Submit PSR to MSBA*

*3/14 or 3/21 – MSBA Facilities Assessment Sub-Committee*

*4/11 – Final MSBA Approval of PSR*

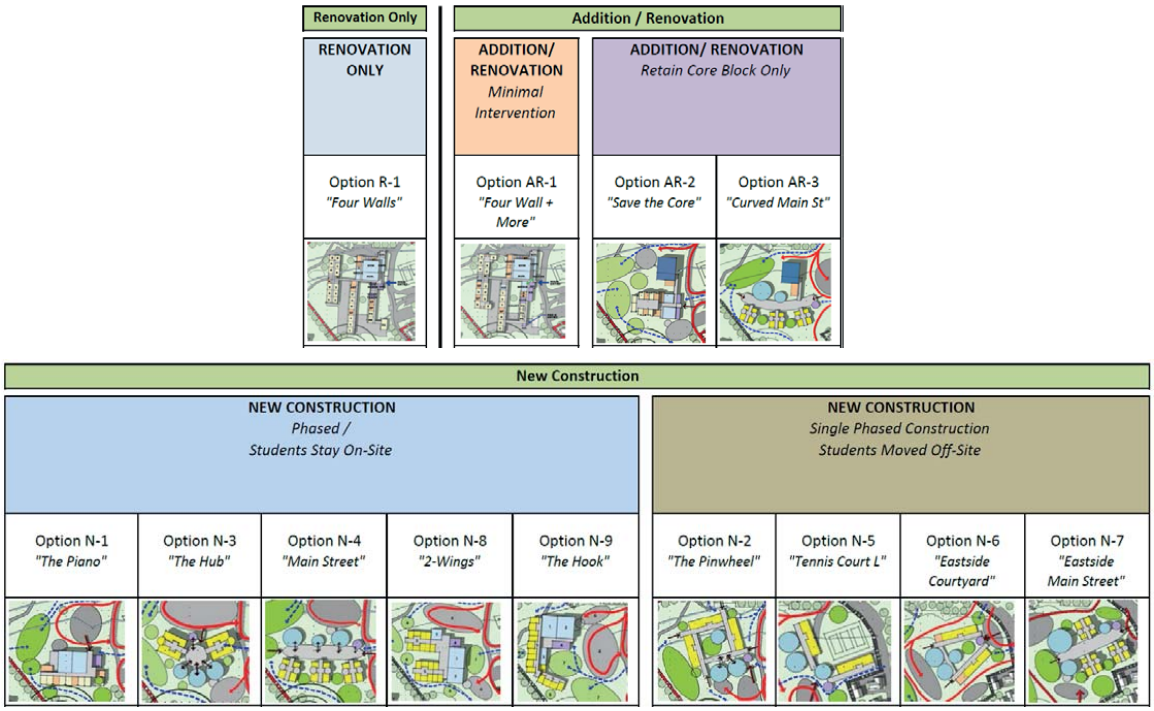
*Move into Schematic Design Phase*



## TODAY'S AGENDA

*Evaluating the Options*

# EVALUATING THE OPTIONS







# EVALUATING THE OPTIONS


## New Scheme: AR-4

*"Out West"*

## OPTION AR-4



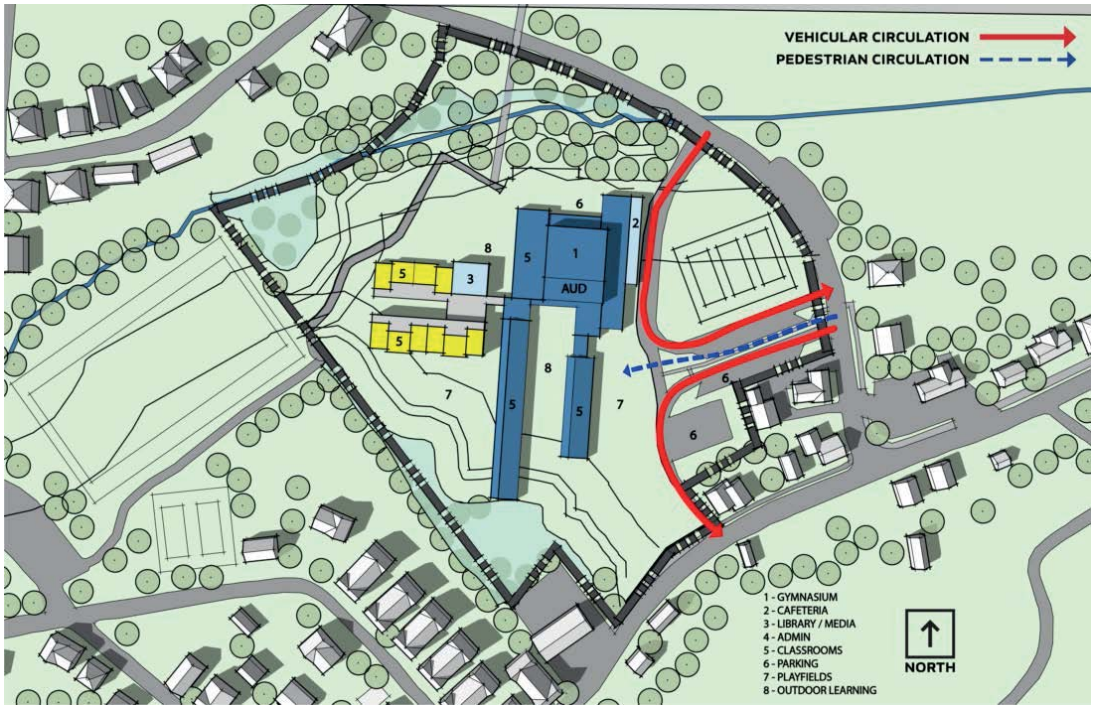




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## OPTION AR-4




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## EVALUATING THE OPTIONS

# Identify and Apply a Common Set of Criteria

*An Initial Set of Criteria was Developed in PDP*

*(Discussion & Review Handout)*



## EVALUATING THE OPTIONS

| | Renovation Only | Addition / Renovation | | | New Construction | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | RENOVATION ONLY | ADDITION/ RENOVATION *Minimal Intervention* | ADDITION/ RENOVATION *Retain Core Block Only* | | NEW CONSTRUCTION *Phased / Students Stay On-Site* | | | | | NEW CONSTRUCTION Single - Phased / Students Stay Off-Site | | | |
| | Option R-1 *"Four Walls"* | Option AR-1 *"Four Wall + More"* | Option AR-2 *"Save the Core"* | Option AR-3 *"Curved Main St"* | Option N-1 *"The Piano"* | Option N-3 *"The Hub"* | Option N-4 *"Main Street"* | Option N-8 *"2-Wings"* | Option N-9 *"The Hook"* | Option N-2 *"The Pinwheel"* | Option N-5 *"Tennis Court L"* | Option N-6 *"Eastside Courtyard"* | Option N-7 *"Eastside Main Street"* |
| **Educational** | | | | | | | | | | | | | |
| *Meets Educational Program for all Students* | | | | | | | | | | | | | |
| *Provides Flexibility for Future Growth* | | | | | | | | | | | | | |
| *Flexibility for Configuration & Adjacencies of Teaching Spaces* | | | | | | | | | | | | | |
| *Minimizes Impact to Students During Construction* | | | | | | | | | | | | | |
| **Community** | | | | | | | | | | | | | |
| *Provides Accessibility to Community Used Space* | | | | | | | | | | | | | |
| *Accommodates Community Program Needs* | | | | | | | | | | | | | |
| *Retains Separated Auditorium* | | | | | | | | | | | | | |
| *Retains Existing Tennis Courts* | | | | | | | | | | | | | |
| *Allows for Desired Gym Size* | | | | | | | | | | | | | |
| **Site** | | | | | | | | | | | | | |
| *Maximizes Efficient Utilization of the Site* | | | | | | | | | | | | | |
| *Increases the Number of Play Areas/ Fields* | | | | | | | | | | | | | |
| *Provides Favorable Building Presence to Street* | | | | | | | | | | | | | |
| *Improves Parent Drop-Off/ Pick-Up Queuing* | | | | | | | | | | | | | |
| *Off-Site Swing Space Not Required* | | | | | | | | | | | | | |
| *Creates Favorable Relationships to Abutters* | | | | | | | | | | | | | |
| **Building** | | | | | | | | | | | | | |
| *Optimizes Building Mass to Perimeter Ratio* | | | | | | | | | | | | | |
| *Optimizes Building's Footprint on the Site (# of Stories)* | | | | | | | | | | | | | |
| **Costs and Schedule** | | | | | | | | | | | | | |
| *Relative Capital Costs* | | | | | | | | | | | | | |
| *Requires Replacement of Tennis Courts* | | | | | | | | | | | | | |
| *Provides a Shorter Construction Period* | | | | | | | | | | | | | |
| *Accommodates Transitions (Swing Space)* | | | | | | | | | | | | | |

## EVALUATING THE OPTIONS

*Next Steps*



# THANK YOU

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS
JCJARCHITECTURE

# MEETING MINUTES

MANAGEMENT PARTNERS, LLC

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 11/28/2017 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | C. Shefferman |

| Present | Name | Affiliation | Present | Name | Affiliation |
|---|---|---|---|---|---|
| ✓ | Caroline Weld * | SBC Co-Chair | ✓ | Jim LaPosta | JCJ |
| ✓ | Ann Cameron * | SBC Co-Chair | ✓ | Daniel Ruiz | JCJ |
| ✓ | Pam Beaudoin * | Superintendent | | Lauren Braren | JCJ |
| ✓ | Avi Urbas * | Dir. of Fin. & Ops | | Emily Czarnecki | JCJ |
| ✓ | Alva Ingaharro * | Essex | | Mike Burton | DWMP |
| | John Willis * | Principal MMES | ✓ | Steven Brown | DWMP |
| ✓ | Jay Pagliarulo | Dir. of Facilities | ✓ | Christina Shefferman | DWMP |
| ✓ | Andy Oldeman * | Man. Fin. Comm. | | | |
| ✓ | Lisa O'Donnell * | Essex B.O.S. | | | |
| ✓ | Remko Brueker * | Manchester | | | |
| | Adam Zaiger * | Manchester | | | |
| ✓ | Tyler Virden * | Essex | | | |
| | George Scharfe * | Manchester | | | |
| ✓ | Gordon Brewster * | Manchester | | | |
| ✓ | Charlie Hay * | Essex | | | |
| ✓ | Sarah Creighton * | Manchester | | | |
| | Maggie Tomaiolo * | Essex | | | |
| ✓ | Jake Foster * | Essex | | | |

**Action Items:**

| Item No. | Responsible Party: | Description |
|---|---|---|
| 7.11 | P. Beaudoin | Site: Swing space availability |
| 8.8 | JCJ/DWMP | Choose date for tour; Contact schools schedule tour |
| 13.9.2 | MEP WG | Send meeting invite for WG meeting |
| 14.4.4 | C. Shefferman | Resend Volunteer email to SBC |

** SBC Voting Member*

PROJECT MANAGERS
ARCHITECTS

Newburyport, MA 01950
260 Merrimac Street Bldg 7
978.499.2999 ph
978.499.2944 fax

www.doreandwhittier.com

| Item No. | Description | Action |
|---|---|---|
| 14.1 | Call to Order: 7:04 pm meeting was called to order by the SBC Co-Chair Ann Cameron with 14 of 17 voting members in attendance. S. Brown of DWMP notes the meeting will follow the Power Point presentation that is being projected on the screen and to follow the agenda that was provided to the SBC prior to the meeting via Dropbox. | Record |
| 14.2.1 | Previous Topics & Approval of November 14, 2017 Meeting Minutes: S. Brown explains and reviews the five previous items requiring action. A review of those items is noted below. | Record |
| 7.11 | Site Understanding: L. Braren reviews site understanding slides included in the JCJ presentation. There are 5 slides total that indicate degraded areas, resource areas, FEMA flood map zone, zone 1 and 2 extents, and property line setbacks. The SBC ask many questions regarding buffer zones, height regulations, zoning restrictions, storm water runoff, and setbacks. The SBC asked whether it might be an option to tear down the building and rebuild exactly where the building is now to avoid any issues. This would mean that during construction, the students would need to be relocated to either another location. P. Beaudoin stated she would contact some other districts to see if they might have a vacant site that might be a consideration. P. Beaudoin to report findings.<br>9/12/17: P. Beaudoin states that she has asked surrounding districts, and has confirmed that Rockport and Beverly do not have anything available. P. Beaudoin is still waiting to hear from Gloucester, Hamilton and Wenham. Once a response received, will report back to the SBC.<br>9/26/17: P. Beaudoin states that she has 3 leads from schools and sites within 10 miles of MMES. Waiting to hear back from the 3 leads and she will report updates to the SBC once information is received.<br>10/24/17: No update at this time. Continuing.<br>11/06/2017: P. Beaudoin provided the SBC with an update of the following:<br>➢ P. Beaudoin and A. Urbas have a meeting with the mayor of Beverly next week to discuss possibly using the Briscoe school.<br>➢ Penguin Hall will not meet the habitable needs for MMES, no longer an option.<br>➢ There is one catholic school in Gloucester, and another in Beverly still waiting to hear back from. Have left several messages with no answer.<br>➢ Possible option to connect with a real estate agent.<br>Additional details and follow up will be provided to the SBC at our next meeting.<br>11/14/2017: P. Beaudoin states that she has a meeting scheduled with the Mayor of the Town of Beverly on 11/20/17. P. Beaudoin is also in communication with St. Mary's in Beverly, and is waiting for a formal response from the school on whether it will fit the needs of MMES. P. Beaudoin is still waiting to hear from Father Jim in Gloucester. P. Beaudoin will continue to pursue these options and will report back to the SBC once she has additional information.<br><br>11/28/2017: P. Beaudoin states that there are still 3 possible options. Briscoe School in Beverly, The Cummings Center in Beverly, and St. Mary's in Beverly. P. Beaudoin met with officials from Beverly's mayor office, and is waiting to hear whether they would be willing to wait a year before someone would possibly occupy the school. The Cummings Center approached P. Beaudoin and stated that they might have an option that would fit their needs. The Cummings Center is working on putting together a quote and space availability between their many available spaces. P. Beaudoin is still waiting to hear if St. Mary's can provide an | |

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| | estimate for the space. After discussion, the SBC agreed that overall, they would steer towards an option that can either have kids on site or off site based on phasing, modulars, and or an offsite temporary campus. P. Beaudoin to continue development of potential swing spaces. | Open/P. Beaudoin |
| 8.8 | Educational Planning: D. Stephen provides a brief recap of the Ed. Planning presentation that was presented to the Leadership team back in August. A copy of the slides are attached in the backup. D. Stephen advises that the team should plan when they would like to visit other school sites that have recently gone through the process. The schools requested include Haverhill, Marblehead, and Andover. P. Beaudoin to provide dates in December that will work for the group.<br>9/26/17: P. Beaudoin states that she sent out a scheduling doodle for potential dates to the SBC. Three dates worked best for the group, 12/8, 12/14, 12/18. P. Beaudoin to send another doodle with these dates to confirm which will be best. P. Beaudoin to confirm best date at next meeting.<br>10/24/17: No update at this time. Continuing.<br>11/06/2017: P. Beaudoin will evaluate schedule doodle and select an open date that worked best for the SBC. S. Brown recommended taking a tour of Hunkings School in Haverhill, West Parish in Gloucester, and a Renovation/Addition School. P. Beaudoin to communicate with DWMP and schedule dates for tours.<br>11/14/2017: S. Brown states that he has reached out to the West Parish School in Gloucester to coordinate a walk through. S. Brown is waiting to hear back with some potential dates and times. D. Ruiz states that he reached out to the Hunking School in Haverhill and is waiting to hear back dates and times. Once both DWMP and JCJ have some potential dates and times they will report back to the SBC.<br><br>11/28/2017: S. Brown states that DWMP is still trying to reach the principal with West Parish and confirm a time for a tour. Once any information is received, DWMP will update the SBC. D. Ruiz confirms that he was able to schedule a tour for 12/8/17 with the Hunking School. D. Ruiz to confirm the afternoon of 12/8/17 for the site tour of Hunking School. D. Ruiz to send out meeting invites to the team once confirmed. | DWMP/JCJ |
| 9.3 | Revised Samiotes Proposal: S. Brown states that originally a BRR had been planned for approval this evening. The request will be moved till the tennis court existing survey is reviewed by Samiotes. The report that was just received could be reviewed and used as existing information that the surveyor will no longer need to test for, therefore lowering the cost of the proposal. JCJ to report back to DWMP with any additional cost savings from Samiotes.<br>10/24/17: No update at this time. Continuing.<br>11/6/2017: No update at this time. Continuing.<br>11/14/2017: No update at this time. Continuing.<br><br>11/28/2017: D. Ruiz states that it is not expected for Samiotes to revise their proposal. The SBC was informed that Samiotes had to come back to the site a couple of time since their flag delineation was removed. Also it was determined that the Geodesic report was different than the standard, therefore requiring additional research. | Closed/Record |
| 13.9.2 | Other Topics Not Reasonably Anticipated 48 Hours Prior to Meeting: The SBC agreed that there should be an MEP working group established. The SBC recommended that R. | |

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| | Breuker, A. Oldeman, T. Virden, G. Sharfe, J. Pagliarulo, and S. Creighton be included in the group. At our next SBC meeting further development will be established.<br><br>11/28/2017: S. Brown states the WG was established at our last SBC meeting, and a date for a meeting with the group needs to be established and determined for the month of December. The WG discussed and agreed that 12/4/2017 at 6 pm would be the best time. D. Ruiz to confirm with GGD, the MEP consultant, whether this time will also work with them. A. Urbas states that he would like to be included and invited to the meeting. The purpose of the MEP WG is to provide buy in on systems for the cost estimates. Once D. Ruiz confirms GGD can make the 12/4/2017 6pm meeting, C. Shefferman will send out a meeting invite. | D.Ruiz/C. Shefferman |
| 14.2.2 | Previous Topics & Approval of November 14, 2017 Meeting Minutes: A motion to approve the 11/6/2017 meeting minutes as submitted made by A. Ingaharro and seconded by C. Weld. Discussion: None. Vote: All in favor w J. Foster abstaining. Motion passes, minutes approved. | Record |
| 14.3 | Invoices and Commitments for Approval: A motion to approve Diners Club Intl. Invoice No. 1820684 in the amount of $644.67 for the Ed. Programming Visioning Workshop Lunch made by C. Weld, and seconded by J. Foster. Discussion: None. All in favor: Motion passes, invoice approved. | Record |
| 14.4.1 | Working Group/Ed. Programming Update: S. Brown states that the Ed. Programming WG met through the PDP submission, which was submitted on 11/21/17. No further updates at this time. | Record |
| 14.4.2 | Working Group/Facilities Assessment Update: S. Brown states that the MEP WG was formed and we discussed earlier that the first meeting will occur on 12/4/17. No further discussion. | Record |
| 14.4.3 | Working Group/Budget Collaboration Update: A. Cameron states there are no updates at this time. | Record |
| 14.4.4 | Working Group/Communications Update: C. Shefferman states that she sent out an email to the SBC outlining volunteers needed for upcoming local events. A handful of members have responded, but many still haven't. C. Shefferman to send out email again to SBC asking for additional sign ups. | C. Shefferman |
| 14.5 | Budget Update: S. Brown updates the SBC on the Budget update information that is displayed and part of the meeting presentation. Not much has changed since the last time we met. Currently, the project is 90% encumbered, 27% expended, and 31% of F&S is complete. | Record |
| 14.6.1 | Schedule/Look Ahead: J. Laposta provides the SBC with an update of where we are now in the project. The discussion is outlined below:<br>➢ PSR-Preliminary Schematic Report Phase<br>• The purpose of the PSR is to summarize the process and conclusions of the Preliminary and Final Evaluation of Alternatives and substantiate and document the District's selection and recommendation of a preferred solution.<br>• The Report should address all concerns and questions raised by the MSBA during its review of the Preliminary Design Program, PDP, and clearly | Record |

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| | identify any changes incorporated by the District based on further evaluations and considerations.<br>• The goal is to identify a singular preferred scheme by the end of the phase<br>• How do we get there?<br>o Establish common evaluation criteria<br>o Apply the criteria to test schemes<br>o Eliminate non-viable schemes<br>o Develop variant schemes as applicable<br>o Identify a short list of schemes for estimating<br>o Review costs for the short list schemes<br>o Select a singular preferred scheme for submission | |
| 14.6.2 | Schedule/Look Ahead: An outline of the Preliminary Schematic Report Milestones is listed below:<br>➢ 1/10/18-Select short list of schemes for estimating<br>➢ 2/5/18-Review cost estimates<br>➢ 2/13/18-Approve PSR at joint SBC/SC meeting<br>➢ 2/21/18-Submit PSR to MSBA<br>➢ 3/14/18 or 3/21/18-MSBA Facilities Assessment Sub Committee meeting<br>➢ 4/11/18-Final MSBA approval of PSR<br>➢ Move into Schematic Design phase<br>A. Cameron asks when we will be discussing CM @ Risk vs DBB? S. Brown states that we will discuss in January. | Record |
| 14.6.3 | Calendar/Look Ahead: S. Brown discusses the calendar slides shown in the presentation. An outline of the dates discussed are highlighted below:<br>➢ 12/5/17 SC meeting<br>➢ 12/11/17 MSBA PDP Approval?<br>➢ 12/12/17 SBC meeting<br>➢ 12/13/17 SC meeting<br>➢ 12/18/17 SBC meeting<br>➢ 1/9/18 SC meeting<br>➢ 1/10/18 SBC meeting<br>➢ 1/22/18 SBC meeting<br>➢ 1/23/18 SC meeting<br>➢ 1/24/18 Comm meeting no. 3 prep<br>➢ 1/26/18 Comm meeting no. 3 slide review<br>➢ 1/30/18 SC meeting<br>➢ 1/31/18 Comm meeting no. 3 | Record |
| 14.7.1 | Design Update/PDP: J. Laposta discusses the design update slides. A recap of the discussion is outlined below:<br>➢ PDP Submission<br>• Submitted on 12/21/17<br>• The MSBA now reviews the submission<br>• Expecting MSBA's comments in approx. 3 weeks<br>• Our response back is due 2 weeks after receipt of comments<br>The Final PDP is on the project dropbox available for any SBC member to view or download electronically. | Record |

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| 14.7.2 | Design Update/Evaluating the Options: J. Laposta presents and discusses the Evaluating the Options slides from the presentation. The SBC reviewed and discussed the options chart and matrix sheet. Tonight, the SBC will be reviewing the criteria, and finalizing the details so at the next SBC meeting, they can start eliminating down some of the options based on the criteria and whether it meets them. J. Laposta presents the SBC with an additional option, AR-4. AR-4 was designed to show more phasing options as a add/reno. Overall AR-4 has 2 phases, and allows a 2-story wing to be built and keep the core and front wing of the existing school. Conceptually half of the classrooms are new, and half are reno/additions. The SBC asked whether any of the options will need to be eliminated based on the new findings of the swale and wetlands setback to the southwest side of the property. J. Laposta responds that some of the options as they are further designed will need to be moved or situated differently on the property due to the new setbacks. The SBC also asked whether it is the school's responsibility to take care of the swale. J. Laposta responds that since the swale is on school property that yes, they will have in the project budget to handle the swale and the culvert drain issues. Anything on the school property will be handled. | Record |
| 14.7.3 | Design Update/Evaluating the Options: J. Laposta presents and discuss the common set of criteria slides. An outline of the discussion is below:<br>➢ An initial set of criteria was developed in PDP<br>➢ Educational:<br>• Meets educational program for all students<br>• Provides flexibility for future growth<br>• Flexible configuration & adjacencies of teaching spaces<br>• Minimizes impact to students during construction<br>➢ Community:<br>• Provides accessibility to community used space<br>• Accommodates community program needs<br>• Allows for desired gym size<br>➢ Site:<br>• Maximizes efficient utilization of the site<br>• Increases the number of play areas/fields<br>• Provides favorable building presence to street<br>• Improves parent drop-off/pick-up queuing<br>• Off-site swing space not required<br>• Creates favorable relationships to abutters<br>➢ Building:<br>• Optimizes building mass to perimeter ratio<br>• Optimizes building's footprint on the site<br>➢ Costs and Schedule:<br>• Relative capital costs<br>• Requires replacement of tennis courts<br>• Provides a shorter construction period<br>• Accommodates transitions (swing space)<br>➢ Sustainability<br>• Optimizes solar orientation<br>• Most improves riparian/wetland conditions<br>➢ Safety & Security: | Record |

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| | • Maintains safe route guidelines for pedestrians<br>• Option to separate community use from classrooms<br>S. Creighton asks whether the criteria can be refined? There are some redundancies between the categories. Some of the criteria could be yes or no, or some could have a scaling system. J. Laposta suggests that JCJ will go through the criteria and rate the options first and provide a recommendation to the SBC whether they meet the program or not. S. Brown suggests even providing a description for each criterion and evaluating system to help the SBC understand each item. G. Brewster wants to make sure that the criteria have been evaluated and are considered practical by those who are in the building, i.e. students, teachers, and staff. P. Beaudoin states that at the Ed. Programming Visioning workshops, there were many teachers and professionals from the district that provided their input regarding the design meeting the program. | |
| 14.7.4 | Design Update/Evaluating the Options: J. Laposta states that at our next SBC meeting, the hope is to eliminate options that are non-starters. Over the next 6-8 weeks as we are in the PSR phase, we will want to get to 3. J. Foster expressed concern how the criteria and evaluation of the options will bring the group up to speed of what the ed. Program is. J. Foster understands within the criteria the designing principles are there, but there may be an opportunity to add more to the program. JCJ reiterates that it is their job to transform the ed. Program visioning session into the design and aesthetics requested. The guiding principles play a central role into the learning experience. At the next SBC meeting JCJ will provide a criteria recommendation for each option, and will ask the SBC to start eliminating options. | Record |
| 14.8 | Next Meetings:<br>• 12/12/17 SBC Meeting<br>• 12/18/17 SBC Meeting<br>• 1/10/18 SBC Meeting | Record |
| 14.9 | Other Topics Not Reasonably Anticipated 48 Hours Prior to Meeting: S. Creighton asks J. Laposta to clarify his comment regarding being mindful of their budget during design. S. Creighton states how they can be mindful of their budget, when the budget hasn't been agreed upon nor established. J. Laposta explains that on a previous job the Owner had been explicit from the beginning what their budget is for a construction project, due to borrowing capacity and other capital projects ongoing at the time. The team is aware of how the SBC and both Manchester, and Essex would like to be extremely mindful of cost and what is designed and how it will affect each town. During the PSR phase the number will become much more defined and provide a better sense of what the building options might cost. | Record |
| 14.10 | Public Comment: None. | Record |
| 14.11 | Adjourn: A motion was made by G. Scharfe and seconded by A. Oldeman to adjourn the meeting. Discussion: None. Vote: Unanimous to approve. Meeting adjourned at 8:46 pm. | Record |

**Attached:**
*SBC Meeting Agenda, Sign In Sheet, SBC Meeting No. 13 11/14/17 Meeting Minutes, Diners Club Intl. Invoice No. 1820684, Manchester Memorial Elementary School Presentation 11/28/17, JCJ Workplan*

**DORE AND WHITTIER MANAGEMENT PARTNERS, LLC.**



Christina Shefferman
Assistant Project Manager
Cc: Attendees, File

**The above is my summation of our meeting. If you have any additions and/or corrections, please contact me for incorporation into these minutes.**

## PRELIMINARY SCHEMATIC REPORT PHASE PROJECT MEETINGS

- November 28, 2017 – SBC Meeting #14
- December 4, 2017 – MEP Systems Sub-Committee Meeting
- December 12, 2017 – SBC Meeting #15
- December 18, 2017 – SBC Meeting #16
- January 10, 2018 – SBC Meeting #17
- January 22, 2018 – SBC Meeting #18
- January 31, 2018 – Community Meeting #3
- February 1, 2018 – SBC Meeting #19
- February 13, 2018 – Joint SBC and School Committee Meeting #1

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GARCIA • GALUSKA • DESOUSA
Consulting Engineers Inc.

370 Faunce Corner Road, Dartmouth, MA 02747-1271

# MEETING AGENDA

**for**

**Manchester Memorial Elementary School**
**Manchester, MA**

## MEP System Project Objectives

- Mechanical Systems to be studied:

    1. Baseline system (VAV-DX / gas)
    2. Displacement Partial AC w/ HW Radiation High Efficiency Boiler Plant
        a. Packaged DX / gas AHU's/ RTU's
        b. Chilled / HW AHU's / RTU's
    3. Displacement Full AC
    4. Chilled Beams
    5. Geothermal for preferred option

    *Systems above represent the majority of classrooms / office spaces, etc. Large single zone spaces such as Gym and/or Cafeteria could be served by overhead or displacement air systems.*

- Electrical Systems:

    1. Service ratings and voltage
    2. Lighting, Lighting Control Systems, Light Power Density
    3. Emergency Power System
    4. Fire Alarm System
    5. Tel / Data / Security

- Plumbing Systems
- Community Goal for reduction in energy consumption
- LEED Goals
- Community Goals for renewable energy
- District standards or proprietary items

# MEP/FP
# SYSTEMS OVERVIEW

**Manchester Memorial Elementary School**
**Manchester, MA**

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## HVAC SYSTEM OVERVIEW

- Comparison:  Mixed Air versus Displacement Ventilation
- Code Baseline  - Overhead Mixed VAV System
- Displacement Ventilation System
- Chilled Beam (Induction) System
- Air Handling Systems Overview
- Hot Water and Chilled Water Plant Overview
- Geothermal Systems
- VRF Systems
- Automatic Temperature Controls and Building Energy Management Systems
- Energy Modeling Methodology

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## HVAC SYSTEM COMPARISON
## MIXING VS. DISPLACEMENT SYSTEMS

- MIXED AIR
- (AIR CONDITIONING)

- VENTILATION AIR COOLED AND SUPPLIED AT 55 DEG F. TO SPACE
- MAINTAINS SPACE TEMP. AT 75 DEG F.
- ADDITIONAL EQUIP. REQD. WITH INCREASED CAP. TO MAINTAIN 75 DEG F.
- INCREASED DUCT SIZES OR NEED FOR ADDITIONAL PIPING SYSTEM
- INCREASED CONSTRUCTION COST BY 20-30% (Dependent upon AC System)
- INCREASED OPERATIONAL COST BY 25-30%

- DISPLACEMENT
- (DEHUMIDIFIED AIR)

- VENTILATION AIR COOLED BY DEHUMIDIFICATION AND REHEATED BY HOT GAS HEAT RECOVERY TO 68 DEG F.
- TEMP. FLOATS IN SPACE WITHIN COMFORT ZONE
- REDUCED DUCT SIZES OR NEED FOR SECONDARY EQUIPMENT
- REDUCED CONSTRUCTION COST WHEN COMPARED TO CONVENTIONAL NON-CONDITIONED BUILDINGS
- SIMILAR OPERATIONAL COST WHEN COMPARED TO CONVENTIONAL NON AIR CONDITIONED BUILDINGS



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## ASHRAE BASELINE)

**Pros:**

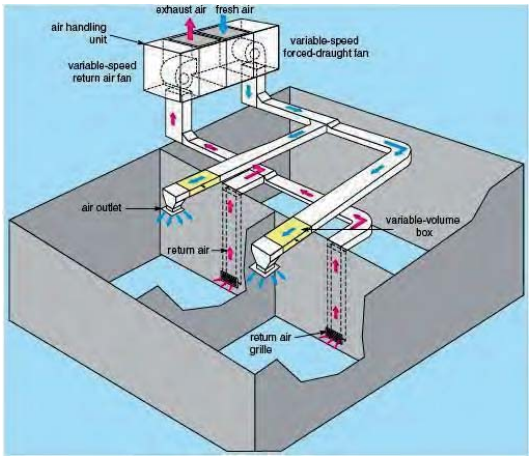
•Lower piping installed costs due to two-pipe system as chilled water piping is not required

•Moderate to high overall installed costs

•Chiller plant and distribution systems or Packaged Direct Expansion (DX) Cooling

•Low maintenance; no condensate drains, fans, or filters at terminal units

•Reduced automatic temperature controls installed costs resulting from reduced control components




**Cons:**

•Moderate noise levels

•Reduced temperature control if several rooms are served by the same VAV unit

•Reduced indoor air quality as a result of being a mixed-air system

•Maintenance of equipment is in occupied area

•Higher energy consumption due to increased fan energy

•Higher energy consumption as summertime use of hot water system is required for hot water reheats of VAV boxes

•Overall ductwork costs are greater due to the larger supply and return ductwork systems providing mixed-air rather than ventilation only

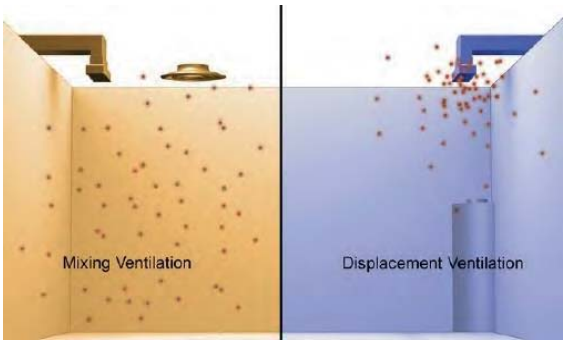




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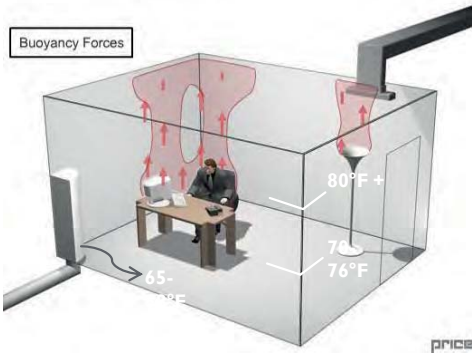
## DISPLACEMENT SYSTEM

- Ventilation air is provided from high efficiency hot water coil heating/chilled water coil cooling RTU w/ ERV
- Air is delivered at low velocity and at low levels within the space
- The system uses naturally occurring buoyant forces within the space to create a vertical rise of the air throughout the space.
- 2-4˚ F differential supply air to space
- Supply air rises when heat source is contacted
- Displaces room air upward
- Air rises with pollutants to ceiling
- Air returns at ceiling back to air handling unit




Mixed Systems $E_c$= 0.8

DV Systems $E_c$=1.2 - 1.4




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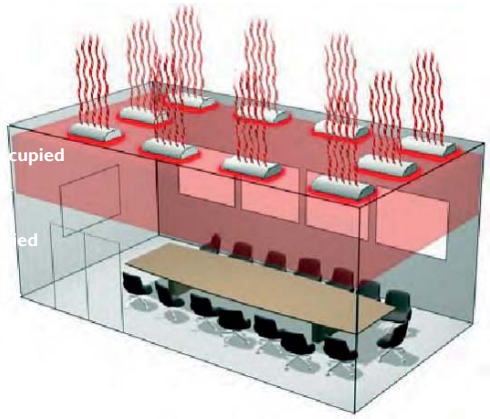
## DISPLACEMENT SYSTEM – ENERGY CONSERVATION

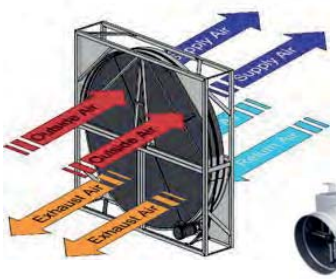
### Load Calculation Reductions

- Conventional System: All heat generated in room is included in air flow calculation since all airflow is mixed.
- Displacement System: Only loads which occur in the Occupied Zone are factored
- Results in: Smaller equipment & systems and lower installed and operating costs for Displacement Systems

### Additional Energy Efficiency Measures

- Energy Recovery: Transfers energy from the return air stream to the supply air stream to pre-heat or pre-cool the outside air.
- Variable Air Volume w/ Aircuity CO2 Demand Control Ventilation: Modulates the airflow to large single zone areas in accordance to space mounted thermostat and CO2 sensors reducing energy consumption due to reduced air changes.
- Supplemental Radiant Cooling Panels: Provide additional cooling without increasing airflow requirements reducing energy consumption due to smaller equipment and fan run time.








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## DISPLACEMENT SYSTEM

Pros:

- Excellent pollution removal
- Very low noise levels
- Very low air velocity
- Low moisture levels
- Reduced cooling loads
- Reduced initial cost
- Variable volume reheat is not required
- High ventilation effectiveness





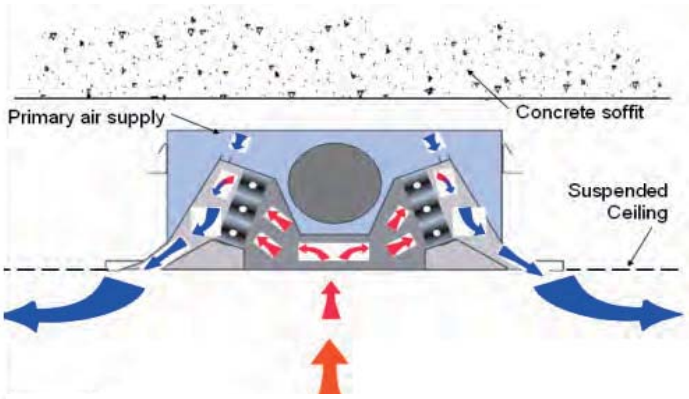
Cons:

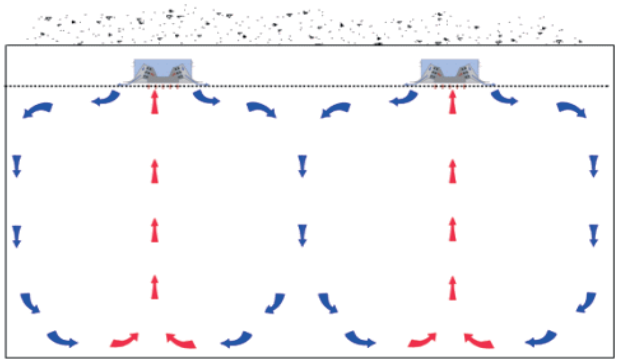
- Requires perimeter radiation heating
- Requires perimeter radiation cooling to maintain full AC setpoints during peak cooling conditions

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## INDUCTION (ACTIVE CHILLED BEAM) UNITS

- Ventilation air is provided from high efficiency hot water coil heating/chilled water coil cooling RTU w/ ERV
- Primary (Ventilation) air is supplied to plenum and discharges through nozzles
- Room air is induced through the heating/cooling coils
- Mixture of Primary and Room air is delivered to room through diffuser slots.
- Condensate drain pans and piping system for condensate removal



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## INDUCTION UNITS

**Pros:**

- Energy efficient
- Low Noise Levels
- Flexibility of Installation
- Moderate first cost
- Simplified Controls (No Fans)
- Lower Maintenance (No Terminal Filters)





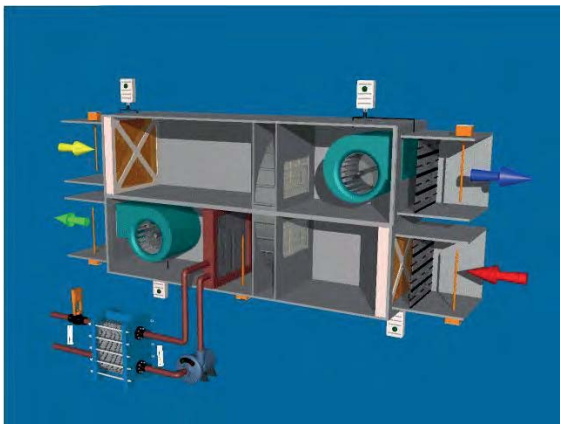
**Cons:**

- Requires increased coordination with "ceiling" system. (e.g. additional piping, HW, CHW & condensate piping)
- Requires additional ventilation air in some cases
- Increase Energy Consumption vs. Dehumidified Air System

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100% Outside Air Central Ventilation Rooftop Unit Enclosures with Energy Recovery, CO2 demand Ventilation for Displacement and Induction Unit Systems



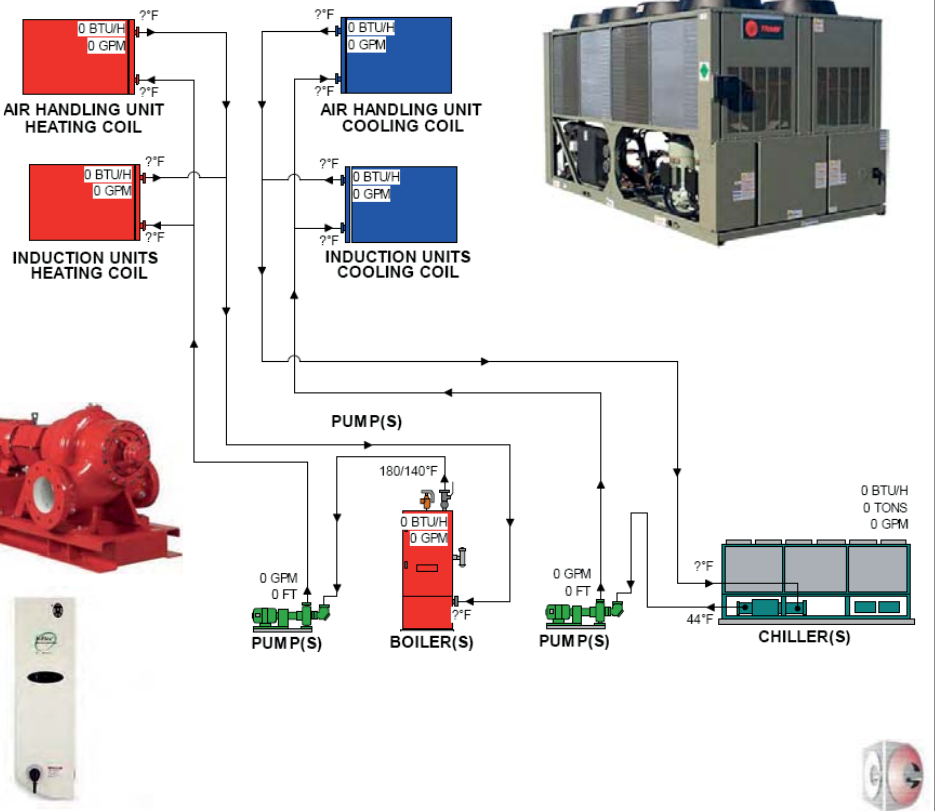


- Ventilation air is provided from Rooftop or Indoor Air Handling Units
- Packaged Gas-Fired Heating/DX Electric Cooling
- Hot water Heating and Chilled water Cooling

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# HIGH-EFFICIENCY GAS-FIRED CONDENSING BOILER AND ELECTRIC CHILLER SYSTEMS














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# HIGH-EFFICIENCY CHILLER PLANT








**Options:**

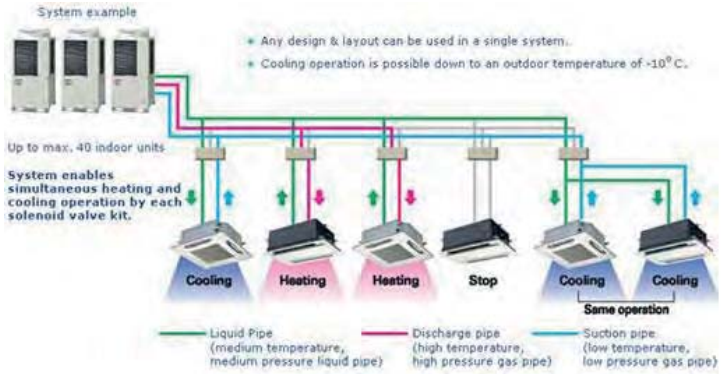
- Air Cooled Packaged or Split Condenser
- Water Cooled with Cooling Tower
- Geothermal Heat Pump Chillers

Garcia Galuska DeSousa, Inc.
370 Faunce Corner Road Dartmouth,
Massachusetts 02747-1217

# VARIABLE FLOW REFRIGERANT (VRF) SYSTEM W/ DOAS (FULL AIR CONDITIONING)

**Pros:**

- Low piping installed costs due to refrigerant piping system only
- Moderate overall installed costs
- Chiller plant and distribution systems not required
- Reduced boiler plant size
- Single cabinet can be utilized for both heating and cooling applications
- Smaller central ventilation ductwork as only the code required ventilation air is provided to meet occupancy load






**Cons:**

- Individual fan motors in space
- Higher noise levels
- Quarterly filter changes per unit
- More complex automatic temperature controls
- Higher automatic temperature controls installed costs on a per unit basis due to amount of control devices required
- Condensate drain maintenance for terminal units
- Maintenance of equipment is in occupied area
- Higher energy consumption due to increased electric heating

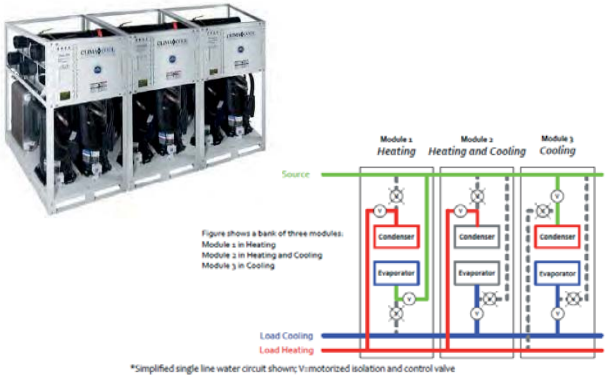


# GEOTHERMAL SYSTEM

**Geothermal Pros:**

- High energy efficiency
- Reduced carbon footprint for environmental considerations
- Low noise levels inside and outside of building as no exterior mounted equipment with condensers or fans is required
- Potential for heat recovery; simultaneous heating and cooling






**Geothermal Cons:**

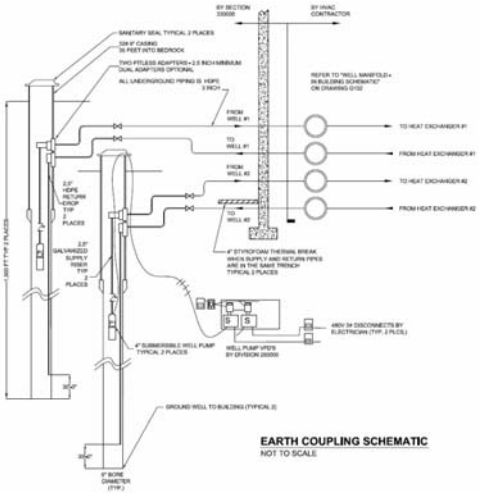
- Increased capital investment for geothermal plant
- Requires increased site coordination for well locations
- Higher automatic temperature controls for geothermal plant equipment
- Requires increased maintenance for geothermal plant equipment (filters, additional pumps, etc.)

## GEOTHERMAL FIELD – CLOSED OR OPEN LOOP



Vertical Standing Column Wells.
Typically Lower First Cost (fewer wells) w/ Higher Maintenance Cost

Closed Loop Wells
Typically Higher First Cost (more wells) w/ Lower Maintenance Cost



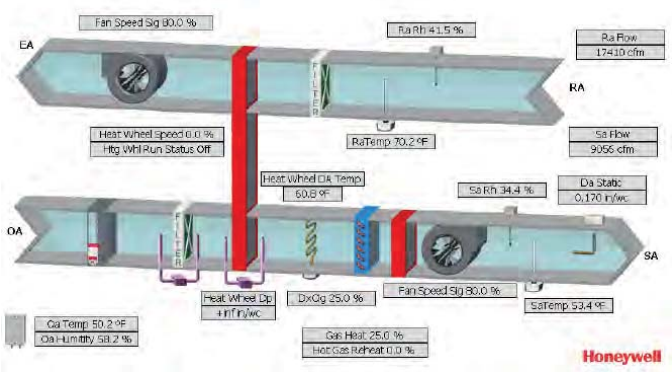

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## BUILDING MANAGEMENT SYSTEM CONTROLLING HVAC AND LIGHTING





- System (Zone) Scheduling
- Occupied-Unoccupied Control
- Night Setback Operation
- Lighting Control System Integration
- Increased Energy Savings
- Integrate with Preventative Maintenance Scheduling






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## BUILDING DASHBOARD ENERGY METERING SYSTEM

1. Building Dashboard System
   - Utility Bill Data
   - Building Automation Systems Data
   - On-Site Generation System Data
   - Submetering Data










GGD

## ECONOMICS METHODOLOGY

- **Weather data**
- **Building occupancy & usage**
- **System Operating Characteristics**
- **Utility Rates**

Energy Simulation

Energy Economics

- **Operating Costs**
- **Installation costs**
- **Maintenance cost**

Life Cycle Cost Analysis

System with the highest ownership savings over the 30 year study period is typically recommended, while also factoring budget limitations, maintenance requirements, site limitations, thermal comfort conditions, and other factors unique to the project studied.

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## POWER DISTRIBUTION SYSTEM

- Power Distribution System
  - Power Switchgear
  - Power Panelboard
  - Transient Voltage Surge Suppressor (TVSS)
  - K-13 Transformer
  - KYZ Meter




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## HIGH EFFICIENCY LED LIGHTING WITH OCCUPANCY SENSOR & DAYLIGHT HARVESTING

- Dual Technology Occupancy Sensor & Daylight Photosensor
- Lighting Control System
- LPD Target of .4 to .5



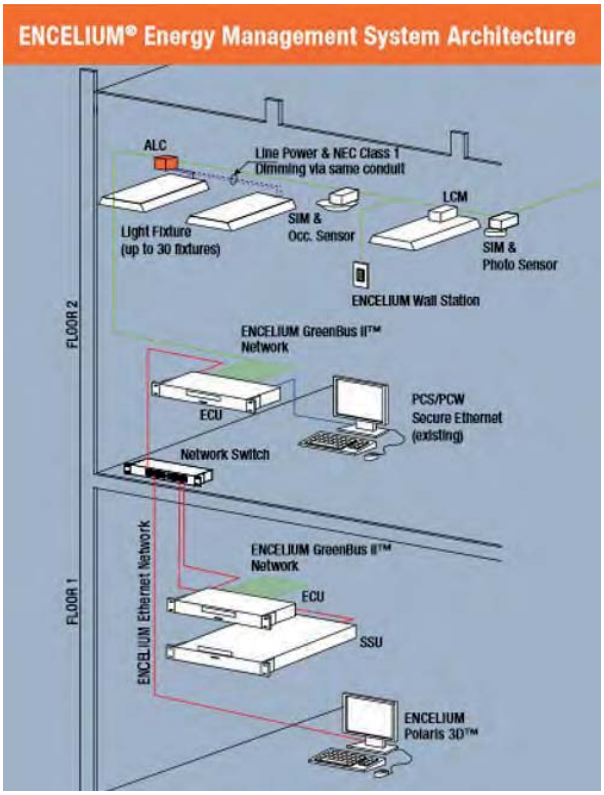




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## ADDRESSABLE LIGHTING CONTROL SYSTEM

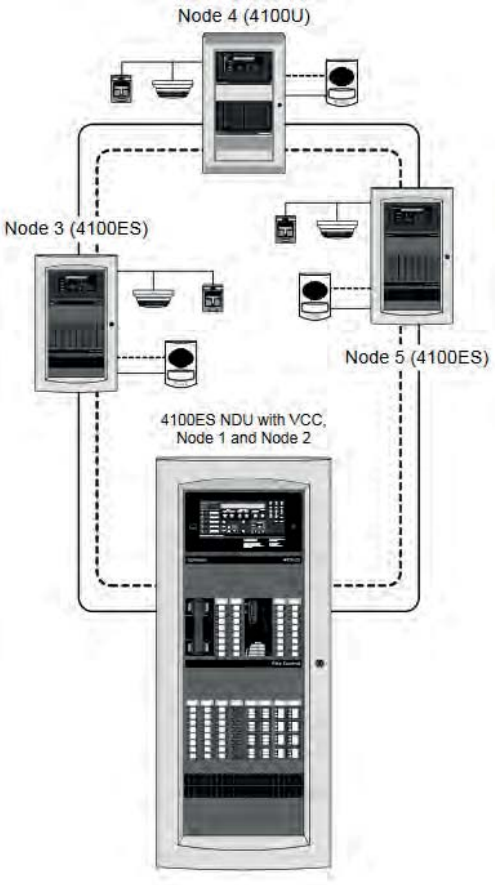
- Lighting Control System
  - Occupancy Sensor
  - Daylight Sensor
  - BMS Integration
  - Addressable groups






## ADDRESSABLE FIRE ALARM SYSTEM

- Fire Alarm System
  - Fire Alarm Control Panel
  - Fire alarm Annunciator
  - Pull Station
  - Smoke Detector
  - Adressable Notification- Speaker Strobe/Visial "ADA" Compliant Signal



# 150-175 KW GENERATOR (ESTIMATED SIZE)

## Load Breakdown for Life Safety Equipment:

•All Exit Signs and Emergency Lighting in the areas listed below are fed by Life Safety Emergency Power:

1. Corridors
2. Electrical Rooms
3. Gymnasium Cafeteria
4. Media Center
5. Lobbies
6. Central Administration area
7. Health Suite/Nurses office
8. Toilets
9. Cafetorium
10. Data rooms “Head End room & IDF Closets
11. Kitchen & Servery
12. Exterior Building mounted lights over doors required for egress lighting
13. Where required by code (egress areas)



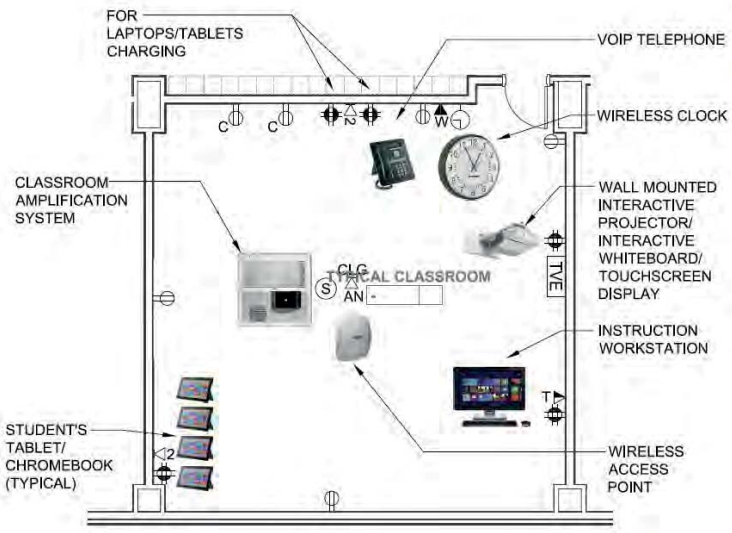

## Load Breakdown for Optional Standby Equipment:

- Equipment listed below is fed by Optional Standby Power

1. Boilers, Water Pumps
2. Door Access Controls, Security System, CCTV
3. ATC Controls
4. Strategically located receptacles in the following areas. These receptacles will be RED in color
    a. Cafeteria
    b. Kitchen/Servery
    c. Central Administration
    d. Electric Rooms and Emergency Electric rooms
    e. Mechanical Rooms
6. Electronic faucets and sinks (where applicable)
7. Heating and ventilation systems required for freeze protection
8. Cooling unit serving Head End room & IDF rooms.
9. Unit heater serving water service room.
10. Equipment within the Head End and IDF rooms including:
    a. Paging/Intercom System
    b. Telephone System
    c. Network electronics
    d. Servers
    e. Telephone system
    f. Clock system
11. Fire alarm system (system also has full battery back-up)
12. Refrigeration



# TYPICAL POWER/TECHNOLOGY CLASSROOM LAYOUT



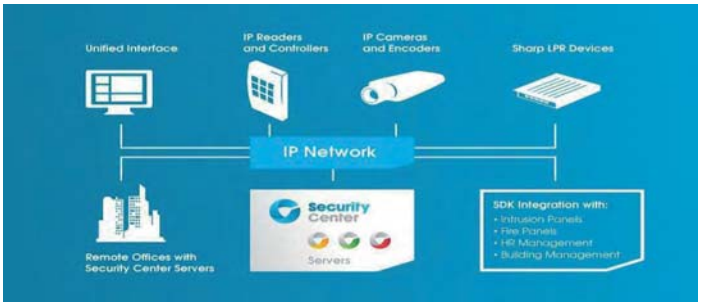





## INTEGRATED ELECTRONIC SECURITY SYSTEM

1. Security System Components
   - Access Control
   - CCTV
   - Intrusion
   - Integration
     a) With each other
     b) With other systems, Paging/Lighting

2. Sequence of operations of key elements
   - Typical access control door
   - Main Entrance
   - CCTV video retrieval
   - Intrusion system






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## WATER CONSERVING PLUMBING



Manual Flush Valve
1.28 gpf Water Closet



Manual Flush Valve 0.125 gpf
Urinal/waterless



Manual Metering Faucet
0.35 Gallons per cycle



Battery Sensor Flush Valves
1.28 gpf Water Closet/0.125 gpf Urinal



<u>Option</u>:
Battery Sensor Faucet
0.35 Gallons per cycle

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## WATER CONSERVING PLUMBING



Drinking fountain
w/bottle filler



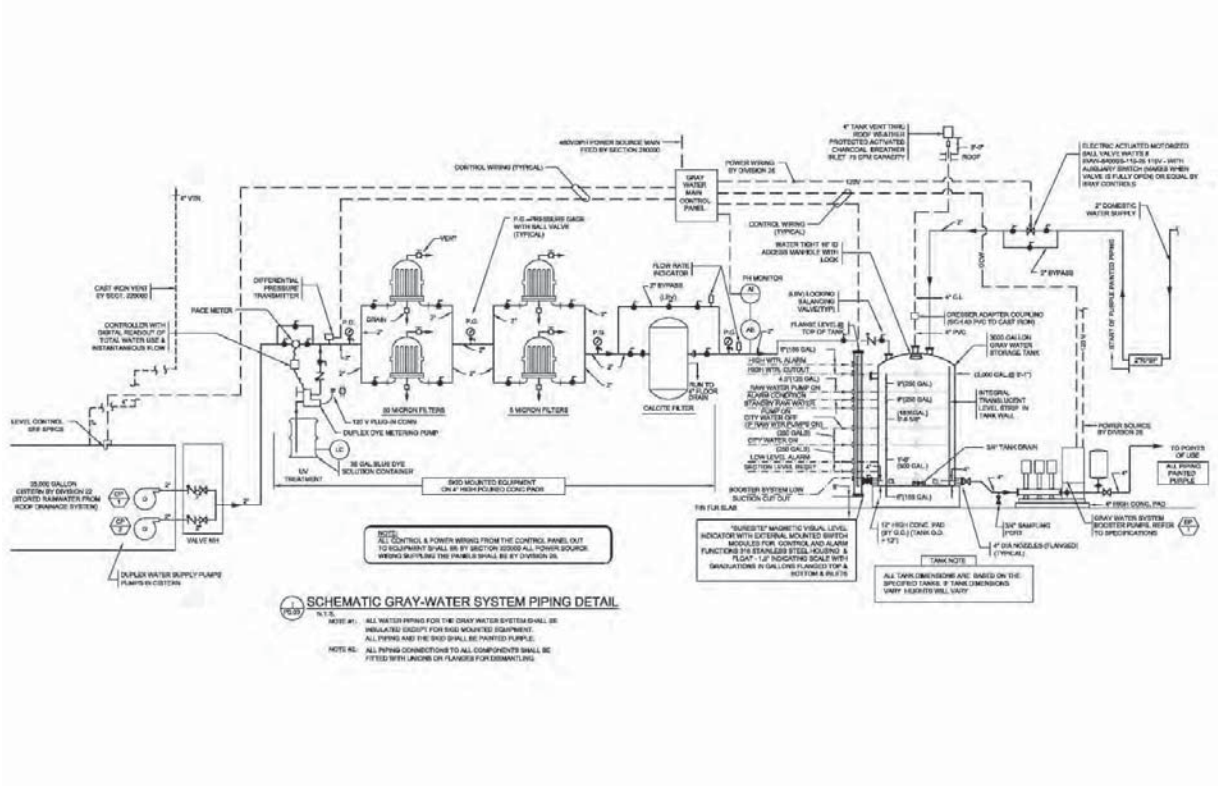
Accessible shower
w/1.5 GPM shower head



Staff/Classroom Sinks

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## RAINWATER HARVEST




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# RAINWATER HARVEST







- Rain water harvesting from roof areas with water stored in a 35,000 gallon underground storage cistern used for both flushing water closets & urinals and for irrigation.

## PRELIMINARY SCHEMATIC REPORT PHASE PROJECT MEETINGS

- November 28, 2017 – SBC Meeting #14
- December 4, 2017 – MEP Systems Sub-Committee Meeting
- December 12, 2017 – SBC Meeting #15
- December 18, 2017 – SBC Meeting #16
- January 10, 2018 – SBC Meeting #17
- January 22, 2018 – SBC Meeting #18
- January 31, 2018 – Community Meeting #3
- February 1, 2018 – SBC Meeting #19
- February 13, 2018 – Joint SBC and School Committee Meeting #1

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# AGENDA

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 12/12/2017 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | C.Shefferman |

1. Call to Order

2. Previous Topics & Approval of November 28, 2017 Meeting Minutes

   - 7.11 Site: Swing Space Availability (P. Beaudoin)
   - 8.8 Choose date for tour; Contact schools schedule tour (P. Beaudoin/JCJ/DWMP)
   - 13.9.2 Send meeting invite for WG meeting (MEP WG)
   - 14.4.4 Resend volunteer email to SBC (C. Shefferman)

3. Invoices and Commitments for Approval
   - DWMP November OPM Invoice No. 9 in the amount of $8,682.00. (invoice attached). Vote expected.
   - JCJ November Designer Invoice No. 4 in the amount of $61,450.00. (invoice attached). Vote expected.

4. Working Group Update (DWMP)

5. Budget Update (ALL)

6. Schedule/Look Ahead (ALL)

7. Project Update (JCJ)

8. Evaluating the Options (JCJ)

9. Design Update (JCJ)

10. Next Meeting(s)

11. Other Topics Not Reasonably Anticipated 48 hours prior to Meeting

12. Public Comments

13. Adjourn

MANAGEMENT PARTNERS, LLC

PROJECT MANAGERS
ARCHITECTS

Newburyport, MA 01950
260 Merrimac Street Bldg 7
978.499.2999 ph
978.499.2944 fax

www.doreandwhittier.com

# MANCHESTER MEMORIAL ELEMENTARY SCHOOL

FEASIBILITY PHASE –
**SBC MEETING #15**
DECEMBER 12TH, 2017



## TODAY'S AGENDA

PROJECT UPDATE

**EVALUATING THE OPTIONS:**
RECOMMENDED REDUCTIONS

NEXT STEPS



# PROJECT UPDATE

## MEP Sub-Committee

- Met on 12/4
- Held an Open Dialogue
  - GGD Presented Multiple System Approaches
  - Sub-Committee Shared Lessons Learned from other Projects
  - Sub-Committee Discussed Possible Sustainability Goals
- Presentation by GGD to Full Committee on 12/18



# PROJECT UPDATE





## Hunking School Visit

- Toured School on 12/8
- SBC Members met with Assistant Superintendent

# EVALUATING THE OPTIONS

RECOMMENDED REDUCTIONS

**R-1** FOUR WALLS



**RENOVATION ONLY**

**AR-1** FOUR WALLS + MORE



**ADDITION/RENOVATION**
MINIMAL INTERVENTION

**AR-2** SAVE THE CORE



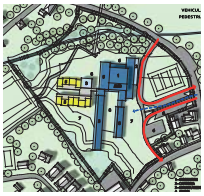
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**AR-3** CURVED MAIN STREET



**ADDITION/RENOVATION**
RETAIN CORE BLOCK ONLY

**AR-4** OUT WEST



**ADDITION/RENOVATION**
MODERATE INTERVENTION

**N-1** THE PIANO



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

**N-2** THE PINWHEEL



**NEW CONSTRUCTION**

**N-3** THE HUB



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

**N-4** MAIN STREET



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

**N-5** TENNIS COURT L



**NEW CONSTRUCTION - 1 PHASE**
STUDENTS MOVE OFF-SITE

**N-6** EAST SIDE COURTYARD



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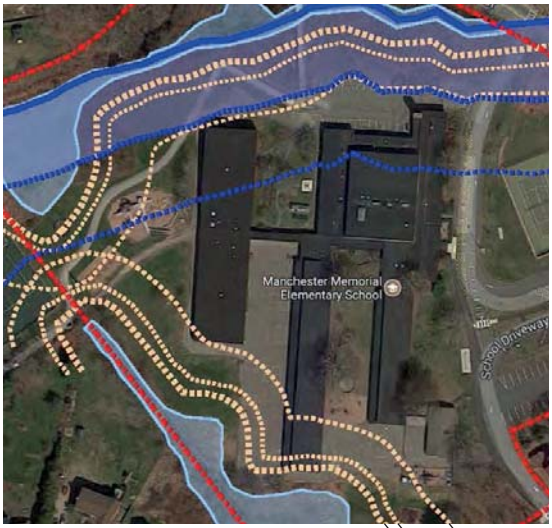


# EVALUATING THE OPTIONS

RECOMMENDED REDUCTIONS

# WETLANDS ENCROACHMENT

## REVISED WETLANDS SETBACKS




100′ REGULATED
50′ NO BUILD
35′ NO TOUCH

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

## EVALUATING THE OPTIONS
RECOMMENDED REDUCTIONS

## WETLANDS ENCROACHMENT

# AR-3 CURVED MAIN STREET




**ADDITION/RENOVATION**
RETAIN CORE BLOCK ONLY

# N-4 MAIN STREET




**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE



## EVALUATING THE OPTIONS
RECOMMENDED REDUCTIONS

## WETLANDS ENCROACHMENT

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**RENOVATION ONLY**

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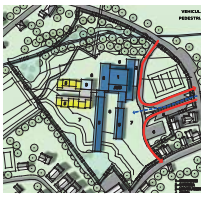
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ADDITION/RENOVATION
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MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS
JCJARCHITECTURE

## EVALUATING THE OPTIONS
RECOMMENDED REDUCTIONS

## WETLANDS ENCROACHMENT
## ADDITIONAL NON-REIMBURSABLE SITE COST

# N-6 EAST SIDE COURTYARD




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# N-7 EAST SIDE MAIN STREET




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## EVALUATING THE OPTIONS
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## WETLANDS ENCROACHMENT
## ADDITIONAL NON-REIMBURSABLE SITE COST

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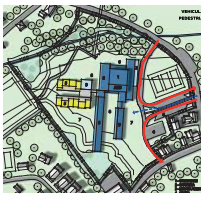
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## EVALUATING THE OPTIONS
RECOMMENDED REDUCTIONS

WETLANDS ENCROACHMENT
ADDITIONAL NON-REIMBURSABLE SITE COST
**REQUIRES STUDENTS OFF-SITE**

# N-2
THE PINWHEEL




**NEW CONSTRUCTION**



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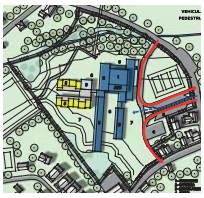
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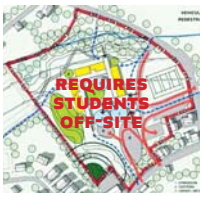
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MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS
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RECOMMENDED REDUCTIONS

WETLANDS ENCROACHMENT
ADDITIONAL NON-REIMBURSABLE SITE COST
REQUIRES STUDENTS OFF-SITE

# AR-1
**MAJORITY OF PROGRAM BELOW MSBA GUIDELINES**
FOUR WALLS + MORE




**ADDITION/RENOVATION**
MINIMAL INTERVENTION



## EVALUATING THE OPTIONS
RECOMMENDED REDUCTIONS

WETLANDS ENCROACHMENT
ADDITIONAL NON-REIMBURSABLE SITE COST
REQUIRES STUDENTS OFF-SITE
**MAJORITY OF PROGRAM BELOW MSBA GUIDELINES**

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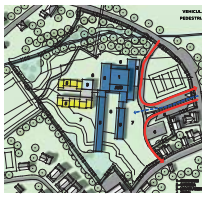
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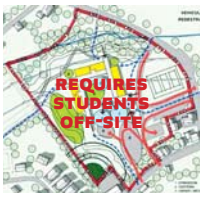
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MANCHESTER MEMORIAL ELEMENTARY SCHOOL
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# EVALUATING THE OPTIONS

RECOMMENDED FOR FURTHER DEVELOPMENT

**R-1** FOUR WALLS



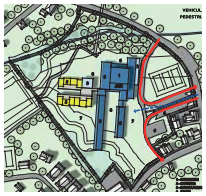
**RENOVATION ONLY**

**AR-2** SAVE THE CORE



**ADDITION/RENOVATION**
RETAIN CORE BLOCK ONLY

**AR-4** OUT WEST



**ADDITION/RENOVATION**
MODERATE INTERVENTION

**N-1** THE PIANO



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

**N-3** THE HUB



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

**N-5** TENNIS COURT L



**NEW CONSTRUCTION - 1 PHASE**
STUDENTS MOVE OFF-SITE

**N-8** TWO WINGS



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

**N-9** THE HOOK



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE



# AR-4 OUT WEST

**PHASE ONE**



## **AR-4** OUT WEST

**PHASE TWO**




MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

## **AR-4** OUT WEST

**PHASE THREE**




MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

## **N-1** THE PIANO






## **N-3** THE HUB



## **N-5** TENNIS COURT L






## **N-8** TWO WINGS

**PHASE ONE**



## **N-8** TWO WINGS

**PHASE TWO**






## **N-8** TWO WINGS

**PHASE THREE**



## **N-8** TWO WINGS

**PHASE FOUR**






## **N-9** THE HOOK

**PHASE ONE**



## **N-9** THE HOOK

**PHASE TWO**




MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

## **N-9** THE HOOK

**PHASE THREE**




MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

# NEXT STEPS

| | |
|---|---|
| **12/18** | Design Update, MEP Presentation |
| **1/10** | Evaluating Options / Select Schemes for Estimating |
| **1/22** | Design Update |
| **1/31** | Community Meeting |
| **2/1** | Review Cost Estimates |
| **2/5** | Select Preferred Option |
| **2/13** | Joint Committee Approval of PSR |
| **2/21** | Submit PSR to MSBA |



# THANK YOU



# MEETING MINUTES

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 12/12/2017 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | S. Brown |

| Present | Name | Affiliation | Present | Name | Affiliation |
|---|---|---|---|---|---|
| | Caroline Weld * | SBC Co-Chair | ✓ | Jim LaPosta | JCJ |
| ✓ | Ann Cameron * | SBC Co-Chair | ✓ | Daniel Ruiz | JCJ |
| ✓ | Pam Beaudoin * | Superintendent | ✓ | Lauren Braren | JCJ |
| ✓ | Avi Urbas * | Dir. of Fin. & Ops | | Emily Czarnecki | JCJ |
| ✓ | Alva Ingaharro * | Essex | | Mike Burton | DWMP |
| ✓ | John Willis * | Principal MMES | ✓ | Steven Brown | DWMP |
| | Jay Pagliarulo | Dir. of Facilities | | Christina Shefferman | DWMP |
| ✓ | Andy Oldeman * | Man. Fin. Comm. | | | |
| ✓ | Lisa O'Donnell * | Essex B.O.S. | | | |
| ✓ | Remko Brueker * | Manchester | | | |
| | Adam Zaiger * | Manchester | | | |
| ✓ | Tyler Virden * | Essex | | | |
| ✓ | George Scharfe * | Manchester | | | |
| ✓ | Gordon Brewster * | Manchester | | | |
| ✓ | Charlie Hay * | Essex | | | |
| ✓ | Sarah Creighton * | Manchester | | | |
| ✓ | Maggie Tomaiolo * | Essex | | | |
| | Jake Foster * | Essex | | | |

**Action Items:**

| Item No. | Responsible Party: | Description |
|---|---|---|
| 7.11 | P. Beaudoin | Site: Swing space availability |

** SBC Voting Member*

MANAGEMENT PARTNERS, LLC

PROJECT MANAGERS
ARCHITECTS

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978.499.2944 fax

www.doreandwhittier.com

| Item No. | Description | Action |
|---|---|---|
| 15.1 | Call to Order: 7:05 pm meeting was called to order by the SBC Co-Chair Ann Cameron with 14 of 17 voting members in attendance. S. Brown of DWMP notes the meeting will follow the Power Point presentation that is being projected on the screen and to follow the agenda that was provided to the SBC prior to the meeting via Dropbox. | Record |
| 15.2.1 | Previous Topics & Approval of November 28, 2017 Meeting Minutes: S. Brown explains and reviews the four previous items requiring action. A review of those items is noted below. | Record |
| 7.11 | Site Understanding: (For previous history of this item, refer to previous meeting minutes)<br><br>…Additional details and follow up will be provided to the SBC at our next meeting.<br>11/14/2017: P. Beaudoin states that she has a meeting scheduled with the Mayor of the Town of Beverly on 11/20/17. P. Beaudoin is also in communication with St. Mary's in Beverly, and is waiting for a formal response from the school on whether it will fit the needs of MMES. P. Beaudoin is still waiting to hear from Father Jim in Gloucester. P. Beaudoin will continue to pursue these options and will report back to the SBC once she has additional information.<br><br>11/28/2017: P. Beaudoin states that there are still 3 possible options. Briscoe School in Beverly, The Cummings Center in Beverly, and St. Mary's in Beverly. P. Beaudoin met with officials from Beverly's mayor office, and is waiting to hear whether they would be willing to wait a year before someone would possibly occupy the school. The Cummings Center approached P. Beaudoin and stated that they might have an option that would fit their needs. The Cummings Center is working on putting together a quote and space availability between their many available spaces. P. Beaudoin is still waiting to hear if St. Mary's can provide an estimate for the space. After discussion, the SBC agreed that overall, they would steer towards an option that can either have kids on site or off site based on phasing, modulars, and or an offsite temporary campus. P. Beaudoin to continue development of potential swing spaces.<br><br>12/12/2017: P. Beaudoin states Cummings Properties has confirmed that they have nothing that fits the District's space needs for the time frame needed. No update from Gloucester or St. Mary's prospect at this time. | P. Beaudoin |
| 8.8 | Educational Planning: D. Stephen provides a brief recap of the Ed. Planning presentation that was presented to the Leadership team back in August. A copy of the slides are attached in the backup. D. Stephen advises that the team should plan when they would like to visit other school sites that have recently gone through the process. The schools requested include Haverhill, Marblehead, and Andover. P. Beaudoin to provide dates in December that will work for the group.<br>9/26/17: P. Beaudoin states that she sent out a scheduling doodle for potential dates to the SBC. Three dates worked best for the group, 12/8, 12/14, 12/18. P. Beaudoin to send another doodle with these dates to confirm which will be best. P. Beaudoin to confirm best date at next meeting.<br>10/24/17: No update at this time. Continuing.<br>11/06/2017: P. Beaudoin will evaluate schedule doodle and select an open date that worked best for the SBC. S. Brown recommended taking a tour of Hunkings School in Haverhill, | |

| | | |
|---|---|---|
| | West Parish in Gloucester, and a Renovation/Addition School. P. Beaudoin to communicate with DWMP and schedule dates for tours.<br>11/14/2017: S. Brown states that he has reached out to the West Parish School in Gloucester to coordinate a walk through. S. Brown is waiting to hear back with some potential dates and times. D. Ruiz states that he reached out to the Hunking School in Haverhill and is waiting to hear back dates and times. Once both DWMP and JCJ have some potential dates and times they will report back to the SBC.<br><br>11/28/2017: S. Brown states that DWMP is still trying to reach the principal with West Parish and confirm a time for a tour. Once any information is received, DWMP will update the SBC. D. Ruiz confirms that he was able to schedule a tour for 12/8/17 with the Hunking School. D. Ruiz to confirm the afternoon of 12/8/17 for the site tour of Hunking School. D. Ruiz to send out meeting invites to the team once confirmed.<br><br>12/12/2017: S. Brown notes that the Hunking tour took place on Friday 12/8 as scheduled. JCJ has provided an update as part of new business under #7 of this meeting. The walkthrough at West Parish ES in Gloucester is scheduled for tomorrow 12/13 @ 3:30p. All educators and Committee members are encouraged to attend. | Record |
| 13.9.2 | Other Topics Not Reasonably Anticipated 48 Hours Prior to Meeting: The SBC agreed that there should be an MEP working group established. The SBC recommended that R. Breuker, A. Oldeman, T. Virden, G. Sharfe, J. Pagliarulo, and S. Creighton be included in the group. At our next SBC meeting further development will be established.<br><br>11/28/2017: S. Brown states the WG was established at our last SBC meeting, and a date for a meeting with the group needs to be established and determined for the month of December. The WG discussed and agreed that 12/4/2017 at 6 pm would be the best time. D. Ruiz to confirm with GGD, the MEP consultant, whether this time will also work with them. A. Urbas states that he would like to be included and invited to the meeting. The purpose of the MEP WG is to provide buy in on systems for the cost estimates. Once D. Ruiz confirms GGD can make the 12/4/2017 6pm meeting, C. Shefferman will send out a meeting invite.<br><br>12/12/2017: The MEP working group met on Monday 12/11 @ 6pm. All future MEP working group updates will be grouped with the others (section 4 of this meeting). | Closed |
| 14.4.4 | Working Group/Communications Update: C. Shefferman states that she sent out an email to the SBC outlining volunteers needed for upcoming local events. A handful of members have responded, but many still haven't. C. Shefferman to send out email again to SBC asking for additional sign ups.<br><br>12/12/2017: Reminder email sent and responses returned. The Communications group continues to meet to review important local PR opportunities and participation.G. Brewster attended the Master Planning committee meeting that was attended by +/- 35 people, who were generally aware of the MMES project, and interested in hearing future updates. | Record/Closed |
| 15.3.1 | Invoices & Commitments for Approval: DWMP invoice no. 9 for OPM Feasibility services in the amount of $8,682.00 (invoice attached) vote expected. Motion made by G. Brewster to approve invoice no. 9 in the amount of $8,682.00, 2nd by R. Brueker. Discussion: None. Vote: Unanimous to approve. | Record |

| | | |
|---|---|---|
| 15.3.2 | Invoices & Commitments for Approval: JCJ invoice no. 4 for Designer Feasibility services in the amount of $61,450.00 (invoice attached) vote expected. Motion made by A. Urbas to approve invoice no. 4 in the amount of $61,450.00, 2nd by R. Brueker. Discussion: None. Vote: Unanimous to approve. | Record |
| 15.4.1 | Working Group Updates: Educational: No updates reported | Record |
| 15.4.2 | Working Group Updates: Facilities Assessment: No updates reported | Record |
| 15.4.3 | Working Group Updates: Budget Collaboration: No updates reported | Record |
| 15.4.4 | Working Group Updates: MEP: D. Ruiz updated the group that the MEP working group met for the first time on 12/4/2017 at 6pm in the MS/HS Library. JCJ's MEP consultants from Garcia, Galuska, DeSousa (GGD) were present to introduce systems goals, explanation of systems, etc. GGD will be present at the 12/18/2017 SBC meeting to lead a discussion for establishing basis-of-design decisions to work into the PSR options. | Record |
| 15.5 | Budget Update: S. Brown updates the SBC on the current budget. As of the meeting, the project is 90% encumbered, and 34% of F&S is complete. With the approval of the two invoices presented at the meeting, the current contracts are 39% expended. | Record |
| 15.6.1 | Schedule/Look Ahead: S. Brown reviews the two-month look-ahead schedule noting upcoming working group, community meetings, and SBC meeting dates (backup attached). | Record |
| 15.7.1 | Project Update: S. Brown updates SBC on status of PDP submission. MSBA would like project team to resubmit the Preliminary Evaluation of Alternatives section of PDP once 12/12 meeting and elimination of some options is complete. While carrying all the options over from PDP is allowed, all parties agreed that eliminating some at the conclusion of the PDP will show a clearer process of elimination. JCJ to resubmit electronic copies to the MSBA of 3.1.6 amended based on the results of this meeting. | JCJ |
| 15.7.2 | Project Update: D. Ruiz summarized the MEP working group meeting held on 12/4. GGD will be in attendance at the 12/18 SBC meeting to review options with the full committee. | Record |
| 15.7.3 | Project Update: D. Ruiz notes members of the Design Team and SBC attended a walkthrough of the recently completed Hunking Elementary School in Haverhill, MA. | Record |
| 15.8.1 | Evaluating the Options: J. LaPosta reviews all 14 options that were developed in the PDP phase, and include R-1, AR-1, AR-2, AR-3, AR-4, and N-1 through N-9. | Record |
| 15.8.2 | Evaluating the Options: J. LaPosta notes that JCJ has the full results surveyed of the wetlands delineation, and options AR-3 Curved Main Street, and N-4 Main Street severely encroach within the existing wetlands. Because these plan options encroach well into the wetlands, and also because their plan structure is sprawling-in- nature, it is JCJ's recommendation these options are not developed further into PSR. | Record |
| 15.8.3 | Evaluating the Options: J. LaPosta reviews options that carry additional non-reimbursable site costs – Options N-6 East Side Courtyard, and N-7 East Side Main Street. These options carry additional non-reimbursable costs associated with site development. Due to additional costs for these options that would not be eligible for MSBA reimbursement, JCJ is recommended these options are not developed further into PSR. | Record |

| | | |
|---|---|---|
| 15.8.4 | Evaluating the Options: J. LaPosta reviews N-2 option that would require students to be relocated completely off-site during construction. While the other options can be phased and keep a large student population on-site (reducing phasing premium/swing space costs), this option can only work with full removal of students. JCJ is recommending Option N-2 be eliminated from further consideration since it will limit flexibility (increasing costs) during construction. | Record |
| 15.8.5 | Evaluating the Options: J. LaPosta reviews Option AR-1 noting that the majority of renovated program spaces would remain below MSBA space guidelines (including the gymnasium, cafeteria, and most classrooms. JCJ notes that there are still a few of renovation/addition options that fully meet the guidelines. Due to the high relative project cost and to be left with a facility that still remains below recommended space standards, JCJ recommends option AR-1 is eliminated from further consideration. | Record. |
| 15.8.6 | Evaluating the Options: L. Braren reviews Option AR-4 Out West (attached, see backup) in greater detail, following up the discussion from last meeting. She notes the following for consideration moving forward:<br>• Phased Construction<br>• Students can remain on-site (a few modular classrooms may be required, TBD)<br>• Renovates more square footage compared to earlier options<br>• Large portion of existing student drop-off loop and parking can remain<br>• New classrooms will meet MSBS space guidelines<br>• Gym will remain below space guidelines | Record |
| 15.8.7 | Evaluating the Options: L. Braren reviews Option N-1 The Piano (attached, see backup) in greater detail, following up the discussion from last meeting. She notes the following for consideration moving forward:<br>• Provides additional (needed) student drop-off/pickup queuing space<br>• Classrooms are stacked at back (two story)<br>• Utilized double loaded corridors (very space efficient)<br>• Provides space for small play field<br>• Phased construction | Record |
| 15.8.8 | Evaluating the Options: L. Braren reviews Option N-3 The Hub (attached, see backup) in greater detail, following up the discussion from last meeting. She notes the following for consideration moving forward:<br>• Designed around a “main street” corridor<br>• Two distinct wings (both two story) for organizing the grades<br>• One wing: Lower elementary (K-2) other wing: Upper elementary (3-5)<br>• Room for small playfield<br>• Provides additional parking near existing pre-k | Record |
| 15.8.9 | Evaluating the Options: L. Braren reviews Option N-5 Tennis Court L (attached, see backup) in greater detail, following up the discussion from last meeting. She notes the following for consideration moving forward:<br>• Phased construction<br>• Extended drop-off & parking off of route 127<br>• Two distinct wings organized around the tennis court (upper & lower elementary) | Record |

| | | |
|---|---|---|
| 15.8.10 | Evaluating the Options: L. Braren reviews Option N-8 Two Wings (attached, see backup) in greater detail, following up the discussion from last meeting. She notes the following for consideration moving forward:<br>• Wetlands added need for some modular during phased construction<br>• Two distinct wings (upper & lower elementary schools)<br>• Provides additional parking near existing Pre-K<br>• Room for small playfield | Record |
| 15.8.11 | Evaluating the Options: L. Braren reviews Option N-9 the Hook (attached, see backup) in greater detail, following up the discussion from last meeting. She notes the following for consideration moving forward:<br>• Added detail to the three phases<br>• No modular classrooms would be required, but students can remain on-site<br>• Single loaded corridor in some parts; less efficient space design<br>• Preserves space for small playfield and outdoor classrooms<br>• Creates some challenges due to proximity of construction to existing facility<br>S. Creighton asked the team to consider if the existing gym, tennis courts w/ bubble could be used for temporary classrooms. | Record |
| 15.8.12 | Evaluating the Options: A motion was made by A. Oldeman, and seconded by L. O'Donnell to remove options AR-1, AR-3, N-2, N-4, N-6, and N-7 from further consideration in PSR for reasons reviewed and recommened by JCJ. Discussion: G. Scharfe noted the team should advocate for a CM as early as possible to help with pricing and phasing options. Vote: Unanimous to eliminate options as listed, motion passes. | Record |
| 15.8.13 | Evaluating the Options: A motion was made by G. Scharfe and seconded by S. Creighton to eliminate option N-5 Tennis Court L from further consideration due to poor siting of the building, and likely non-support from the communities. Discussion: A. Cameron noted the safety concern due to undesirable design of having kids constantly crossing vehicle traffic at the drop-off loop in the rear of the building. Vote: Unanimous to eliminate, motion passes. | Record |
| 15.9.1 | Next Steps: J. LaPosta notes that the next steps are to develop the remaining options to a level of detail including; massing, phasing, program spaces/plans, so they can be cost estimated. JCJ will provide examples of PSR options from other projects so the SBC can visualize the level of detail each of the options will have prior to estimating. S. Brown notes the estimates, while in greater detail, are still very preliminary in nature and try to capture the biggest scope differences between the options. | Record |
| 15.9.2 | Next Steps: J. LaPosta reviews the milestone schedule (backup attached) with the SBC for the remainder of PSR. On 1/10 the goal is to make final determination of schemes for estimating purposes, and 2/1 will be the first look at the preliminary cost estimates for the options. | Record |
| 15.10 | Next Meetings: The next SBC will be held Monday, December 18th at 7pm in the Manchester Essex Regional Middle/High School Library. | Record |
| 15.11 | Other Topics Not Reasonably Anticipated (48 hour prior to meeting): C. Hay recommended the SBC consider reengagement of faculty that took part in the ed. visioning sessions. This will update them on how their contributions have affected the process so far. J. LaPosta | Record |

| | | |
|---|---|---|
| | acknowledged this is typical and they plan on coordinating a meeting with this subgroup in early January. | |
| 15.12 | Public Comment: None. | Record |
| 15.13 | Adjourn: A motion was made by G. Scharfe and seconded by M. Tomaiolo to adjourn the meeting. Discussion: None. Vote: Unanimous to approve. Meeting adjourned at 8:58 pm. | Record |

**Attached:**
*SBC Meeting Agenda, Sign In Sheet, SBC Meeting No. 14 11/28/17 Meeting Minutes, DWMP Invoice No. 9, JCJ Invoice No. 4, Manchester Memorial Elementary School Presentation 12/12/17*

**DORE AND WHITTIER MANAGEMENT PARTNERS, LLC.**

Steven W. Brown
Project Manager
Cc: Attendees, File

**The above is my summation of our meeting. If you have any additions and/or corrections, please contact me for incorporation into these minutes.**

## PRELIMINARY SCHEMATIC REPORT PHASE PROJECT MEETINGS

- November 28, 2017 – SBC Meeting #14
- December 4, 2017 – MEP Systems Sub-Committee Meeting
- December 12, 2017 – SBC Meeting #15
- December 18, 2017 – SBC Meeting #16
- January 10, 2018 – SBC Meeting #17
- January 22, 2018 – SBC Meeting #18
- January 31, 2018 – Community Meeting #3
- February 1, 2018 – SBC Meeting #19
- February 13, 2018 – Joint SBC and School Committee Meeting #1

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# AGENDA

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 12/18/2017 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | C.Shefferman |

1. Call to Order
2. Previous Topics & Approval of December 12, 2017 Meeting Minutes
3. Working Group Update (DWMP)
4. Schedule/Look Ahead (DWMP)
5. Project Update (JCJ)
6. Building Systems Discussion/MEP (JCJ)
7. Design Update (JCJ)
8. Other Topics Not Reasonably Anticipated 48 hours prior to Meeting
9. Public Comments
10. Adjourn

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# Manchester Memorial Elementary School

## Feasibility Phase - SBC Meeting #16

December 18, 2017



## TODAY'S AGENDA

*Project Update*

*Building Systems*

*Evaluating the Options*

## TODAY'S AGENDA

### Project Update

*Tour of the West Parish School*

*Takeaways*



## PROJECT UPDATE

### Survey Update

*Completion of the Survey Delayed Due to Some Conflicting Data*

*Property Line Discrepancies with Abutters*

*and*

*Layout of Lincoln Street*

## PROJECT UPDATE






## PROJECT UPDATE

# Survey Update

*Property Line Discrepancies with Abutters*

*To be resolved by Standard Practices*

*Suggest Resolving Layout of Lincoln Street*

*By Having Town Recording Survey at Essex Registry of Deeds*

## TODAY'S AGENDA

*Building Systems*









## BUILDING SYSTEMS

### Why Are We Beginning to Look at Building Systems?

*Per the MSBA*

*(Provide) "A narrative of the major building systems including;*

- *Plumbing,*
- *HVAC,*
- *Electrical (incl. proposed IT and/or multi-media systems)*

*With estimated mechanical and electrical loads including applicable heating, cooling, domestic hot water and electrical block loads; by the District based on further evaluations and considerations."*

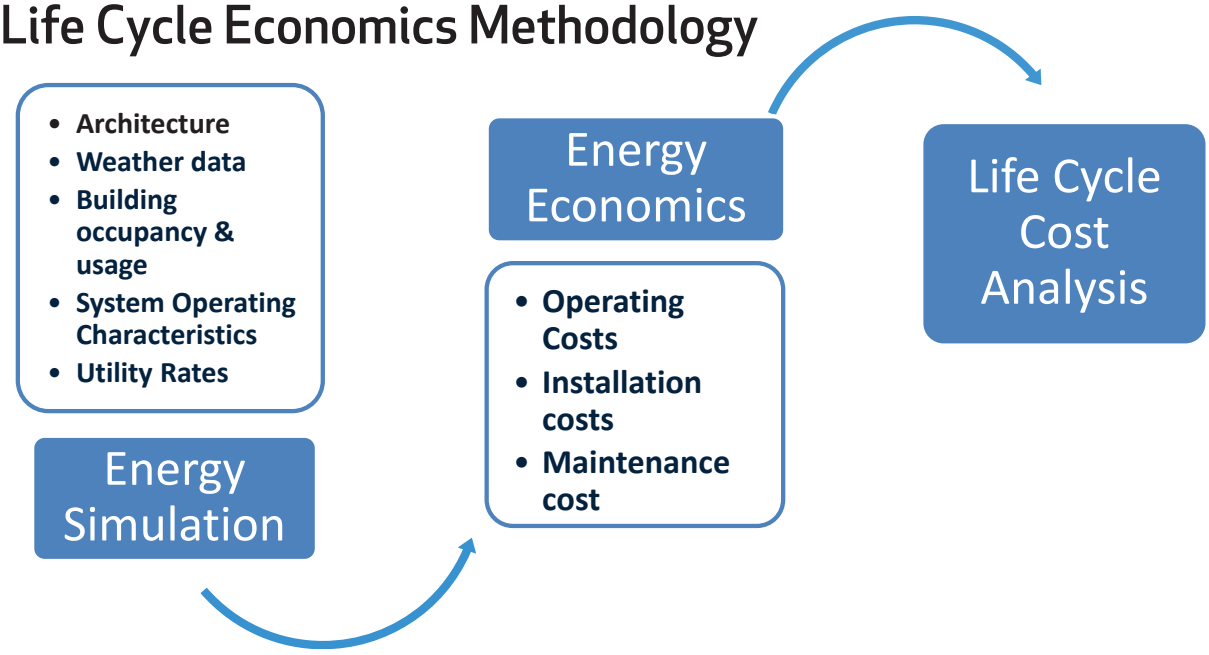
## Process & Timeline

- *Identified a Number of Possible Approaches*
- *Meet with MEP Working Group (12/4)*
- *Introduce Future Decision Points to Full Committee (12/18)*
- *Initial Estimate of the Various Approaches (PSR)*
- *Life Cycle Cost Analysis (SD)*
- *Review of Options & Estimates by Working Group (SD)*
- *JCJ/ GGD to Make Recommendations (SD)*
- *SBC to Finalize System Choices (SD)*

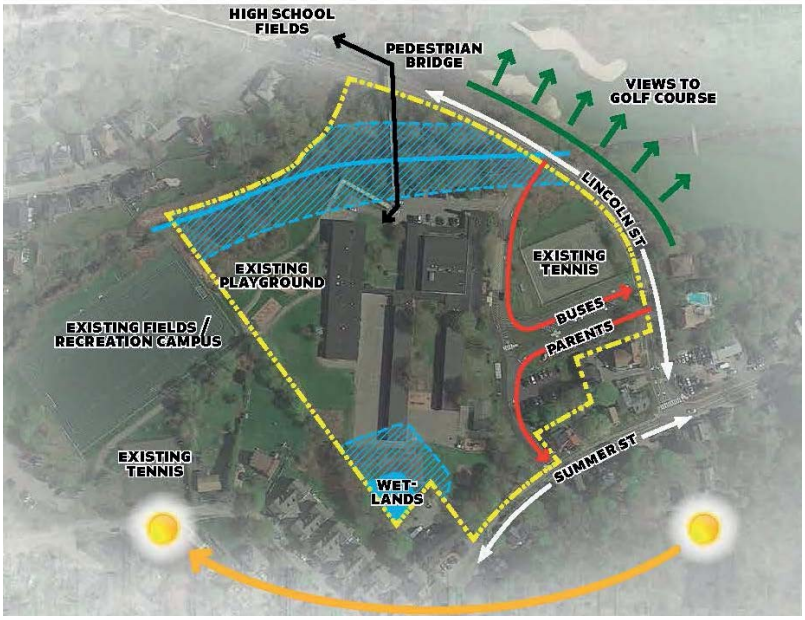




## Life Cycle Economics Methodology



# Architectural Considerations




## Building Orientation

- *Solar Gain*
- *Shading*

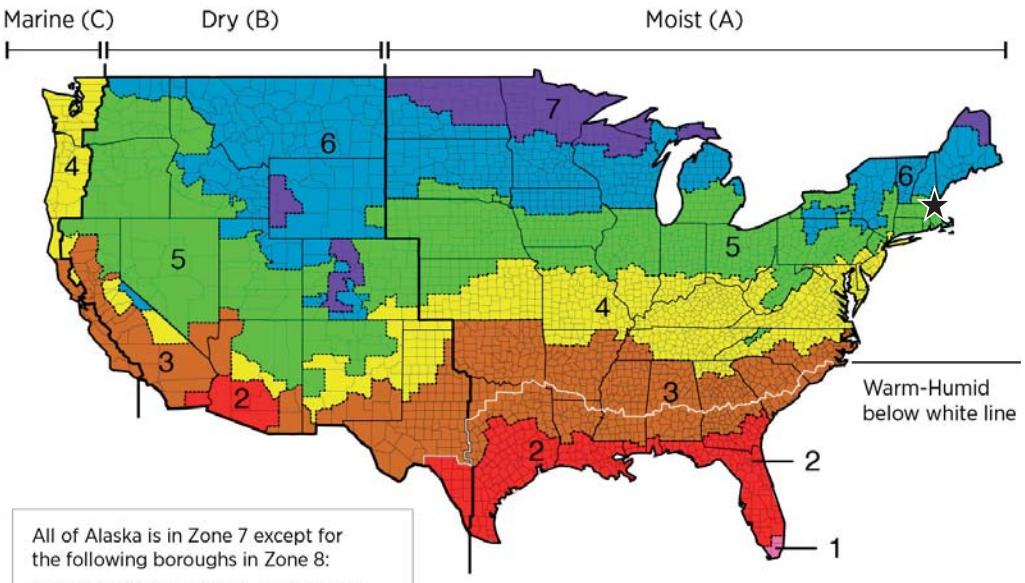


BUILDING SYSTEMS

# Architectural Considerations

- Building Envelope (MASS Code – 2015 IECC - Minimum R/U Values)
  - *Roofs: White, Vegetated, Sloped*
  - *Walls:*
    - *Wall construction – CMU, Metal Stud, Insulated Cavity Wall*
    - *Glazing (Heat Mirror, Triple Glazed)*
  - *Floors: Slabs on grade, Continuous Insulation*

# BUILDING SYSTEMS




All of Alaska is in Zone 7 except for the following boroughs in Zone 8:

Bethel, Northwest Arctic, Dellingham, Southeast Fairbanks, Fairbanks N. Star, Wade Hampton, Nome, Yukon-Koyukuk, North Slope

Zone 1 includes Hawaii, Guam, Puerto Rico, and the Virgin Islands




# BUILDING SYSTEMS


TABLE C402.1.3
OPAQUE THERMAL ENVELOPE INSULATION COMPONENT MINIMUM REQUIREMENTS, *R*-VALUE METHOD[a]

| CLIMATE ZONE | 1 | | 2 | | 3 | | 4 EXCEPT MARINE | | 5 AND MARINE 4 | | 6 | | 7 | | 8 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | All other | Group R | All other | Group R | All other | Group R | All other | Group R | All other | Group R | All other | Group R | All other | Group R | All other | Group R |
| **Roofs** | | | | | | | | | | | | | | | | |
| Insulation entirely above roof deck | R-20ci | R-25ci | R-25ci | R-25ci | R-25ci | R-25ci | R-30ci | R-30ci | R-30ci | R-30ci | R-30ci | R-30ci | R-35ci | R-35ci | R-35ci | R-35ci |
| Metal buildings[b, k] | R-19 + R-11 LS | R-19 + R-11 LS | R-19 + R11 LS | R-19 + R-11 LS | R-19 + R-11 LS | R-19 + R-11 LS | R-19 + R-11 LS | R-19 + R-11 LS | R-19 + R-11 LS | R-19 + R-11 LS | R-25 + R-11 LS | R-25 + R-11 LS | R-30 + R-11 LS | R-30 + R-11 LS | R-30 + R-11 LS | R-30 + R-11 LS |
| Attic and other | R-38 | R-38 | R-38 | R-38 | R-38 | R-38 | R-38 | R-38 | R-38 | R-49 | R-49 | R-49 | R-49 | R-49 | R-49 | R-49 |
| **Walls, above grade** | | | | | | | | | | | | | | | | |
| Mass | R-5.7ci[e] | R-5.7ci[e] | R-5.7ci[e] | R-7.6ci | R-7.6ci | R-9.5ci | R-9.5ci | R-11.4ci | R-11.4ci | R-13.3ci | R-13.3ci | R-15.2ci | R-15.2ci | R-15.2ci | R-25ci | R-25ci |
| Metal building | R-13+ R-6.5ci | R-13 + R-6.5ci | R13 + R-6.5ci | R-13 + R-13ci | R-13 + R-6.5ci | R-13 + R-13ci | R-13 + R-13ci | R-13 + R-13ci | R-13 + R-13ci | R-13 + R-13ci | R-13 + R-13ci | R-13 + R-13ci | R-13 + R-13ci | R-13+ R-19.5ci | R-13 + R-13ci | R-13+ R-19.5ci |
| Metal framed | R-13 + R-5ci | R-13 + R-5ci | R-13 + R-5ci | R-13 + R-7.5ci | R-13 + R-7.5ci | R-13 + R-7.5ci | R-13 + R-7.5ci | R-13 + R-7.5ci | R-13 + R-7.5ci | R-13 + R-7.5ci | R-13 + R-7.5ci | R-13 + R-7.5ci | R-13 + R-7.5ci | R-13 + R-15.6ci | R-13 + R-7.5ci | R-13+ R17.5ci |
| Wood framed and other | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-3.8ci or R-20 | R-13 + R-7.5ci or R-20 + R-3.8ci | R-13 + R-7.5ci or R-20 + R-3.8ci | R-13 + R-7.5ci or R-20 + R-3.8ci | R-13 + R-7.5ci or R-20 + R-3.8ci | R-13 + R-7.5ci or R-20 + R-3.8ci | R13 + R-15.6ci or R-20 + R-10ci | R13 + R-15.6ci or R-20 + R-10ci |
| **Walls, below grade** | | | | | | | | | | | | | | | | |
| Below-grade wall[d] | NR | NR | NR | NR | NR | NR | R-7.5ci | R-7.5ci | R-7.5ci | R-7.5ci | R-7.5ci | R-7.5ci | R-10ci | R-10ci | R-10ci | R-12.5ci |
| **Floors** | | | | | | | | | | | | | | | | |
| Mass[e] | NR | NR | R-6.3ci | R-8.3ci | R-10ci | R-10ci | R-10ci | R-10.4ci | R-10ci | R-12.5ci | R-12.5ci | R-12.5ci | R-15ci | R-16.7ci | R-15ci | R-16.7ci |
| Joist/framing | NR | NR | R-30 | R-30 | R-30 | R-30 | R-30 | R-30 | R-30 | R-30 | R-30 | R-30[f] | R-30[f] | R-30[f] | R-30[f] | R-30[f] |
| **Slab-on-grade floors** | | | | | | | | | | | | | | | | |
| Unheated slabs | NR | NR | NR | NR | NR | NR | R-10 for 24" below | R-10 for 24" below | R-10 for 24" below | R-10 for 24" below | R-10 for 24" below | R-15 for 24" below | R-15 for 24" below | R-15 for 24" below | R-15 for 24" below | R-20 for 24" below |
| Heated slabs[c] | R-7.5 for 12" below | R-7.5 for 12" below | R-7.5 for 12" below | R-7.5 for 12" below | R-10 for 24" below | R-10 for 24" below | R-15 for 24" below | R-15 for 24" below | R-15 for 36" below | R-15 for 36" below | R-15 for 36" below | R-20 for 48" below | R-20 for 24" below | R-20 for 48" below | R-20 for 48" below | R-20 for 48" below |
| **Opaque doors** | | | | | | | | | | | | | | | | |
| Nonswinging | R-4.75 | R-4.75 | R-4.75 | R-4.75 | R-4.75 | R-4.75 | R-4.75 | R-4.75 | R-4.75 | R-4.75 | R-4.75 | R-4.75 | R-4.75 | R-4.75 | R-4.75 | R-4.75 |


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## BUILDING SYSTEMS

# Preliminary Decision Points

## LEED Level versus Net Zero

*Requires Very Different Approaches*

### LEED/ CHPS

(*99% of all MSBA Projects*)

*(Min. Requirement)*
*LEED Silver + Stretch Code*
*20% Better than Energy Code to get 2% Reimbursement*

*LEED Gold*

*LEED Platinum*



## BUILDING SYSTEMS

# Preliminary Decision Points

## LEED Level versus Net Zero

*Requires Very Different Approaches*

### Net Zero

*(Few MSBA Projects)*

*Geothermal Wells*
*Photovoltaic Panels*
*Higher Efficiency Equipment*
*Improved Envelope*
*Glazing*
*Higher Capital & Maint Costs*
*Lower Utility Costs*

### Net Zero Carbon

*(No MSBA Projects Yet)*

*Zero Carbon Emissions*
*All Electrical System*
*More Geothermal Wells*
*More Photovoltaic Panels*
*Higher Capital & Maint Costs*
*Lower Utility Costs*

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## BUILDING SYSTEMS

# Mechanical Systems











## BUILDING SYSTEMS: MECHANICAL

# Elements to Be Explored

*Renovation vs. New Construction*

*Air Conditioning*

*Enclosed Units vs. Exposed*

**BUILDING SYSTEMS:** MECHANICAL

## Renovation & Add/ Reno versus New Construction

*Not all Systems are Appropriate or Possible for Each Choice*

### Renovation & Add/ Reno

- *HVAC Systems with Smaller Ductwork (Exposed or Soffits Req'd)*
- *Displacement Dehumidification*
- *Chilled Beams or Fan Coil*
- *Typically Higher Install & Operating Costs*

### New Construction

- *More Compatible HVAC System Options*
- *Reduced HVAC Loads*
- *Reduce HVAC Equipment Sizes*
- *Reduced HVAC System Costs*



**BUILDING SYSTEMS:** MECHANICAL

## Preliminary Decision Points
## Air Conditioning

### Full Building A/C – All Areas

- *Improved Comfort*
- *Allows Summer Use*
- *Higher Capital Costs*
- *Higher Energy Use*
- *Greater Maintenance*

### Dehumidification, With A/C in Selected Areas

- *Select Areas: Administration Suite & Media Center*
- *Reduced Capital, Energy, and Maintenance Costs*
- *Same System at MERMHS*

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## BUILDING SYSTEMS: MECHANICAL

# Preliminary Decision Points
# RTUs: Enclosed vs. Exposed

### Enclosed

- *Protection from Salt Air*
- *Ease of Maintenance*
- *Acoustical Control*
- *Additional Costs (Envelope and Additional Ductwork/Louvers)*

### Exposed

- *Salt-Rated Equipment Possible*
- *Lower Costs*
- *Reduced Expected Service Life versus Enclosed Units*



## BUILDING SYSTEMS

# Electrical Systems



# Elements to Be Explored

*Emergency Power*



**BUILDING SYSTEMS:** ELECTRICAL

# Emergency Power System
## Required Life Safety Loads & Optional Standby Loads

*Provide Emergency Generator*
*or Emergency Lighting Battery Back-Up Only?*

*Estimated Size of Generator: 125 – 150 KW*

*Will the Building be an Emergency Shelter?*
*(This has Electrical, Architectural, and Structural Impacts)*

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**BUILDING SYSTEMS:** ELECTRICAL & TECHNOLOGY

## Emergency Power System: *Required Life Safety Loads*

*Corridors*
*Electrical Rooms*
*Gymnasium Cafeteria*
*Media Center*
*Lobbies*
*Central Administration Area*
*Health Suite/Nurses office*
*Toilets*
*Cafetorium*
*Data Rooms (MDF & IDF)*
*Kitchen & Servery*
*Exterior Building Mounted Lights*
*Code (Egress Areas)*



**BUILDING SYSTEMS:** ELECTRICAL & TECHNOLOGY

## Emergency Power System: *Optional Standby Loads*

*Boilers, Water Pumps*
*Security / CCTV / Door Access*
*ATC Controls*
*Strategic Power Receptacles*
*Elec. Faucets & Sinks*
*Heating & Ventilation*
*Unit Heater Serving Water Room*
*Critical Colling Units (IT)*
*IT Equipment*
*Fire Alarm Systems (+ Batteries)*
*Refrigeration*

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# Plumbing Systems







# Elements to Be Explored

*Water Conservation*

## **BUILDING SYSTEMS:** PLUMBING



Manual Flush Valve
1.28 gpf Water Closet



Option:
Battery Sensor Flush Valves
1.28 gpf Water Closet / 0.125 gpf Urinal



Manual Flush Valve
0.125 gpf Urinal/waterless



Option:
Battery Sensor Faucet
0.35 Gallons per cycle



Manual Metering Faucet
0.35 Gallons per cycle



## **BUILDING SYSTEMS:** PLUMBING



Drinking fountain
w/bottle filler



Accessible shower
w/1.5 GPM shower head



Staff/Classroom Sinks
w/manual 0.5 GPM faucet

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# TODAY'S AGENDA

*Evaluating the Options*



# EVALUATING THE OPTIONS

**R-1** FOUR WALLS



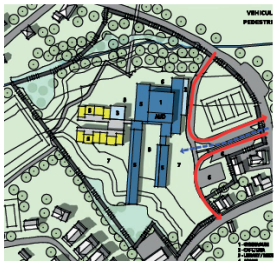
**RENOVATION ONLY**

**AR-2** SAVE THE CORE



**ADDITION/RENOVATION**
RETAIN CORE BLOCK ONLY

**AR-4** OUT WEST



**ADDITION/RENOVATION**
MODERATE INTERVENTION

**N-1** THE PIANO



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

**N-3** THE HUB



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

**N-8** TWO WINGS



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

**N-9** THE HOOK



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

## EVALUATING THE OPTIONS

# Classroom Community Arrangements

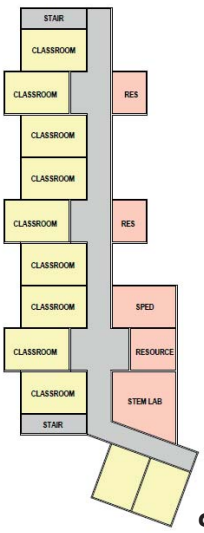
*Classroom Communities*

*Linear vs. Cluster*

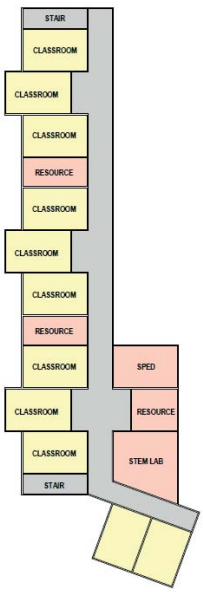


## EVALUATING THE OPTIONS

# Classroom Community Arrangements: Linear



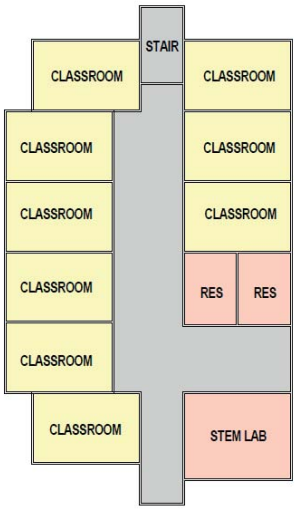

Scheme A



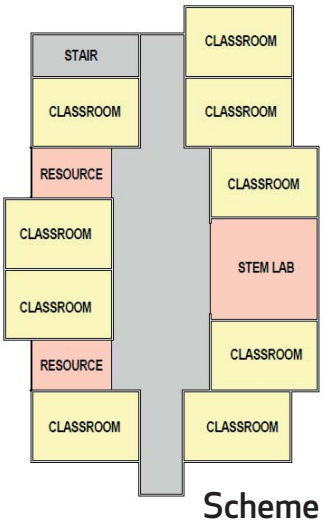

Scheme B

## EVALUATING THE OPTIONS

# Classroom Community Arrangements: Cluster




Scheme A




Scheme B



## TODAY'S AGENDA

# Next Steps

| | |
|---|---|
| 1/10 | Evaluating Options / Select Schemes for Estimating |
| 1/22 | Design Update |
| 1/31 | Community Meeting |
| 2/1 | Review Cost Estimates |
| 2/5 | Select Preferred Option |
| 2/13 | Joint Committee Approval of PSR |
| 2/21 | Submit PSR to MSBA |

# THANK YOU



# MEETING MINUTES

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 12/18/2017 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | C.Shefferman |

| Present | Name | Affiliation | Present | Name | Affiliation |
|---|---|---|---|---|---|
| ✓ | Caroline Weld * | SBC Co-Chair | ✓ | Jim LaPosta | JCJ |
| ✓ | Ann Cameron * | SBC Co-Chair | ✓ | Daniel Ruiz | JCJ |
| ✓ | Pam Beaudoin * | Superintendent | ✓ | Lauren Braren | JCJ |
| | Avi Urbas * | Dir. of Fin. & Ops | | Emily Czarnecki | JCJ |
| ✓ | Alva Ingaharro * | Essex | | Mike Burton | DWMP |
| | John Willis * | Principal MMES | ✓ | Steven Brown | DWMP |
| ✓ | Jay Pagliarulo | Dir. of Facilities | ✓ | Christina Shefferman | DWMP |
| ✓ | Andy Oldeman * | Man. Fin. Comm. | ✓ | Chris Garcia | GGD |
| | Lisa O'Donnell * | Essex B.O.S. | ✓ | Dominic | GGD |
| ✓ | Remko Brueker * | Manchester | ✓ | David | GGD |
| | Adam Zaiger * | Manchester | | | |
| ✓ | Tyler Virden * | Essex | | | |
| ✓ | George Scharfe * | Manchester | | | |
| ✓ | Gordon Brewster * | Manchester | | | |
| | Charlie Hay * | Essex | | | |
| ✓ | Sarah Creighton * | Manchester | | | |
| | Maggie Tomaiolo * | Essex | | | |
| ✓ | Jake Foster * | Essex | | | |

**Action Items:**

| Item No. | Responsible Party: | Description |
|---|---|---|
| 7.11 | P. Beaudoin | Site: Swing space availability |

** SBC Voting Member*

MANAGEMENT PARTNERS, LLC

PROJECT MANAGERS
ARCHITECTS

Newburyport, MA 01950
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978.499.2944 fax

www.doreandwhittier.com

| Item No. | Description | Action |
|---|---|---|
| 16.1 | Call to Order: 7:03 pm meeting was called to order by the SBC Co-Chair Ann Cameron with 11 of 17 voting members in attendance. S. Brown of DWMP notes the meeting will follow the Power Point presentation that is being projected on the screen and to follow the agenda that was provided to the SBC prior to the meeting via Dropbox. | Record |
| 16.2.1 | Previous Topics & Approval of December 12, 2017 Meeting Minutes: S. Brown explains and reviews the one previous item requiring action. A review of the item is noted below. | Record |
| 7.11 | Site Understanding: (For previous history of this item, refer to previous meeting minutes)<br><br>…Additional details and follow up will be provided to the SBC at our next meeting.<br>11/14/2017: P. Beaudoin states that she has a meeting scheduled with the Mayor of the Town of Beverly on 11/20/17. P. Beaudoin is also in communication with St. Mary's in Beverly, and is waiting for a formal response from the school on whether it will fit the needs of MMES. P. Beaudoin is still waiting to hear from Father Jim in Gloucester. P. Beaudoin will continue to pursue these options and will report back to the SBC once she has additional information.<br>11/28/2017: P. Beaudoin states that there are still 3 possible options. Briscoe School in Beverly, The Cummings Center in Beverly, and St. Mary's in Beverly. P. Beaudoin met with officials from Beverly's mayor office, and is waiting to hear whether they would be willing to wait a year before someone would possibly occupy the school. The Cummings Center approached P. Beaudoin and stated that they might have an option that would fit their needs. The Cummings Center is working on putting together a quote and space availability between their many available spaces. P. Beaudoin is still waiting to hear if St. Mary's can provide an estimate for the space. After discussion, the SBC agreed that overall, they would steer towards an option that can either have kids on site or off site based on phasing, modulars, and or an offsite temporary campus. P. Beaudoin to continue development of potential swing spaces.<br>12/12/2017: P. Beaudoin states Cummings Properties has confirmed that they have nothing that fits the District's space needs for the time frame needed. No update from Gloucester or St. Mary's prospect at this time.<br><br>12/18/2017: No update at this time. | P. Beaudoin |
| 16.2.2 | Previous Topics & Approval of December 12, 2017 Meeting Minutes: A motion to approve the 12/12/2017 meeting minutes as submitted made by A. Oldeman and seconded by G. Scharfe. Discussion: None. Vote: All in favor w J. Foster, and A. Ingaharro abstaining. Motion passes, minutes approved. | Record |
| 16.3 | Working Groups Update: No updates at this time. | Record |
| 16.4 | Schedule/Look Ahead: S. Brown reviews the two-month look-ahead schedule noting upcoming working group, community meetings, and SBC meeting dates (backup attached).<br>➢ 1/10/18-SBC Meeting<br>➢ 1/22/18-SBC Meeting<br>➢ 1/31/18-Community Meeting No. 3<br>➢ 2/5/18-SBC Meeting<br>➢ 2/13/18-Joint SBC/SC Meeting (Approve PSR) | Record |

| | | |
|---|---|---|
| | 2/27/18-SBC Meeting | |
| 16.5.1 | Project Update: D. Ruiz recaps that the SBC went and toured the West Parish School in Gloucester last week. The SBC has now toured two schools, West Parish and Hunkings in Haverhill. The team will try and schedule a couple additional schools in the month of January for the SBC to tour. | DWMP/JCJ |
| 16.5.2 | Project Update: D. Ruiz summarizes the survey update slides. There were two discrepancies in the survey, the property line of the school and the abutters and the layout of Lincoln Street. There is less than a foot in the discrepancies. The property line discrepancies will be resolved by standard practices and the Lincoln Street layout by having town recording survey at Essex registry of deeds. | Record |
| 16.6.1 | Building Systems Discussion/MEP: D. Ruiz introduces the GGD team, David, Chris and Dominic. GGD is JCJ's MEP and Building Systems consultant that will be used on the project. D. Ruiz starts the discussion by explaining why we are beginning to look at building systems. An outline of the discussion is below:<br>➢ Per the MSBA we must provide a narrative of the major building systems included:<br>• Plumbing, HVAC, and Electrical<br>➢ With estimated mechanical and electrical loads including applicable heating, cooling, domestic hot water and electrical block loads; by the District based on further evaluations and considerations<br>➢ Process and Timeline<br>• Identified a number of possible approaches<br>• Met with MEP working group (12/4)<br>• Introduce future decision points to full committee (12/18)<br>• Initial estimate of the various approaches (PSR)<br>• Life cycle cost analysis (SD)<br>• Review of options and estimates by working group (SD)<br>• JCJ/GGD to make recommendations (SD)<br>• SBC to finalize system choices (SD) | Record |
| 16.6.2 | Building Systems Discussion: D. Ruiz discussions slides as displayed in the presentation to the SBC. An outline of the discussion is below:<br>➢ Life Cycle Economics Methodology:<br>• Energy Simulation:<br>o Architecture<br>o Weather data<br>o Building occupancy and usage<br>o System operating characteristics<br>o Utility rates<br>• Energy Economics:<br>o Operating costs<br>o Installation costs<br>o Maintenance costs<br>• Life Cycle Cost Analysis<br>➢ Architectural Considerations<br>• Building Orientation<br>o Solar Gain | Record |

| | | |
|---|---|---|
| | ○ Shading<br>• Building Envelope (MASS Code-2015 IECC-Minimum R/U Values)<br>○ Roofs: White, Vegetated, Sloped<br>○ Walls:<br>▪ Wall construction-CMU, metal, stud, insulated cavity wall<br>▪ Glazing (heat mirror, triple glazed)<br>○ Floors:<br>▪ Slabs on grade<br>▪ Continuous insulation | |
| 16.6.3 | <u>Building Systems Discussion/LEED:</u> L. Braren from JCJ discusses the LEED point systems pages of the presentation. An outline of the discussion is below:<br>➢ Preliminary Decision Points<br>• LEED level versus net zero (requires very different approaches)<br>• LEED/CHPS (90% of all MSBA projects)<br>○ Minimum requirement is LEED Silver + stretch code<br>○ 20% better than energy code to get 2% reimbursement<br>• LEED Gold<br>• LEED Platinum<br>➢ Net Zero (few MSBA projects)<br>• Geothermal Wells<br>• Photovoltaic Panels<br>• Higher efficiency equipment<br>• Improved envelop<br>• Glazing<br>• Higher capital and maintenance costs<br>• Lower utility costs<br>➢ Net Zero Carbon (No MSBA projects yet)<br>• Zero carbon emissions<br>• All electrical system<br>• More geothermal wells<br>• More photovoltaic panels<br>• Higher capital and maintenance costs<br>• Loser Utility costs | Record |
| 16.6.4 | <u>Building Systems Discussion/Mechanical:</u> Dominic from GGD discusses the Mechanical Systems slide as they are displayed in the presentation to the SBC. An outline of the discussion is below:<br>➢ Elements to be Explored:<br>• Renovation vs. New Construction<br>• Air conditioning<br>• Enclosed units vs. exposed<br>➢ Renovation and Add/Reno:<br>• HVAC systems with smaller ductwork (exposed or soffits required)<br>• Displacement dehumidification<br>• Chilled beams or fan coil<br>• Typically higher install and operating costs | |

| | | |
|---|---|---|
| | ➢ New Construction:<br>• More compatible HVAC systems<br>• Reduced HVAC loads<br>• Reduced HVAC equipment size<br>• Reduced HVAC system costs<br>➢ Preliminary Decision Points-Air Conditioning:<br>• Full Building-A/C-All Areas<br>o Improves comfort<br>o Allows summer use<br>o Higher capital costs<br>o Higher energy use<br>o Greater maintenance<br>• Dehumidification-With A/C in selected areas<br>o Select areas: Administration suite and media center<br>o Reduced capital, energy and maintenance costs<br>o Same system as MERMHS<br>➢ Preliminary Decision Points-RTUs: Enclosed vs. Exposed<br>• Enclosed<br>o Protection from salt air<br>o Ease of maintenance<br>o Acoustical control<br>o Additional costs (envelop and additional ductwork/louvers)<br>• Exposed<br>o Salt rated equipment possible<br>o Lower costs<br>o Reduced expected service life vs. enclosed units | |
| 16.6.5 | <u>Building Systems/Electrical:</u> David from GGD discusses the Electrical Systems slides from the presentation to the SBC. An outline of the discussion is below:<br>➢ Emergency Power System<br>• Required life safety loads & optional standby loads<br>o Provide emergency generator or emergency lighting battery back-up only<br>o Estimated size of generator: 125-150k<br>o Will the building be an emergency shelter? (this has electrical, architectural, and structural impacts)<br>➢ Emergency Power System: Required life safety loads<br>• Corridors, electrical rooms, gymnasium cafeteria, media center, lobbies, central administration area, health suite/nurses office, toilets, cafetorium, data rooms (MDF &IDF), kitchen, exterior building mounted lights, code (egress areas).<br>➢ Emergency Power System: Optional standby loads<br>• Boilers/water pumps, security/CCTV/door access, ATC controls, strategic power receptacles, electric facets & sinks, heating & ventilation, unit heater serving water, critical cooling units (IT), IT equipment, fire alarm systems(batteries), refrigeration | |

| | | |
|---|---|---|
| 16.6.6 | Building Systems/Plumbing: Chris from GGD discusses the Plumbing Systems slides from the presentation to the SBC. An outline of the discussion is below:<br>➢ Water Conservation:<br>• Manual flush valve vs. Battery sensor flush valves<br>• Manual metering faucet vs batter sensor faucet<br>• Drinking fountain w/bottle filler<br>• Accessible shower<br>• Staff/classroom sinks | |
| 16.7 | Design Update/Evaluating the Options: L. Braren from JCJ discusses the evaluating the options slides. At the last SBC meeting, the SBC voted to eliminate some options. Currently, there are 7 options remaining to further evaluate. L. Braren further discusses the Classroom Community Arrangements slides. An outline of the discussion is below:<br>➢ Classroom communities<br>➢ Linear<br>o Scheme A and Scheme B were presented. (the graphic is displayed in the backup of these minutes)<br>➢ Cluster<br>o Scheme A and Scheme B were presented. (the graphic is displayed in the backup of these minutes) | |
| 16.8 | Next Steps: J. LaPosta notes the next steps slide and discusses important upcoming dates. An outline of these discussion is below:<br>➢ 1/10/18-Evaluating Options/Select Schemes for Estimating (3-5 would be ideal)<br>➢ 1/22/18-Design Update<br>➢ 1/31/18-Community Meeting<br>➢ 2/1/18-Review Cost Estimates<br>➢ 2/5/18-Select Preferred Option<br>➢ 2/13/18-Joint Committee Approval of PSR<br>➢ 2/21/18-Submit PSR to MSBA | Record |
| 16.9 | Next Meetings: The next SBC will be held Wednesday January 10th at 7pm in the Manchester Essex Regional Middle/High School Library. | Record |
| 16.10 | Other Topics Not Reasonably Anticipated (48 hour prior to meeting): None. | Record |
| 16.11 | Public Comment: None. | Record |
| 16.12 | Adjourn: A motion was made by G. Scharfe and seconded by A. Ingaharro to adjourn the meeting. Discussion: None. Vote: Unanimous to approve. Meeting adjourned at 8:52 pm. | Record |

**Attached:**
*SBC Meeting Agenda, Sign In Sheet, SBC Meeting No. 15 12/12/17 Meeting Minutes, Manchester Memorial Elementary School Presentation 12/18/17*

**DORE AND WHITTIER MANAGEMENT PARTNERS, LLC.**

Christina Shefferman

Assistant Project Manager
Cc: Attendees, File

**The above is my summation of our meeting. If you have any additions and/or corrections, please contact me for incorporation into these minutes.**

## PRELIMINARY SCHEMATIC REPORT PHASE PROJECT MEETINGS

- November 28, 2017 – SBC Meeting #14
- December 4, 2017 – MEP Systems Sub-Committee Meeting
- December 12, 2017 – SBC Meeting #15
- December 18, 2017 – SBC Meeting #16
- January 10, 2018 – SBC Meeting #17
- January 22, 2018 – SBC Meeting #18
- January 31, 2018 – Community Meeting #3
- February 1, 2018 – SBC Meeting #19
- February 13, 2018 – Joint SBC and School Committee Meeting #1

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# AGENDA

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 1/10/2018 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | C.Shefferman |

1. Call to Order
2. Previous Topics & Approval of December 18, 2017 Meeting Minutes
   - 7.11 Site: Swing space availability (P. Beaudoin)
3. Design Update (JCJ)
4. Scheme Development (JCJ)
5. Invoices and Commitments for Approval
   - DWMP December Invoice no. 10 in the amount of $8,682.00 (vote expected). Backup attached.
   - JCJ December Invoice no. 5 in the amount of $24,285.00 (vote expected). Backup attached.
6. Working Group Update (DWMP)
7. Schedule/Look Ahead (DWMP)
8. Next Steps
9. Other Topics Not Reasonably Anticipated 48 hours prior to Meeting
10. Public Comments
11. Adjourn

MANAGEMENT PARTNERS, LLC

PROJECT MANAGERS
ARCHITECTS

Newburyport, MA 01950
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978.499.2999 ph
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www.doreandwhittier.com

# MANCHESTER MEMORIAL ELEMENTARY SCHOOL

FEASIBILITY PHASE –
**SBC MEETING #16**
JANUARY 10TH, 2018



## TODAY'S AGENDA

PROJECT UPDATE

**EVALUATING THE OPTIONS:**

NEXT STEPS

## Today's Goal:

## Eliminate 3 Schemes

*(1 Addition- Renovation and 2 New)*



EVALUATING THE OPTIONS

## Today's Goal:

## Allow us to Run Through All 7 Schemes

*(Reserve Questions & Discussion Until After Presentaiton)*

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## EVALUATING THE OPTIONS

# Things to Know:

# Scheme are not in their Final Configuration

# Elements Between Scheme are Still Interchangeable

# There are Multiple Ways to Phase Construction



## EVALUATING THE OPTIONS

RECOMMENDED FOR FURTHER DEVELOPMENT

### R-1 FOUR WALLS



**RENOVATION ONLY**

### AR-2 SAVE THE CORE



**ADDITION/RENOVATION**
RETAIN CORE BLOCK ONLY

### AR-4 OUT WEST



**ADDITION/RENOVATION**
MODERATE INTERVENTION

### N-1 THE PIANO



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

### N-3 THE HUB



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

### N-8 TWO WINGS



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

### N-9 THE HOOK



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

# RECOMMENDATIONS

- FAVORABLE
- NEUTRAL
- UNFAVORABLE

| | Option R-1 *"Four Walls"* | Option AR-2 *"Save the Core"* | Option AR-4 *"Out West"* | Option N-1 *"The Piano"* | Option N-3 *"The Hub"* | Option N-8 *"Two Wings"* | Option N-9 *"The Hook"* |
|---|---|---|---|---|---|---|---|
|  | |  |  |  |  |  |  |
| **Educational** | | | | | | | |
| Meets District's Space Program Goals | | | | | | | |
| Provides Flexibility for Future Building Expansion | | | | | | | |
| Flexibility for Grade Level Re-Configuration (Bubble Grades) | | | | | | | |
| Minimizes Impact to Students During Construction | | | | | | | |
| Provides Separated Whole School Gathering Space | | | | | | | |
| **Community** | | | | | | | |
| Provides Independent Access to Community Used Space | | | | | | | |
| Allows for Competition Size Gym with Bleachers | | | | | | | |
| **Site** | | | | | | | |
| Increases Amount of Play Areas/ Fields | | | | | | | |
| Welcoming Street Presence | | | | | | | |
| Improves Parent Drop-Off/ Pick-Up Queuing | | | | | | | |
| Improves Impact to Riverfront Resource Areas | | | | | | | |
| Minimizes Potential Pedestrian/ Vehicular Conflicts | | | | | | | |
| **Building** | | | | | | | |
| Optimizes Building Area to Perimeter Ratio | | | | | | | |
| **Costs and Schedule** | | | | | | | |
| Relative Capital Costs | | | | | | | |
| Minimizes Number of Phases | | | | | | | |



# R-1 FOUR WALLS

**PHASE ONE**



## PHASING

- Site Mobilization
- Install Modulars
- Renovate West Wing

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

## **R-1** FOUR WALLS

**PHASE TWO**



# PHASING

- Renovate Center and East Wings
- Renovate Pre-K

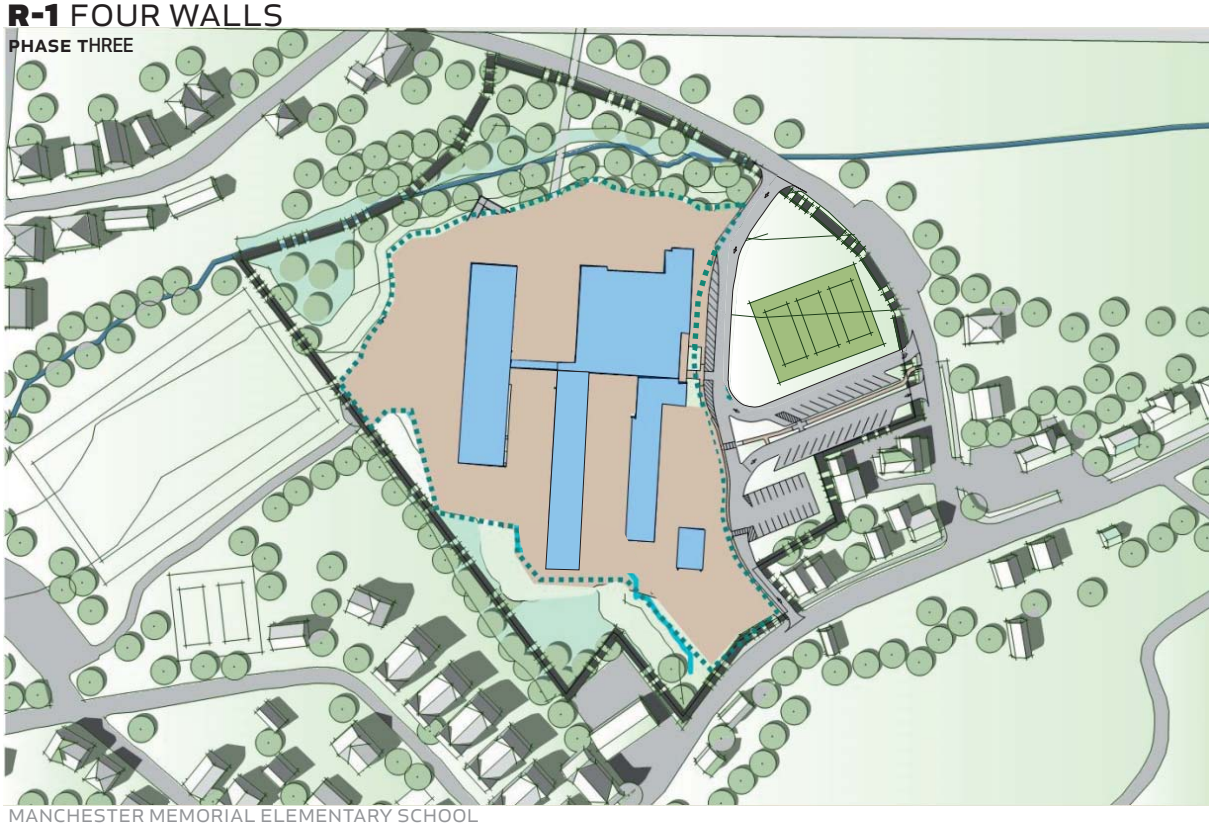
Existing Building
Modulars
Demolition
Renovated Area or New Construction

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## **R-1** FOUR WALLS

**PHASE THREE**



# PHASING

- Renovate Core Area

Existing Building
Modulars
Demolition
Renovated Area or New Construction

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**R-1** FOUR WALLS




# PHASING

– Complete Site Work

1. GYMNASIUM
2. CAFETERIA
3. LIBRARY / MEDIA
4. ADMIN
5. CLASSROOMS
6. PARKING
7. PLAYFIELDS
8. OUTDOOR LEARNING

NORTH

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**R-1** FOUR WALLS



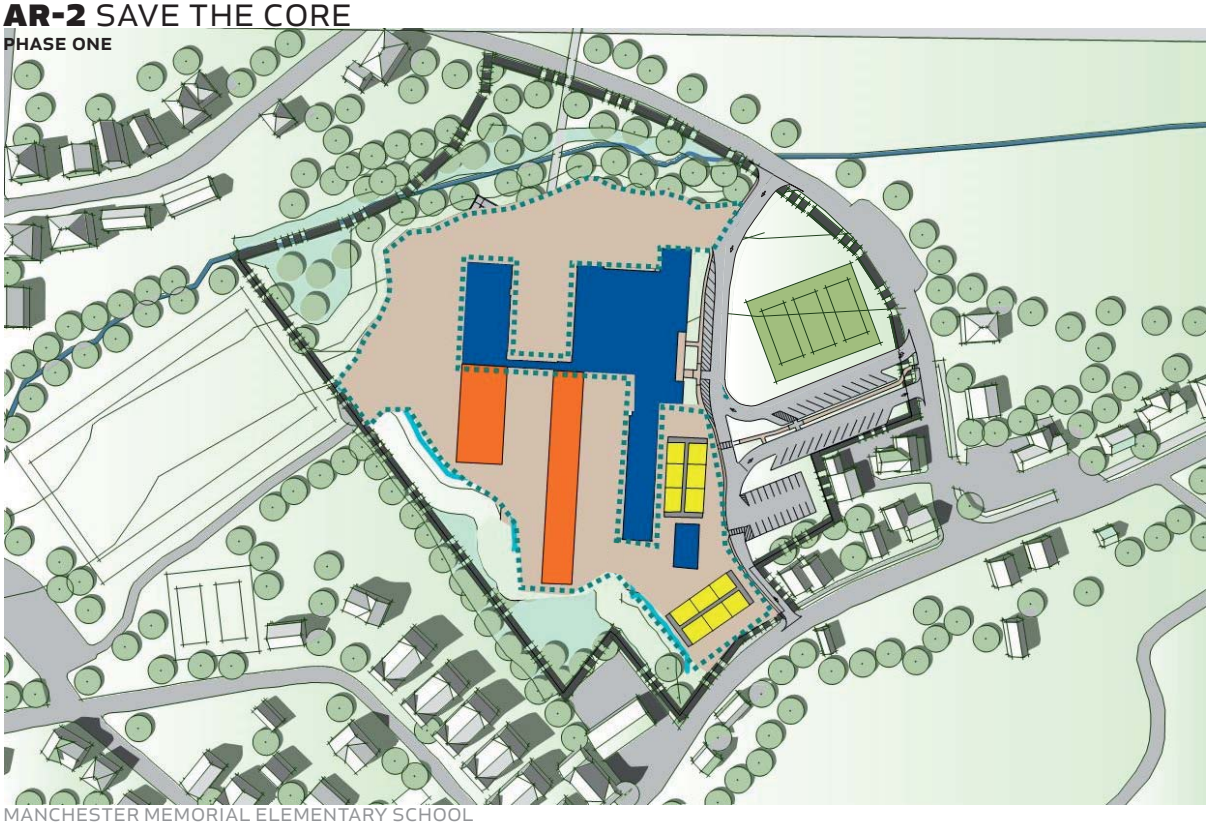

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## **AR-2** SAVE THE CORE

**PHASE ONE**



# PHASING

– Mobilize

– Install Modulars

– Renovate Center and West Wings

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

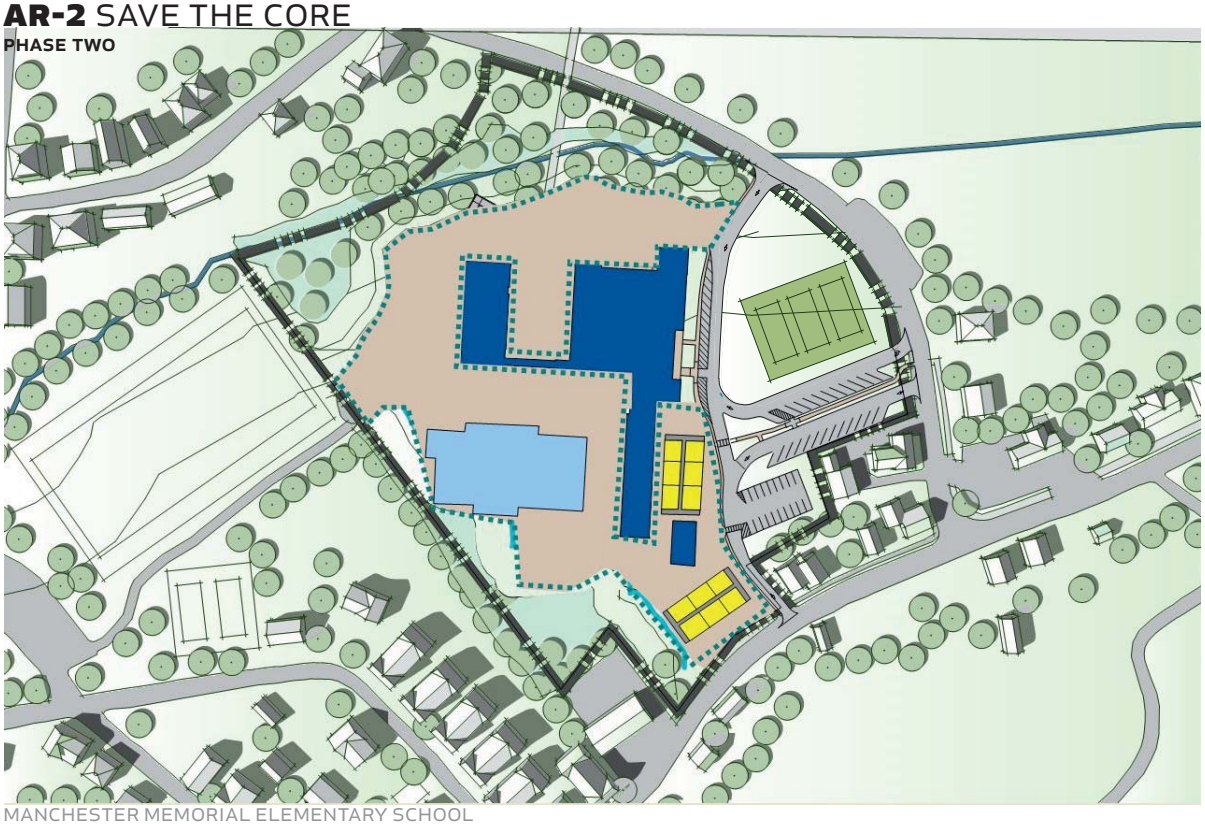
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## **AR-2** SAVE THE CORE

**PHASE TWO**



# PHASING

– Construct New 2-Story West Wing

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

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**AR-2** SAVE THE CORE

**PHASE THREE**



## PHASING

– Demolition of East Wing and Pre-K

Existing Building

Modulars

Demolition

Renovated Area or New Construction

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**AR-2** SAVE THE CORE

**PHASE FOUR**



## PHASING

– Construction New Center Wing (Core)

Existing Building

Modulars

Demolition

Renovated Area or New Construction

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## **AR-2** SAVE THE CORE

**PHASE FIVE**



# PHASING

– Renovation of Existing "Core" Block"

– Demolition of Remaining Existing Building

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

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## **AR-2** SAVE THE CORE




# PHASING

– Complete Site Work

1. GYMNASIUM
2. CAFETERIA
3. LIBRARY / MEDIA
4. ADMIN
5. CLASSROOMS
6. PARKING
7. PLAYFIELDS
8. OUTDOOR LEARNING

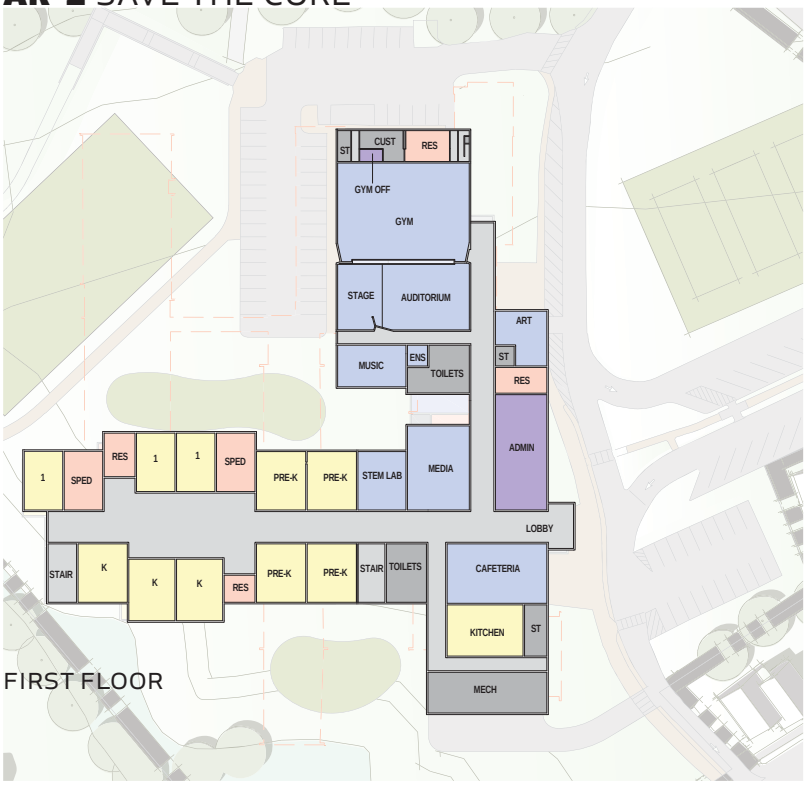
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## **AR-2** SAVE THE CORE




FIRST FLOOR




SECOND FLOOR

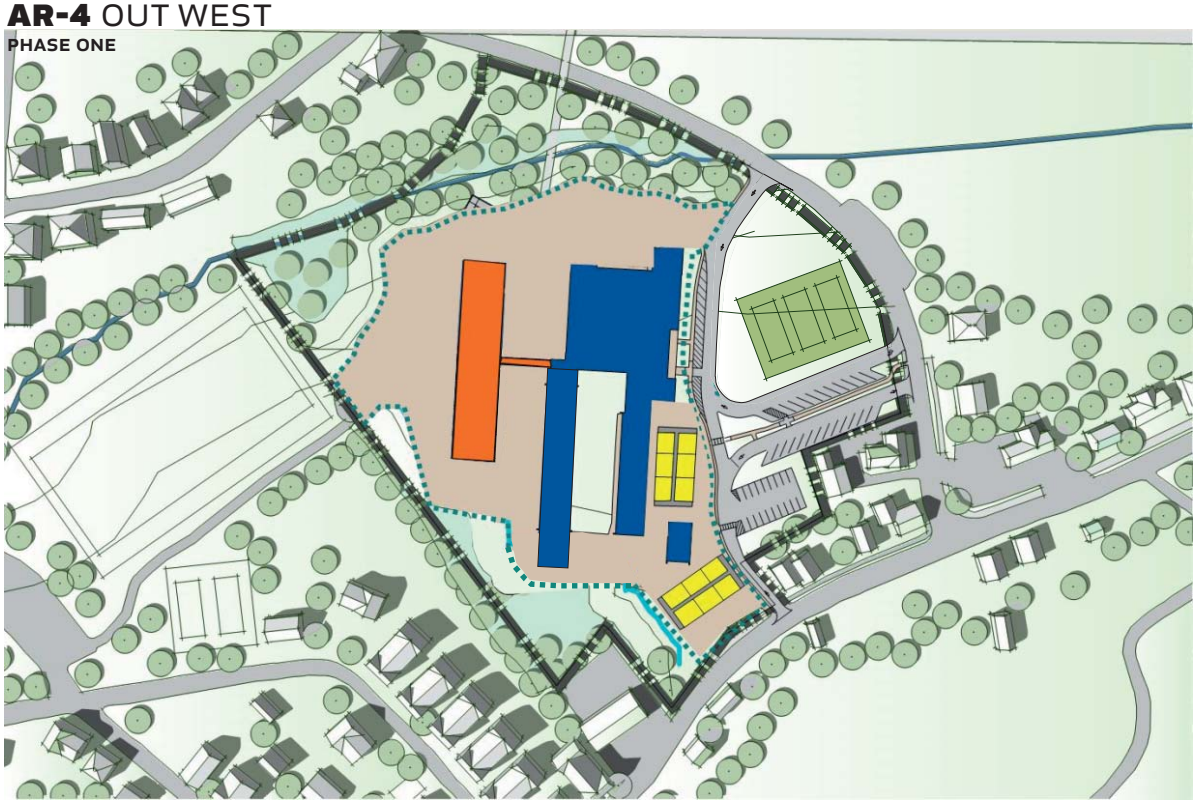
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## **AR-4** OUT WEST

**PHASE ONE**



## PHASING

- Site Mobilization
- Install Modulars
- Demolition of West Wing

Existing Building

Modulars

Demolition

Renovated Area or New Construction

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## AR-4 OUT WEST

**PHASE TWO**



# PHASING

– Construct New West Wing

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

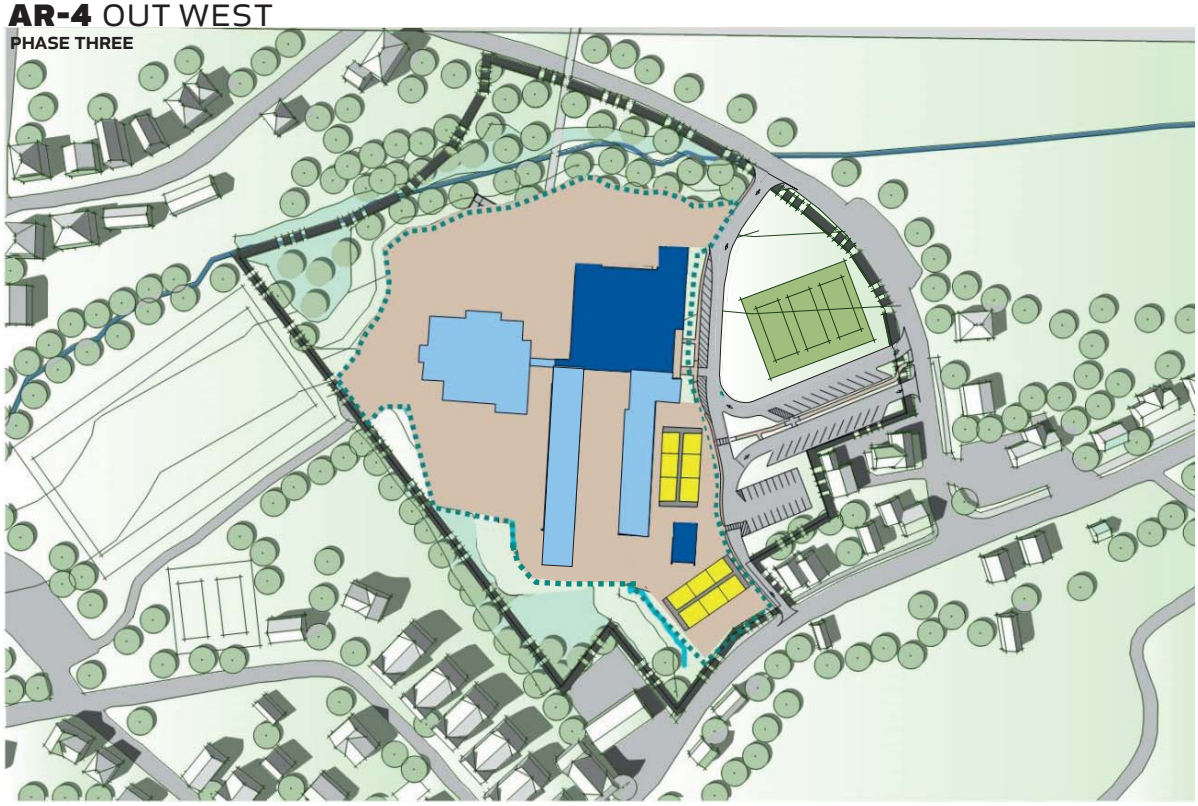
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## AR-4 OUT WEST

**PHASE THREE**



# PHASING

– Renovate Center and East Wings of Existing Building

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

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## AR-4 OUT WEST

**PHASE FOUR**



# PHASING

– Renovate Existing Building "Core" Block

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

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## AR-4 OUT WEST

**PHASE THREE**




# PHASING

– Complete Site Work

1. GYMNASIUM
2. CAFETERIA
3. LIBRARY / MEDIA
4. ADMIN
5. CLASSROOMS
6. PARKING
7. PLAYFIELDS
8. OUTDOOR LEARNING

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MANCHESTER MEMORIAL ELEMENTARY SCHOOL

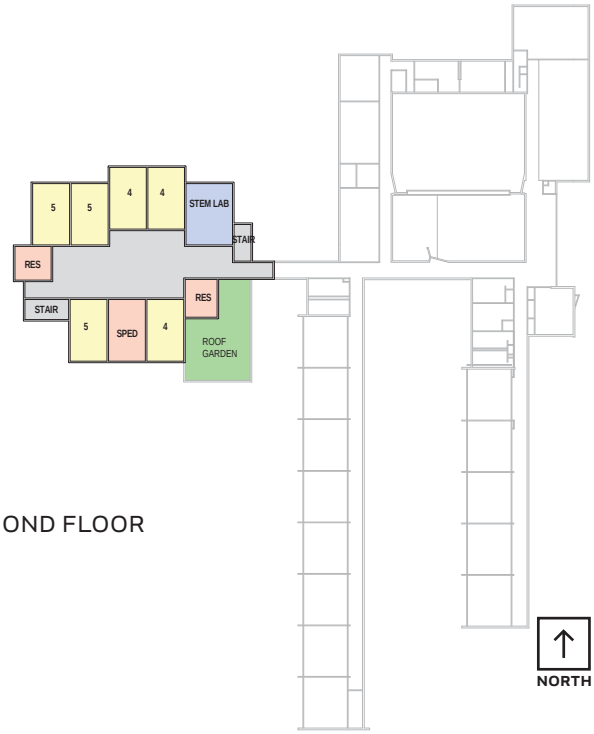
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## **AR-4** OUT WEST




FIRST FLOOR




SECOND FLOOR

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## **N-1** THE PIANO

**PHASE ONE**



# PHASING

- Site Mobilization
- Install Modulars
- Demolition of Remaining Existing Building

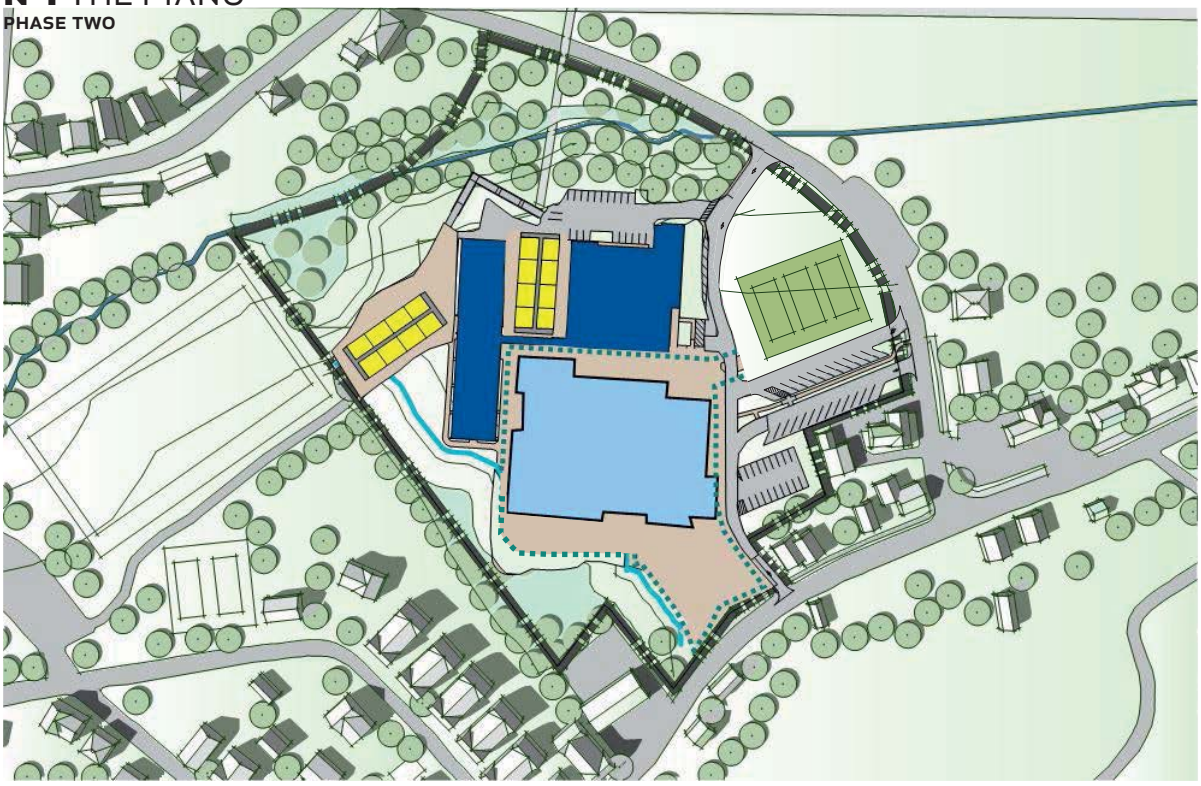
Existing Building
Modulars
Demolition
Renovated Area or New Construction

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MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

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**N-1** THE PIANO

**PHASE TWO**



## PHASING

– Construct New Building

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

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**N-1** THE PIANO

**PHASE THREE**



## PHASING

– Demolition of Remaining Existing Building

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

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# PHASING

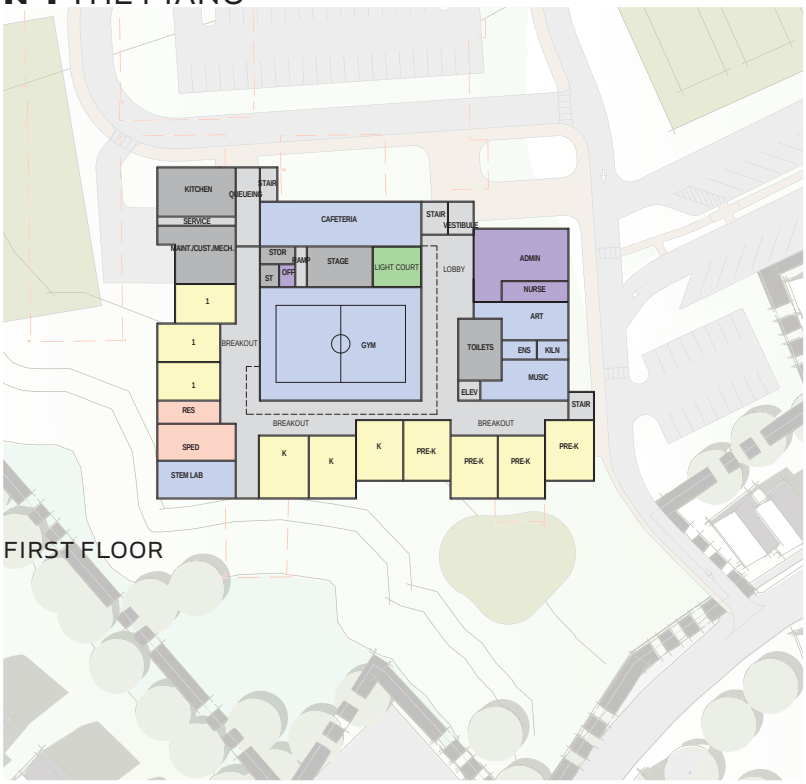
– Complete Site Work

1. GYMNASIUM
2. CAFETERIA
LIBRARY / MEDIA ABOVE
4. ADMIN
5. CLASSROOMS
6. PARKING
7. PLAYFIELDS
8. OUTDOOR LEARNING

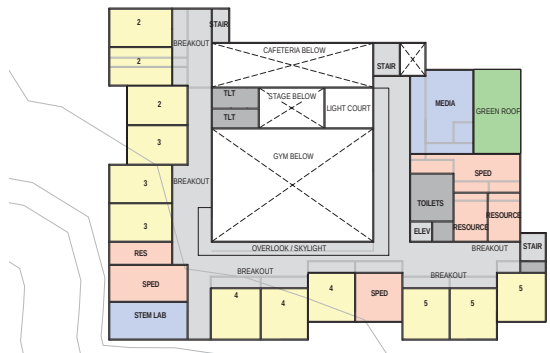
NORTH



**N-1** THE PIANO




FIRST FLOOR




SECOND FLOOR

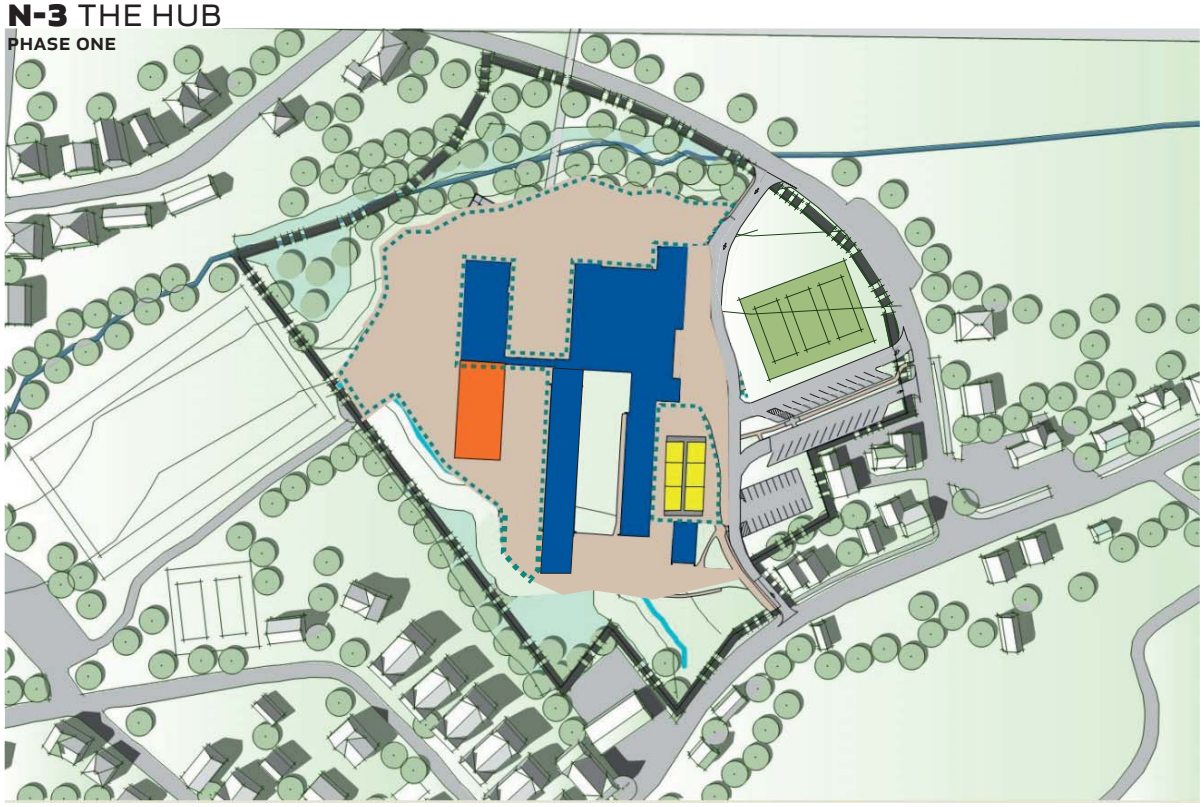
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**N-3** THE HUB

**PHASE ONE**



## PHASING

- Site Mobilization
- Install Modulars
- Demolition of Remaining Existing Building

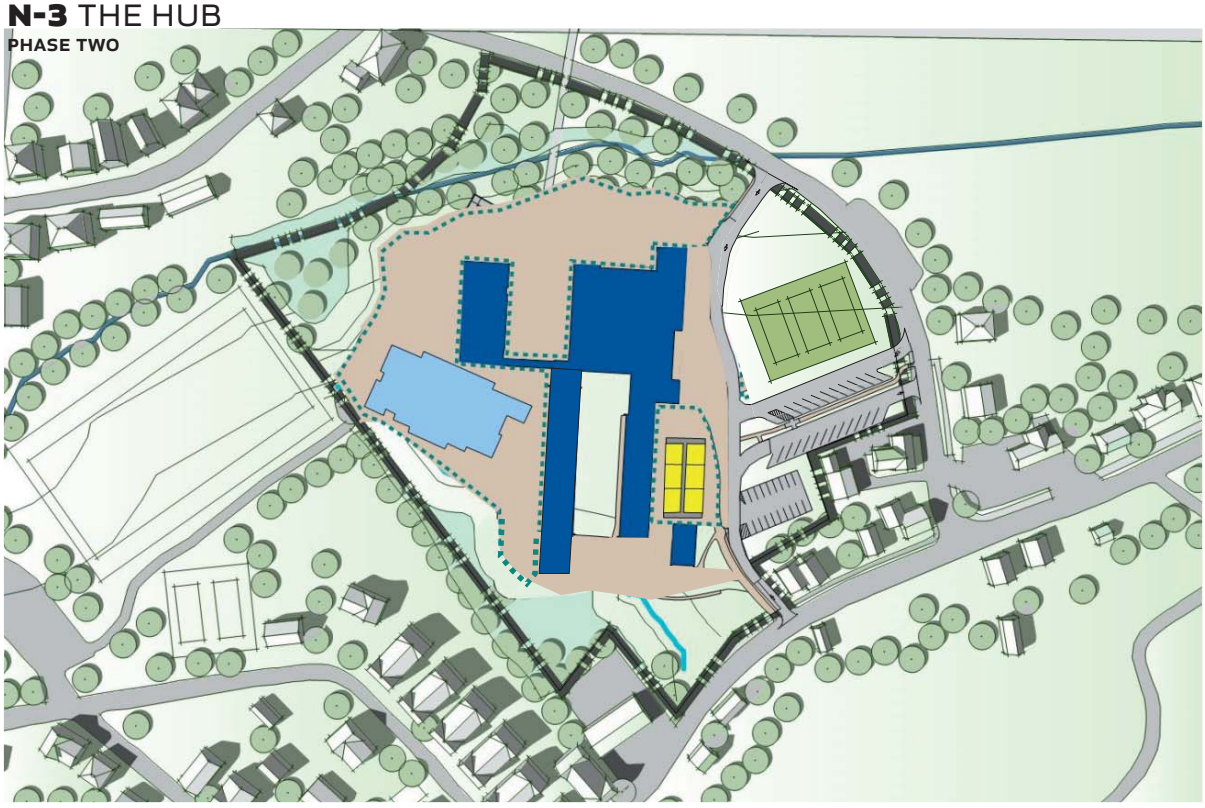
Existing Building
Modulars
Demolition
Renovated Area or New Construction

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**N-3** THE HUB

**PHASE TWO**



## PHASING

- Construct New West Wing

Existing Building
Modulars
Demolition
Renovated Area or New Construction

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**N-3** THE HUB

**PHASE TWO A**



## PHASING

– Relocate Students to New Building

– Demolition of Center and East Wings of Existing Building

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

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**N-3** THE HUB

**PHASE THREE**



## PHASING

– Relocate Students to New Building

– Demolition of Remaining Existing Building

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

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**N-3** THE HUB

**PHASE THREE A**



## PHASING

– Relocate Students to New Building

– Demolition of Remaining Existing Building

Existing Building
Modulars
Demolition
Renovated Area or New Construction

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**N-3** THE HUB

**PHASE FOUR**



## PHASING

– Construct New East Wing

Existing Building
Modulars
Demolition
Renovated Area or New Construction

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# PHASING

- Complete Site Work

1. GYMNASIUM
2. CAFETERIA
3. LIBRARY / MEDIA
4. ADMIN
5. CLASSROOMS
6. PARKING
7. PLAYFIELDS
8. OUTDOOR LEARNING

NORTH

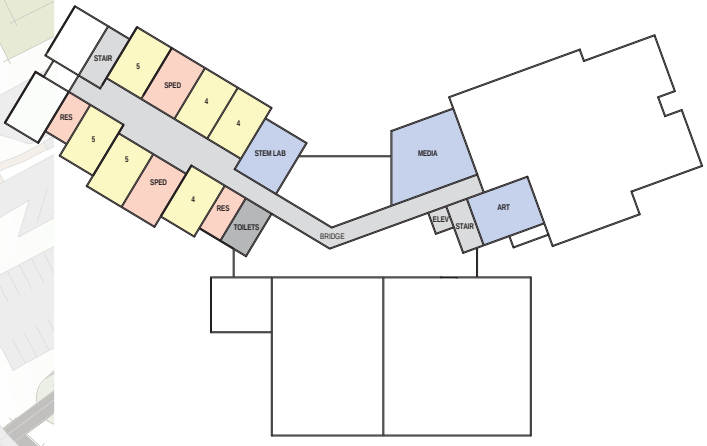
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**N-3** THE HUB




FIRST FLOOR




SECOND FLOOR

NORTH

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## **N-8** TWO WINGS

**PHASE ONE**



# PHASING

- Site Mobilization
- Install Modulars
- Demolition of Center and East Existing Classroom Wings

Existing Building
Modulars
Demolition
Renovated Area or New Construction

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## **N-8** TWO WINGS

**PHASE TWO**



# PHASING

- Construct South Classroom Wing and New "Core" Block

Existing Building
Modulars
Demolition
Renovated Area or New Construction

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## **N-8** TWO WINGS

**PHASE THREE**



# PHASING

– Demolition of Remaining Existing Building

Existing Building
Modulars
Demolition
Renovated Area or New Construction

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## **N-8** TWO WINGS

**PHASE FOUR**



# PHASING

– Construct New North Classroom Wing

– Remove Modulars

Existing Building
Modulars
Demolition
Renovated Area or New Construction

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## **N-8** TWO WINGS

**PHASE FOUR**




# PHASING

- Complete Site Work

1. GYMNASIUM
2. CAFETERIA
3. LIBRARY / MEDIA
4. ADMIN
5. CLASSROOMS
6. PARKING
7. PLAYFIELDS
8. OUTDOOR LEARNING

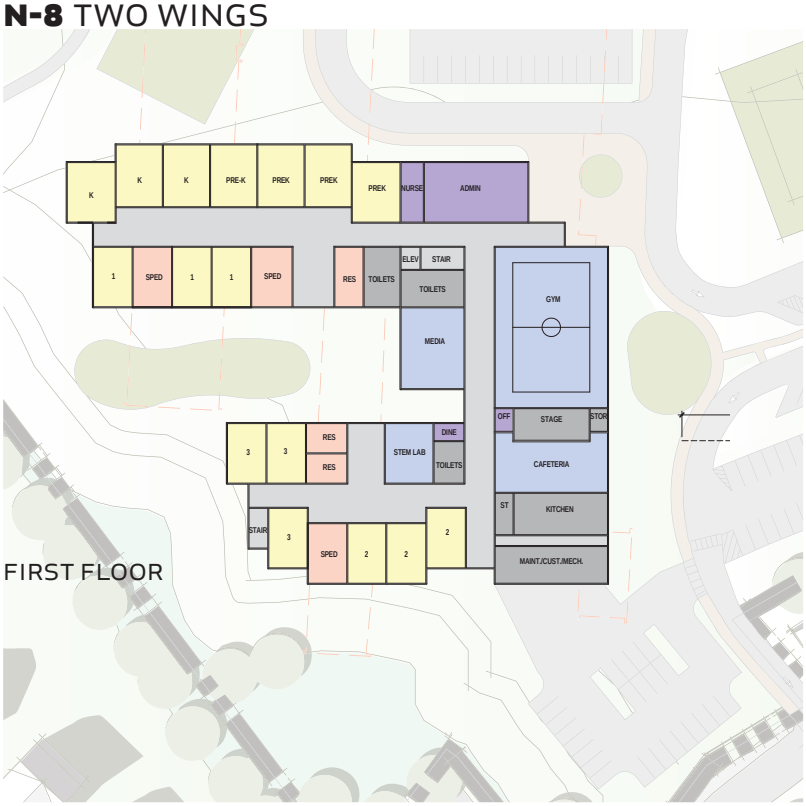
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## **N-8** TWO WINGS




FIRST FLOOR




SECOND FLOOR

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## **N-9** THE HOOK

**PHASE ONE**



# PHASING

- Mobilize

- Construct New Wing ofnr-9. New 2-Story West Wing

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

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## **N-9** THE HOOK

**PHASE TWO**



# PHASING

- Construct New Classroom Wings

- Relocate Students to New Construction

- Remove Modulars

- Temporary Connector from Existing to New Building

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

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## **N-9** THE HOOK

**PHASE THREE**



# PHASING

– Demolition of Art and Music Area

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

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## **N-9** THE HOOK

**PHASE FOUR**



# PHASING

– Construct New "Core" Block"

- Existing Building
- Modulars
- Demolition
- Renovated Area or New Construction

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## **N-9** THE HOOK

**PHASE FIVE**



# PHASING

– Demolition of Remaining Existing Building

Existing Building

Modulars

Demolition

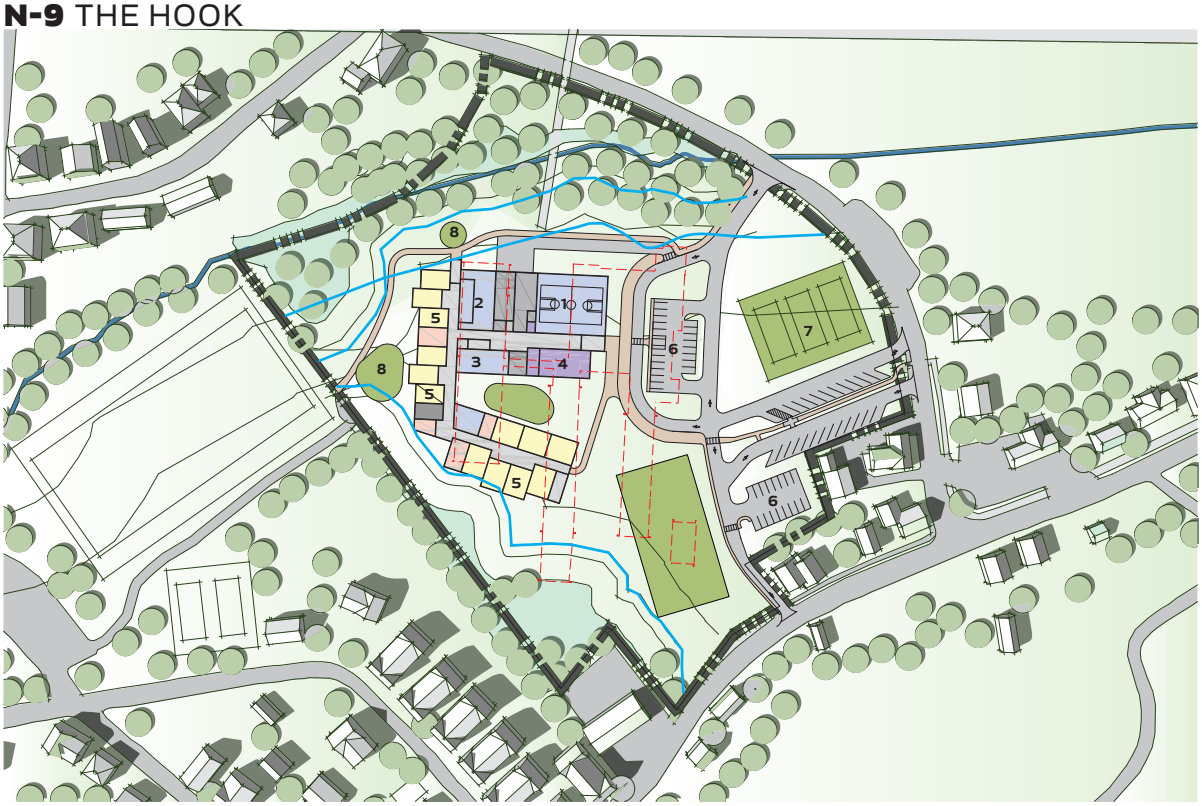
Renovated Area or New Construction

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## **N-9** THE HOOK




# PHASING

– Complete Site Work

1. GYMNASIUM
2. CAFETERIA
3. LIBRARY / MEDIA
4. ADMIN
5. CLASSROOMS
6. PARKING
7. PLAYFIELDS
8. OUTDOOR LEARNING

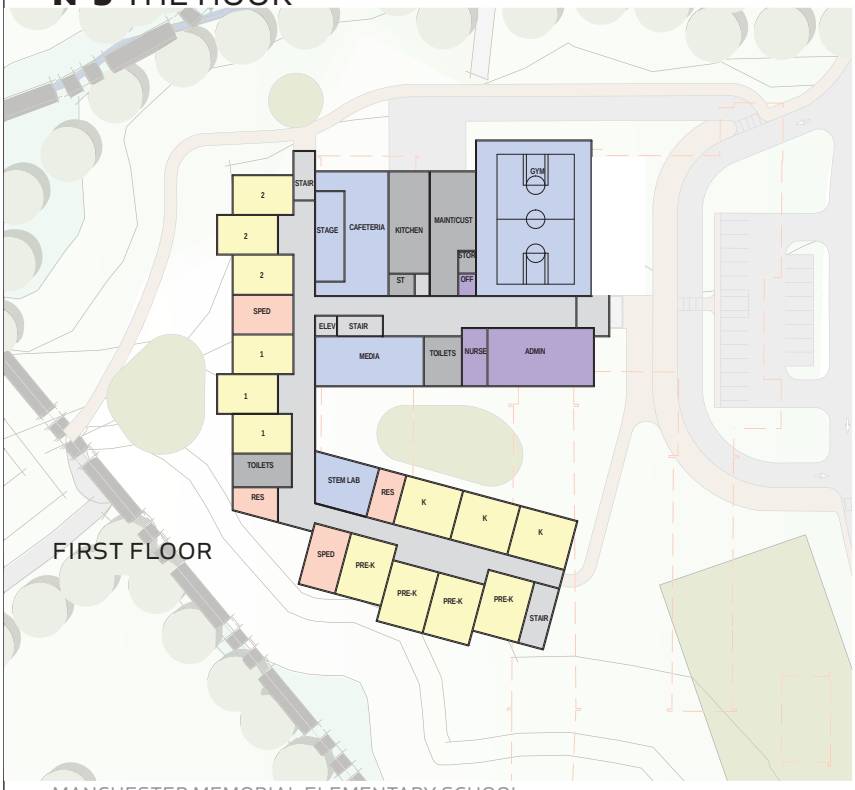
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MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

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# **N-9** THE HOOK







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# RECOMMENDATIONS

● FAVORABLE
◉ NEUTRAL
○ UNFAVORABLE

| | Option R-1 *"Four Walls"* | Option AR-2 *"Save the Core"* | Option AR-4 *"Out West"* | Option N-1 *"The Piano"* | Option N-3 *"The Hub"* | Option N-8 *"Two Wings"* | Option N-9 *"The Hook"* |
|---|---|---|---|---|---|---|---|
| **Educational** | | | | | | | |
| Meets District's Space Program Goals | ○ | ○ | ◉ | ● | ● | ● | ● |
| Provides Flexibility for Future Building Expansion | ○ | ○ | ○ | ○ | ● | ● | ● |
| Flexibility for Grade Level Re-Configuration (Bubble Grades) | ◉ | ● | ○ | ● | ● | ● | ◉ |
| Minimizes Impact to Students During Construction | ◉ | ◉ | ○ | ● | ○ | ● | ◉ |
| Provides Separated Whole School Gathering Space | ● | ● | ● | ○ | ● | ○ | ○ |
| **Community** | | | | | | | |
| Provides Independent Access to Community Used Space | ● | ● | ● | ○ | ● | ● | ● |
| Allows for Competition Size Gym with Bleachers | ○ | ○ | ○ | ● | ● | ● | ● |
| **Site** | | | | | | | |
| Increases Amount of Play Areas/ Fields | ◉ | ● | ● | ● | ◉ | ◉ | ● |
| Welcoming Street Presence | ◉ | ◉ | ◉ | ● | ● | ● | ● |
| Improves Parent Drop-Off/ Pick-Up Queuing | ◉ | ◉ | ◉ | ● | ● | ● | ● |
| Improves Impact to Riverfront Resource Areas | ◉ | ◉ | ◉ | ● | ● | ● | ◉ |
| Minimizes Potential Pedestrian/ Vehicular Conflicts | ◉ | ◉ | ◉ | ● | ● | ● | ● |
| **Building** | | | | | | | |
| Optimizes Building Area to Perimeter Ratio | ○ | ○ | ○ | ● | ◉ | ◉ | ◉ |
| **Costs and Schedule** | | | | | | | |
| Relative Capital Costs | $ 25,4 M * | $ 43.6 M * | TBD | $ 45.6 M * | $ 45.6 M * | $ 45.6 M * | $ 45.6 M * |
| Minimizes Number of Phases | 3 Reno | 3 Demo/ 3 Const | 1 Demo/ 2 Const | 2 Demo / 1 Const | 3 Demo/ 3 Const | 2 Demo/ 2 Const | 3 Demo/ 2 Const |

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# NEXT STEPS

| | |
|---|---|
| **1/10** | Evaluating Options / Select Schemes for Estimating |
| **1/22** | Design Update |
| **1/31** | Community Meeting |
| **2/1** | Review Cost Estimates |
| **2/5** | Select Preferred Option |
| **2/13** | Joint Committee Approval of PSR |
| **2/21** | Submit PSR to MSBA |



# THANK YOU

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS
JCJARCHITECTURE

# MEETING MINUTES

MANAGEMENT PARTNERS, LLC

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 1/10/2018 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | C.Shefferman |

| Present | Name | Affiliation | Present | Name | Affiliation |
|---|---|---|---|---|---|
| ✓ | Caroline Weld * | SBC Co-Chair | ✓ | Jim LaPosta | JCJ |
| ✓ | Ann Cameron * | SBC Co-Chair | ✓ | Daniel Ruiz | JCJ |
| ✓ | Pam Beaudoin * | Superintendent | ✓ | Lauren Braren | JCJ |
| ✓ | Avi Urbas * | Dir. of Fin. & Ops | | Emily Czarnecki | JCJ |
| | Alva Ingaharro * | Essex | | Mike Burton | DWMP |
| ✓ | John Willis * | Principal MMES | ✓ | Steven Brown | DWMP |
| ✓ | Jay Pagliarulo | Dir. of Facilities | ✓ | Christina Shefferman | DWMP |
| ✓ | Andy Oldeman * | Man. Fin. Comm. | | | |
| ✓ | Lisa O'Donnell * | Essex B.O.S. | | | |
| ✓ | Remko Brueker * | Manchester | | | |
| ✓ | Adam Zaiger * | Manchester | | | |
| ✓ | Tyler Virden * | Essex | | | |
| | George Scharfe * | Manchester | | | |
| ✓ | Gordon Brewster * | Manchester | | | |
| ✓ | Charlie Hay * | Essex | | | |
| | Sarah Creighton * | Manchester | | | |
| ✓ | Maggie Tomaiolo * | Essex | | | |
| ✓ | Jake Foster * | Essex | | | |

**Action Items:**

| Item No. | Responsible Party: | Description |
|---|---|---|
| 7.11 | P. Beaudoin | Site: Swing space availability |

** SBC Voting Member*

PROJECT MANAGERS
ARCHITECTS

Newburyport, MA 01950
260 Merrimac Street Bldg 7
978.499.2999 ph
978.499.2944 fax

www.doreandwhittier.com

| Item No. | Description | Action |
|---|---|---|
| 17.1 | Call to Order: 7:06 pm meeting was called to order by the SBC Co-Chair Ann Cameron with 14 of 17 voting members in attendance. S. Brown of DWMP notes the meeting will follow the Power Point presentation that is being projected on the screen and to follow the agenda that was provided to the SBC prior to the meeting via Dropbox. | Record |
| 17.2.1 | Previous Topics & Approval of December 18, 2017 Meeting Minutes: S. Brown explains and reviews the one previous item requiring action. A review of the item is noted below. | Record |
| 7.11 | Site Understanding: (For previous history of this item, refer to previous meeting minutes)<br><br>…Additional details and follow up will be provided to the SBC at our next meeting.<br>11/14/2017: P. Beaudoin states that she has a meeting scheduled with the Mayor of the Town of Beverly on 11/20/17. P. Beaudoin is also in communication with St. Mary's in Beverly, and is waiting for a formal response from the school on whether it will fit the needs of MMES. P. Beaudoin is still waiting to hear from Father Jim in Gloucester. P. Beaudoin will continue to pursue these options and will report back to the SBC once she has additional information.<br>11/28/2017: P. Beaudoin states that there are still 3 possible options. Briscoe School in Beverly, The Cummings Center in Beverly, and St. Mary's in Beverly. P. Beaudoin met with officials from Beverly's mayor office, and is waiting to hear whether they would be willing to wait a year before someone would possibly occupy the school. The Cummings Center approached P. Beaudoin and stated that they might have an option that would fit their needs. The Cummings Center is working on putting together a quote and space availability between their many available spaces. P. Beaudoin is still waiting to hear if St. Mary's can provide an estimate for the space. After discussion, the SBC agreed that overall, they would steer towards an option that can either have kids on site or off site based on phasing, modulars, and or an offsite temporary campus. P. Beaudoin to continue development of potential swing spaces.<br>12/12/2017: P. Beaudoin states Cummings Properties has confirmed that they have nothing that fits the District's space needs for the time frame needed. No update from Gloucester or St. Mary's prospect at this time.<br>12/18/2017: No update at this time.<br><br>1/10/2018: No update at this time. | P. Beaudoin |
| 17.2.2 | Previous Topics & Approval of December 18, 2017 Meeting Minutes: A motion to approve the 12/18/2017 meeting minutes as submitted made by J. Foster and seconded by C. Weld. Discussion: None. Vote: All in favor w J. Foster, L. O'Donnell, A. Zaiger, C. Hay, M. Tomaiolo, and A. Urbas abstaining. Motion passes, minutes approved. | Record |
| 17.3.1 | Design Update: JCJ starts discussion by going through all options, and providing details about the developed design for the SBC to evaluate. An outline of the discussion is below:<br>➢ Things to know:<br>• Schemes are not in their final configuration<br>• Elements between scheme are still interchangeable<br>• There are multiple ways to phase construction<br>➢ Today's Goal<br>• Run through all 7 schemes | Record |

- Review and evaluate based on how they work and fit within their ed plan and specifications
- Goal is to get the revised schemes estimates in 3 weeks

➢ R-1 Four Walls
- Phasing
  - Site mobilization
  - Install modulars
  - Renovate west wing
  - Renovate center and east wings
  - Renovate pre-k
  - Renovate core area
  - Complete site work

➢ AR-2 Save the Core
- Phasing
  - Mobilize
  - Install modulars
  - Renovate center and west wings
  - Construct new 2-story west wing
  - Demolition of east wing and pre-k
  - Construction new center wing (core)
  - Renovation of existing “core block”
  - Demolition of remaining existing building
  - Complete site work

➢ AR-4 Out West
- Phasing
  - Site mobilization
  - Install modulars
  - Demolition of west wing
  - Construct new west wing
  - Renovate center and east wings of existing building
  - Renovate existing building “core” block
  - Complete site work

➢ N-1 The Piano
- Phasing
  - Site mobilization
  - Install modulars
  - Demolition of remaining existing building
  - Construct new building
  - Demolition of remaining existing building
  - Complete site work

➢ N-3 The Hub
- Phasing
  - Site mobilization
  - Install modulars
  - Demolition of remaining existing building
  - Construct new west wing
  - Relocate students to new building
  - Demolition of center and east wings of existing building

| | | |
|---|---|---|
| | ○ Relocate students to new building<br>○ Demolition of remaining existing building<br>○ Relocate students to new building<br>○ Demolition of remaining existing building<br>○ Construct new east wing<br>○ Complete site work<br>➢ N-8 Two Wings<br>• Phasing<br>○ Site mobilization<br>○ Install modulars<br>○ Demolition of center and east existing classroom wings<br>○ Construct south classroom wing and new "core" block<br>○ Demolition of remaining existing building<br>○ Construct new north classroom wing<br>○ Remove modulars<br>○ Complete site work<br>➢ N-9 The Hook<br>• Phasing<br>○ Mobilize<br>○ Construct new wing. New 2-story west wing<br>○ Construct new classroom wings<br>○ Relocate students to new construction<br>○ Remove modulars<br>○ Temporary connector from existing to new building<br>○ Demolition of art and music area<br>○ Construct new "core" bock<br>○ Demolition of remaining existing building<br>○ Complete site work | |
| 17.4 | <u>Scheme Update:</u> Once the SBC was provided with the scheme information the SBC discussed at length the pluses and minuses to each. A recap of the discussion is outlined below:<br><u>General Criteria</u>:<br>➢ JCJ to add an additional criteria to the evaluation matrix to consider how each scheme provides natural daylight<br>➢ For the remaining new construction schemes, JCJ to reconfigure the kitchen/cafeteria/gymnasium/stage spaces to allow the possibility for the gymnasium and cafeteria to open into each other<br>➢ The SBC would prefer avoiding having high noise impact spaces or activities away or buffered from classrooms<br>➢ The SBC would like to see a hybrid of N-3 and N-9<br>➢ The SBC would like to see a hybrid of N-1 and AR-2<br>➢ The SBC requested that vestibules be created at entryways to help minimize the impact of mud, grit and debris from entering the building<br>➢ The SBC requested that the preferred site would allow access for continued existing through Summer Street.<br><u>R-1 Four Walls</u>: | Record |

| | | |
|---|---|---|
| | ➢ This scheme will continue to be considered as the at least one renovation only scheme minimally required by MSBA<br>AR-2 Save the Core:<br>➢ The SBC would like to see the entire core block retained<br>➢ The SBC would like to see this scheme as a whole new construction scheme<br>AR-4 Out West<br>➢ A motion was made by C. Hay and seconded by 9 out of the 14 SBC members present to eliminate AR-4<br>N-1 The Piano<br>➢ The SBC was concerned about separating the public from the core spaces from the academic areas.<br>➢ The SBC was concerned about potential future expansion opportunities. JCJ noted that the scheme could be modified to allow potential expansion if a future third floor was added.<br>➢ The SBC liked this scheme because of costs associated and how compact the design was on the site.<br>N-3 The Hub<br>➢ The SBC would like to see relocating the program on the 2nd floor of the East Wing to the West Wing and eliminate the bridge.<br>➢ The SBC like this scheme because of the separation between the core and the academic areas.<br>N-8 Two Wings<br>➢ The SBC liked how the specialist classrooms were together<br>➢ A motion was made by A. Cameron and seconded by 8 out of 14 SBC members present to eliminate N-8<br>N-9 The Hook<br>➢ The SBC asked JCJ to consider moving the specialist rooms along of the spine and all of the classrooms in a cluster arrangement.<br>After discussion the SBC acknowledged that they eliminated two options, AR-4, and N-8, and to move forward with further development of R-1, AR-2, N-1, N-3, and N-9. JCJ will come back to the SBC on 1/22 with variations and reconfigurations based on the comments and votes received today. S. Brown states that a design working work was already established to include A. Oldeman, G. Brewster, C. Hay, R. Breuker, and G. Scharfe. The design working group was established to meet with the JCJ, and DWMP to provide the SBC with feedback based on their expertise as far as what options they believe should be moved forward with. The group will determine in the next couple of days what time in the next week will work to meet and discuss further. The design working group will present the SBC with their feedback and recommendation for our next SBC meeting. | |
| 17.5.1 | Invoices and Commitments for Approval: DWMP invoice no. 10 for OPM Feasibility services in the amount of $8,682.00 (invoice attached) vote expected. Motion made by C. Weld to approve invoice No. 10 in the amount of $8,682.00, 2nd by L. O'Donnell. Discussion: None. Vote: Unanimous to approve. | Record |
| 17.5.2 | Invoices and Commitments for Approval: JCJ invoice no. 5 for Designer Feasibility services in the amount of $24,285.00 (invoice attached) vote expected. Motion made by C. Weld to approve invoice no. 5 in the amount of $24,285.00 2nd by J. Foster. Discussion: None. Vote: Unanimous to approve. | Record |

| | | |
|---|---|---|
| 17.6 | Working Groups Update: Update was discussed above regarding design working group. No additional comments. | Record |
| 17.7 | Schedule/Look Ahead: S. Brown reviews the two-month look-ahead schedule noting upcoming working group, community meetings, and SBC meeting dates (backup attached).<br>➢ 1/22/18-SBC Meeting<br>➢ 1/31/18-Community Meeting No. 3<br>➢ 2/5/18-SBC Meeting<br>➢ 2/13/18-Joint SBC/SC Meeting (Approve PSR)<br>➢ 2/27/18-SBC Meeting | Record |
| 17.8 | Next Steps: J. LaPosta notes the next steps slide and discusses important upcoming dates. An outline of these discussion is below:<br>➢ 1/22/18-Design Update & Construction Delivery Method<br>➢ 1/31/18-Community Meeting<br>➢ 2/1/18-Review Cost Estimates<br>➢ 2/5/18-Select Preferred Option<br>➢ 2/13/18-Joint Committee Approval of PSR<br>➢ 2/21/18-Submit PSR to MSBA | Record |
| 17.9 | Next Meetings: The next SBC will be held Monday, January 22th at 7pm in the Manchester Essex Regional Middle/High School Library. | Record |
| 17.10 | Other Topics Not Reasonably Anticipated (48 hour prior to meeting): T. Virden discusses CM @ Risk topic. At our next SBC on 1/22/18, the CM @ Risk vs. DBB discussion will be held. T. Virden will not be at the 1/22 meeting, so wanted to voice his opinion regarding which option he preferred and recommended. Since T. Virden works for Windover Construction, and is in the industry, he recommends that the SBC highly considers using and moving forward with the CM @ Risk method. Since the site will be occupied during construction, has many constraints and setbacks, it is preferred to use. L. O'Donnell voices her agreement with T. Virden and also states that she would recommend using the CM @ Risk method. CM @ Risk vs. DBB construction delivery method will be discussed and an agenda item at our next SBC meeting scheduled for 1/22/18. | Record |
| 17.11 | Public Comment: Jenn a member from the public offered her opinion regarding the schemes shown this evening. It is her preference to consider N-3 The Hub. After speaking with many members of the MMES community, she feels that they would love this scheme since there is a central location to the core and small corridors making easy navigation. Jenn also states that many MMES community members feel that continued access to Summer Street allowing access to 127 is vital. Jenn states that further communication with the Manchester Mothers Club and Preschool Club will be vital in further development. | Record |
| 17.12 | Adjourn: A motion was made by J. Foster and seconded by T. Virden to adjourn the meeting. Discussion: None. Vote: Unanimous to approve. Meeting adjourned at 9:26 pm. | Record |

**Attached:**
*SBC Meeting Agenda, Sign In Sheet, SBC Meeting No. 17 1/10/18 Meeting Minutes, Manchester Memorial Elementary School Presentation 1/10/18, DWMP Invoice No. 10, JCJ Invoice No. 5*

**DORE AND WHITTIER MANAGEMENT PARTNERS, LLC.**



Christina Shefferman
Assistant Project Manager
Cc: Attendees, File

**The above is my summation of our meeting. If you have any additions and/or corrections, please contact me for incorporation into these minutes.**

## PRELIMINARY SCHEMATIC REPORT PHASE PROJECT MEETINGS

- November 28, 2017 – SBC Meeting #14
- December 4, 2017 – MEP Systems Sub-Committee Meeting
- December 12, 2017 – SBC Meeting #15
- December 18, 2017 – SBC Meeting #16
- January 10, 2018 – SBC Meeting #17
- January 22, 2018 – SBC Meeting #18
- January 31, 2018 – Community Meeting #3
- February 1, 2018 – SBC Meeting #19
- February 13, 2018 – Joint SBC and School Committee Meeting #1

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# AGENDA

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 1/22/2018 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | C.Shefferman |

1. Call to Order
2. Previous Topics & Approval of January 10, 2018 Meeting Minutes
   - 7.11 Site: Swing space availability (P. Beaudoin)
3. Invoices and Commitments for Approval
   - DWMP Amendment No. 1 in the amount of $7,040.00 (amendment attached). Vote expected.
4. Design Update (JCJ)
5. Evaluating The Options (JCJ)
6. CM @ Risk vs. DBB (vote anticipated) DWMP)
7. Working Group Update (DWMP)
8. Schedule/Look Ahead (DWMP)
9. Next Steps
10. Other Topics Not Reasonably Anticipated 48 hours prior to Meeting
11. Public Comments
12. Adjourn

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# MANCHESTER MEMORIAL ELEMENTARY SCHOOL

FEASIBILITY PHASE –
**SBC MEETING #18**
JANUARY 22ND, 2018



## TODAY'S AGENDA

# PROJECT UPDATE

# EVALUATING THE OPTIONS

# PROJECT UPDATE

## System Narratives are Available on Dropbox

## Design Sub-Committee Meeting 1/16

## Estimators Reviewing Materials



## EVALUATING THE OPTIONS

RECOMMENDED FOR FURTHER DEVELOPMENT

### R-1 FOUR WALLS



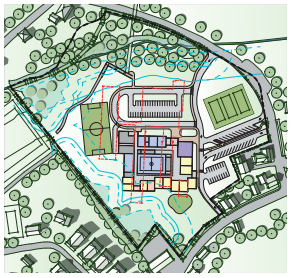
**RENOVATION ONLY**

### AR-2 SAVE THE CORE



**ADDITION/RENOVATION**
RETAIN CORE BLOCK ONLY

### N-1 THE PIANO



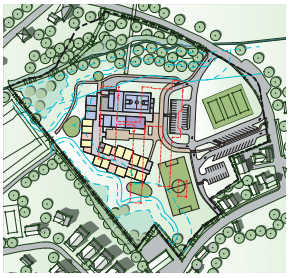
**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

### N-3 THE HUB



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

### N-9 THE HOOK



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

## **R-1** FOUR WALLS

**PHASE ONE**





## **R-1** FOUR WALLS

**PHASE TWO**



## **R-1** FOUR WALLS

**PHASE THREE**





## **R-1** FOUR WALLS

**PHASE FOUR**



# **R-1** FOUR WALLS




SITE PLAN

MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

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# **R-1** FOUR WALLS






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## **AR-2** SAVE THE CORE

**PHASE ONE**



NORTH



## **AR-2** SAVE THE CORE

**PHASE TWO**



NORTH

## **AR-2** SAVE THE CORE

**PHASE THREE**



NORTH



## **AR-2** SAVE THE CORE

**PHASE FOUR**



NORTH

## **AR-2** SAVE THE CORE

**PHASE FIVE**



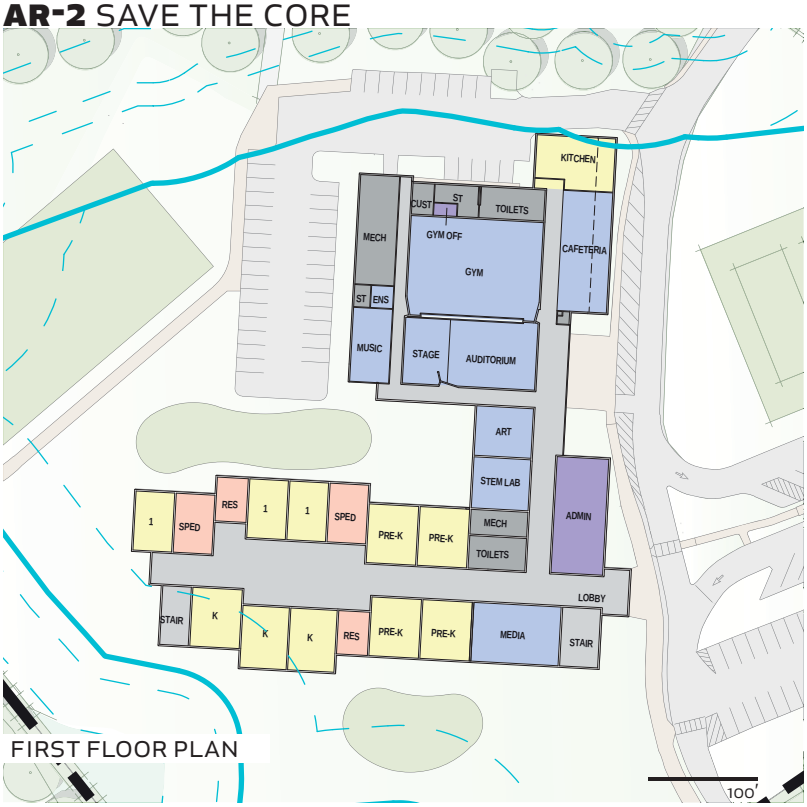
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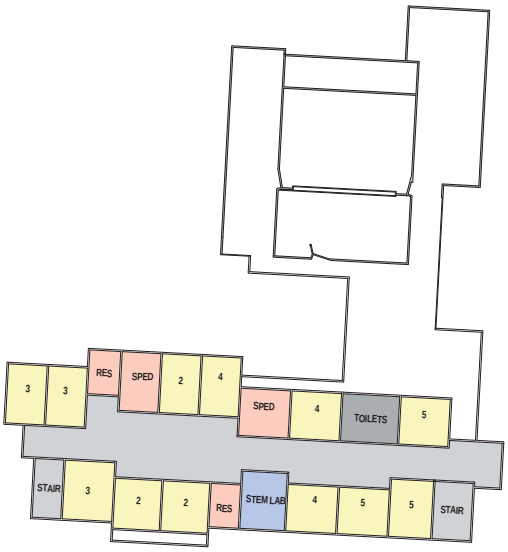
## **AR-2** SAVE THE CORE



## **AR-2** SAVE THE CORE




FIRST FLOOR PLAN




SECOND FLOOR PLAN

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

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## **N-1** THE PIANO

**PHASE ONE**



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## **N-1** THE PIANO

**PHASE TWO**



NORTH



## **N-1** THE PIANO

**PHASE THREE**



NORTH

## **N-1** THE PIANO



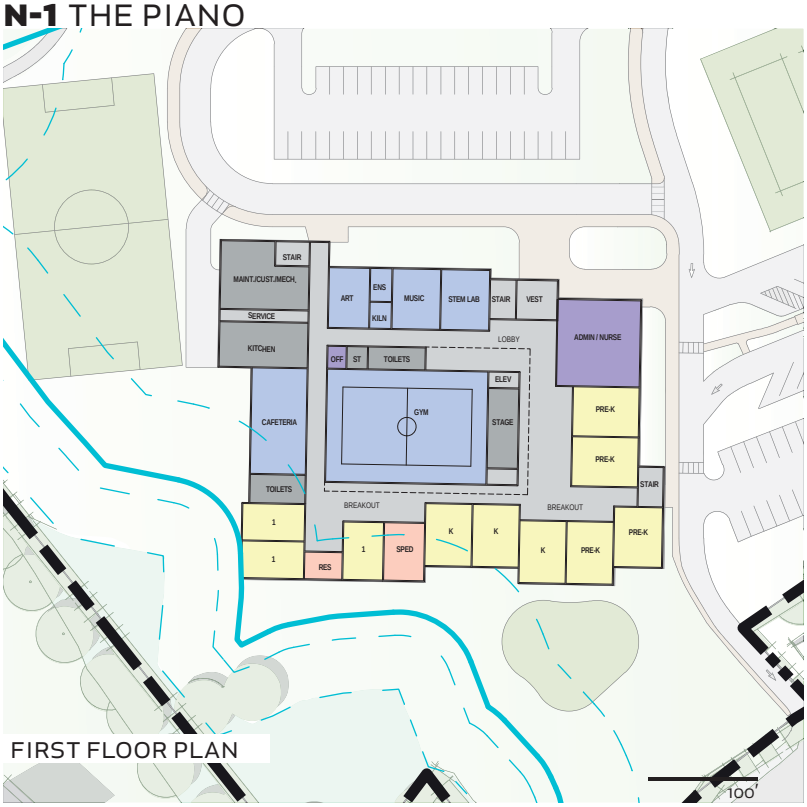

SITE PLAN

MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

## **N-1** THE PIANO




FIRST FLOOR PLAN




SECOND FLOOR PLAN

MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

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## **N-3** THE HUB

**PHASE ONE**



NORTH

MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

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## **N-3** THE HUB

**PHASE TWO**



NORTH

MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

## **N-3** THE HUB

**PHASE THREE**



NORTH



## **N-3** THE HUB

**PHASE FOUR**



NORTH

## **N-3** THE HUB

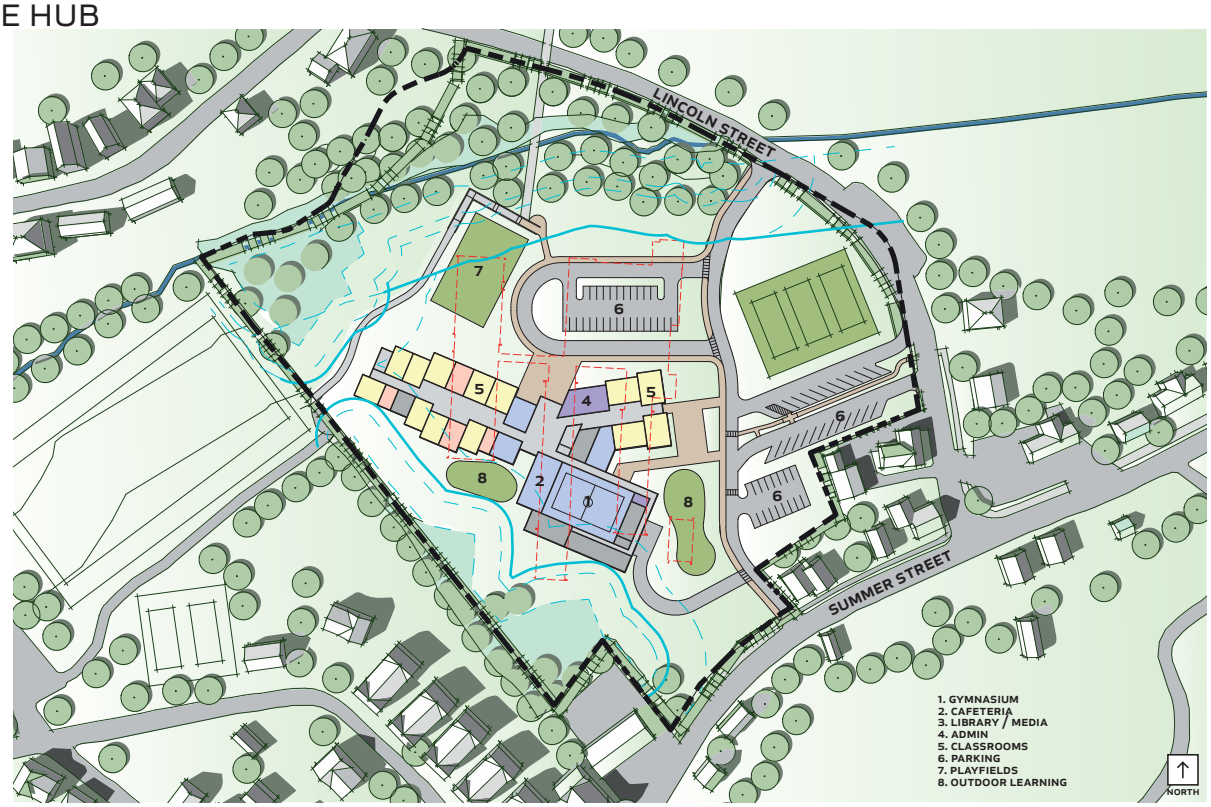
**PHASE FIVE**



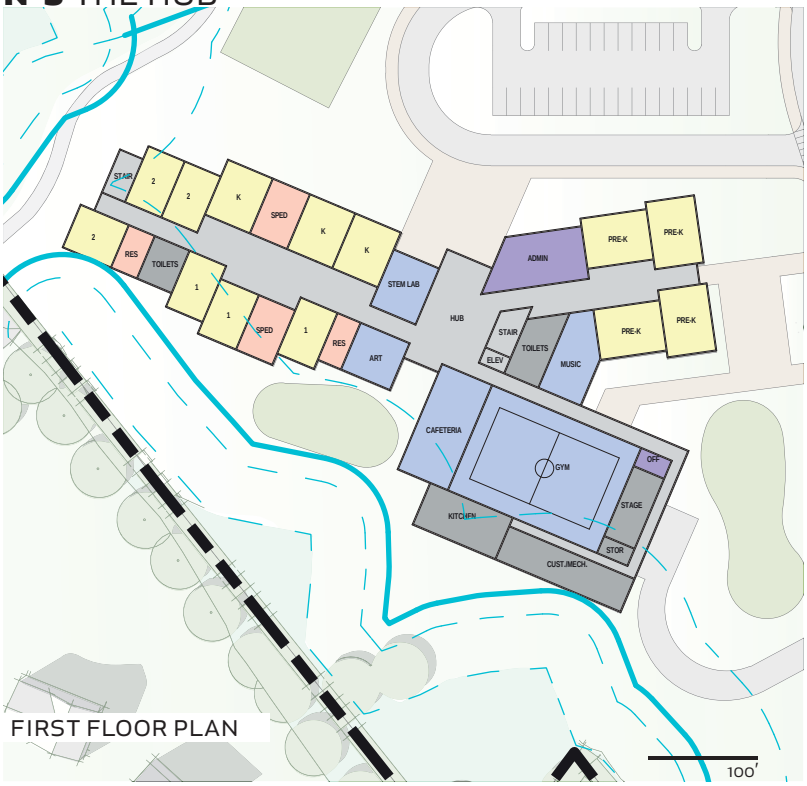
NORTH



## **N-3** THE HUB



## **N-3** THE HUB




FIRST FLOOR PLAN



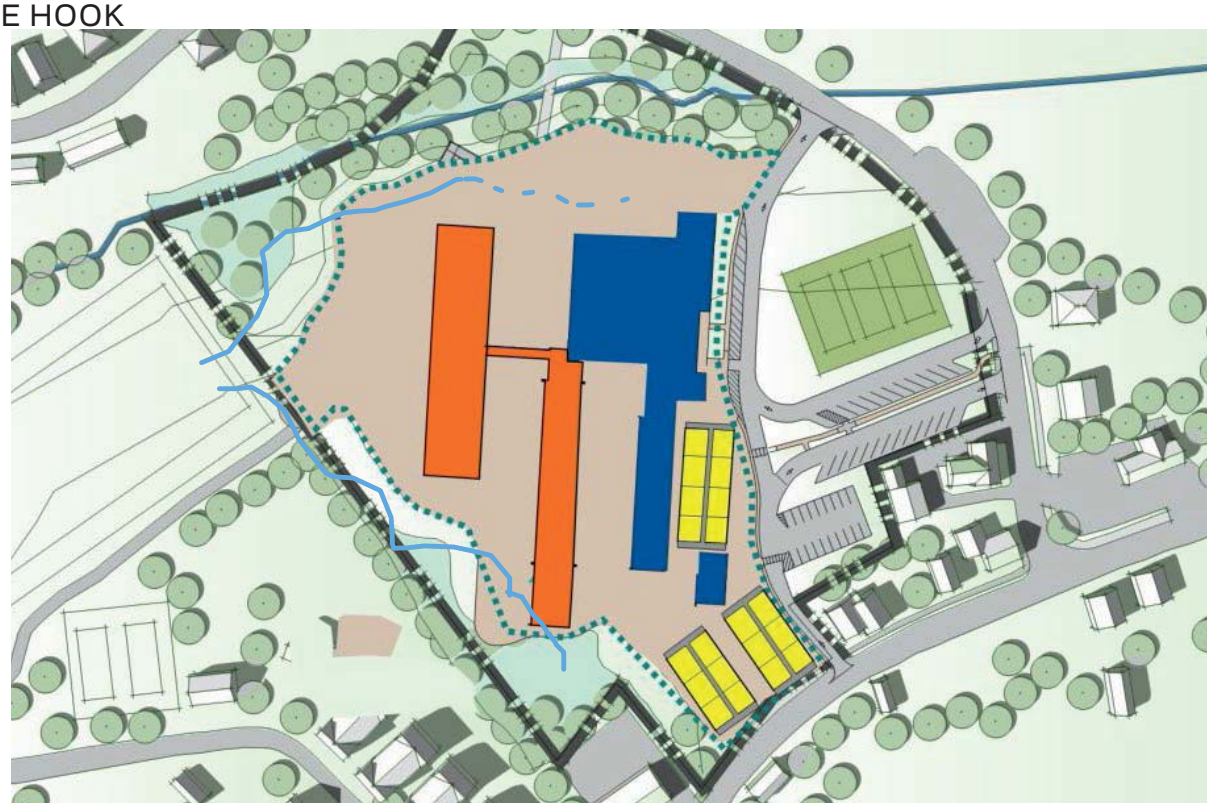

SECOND FLOOR PLAN

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

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## **N-9** THE HOOK

**PHASE ONE**



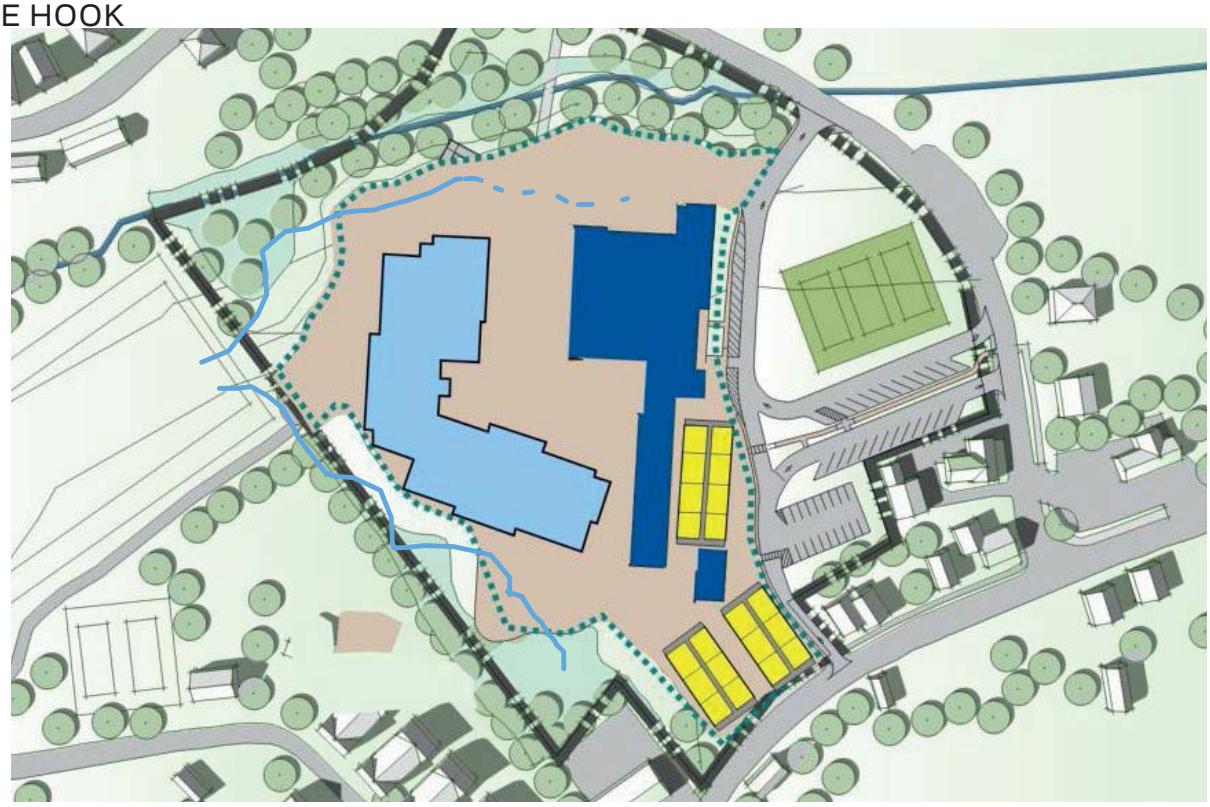
NORTH

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
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## **N-9** THE HOOK

**PHASE TWO**



NORTH



## **N-9** THE HOOK

**PHASE THREE**



NORTH

# **N-9** THE HOOK

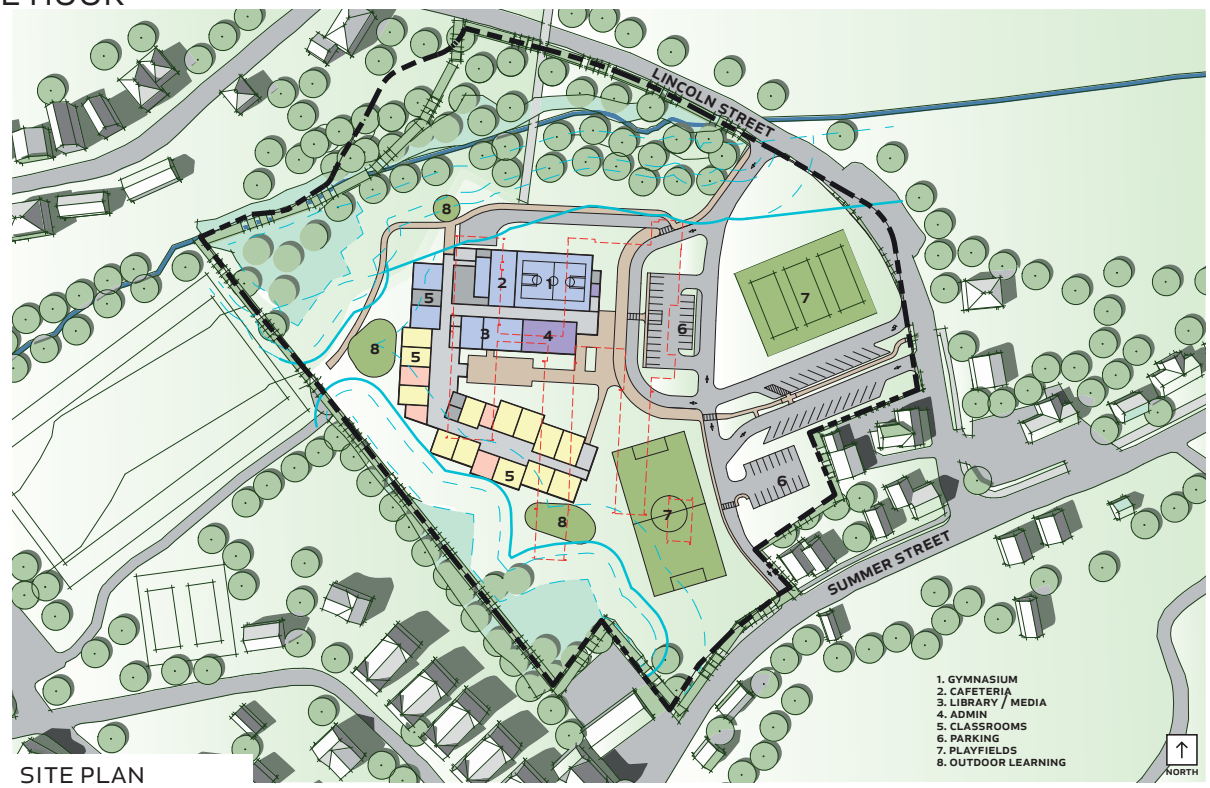
**PHASE FOUR**



NORTH

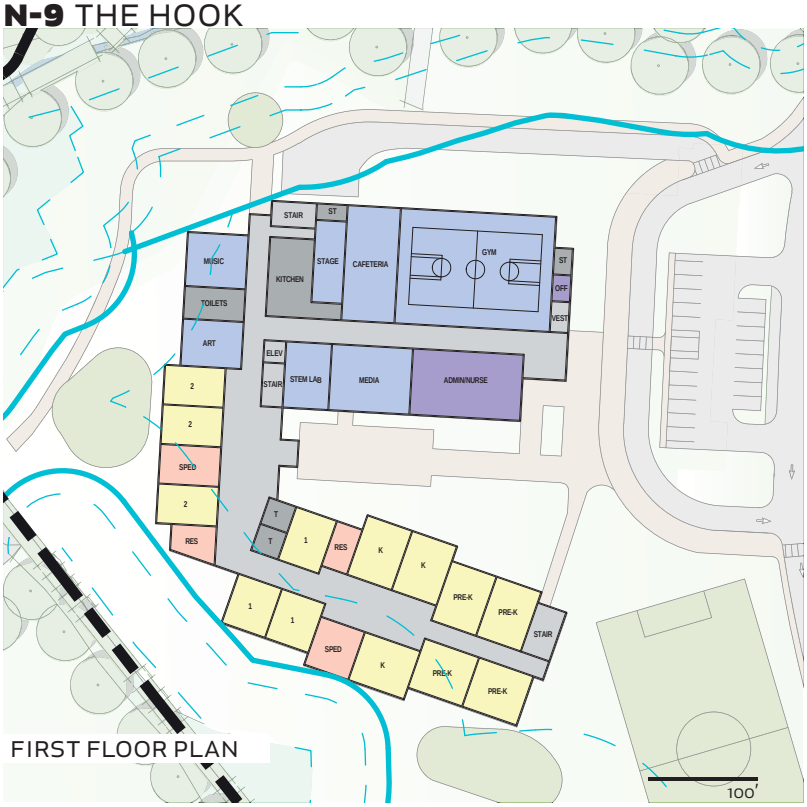


# **N-9** THE HOOK

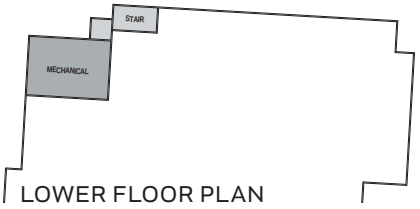



SITE PLAN

## **N-9** THE HOOK




FIRST FLOOR PLAN




LOWER FLOOR PLAN




SECOND FLOOR PLAN



## OPTION MATRIX

| | Option R-1 *"Four Walls"* | Option AR-2 *"Save the Core"* | Option N-1 *"The Piano"* | Option N-3 *"The Hub"* | Option N-9 *"The Hook"* |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Educational** | | | | | |
| Meets District's Space Program Goals | ○ | ○ | ● | ● | ● |
| Provides Flexibility for Future Building Expansion | ○ | ◉ | ○ | ● | ● |
| Flexibility for Grade Level Re-Configuration (Bubble Grades) | ◉ | ● | ● | ● | ◉ |
| Minimizes Impact to Students During Construction | ◉ | ◉ | ○ | ● | ◉ |
| Provides Separated Whole School Gathering Space | ● | ● | ○ | ● | ○ |
| **Community** | | | | | |
| Provides Independent Access to Community Used Space | ● | ● | ○ | ● | ● |
| Allows for Competition Size Gym with Bleachers | ○ | ○ | ● | ● | ● |
| **Site** | | | | | |
| Increases Amount of Play Areas/ Fields | ◉ | ● | ● | ◉ | ● |
| Welcoming Street Presence | ◉ | ◉ | ● | ● | ● |
| Improves Parent Drop-Off/ Pick-Up Queuing | ◉ | ◉ | ● | ● | ● |
| Improves Impact to Riverfront Resource Areas | ◉ | ◉ | ● | ● | ◉ |
| Minimizes Potential Pedestrian/ Vehicular Conflicts | ◉ | ◉ | ● | ● | ● |
| **Building** | | | | | |
| Optimizes Building Area to Perimeter Ratio | ○ | ○ | ● | ● | ◉ |
| **Costs and Schedule** | | | | | |
| Relative Capital Costs | $ 25,4 M * | $ 43.6 M * | $ 45.6 M * | $ 45.6 M * | $ 45.6 M * |
| Minimizes Number of Phases | 3 Reno | 3 Demo/ 3 Const | 2 Demo / 1 Const | 3 Demo/ 3 Const | 3 Demo/ 2 Const |

# NEXT STEPS

| | |
|---|---|
| **1/31** | Community Meeting |
| **2/1** | Review Cost Estimates |
| **2/5** | Select Preferred Option |
| **2/13** | Joint Committee Approval of PSR |
| **2/21** | Submit PSR to MSBA |



# THANK YOU

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS
JCJARCHITECTURE

# MEETING MINUTES

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 1/22/2018 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | C.Shefferman |

| Present | Name | Affiliation | Present | Name | Affiliation |
|---|---|---|---|---|---|
| ✓ | Caroline Weld * | SBC Co-Chair | ✓ | Jim LaPosta | JCJ |
| ✓ | Ann Cameron * | SBC Co-Chair | ✓ | Daniel Ruiz | JCJ |
| ✓ | Pam Beaudoin * | Superintendent | ✓ | Lauren Braren | JCJ |
| ✓ | Avi Urbas * | Dir. of Fin. & Ops | | Emily Czarnecki | JCJ |
| ✓ | Alva Ingaharro * | Essex | ✓ | Mike Burton | DWMP |
| ✓ | John Willis * | Principal MMES | ✓ | Steven Brown | DWMP |
| ✓ | Jay Pagliarulo | Dir. of Facilities | ✓ | Christina Shefferman | DWMP |
| ✓ | Andy Oldeman * | Man. Fin. Comm. | | | |
| | Lisa O'Donnell * | Essex B.O.S. | | | |
| ✓ | Remko Brueker * | Manchester | | | |
| ✓ | Adam Zaiger * | Manchester | | | |
| | Tyler Virden * | Essex | | | |
| ✓ | George Scharfe * | Manchester | | | |
| ✓ | Gordon Brewster * | Manchester | | | |
| ✓ | Charlie Hay * | Essex | | | |
| | Sarah Creighton * | Manchester | | | |
| | Maggie Tomaiolo * | Essex | | | |
| ✓ | Jake Foster * | Essex | | | |

**Action Items:**

| Item No. | Responsible Party: | Description |
|---|---|---|
| 7.11 | P. Beaudoin | Site: Swing space availability |

** SBC Voting Member*

MANAGEMENT PARTNERS, LLC

PROJECT MANAGERS
ARCHITECTS

Newburyport, MA 01950
260 Merrimac Street Bldg 7
978.499.2999 ph
978.499.2944 fax

www.doreandwhittier.com

| Item No. | Description | Action |
|---|---|---|
| 18.1 | Call to Order: 7:06 pm meeting was called to order by the SBC Co-Chair Ann Cameron with 13 of 17 voting members in attendance. S. Brown of DWMP notes the meeting will follow the Power Point presentation that is being projected on the screen and to follow the agenda that was provided to the SBC prior to the meeting via Dropbox. | Record |
| 18.2.1 | Previous Topics & Approval of January 10, 2018 Meeting Minutes: S. Brown explains and reviews the one previous item requiring action. A review of the item is noted below. | Record |
| 7.11 | Site Understanding: (For previous history of this item, refer to previous meeting minutes)<br><br>…Additional details and follow up will be provided to the SBC at our next meeting.<br>11/14/2017: P. Beaudoin states that she has a meeting scheduled with the Mayor of the Town of Beverly on 11/20/17. P. Beaudoin is also in communication with St. Mary's in Beverly, and is waiting for a formal response from the school on whether it will fit the needs of MMES. P. Beaudoin is still waiting to hear from Father Jim in Gloucester. P. Beaudoin will continue to pursue these options and will report back to the SBC once she has additional information.<br>11/28/2017: P. Beaudoin states that there are still 3 possible options. Briscoe School in Beverly, The Cummings Center in Beverly, and St. Mary's in Beverly. P. Beaudoin met with officials from Beverly's mayor office, and is waiting to hear whether they would be willing to wait a year before someone would possibly occupy the school. The Cummings Center approached P. Beaudoin and stated that they might have an option that would fit their needs. The Cummings Center is working on putting together a quote and space availability between their many available spaces. P. Beaudoin is still waiting to hear if St. Mary's can provide an estimate for the space. After discussion, the SBC agreed that overall, they would steer towards an option that can either have kids on site or off site based on phasing, modulars, and or an offsite temporary campus. P. Beaudoin to continue development of potential swing spaces.<br>12/12/2017: P. Beaudoin states Cummings Properties has confirmed that they have nothing that fits the District's space needs for the time frame needed. No update from Gloucester or St. Mary's prospect at this time.<br>12/18/2017: No update at this time.<br>1/10/2018: No update at this time.<br>1/22/2018: No update at this time. | P. Beaudoin |
| 18.2.2 | Previous Topics & Approval of January 10, 2018 Meeting Minutes: A motion to approve the 1/10/2018 meeting minutes as submitted made by C. Hay and seconded by C. Weld. Discussion: None. Vote: All in favor w G. Scharfe and A. Ingaharro abstaining. Motion passes, minutes approved. | Record |
| 18.3 | Invoices and Commitments for Approval: DWMP amendment No. 1 for OPM additional services in the amount of $7,040.00 (amendment attached) vote expected. Motion made by G. Scharfe to approve amendment No. 1 in the amount of $7,040.00, 2nd by A. Ingaharro Discussion: None. Vote: Unanimous to approve. | Record |
| 18.4 | Design Update: J. Laposta provides the SBC with a design/project update. JCJ reminds the SBC that the systems narratives for MEP, site, structure, etc. are available on the team dropbox for viewing. A design sub-committee meeting was held on 1/16/18. During the | Record |

| | | |
|---|---|---|
| | meeting the group provided JCJ with feedback on the current schemes and potential changes that could be made to help the process of elimination. Tonight JCJ will be presenting the revised schemes for review. Currently the schemes are being evaluated and estimated by both JA Associates, and PM&C. These estimates for all schemes will be included in the PSR submission. | |
| 18.5.1 | Evaluating the Options: L. Braren from JCJ presents the SBC with the revised plans and development to the 5 schemes. An outline of the discussion is below:<br>➢ R-1-Four Walls<br>• There are still 4 phases to this scheme. No changes have been made since the last meeting.<br>➢ AR-2-Save the Core<br>• The music room and media center have been added back into the core/renovation.<br>• Additional parking, queueing decreased.<br>• Same gymnasium and auditorium footprint.<br>➢ N-1-The Piano<br>• Main road shifted, provided additional queueing and increased parking.<br>• New playfield, not full sized<br>• Potential for a separate gym entrance<br>• Maintain lightwell around the gymnasium for added light in the core.<br>• A. Ingaharro asked whether the stage could be flipped and be on the other side of the gym to be closer to cafeteria. J. Braren to confirm.<br>➢ N-3-The Hub<br>• Reduced amount of phasing<br>• Reduced size of the hub<br>• Additional parking and queueing<br>• Potential to add wing into 3 floors<br>➢ N-9-The Hook<br>• Additional modulars needed due to wetlands.<br>• Without a gym during one of the phases<br>• Additional parking and queueing | L. Braren |
| 18.5.2 | Evaluating the Options: After presenting the phasing changes to the SBC, JCJ presents a revised option matrix. JCJ reminds the SBC that no decisions need to be made tonight. The SBC discussed all options, a recap of the discussion is below:<br>➢ R-1: it's the existing building, the community will not understand why it's the same school when its inefficient and over 50 years old.<br>➢ AR-2: doesn't improve queueing, same size gym, won't fit the program.<br>➢ N-1: no separate community access from the learning spaces<br>➢ N-3: fits well within the neighborhood, separate access from community wing and learning spaces, potential for additional 3rd floor on west wing for growth.<br>➢ N-9: gym in front of building which is a large space to see when you first enter site and see building.<br>J. Laposta states that at our next meeting, 2/1/2018, the SBC will be presented with an updated matrix, as well as estimates for all 5 schemes. Following the 2/1/2018 meeting, another meeting is scheduled for 2/5/2018 to select one scheme for PSR submittal. If both 2/1/2018 and 2/5/2018 can be combined, then we will not need to meet on 2/5/2018. | Record |

| | | |
|---|---|---|
| 18.6.1 | CM @ Risk vs. DBB: S. Brown discusses the CM @ Risk vs. DBB slides. A recap of the discussion is below:<br>➢ Design-Bid-Build: MGL Chapter 149<br>• You are purchasing a building in accordance with plans and specifications<br>• Facts:<br>o Selection is bid based<br>o Designed to 100% construction documents: no contractor involvement<br>o Bids solicited from general contractors & trade contractors<br>o Contract value based on "lump sum" amount<br>o "Closed book" construction budget accounting<br>• Advantages:<br>o Familiar delivery method<br>o Simple process to manage<br>o Lowest price proposed & accepted<br>o Simple accounting<br>• Disadvantages<br>o Linear process: may mean longer schedule durations<br>o Full cost not known until bids received; may require re-design/re-bid<br>o GC project management is minimal<br>o Increased probability of disputes/claims<br>o No GC input in design, planning or budgeting<br>➢ CM @ Risk: MGL Chapter 149a<br>• You are hiring a professional service firm that manages the construction of buildings<br>• Facts<br>o Selection is qualified, AND cost based<br>o CM provides pre-construction & construction services<br>o CM participates in the sub-contractor prequalification's process<br>o Option for early release bid packages or "fast-track" schedules<br>o Contract value based on "Guaranteed Maximum Price"<br>o "Open book" construction budget accounting<br>• Advantages:<br>o Qualifications based selection<br>o The builder assists with budgeting logistics & constructability<br>o Fast track scheduling possible<br>o CM joins the "Team"<br>o Negotiations and "Team" atmosphere reduces likelihood of claims<br>• Disadvantages<br>o Requires OPM/Design team to be familiar with GMP model<br>o Higher upfront costs<br>o Potential additional costs related to early bid packages<br>o May be difficult to determine if best price is achieved<br>➢ CM @ Risk vs DBB comparisons:<br>• DBB:<br>o Lowest theoretical cost<br>o Builder selected on cost only | Record |

| | | |
|---|---|---|
| | ○ Traditional, simple procurement<br>• CM @ Risk:<br>○ Fast track scheduling available<br>○ Flexibility to deal with unforeseen conditions<br>○ Flexibility in occupied, multi-phases renovations<br>○ Schedule driven, non-negotiable occupancy date<br>○ Builder selected on qualifications & cost | |
| 18.6.2 | CM @ Risk vs. DBB: After review, the SBC discussed and outlined pluses and minuses to both options. A motion was made by G. Scharfe and seconded by A. Oldeman to approve the CM @ Risk Construction Delivery Method. Discussion: P. Beaudoin asks whether any SBC designer members have any additional opinion? C. Hay states due to the complexity of the site, size and logistics CM @ Risk is the preferred method. All in favor: Unanimous, vote passes. | Record |
| 18.7 | Working Groups Update: P. Beaudoin states post cards will be sent out 1/23/2018 regarding community meeting no. 3. The district has pushed heavy on social media, and on the website. | Record |
| 18.8 | Schedule/Look Ahead: S. Brown reviews the two-month look-ahead schedule noting upcoming working group, community meetings, and SBC meeting dates (backup attached).<br>➢ 1/31/18-Community Meeting No. 3<br>➢ 2/5/18-SBC Meeting<br>➢ 2/13/18-Joint SBC/SC Meeting (Approve PSR)<br>➢ 2/27/18-SBC Meeting | Record |
| 18.9 | Next Steps: J. LaPosta notes the next steps slide and discusses important upcoming dates. An outline of these discussion is below:<br>➢ 1/31/18-Community Meeting<br>➢ 2/1/18-Review Cost Estimates<br>➢ 2/5/18-Select Preferred Option<br>➢ 2/13/18-Joint Committee Approval of PSR<br>➢ 2/21/18-Submit PSR to MSBA | Record |
| 18.10 | Next Meetings: The next SBC will be held Thursday, February 1st at 7pm in the Manchester Essex Regional Middle/High School Library. | Record |
| 18.11 | Other Topics Not Reasonably Anticipated (48 hour prior to meeting): None. | Record |
| 18.12 | Public Comment: None. | Record |
| 18.13 | Adjourn: A motion was made by J. Foster and seconded by A. Ingaharro to adjourn the meeting. Discussion: None. Vote: Unanimous to approve. Meeting adjourned at 8:59 pm. | Record |

**Attached:**
*SBC Meeting Agenda, Sign In Sheet, SBC Meeting No. 18 1/10/18 Meeting Minutes, Manchester Memorial Elementary School Presentation 1/22/18, DWMP Amendment No. 1*

**DORE AND WHITTIER MANAGEMENT PARTNERS, LLC.**



Christina Shefferman
Assistant Project Manager
Cc: Attendees, File

**The above is my summation of our meeting. If you have any additions and/or corrections, please contact me for incorporation into these minutes.**

## PRELIMINARY SCHEMATIC REPORT PHASE PROJECT MEETINGS

- November 28, 2017 – SBC Meeting #14
- December 4, 2017 – MEP Systems Sub-Committee Meeting
- December 12, 2017 – SBC Meeting #15
- December 18, 2017 – SBC Meeting #16
- January 10, 2018 – SBC Meeting #17
- January 22, 2018 – SBC Meeting #18
- January 31, 2018 – Community Meeting #3
- February 1, 2018 – SBC Meeting #19
- February 13, 2018 – Joint SBC and School Committee Meeting #1

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# MANCHESTER MEMORIAL ELEMENTARY SCHOOL

FEASIBILITY PHASE –
**COMMUNITY MEETING #3**
JANUARY 31ST, 2018



## TODAY'S AGENDA

- WELCOME
- ORGANIZATION / PROJECT TEAM
- PROCESS & SCHEDULE
- OPTIONS EXPLORED
- FEEDBACK EXERCISE
- DISCUSSION
- NEXT STEPS

# THE SCHOOL DISTRICT'S PROCESS

## Began with three schools in need



**MIDDLE HIGH SCHOOL**
COMPLETED 2009



**MEMORIAL ELEMENTARY SCHOOL**
IN PROCESS (YOU ARE HERE)



**ESSEX ELEMENTARY SCHOOL**
NEXT STEP





# THE SCHOOL DISTRICT'S PROCESS

**Effort began in 2013 with an Elementary School Facilities Needs Assessment Report by Habeeb & Associates & Elementary Facilities Task Force and Community Survey**

**SOIs Submitted to MSBA for both Memorial and Essex Elementary Schools in January 2015**

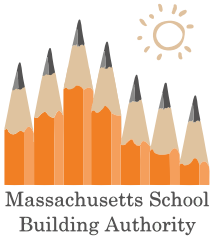
# THE SCHOOL DISTRICT'S PROCESS

**January 2016**
**Memorial Elementary Accepted into MSBA's Eligibility Phase**

**September 2016**
**Accepted into Feasibility Phase**











JCJARCHITECTURE

## ORGANIZATION & PROJECT TEAM

# MEMORIAL SCHOOL BUILDING COMMITTEE

Local committee recognized by the MSBA to oversee the design and construction of public school facilities

**Caroline Weld** CO-CHAIR
**Ann Cameron** CO-CHAIR
**Pam Beaudoin** SUPERINTENDENT
**Avi Urbas**
**Alva Ingaharro**
**John Willis**
**Jay Pagliarulo**
**Andy Oldeman**
**Lisa O'Donnell**
**Remko Brueker**
**Adam Zaiger**
**Tyler Virden**
**George Scharfe**
**Gordon Brewster**
**Charlie Hay**
**Sarah Creighton**
**Maggie Tomaiolo**
**Jake Foster**



## ORGANIZATION & PROJECT TEAM

# DORE & WHITTIER MANAGEMENT PARTNERS

Owner's Project Manager acts as the District's representative and is responsible for managing the project from design through construction.

**Michael Burton** PROJECT DIRECTOR
**Steve Brown** PROJECT MANAGER
**Christina Shefferman** ASSISTANT PROJECT MANAGER

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS
JCJARCHITECTURE

## ORGANIZATION & PROJECT TEAM

**JCJ**ARCHITECTURE

Design team which includes a variety of Architectural and engineering consultants.
Responsible for developing the building design.

**Jim LaPosta** PRESIDENT / PRINCIPAL-IN-CHARGE
**Daniel Ruiz** SENIOR PROJECT MANAGER
**Lauren Braren** SENIOR PROJECT ARCHITECT
**Emily Czarnecki** SENIOR INTERIOR DESIGNER



## ORGANIZATION & PROJECT TEAM

Massachusetts School Building Authority

THE MASSACHUSETTS SCHOOL BUILDING AUTHORITY

**A State Agency Created to Reform Funding of Capital Improvement in the Commonwealth's Public Schools**

They Support the Design and Construction of Educationally Appropriate, Flexible, Sustainable and Cost-Effective Schools

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
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JCJARCHITECTURE

# FEASIBILITY PHASE SCHEDULE

| NOVEMBER 22ND 2017 | FEBRUARY 21ST 2018 | APRIL 10TH 2018 | JULY 10TH 2018 | AUGUST 29TH 2018 | NOVEMBER 2018 |
|---|---|---|---|---|---|
| PRELIMINARY DESIGN PROGRAM | PREFERRED SCHEMATIC REPORT | MSBA REVIEW PERIOD | SCHEMATIC DESIGN | MSBA REVIEW PERIOD | LOCAL APPROVALS |
| MODULE 3 | | | MODULE 4 | | MODULE 5 |

## Community Input is Important Throughout the Process



PROCESS & SCHEDULE

# FEASIBILITY PHASE PROCESS

| NOVEMBER 22ND 2017 | FEBRUARY 21ST 2018 | APRIL 10TH 2018 | JULY 10TH 2018 | AUGUST 29TH 2018 | NOVEMBER 2018 |
|---|---|---|---|---|---|
| (PDP) | (PSR) | | (SD) | | |
| PRELIMINARY DESIGN PROGRAM | PREFERRED SCHEMATIC REPORT | MSBA REVIEW PERIOD | SCHEMATIC DESIGN | MSBA REVIEW PERIOD | LOCAL APPROVALS |
| Identify the Issues/ Articulate the Educational Plan<br>Select Site<br>List Options to be Studied in PSR | Evaluate the Site & Building Options<br>Select a Preferred Option | Approve Preferred Option and Authorize SD | Develop Schematic Drawings and Specifications to Establish the Project Budget | Approve SD Scope and Budget<br>Finalize Reimbursement Rate | Seek Local Funding Approval in Essex & Manchester-by-the-Sea |

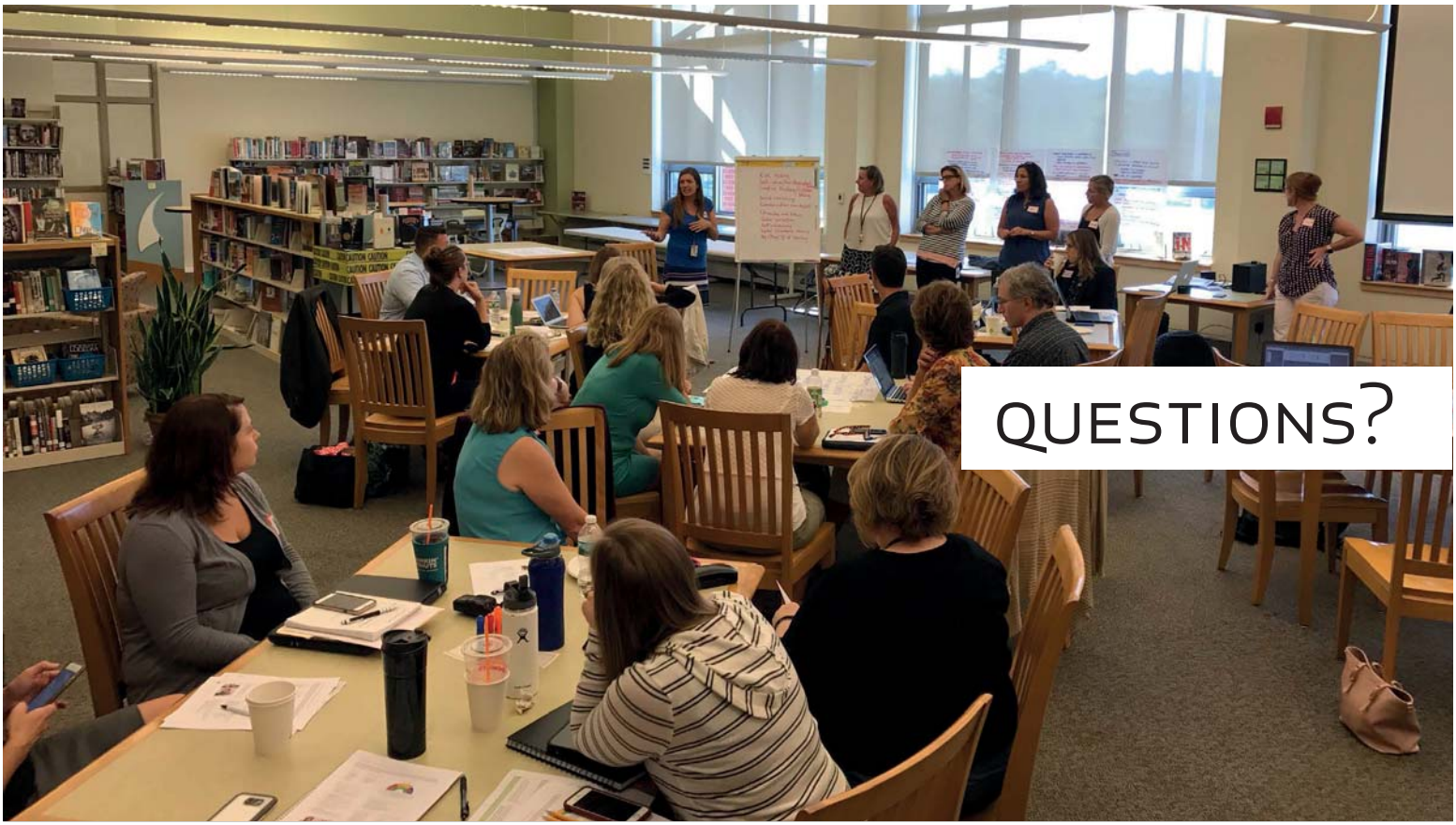
## If Project is Approved: Proceed to Detailed Design and Construction

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# FEASIBILITY PHASE ACCOMPLISHMENTS

- ✓ **Building Existing Conditions Survey**
  Architectural / Structural / Mechanical / Electrical/ Plumbing-Fire Protection / Technology
- ✓ **Site Survey**
- ✓ **Wetlands Delineation**
- ✓ **Geotechnical Investigation**
- ✓ **Hazardous Materials Survey**
- ✓ **Phase I Environmental Report**
- ✓ **Traffic Impact Analysis**
- ✓ **Educational Visioning Sessions (2)**
- ✓ **Building Committee Mtgs (18)**
- ✓ **Community Meetings (3)**
- ✓ **Various Sites Considered (7)**
- ✓ **Schemes Developed (14)**
- ✓ **Building Systems Considered**
- ✓ **Preliminary Design Program Submitted**
- ○ **Preferred Schematic Design**





## OPTIONS EXPLORED





## EVALUATING THE OPTIONS

# THE MSBA REQUIRES THREE OPTIONS TO BE CONSIDERED

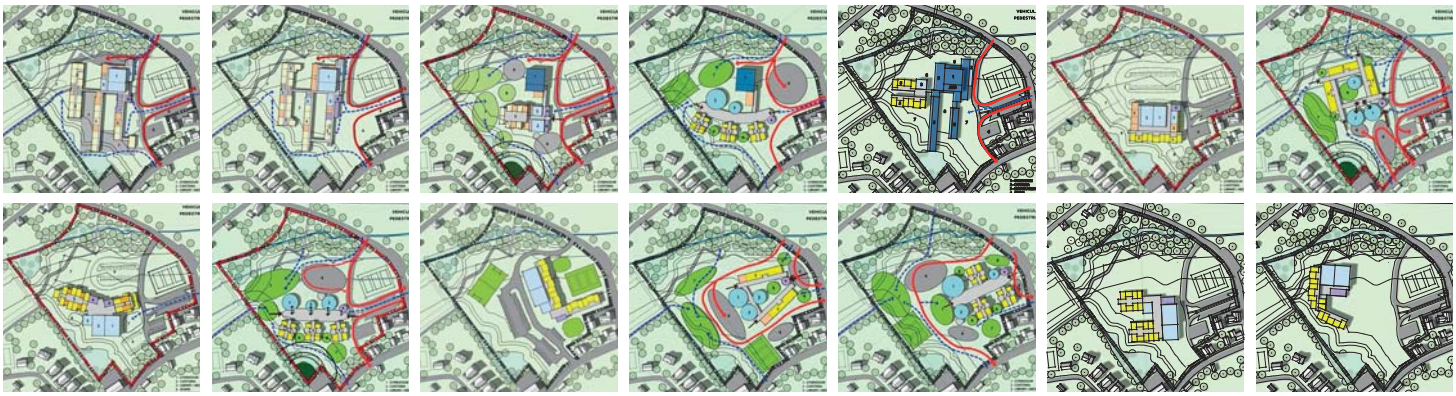
**Renovation Only**

**Addition/Renovation**

**New Construction**

## EVALUATING THE OPTIONS

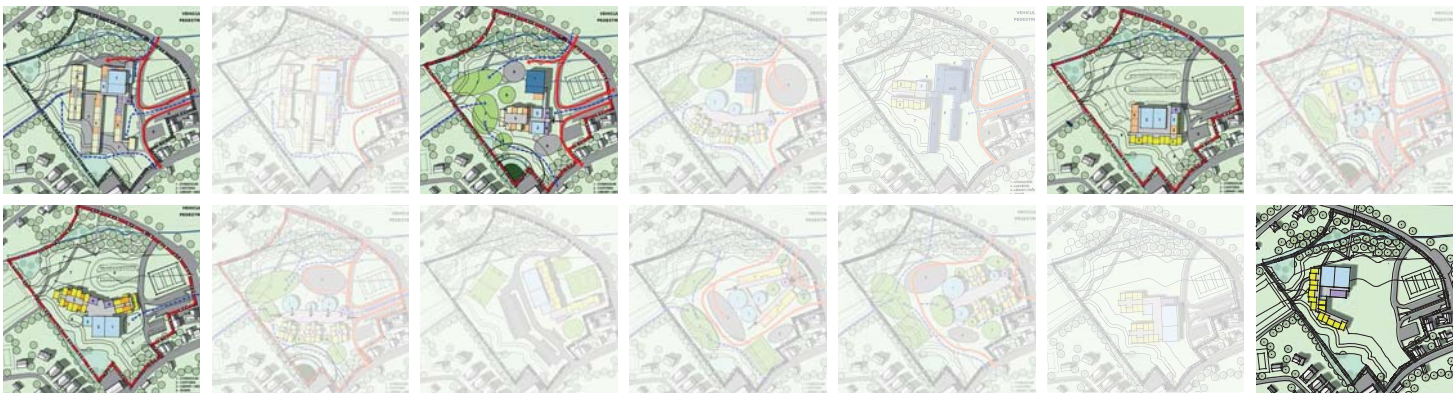
# 14 SCHEMES WERE CONSIDERED





## EVALUATING THE OPTIONS

# FIVE RECOMMENDED FOR FURTHER DEVELOPMENT



MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

DLW JCJARCHITECTURE

# EVALUATING THE OPTIONS

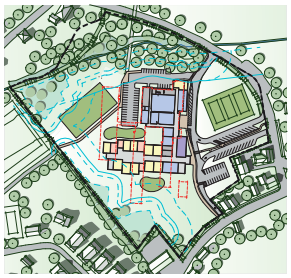
RECOMMENDED FOR FURTHER DEVELOPMENT

## R-1



RENOVATION ONLY

## AR-2



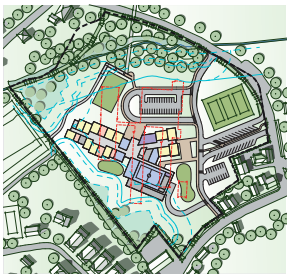
ADDITION/RENOVATION

## N-1



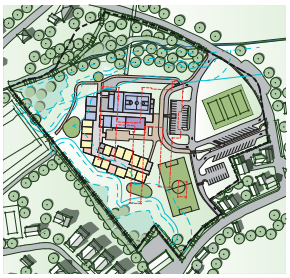
NEW CONSTRUCTION

## N-3



NEW CONSTRUCTION

## N-9



NEW CONSTRUCTION



# EVALUATING THE OPTIONS

| | Option R-1 *"Four Walls"* | Option AR-2 *"Save the Core"* | Option N-1 *"The Piano"* | Option N-3 *"The Hub"* | Option N-9 *"The Hook"* |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Educational** | | | | | |
| Meets District's Space Program Goals | | | | | |
| Provides Flexibility for Future Building Expansion | | | | | |
| Flexibility for Grade Level Re-Configuration (Bubble Grades) | | | | | |
| Minimizes Impact to Students During Construction | | | | | |
| Provides Separated Whole School Gathering Space | | | | | |
| **Community** | | | | | |
| Provides Independent Access to Community Used Space | | | | | |
| Allows for Competition Size Gym with Bleachers | | | | | |
| **Site** | | | | | |
| Increases Amount of Play Areas/ Fields | | | | | |
| Welcoming Street Presence | | | | | |
| Improves Parent Drop-Off/ Pick-Up Queuing | | | | | |
| Improves Impact to Riverfront Resource Areas | | | | | |
| Minimizes Potential Pedestrian/ Vehicular Conflicts | | | | | |
| **Building** | | | | | |
| Optimizes Building Area to Perimeter Ratio | | | | | |
| **Costs and Schedule** | | | | | |
| Relative Capital Costs | | | | | |
| Minimizes Number of Phases | | | | | |

# PREFERRED SCHEMATIC REQUIREMENTS

## General Site Layout

## Floor Plan Diagram

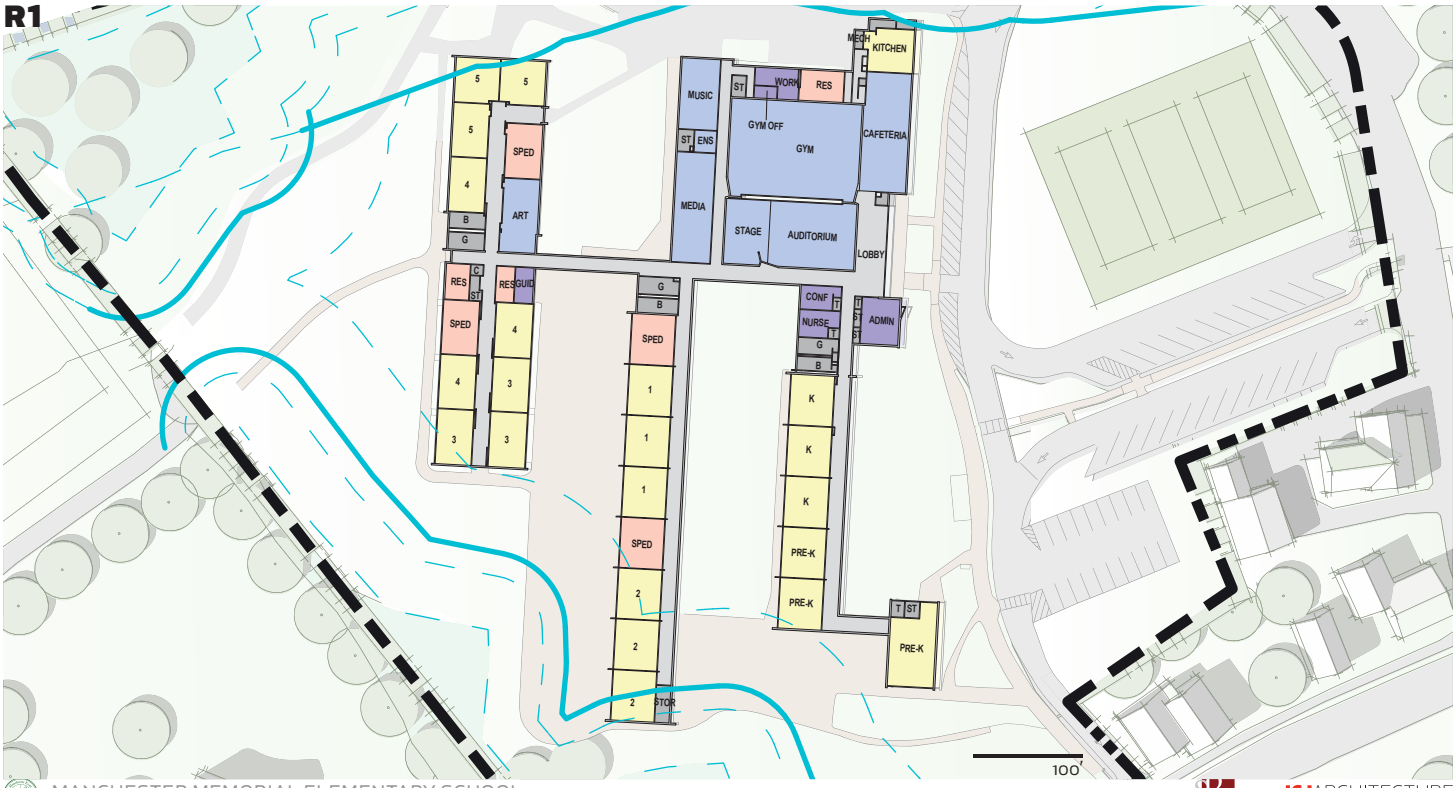


**R1**




SITE PLAN

**R1**




MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

**AR-2**



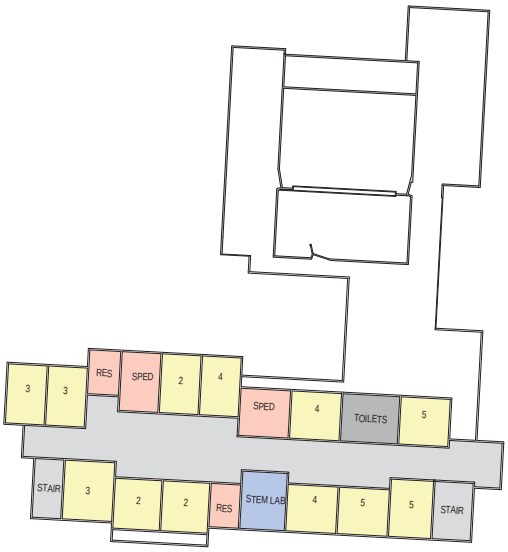

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

## AR-2




FIRST FLOOR PLAN

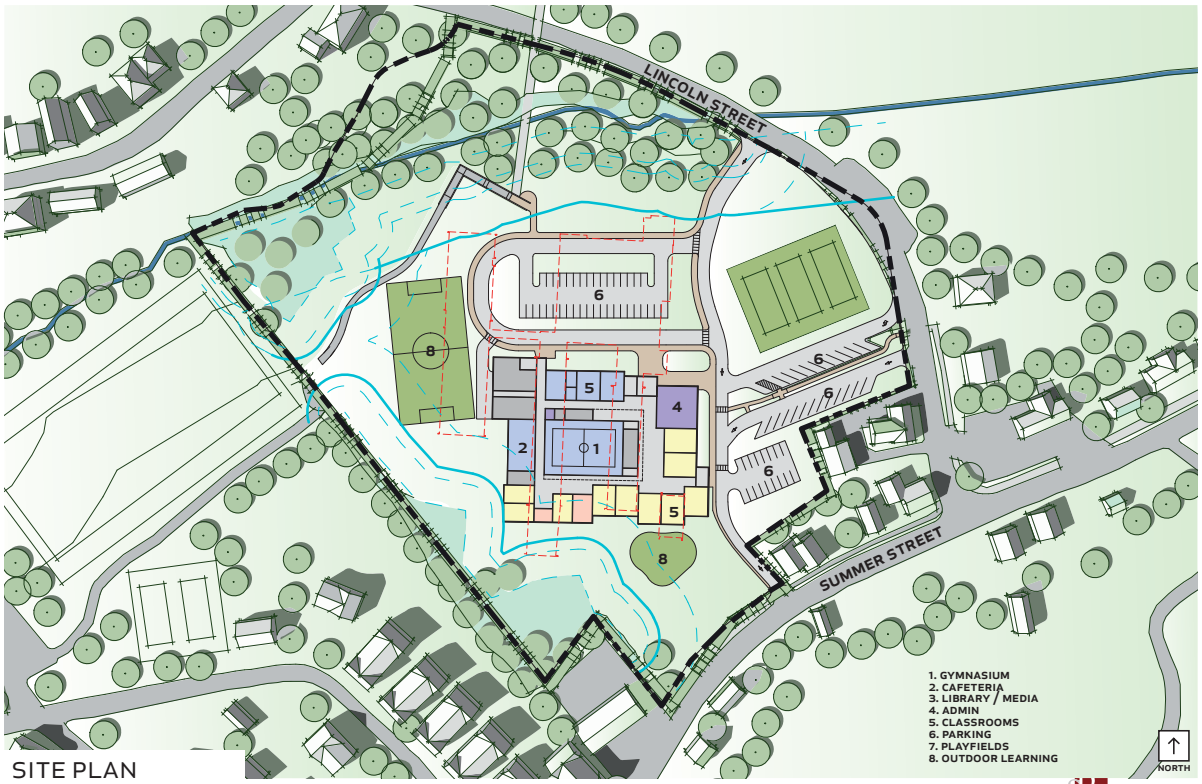



SECOND FLOOR PLAN

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

DLW JCJARCHITECTURE

## N-1

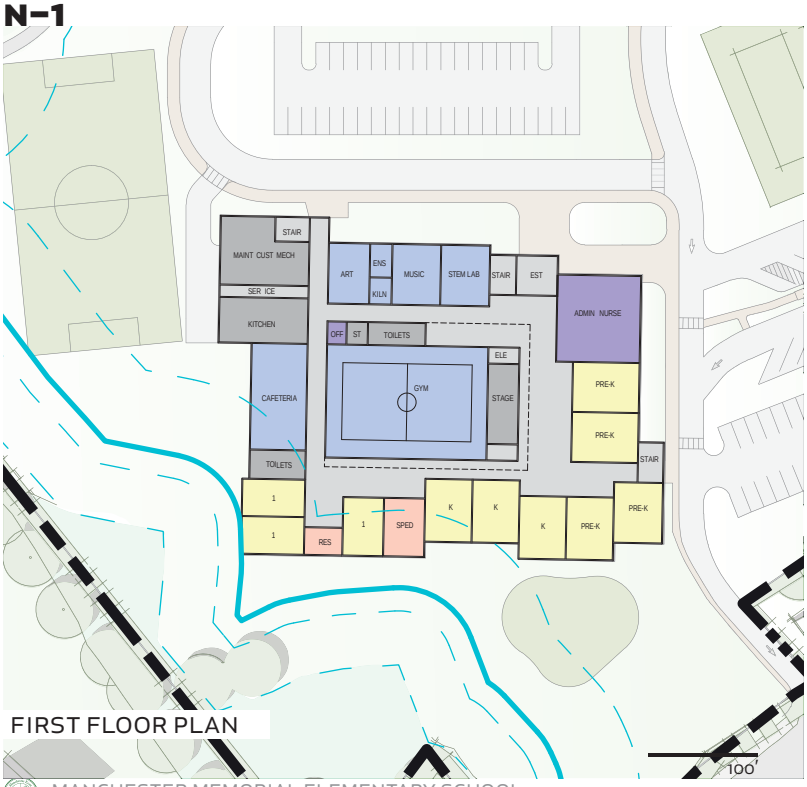



SITE PLAN

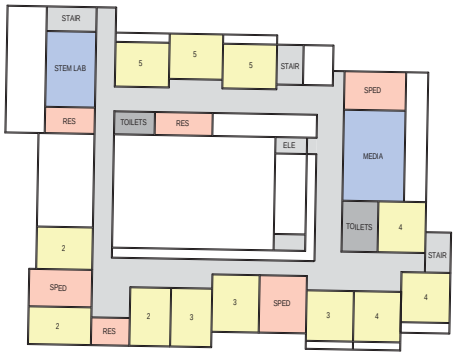
MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

DLW JCJARCHITECTURE

## N-1



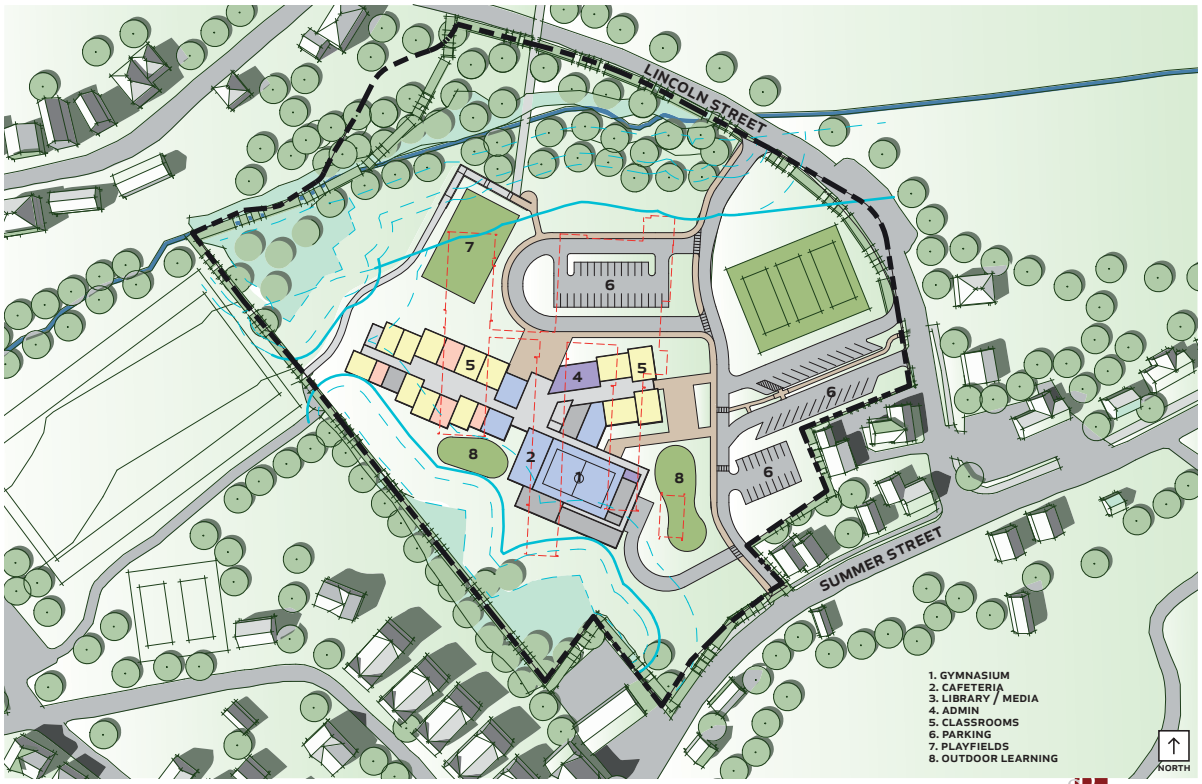

FIRST FLOOR PLAN



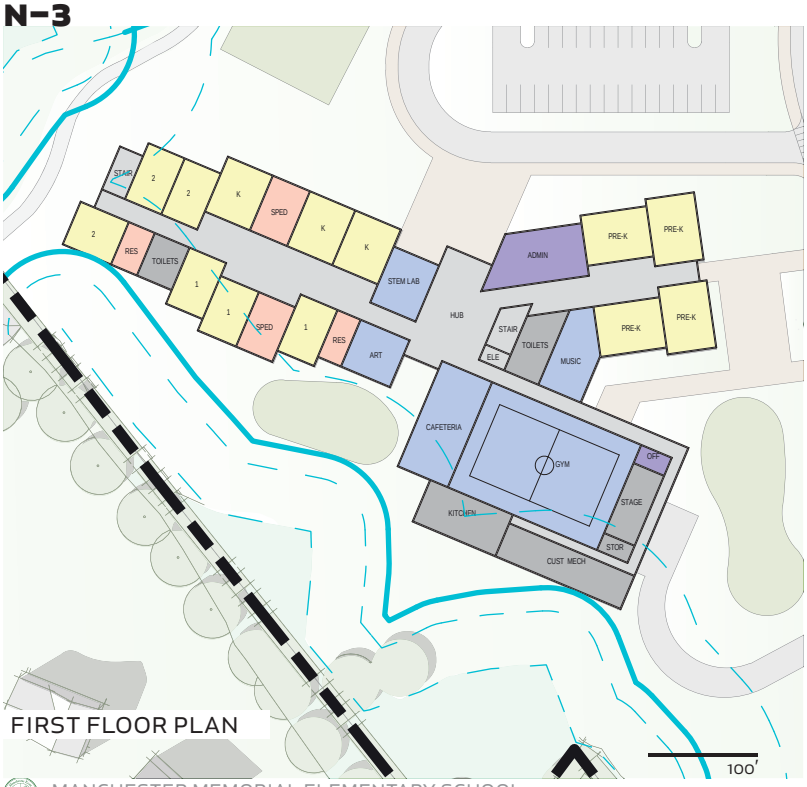

SECOND FLOOR PLAN



## N-3



## N-3




FIRST FLOOR PLAN

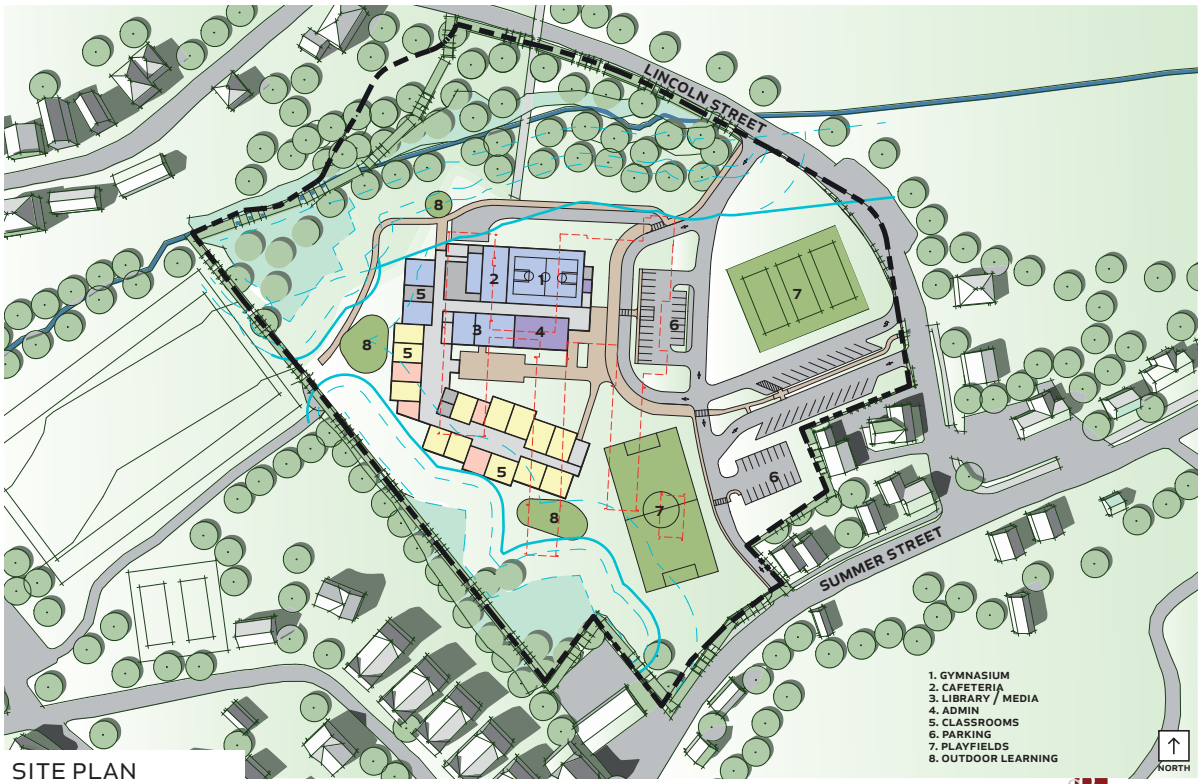



SECOND FLOOR PLAN

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

## N-9

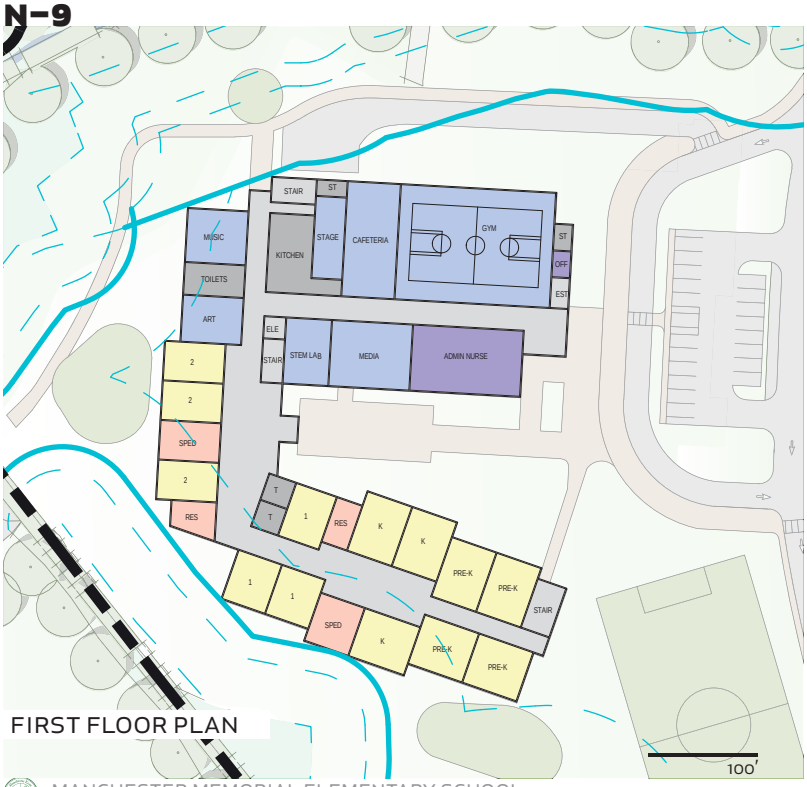



SITE PLAN

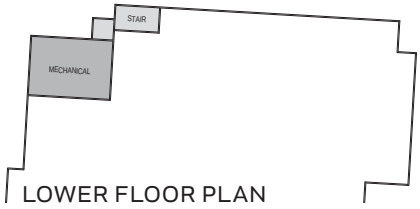
MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

N-9




FIRST FLOOR PLAN




LOWER FLOOR PLAN




SECOND FLOOR PLAN



**EVALUATING THE OPTIONS**

# SHARE YOUR THOUGHTS

**Write down your comments or questions on a post it note and place it on the drawing**

Reconvene in 15 minutes

# NEXT STEPS

## Finalize Preferred Schematic Report (PSR)

| | |
|---|---|
| **2/1 & 2/5** | Receive & Review Cost Estimates for Five Finalist Schemes |
| **2/1 & 2/5** | Determine Most Educationally Appropriate /Cost Effective Option |
| **2/21** | Submit Report to MSBA Identifying Preferred Option |
| **4/10** | MSBA Approval (Anticipated) |

## APR-JUL Schematic Design Phase (SD)

Develop a Robust Schematic Design of Sufficient Detail to Establish Scope, Budget and Schedule for the Proposed Project





# NEXT COMMUNITY FORUM

# MAY 23, 2018

# WE NEED YOUR FEEDBACK

## PARTICIPATE IN THE PROCESS

### Attend Building Committee Meetings

Dates/Times Posted on the Building Committee Webpage
Watch for Newspaper & Web Announcements
Meetings are Replayed on Cape Ann TV - Channel 67 or Video Download

### Upcoming Topics at Committee Meetings

**Feb 1st** Cost Estimate Review / Selection of Preferred Option
**Feb 5th*** Selection of Preferred Option (* IF NEEDED)
**Feb 13th** Meetings Approval to Submit PSR to MSBA



NEXT STEPS

# WE NEED YOUR FEEDBACK

## FOLLOW THE PROJECT

# WWW.MERSD.COM

Meeting Agendas & Minutes
Project Updates
Presentations & Documents

### eMail Comments & Questions:
### msbcquestions@mersd.com

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JCJARCHITECTURE

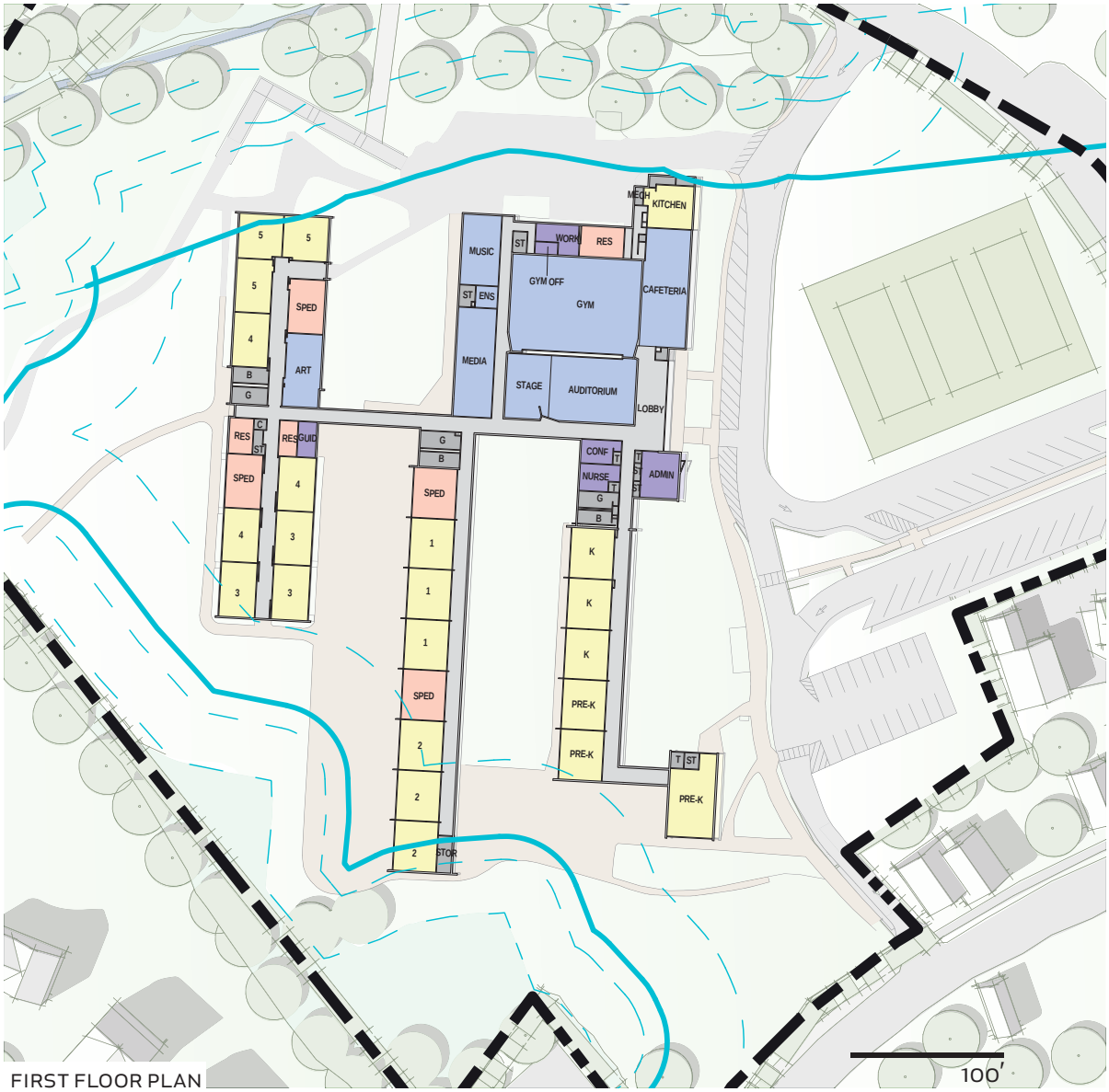
# THANK YOU

# **R-1** FOUR WALLS

BOARDS SHARED AT COMMUNITY MEETING #3




SITE PLAN




FIRST FLOOR PLAN

MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

# **AR-2** SAVE THE CORE

BOARDS SHARED AT COMMUNITY MEETING #3




SITE PLAN



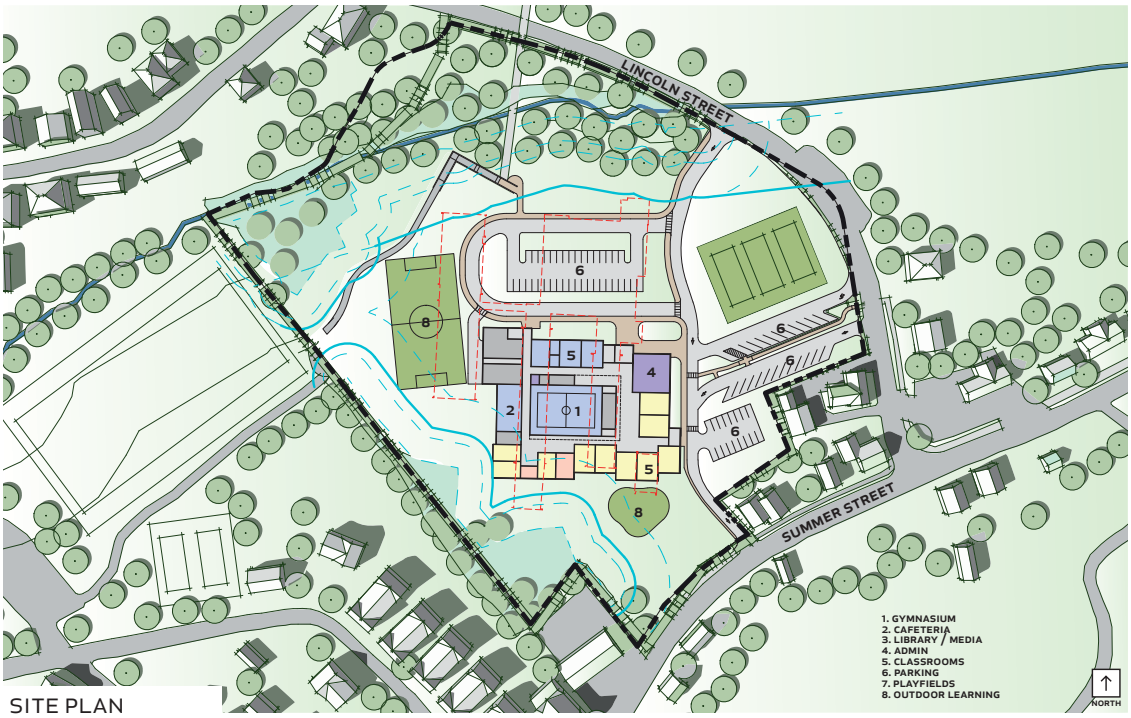

SECOND FLOOR PLAN




FIRST FLOOR PLAN

# **N-1** THE PIANO

BOARDS SHARED AT COMMUNITY MEETING #3




SITE PLAN



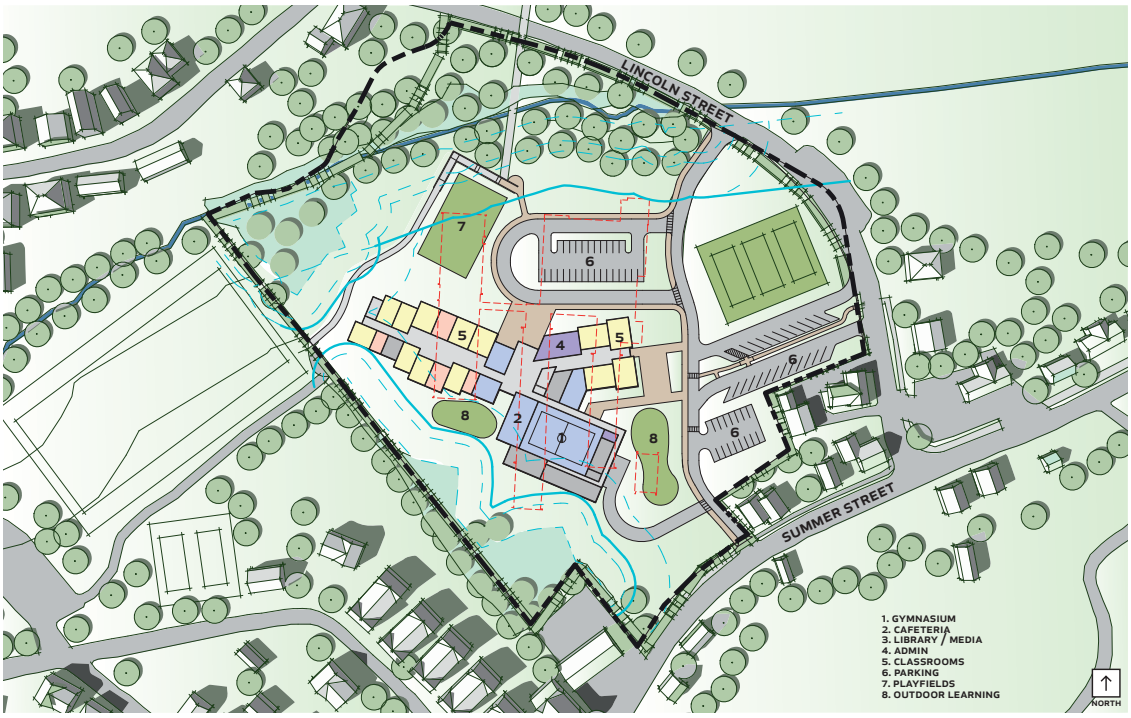

SECOND FLOOR PLAN




FIRST FLOOR PLAN

# **N-3** THE HUB

BOARDS SHARED AT COMMUNITY MEETING #3







SECOND FLOOR PLAN



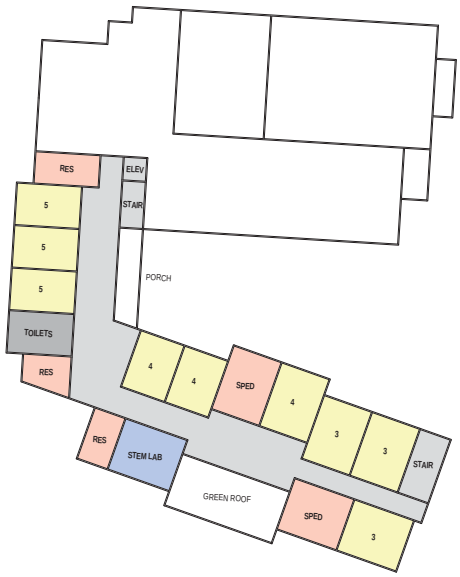

FIRST FLOOR PLAN

# **N-9** THE HOOK

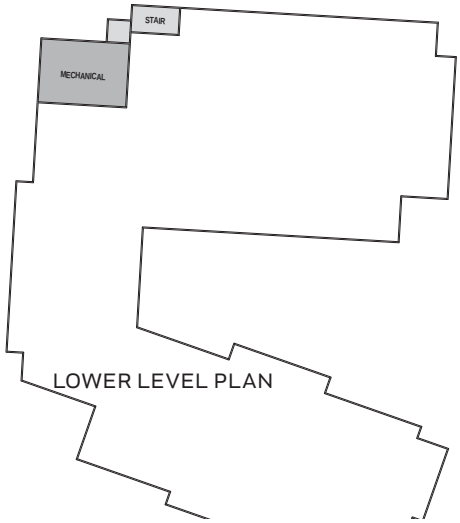
BOARDS SHARED AT COMMUNITY MEETING #3




SITE PLAN




SECOND FLOOR PLAN




LOWER LEVEL PLAN




FIRST FLOOR PLAN

## 3.3.5.2.7 – COMMUNITY MEETING #3 – ATTENDEE QUESTIONS AND COMMENTS

Community Meeting #3 consisted of two sessions of the same presentation. One session was held at 9:00 AM and the other at 7:00 pm. Both were held in the Auditorium of the existing Manchester Memorial Elementary School. The two sessions were held at different times of the day to help ensure the highest number of individuals could attend. In fact, each session netted almost 30 individuals or almost 60 attendees for the day. These counts do not include members of the design team, OPM or members of the school building committee who were in attendance.

While Community Meeting #1 primarily introduced the project, project team, outlined the anticipated process and goals and Community Meeting #2 focused on the site selection process, Community Meeting #3 shared, at a high–level, the fourteen (14) schemes that were developed to accommodate one of the three Options required to be investigated. However. More focused attention was spent on the final five (5) finalist schemes that formed the committee's preferred short-list and which were sent for estimating.

In addition to presenting the finalist schemes, the community meeting included a community input element where attendees were able to gather in the school lobby review the schemes up-close on printed boards and then leave any comments they wished on sticky notes placed on the boards themselves. Afterwards, attendees reconvened in the auditorium where some of the comments were shared with the wider group, and when questions could be asked.

Comments left on the boards as well as a list of the questions asked during the two sessions of Community Meeting #3 are included below for the record.

### ATTENDEE COMMENTS – COMMUNITY MEETING #3

During each of the two Community Meeting #3 sessions, attendees were asked to visit boards of each of the five Options under consideration by the Building Committee. Attendees where ask to put any comments they may have about any particular Option, or about all Options on a sticky note post-it. These are the comments they provided.

<u>Option R-1</u>

- Security Issues
- Art Room: Storage, normal sized sinks, kiln room, Central location on 1st floor
- Classroom sizes do not meet requirements, not OK

<u>Option AR-2</u>

- Maintenance on old potions can be very challenging?
- We favor this design.
- Save the auditorium as separate structure – important for arts and enrichment

- Keeping the Auditorium is bonus. (Me Too!)
- Auditorium is valuable asset – save it! (Agree)
- This is the best plan.
- 2 stories a plus.
- Keep the Auditorium – it is still structurally sound.
- Appreciate keeping Auditorium – especially for in-school programs and it would be a shame to lose such an amazing/ beautiful space.
- Gym is still not regulation size.
- Love additional parking – but can't access during drop-off/ pick-up without waiting in line.
- At 1st glance – this would be my choice.
- Separate walkway to back door for pedestrian?
- I like saving the central spaces, especially the Auditorium! This Option achieves other classroom efficiencies as well.

Option N-1

- How to control noise from Gym in (to) surrounding classrooms
- Grade 2 should be with Kindergarten and Grade 1
- Lockers big enough to accommodate backpacks, etc.
- Where do walkers enter?
- Without an Auditorium, where would enrichment happen?
- Teachers too spread out – hard to collaborate.
- This option is extremely isolating.
- Municipal polling place?
- Claustrophobic + noise
- Is there space for boot storage?
- Consider traffic flow – Being able to get out of parking lot during dismissal and drop off.
- Do these improve drop-off/ pick up traffic flows?

Option N-3

- Play Structure?
- Asphalt/ Outdoor Basketball.
- A Pumping/ Mother's Room. Private space w/ outlet and fridge capacity.
- Private Pumping Station off Staff Room.
- N-3 would be my favorite, 2 stories makes sense, like the separation of gym vs classrooms for community functions.

- The Gym and Mechanical Rooms faces the sun and sweet spot for exposure, does not maximize sun in classrooms.
- Separate bathrooms for male/ female staff
- Cafeteria door out. Outside Seating.
- How are assemblies addressed during school?
- Save Joyce's garden.
- I want a garden here so I can have outdoor sing-a-longs in the spring.
- Pre-K separate. Good thing.
- Good for municipal polling and potentially for a large Town Meeting.
- Compare current storage (in the Basement) to new storage?

Option N-9

- Classrooms have maximized sun exposure (face the southwest)
- Encouraging back door walkers.
- Really long travel to get to gym/ café & already not enough lunch time.
- Where would one or 2 grade programs meet. Opening walls in classrooms?
- Dislike foot traffic from parking lot 6 into building.
- Fields closer to Summer Street may not (be) as desirable for elementary kids?
- The building should include a second floor. It takes less space, less roof repairs or replacement costs. Younger age downstairs and higher upstairs, better heating, etc. (Editor's note: This Option does include a second floor which was shown on the boards.)
- We should always have an Auditorium if the school will house a gym it should have the other too. We need to support the Arts equally with the sports.
- Is there going to be a privacy fence or wall installed along Memorial Drive? (Editor's note: We assume the reference to Memorial Drive is the main school's driveway.)

### ATTENDEE QUESTIONS – COMMUNITY MEETING #3

Morning Session Questions and Comments:

- How much will the building cost?
- Can we avoid designing "flat" roofs?
- How does Option N-1 address the "back door" arrivals and dismissals?
- Where would the chairs for an event in a gymnatorium be stored?
- Can you confirm that "portables" (modulars) are not reimbursable?
- How do any of these designs without a separate auditorium deal with grade-level assemblies which often require full-days?
- How much capacity will there be for additional students?

- Will a new Memorial School be large enough to accommodate the Essex population when that school is renovated or replaced?

Evening Session Questions and Comments

- Why isn't the committee considering building a building that will last more than 50-years?
- Are there any conditions that have been studied which might favor any particular option?
- Will the building have an elevator?
- What is the District planning for Pre-K?
- Would a three story option make better structural sense?
- Will your design consider LEED certification?
- As a teacher, for the new Options, I am concerned about those that park in the lot within the loop to be trapped in there when drop-off or pick-up routines are happening.
- Expression of favor for Option AR-2. because it retains a separate auditorium.
- Could a special traffic light be installed at the school's driveway exit onto Summer Street?
- Will there be solar panels?
- The original building was not well designed so what's needed for updating the building for Options R-1 and AR-2?
- Encourage the community not to tear down the auditorium. Kids should not have to have to choose between athletics and the arts. Why not entertain keeping the auditorium?
- Reminder by attendee that Essex has an auditorium
- Expression of concern that there will be no raked seating an a cafetorium or gymnatorium configuration
- Which option has the most outdoor space?
- How will the separation of student and public activities such as on voting days be addressed?
- Any opportunity to take some of the Essex students during their construction project?
- Is the timeline for the Town Meeting and public votes still the same?
- Has security concerns been looked at yet with these options?
- How effectively will you be able separate gymnasium noise from the classrooms in Option N-1?

## PRELIMINARY SCHEMATIC REPORT PHASE PROJECT MEETINGS

- November 28, 2017 – SBC Meeting #14
- December 4, 2017 – MEP Systems Sub-Committee Meeting
- December 12, 2017 – SBC Meeting #15
- December 18, 2017 – SBC Meeting #16
- January 10, 2018 – SBC Meeting #17
- January 22, 2018 – SBC Meeting #18
- January 31, 2018 – Community Meeting #3
- February 1, 2018 – SBC Meeting #19
- February 13, 2018 – Joint SBC and School Committee Meeting #1

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# AGENDA

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 2/1/2018 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | C.Shefferman |

1. Call to Order
2. Previous Topics & Approval of January 22, 2018 Meeting Minutes
   - 7.11 Site: Swing space availability (P. Beaudoin)
3. Design Update (JCJ)
4. Review Cost Estimates (JCJ)
5. Preferred Option Discussion (vote anticipated) (JCJ/DWMP)
6. Schedule/Look Ahead (DWMP)
7. Next Steps
8. Other Topics Not Reasonably Anticipated 48 hours prior to Meeting
9. Public Comments
10. Adjourn

MANAGEMENT PARTNERS, LLC

PROJECT MANAGERS
ARCHITECTS

Newburyport, MA 01950
260 Merrimac Street Bldg 7
978.499.2999 ph
978.499.2944 fax

www.doreandwhittier.com

# Manchester Memorial Elementary School

## Feasibility Phase - SBC Meeting #19

February 1, 2018



1. Call to Order
2. Previous Topics & Approval of December January 22, 2017 Meeting Minutes
3. Design Update / Community Meeting Feedback
4. Review Cost Estimates
5. Preferred Option Discussion (vote anticipated)
6. Schedule/Look Ahead
7. Next Steps
8. Other Topics Not Reasonably Anticipated 48 hours prior to Meeting
9. Public Comments
10. Adjourn

# 1. Call to Order



# 2. Previous Topics & Approval of January 22, Minutes

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

# 3. Design Update/Community Meeting Feedback



# 4. Review Cost Estimates

# 5. Preferred Option Discussion (vote expected)



## RECOMMENDATIONS

● FAVORABLE
◉ NEUTRAL
○ UNFAVORABLE

| | Option R-1 *"Four Walls"* | Option AR-2 *"Save the Core"* | Option N-1 *"The Piano"* | Option N-3 *"The Hub"* | Option N-9 *"The Hook"* |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Educational** | | | | | |
| Meets District's Space Program Goals | ○ | ○ | ● | ● | ● |
| Provides Flexibility for Future Building Expansion | ○ | ○ | ○ | ● | ● |
| Flexibility for Grade Level Re-Configuration (Bubble Grades) | ◉ | ● | ◉ | ◉ | ◉ |
| Minimizes Impact to Students During Construction | ◉ | ◉ | ◉ | ◉ | ○ |
| Provides Separated Whole School Gathering Space w/ Stage | ○ | ○ | ● | ● | ● |
| **Community** | | | | | |
| Provides Independent Access to Community Used Space | ● | ● | ○ | ● | ● |
| Allows for Competition Size Gym with Bleachers | ○ | ○ | ● | ● | ● |
| **Site** | | | | | |
| Increases Amount of Play Areas/ Fields | ◉ | ● | ● | ● | ● |
| Welcoming Street Presence | ◉ | ● | ● | ● | ◉ |
| Improves Parent Drop-Off/ Pick-Up Queuing | ◉ | ◉ | ● | ● | ● |
| Improves Impact to Riverfront Resource Areas | ◉ | ◉ | ● | ● | ◉ |
| Minimizes Potential Pedestrian/ Vehicular Conflicts | ◉ | ◉ | ● | ● | ● |
| **Building** | | | | | |
| Optimizes Building Area to Perimeter Ratio | ○ | ◉ | ● | ◉ | ◉ |
| **Costs and Schedule** | | | | | |
| Relative Capital Costs | $ 35.8 M | $ 55.8 M | $ 57.0 M | $ 55.6 M | $ 62.6 M |
| District Share (Estimated) | $ 24.2 M | $ 39.6 M | $ 42.4 M | $ 41.6 M | $ 47.8 M |

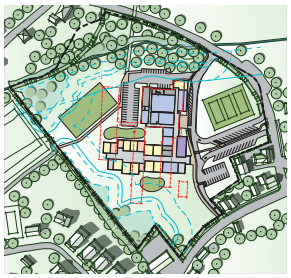
# EVALUATING THE OPTIONS
RECOMMENDED FOR FURTHER DEVELOPMENT

## R-1 FOUR WALLS



**RENOVATION ONLY**

## AR-2 SAVE THE CORE



**ADDITION/RENOVATION**
RETAIN CORE BLOCK ONLY

## N-1 THE PIANO



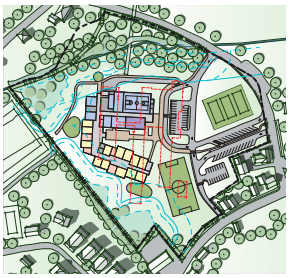
**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

## N-3 THE HUB



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

## N-9 THE HOOK



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE



## R-1 FOUR WALLS
**PHASE ONE**



## **R-1** FOUR WALLS

**PHASE TWO**





## **R-1** FOUR WALLS

**PHASE THREE**



## **R-1** FOUR WALLS

**PHASE FOUR**





## **R-1** FOUR WALLS




SITE PLAN

## **R-1** FOUR WALLS




MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

## **AR-2** SAVE THE CORE

**PHASE ONE**



NORTH

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

## **AR-2** SAVE THE CORE

**PHASE TWO**



NORTH



## **AR-2** SAVE THE CORE

**PHASE THREE**



NORTH

## **AR-2** SAVE THE CORE

**PHASE FOUR**



NORTH



## **AR-2** SAVE THE CORE

**PHASE FIVE**



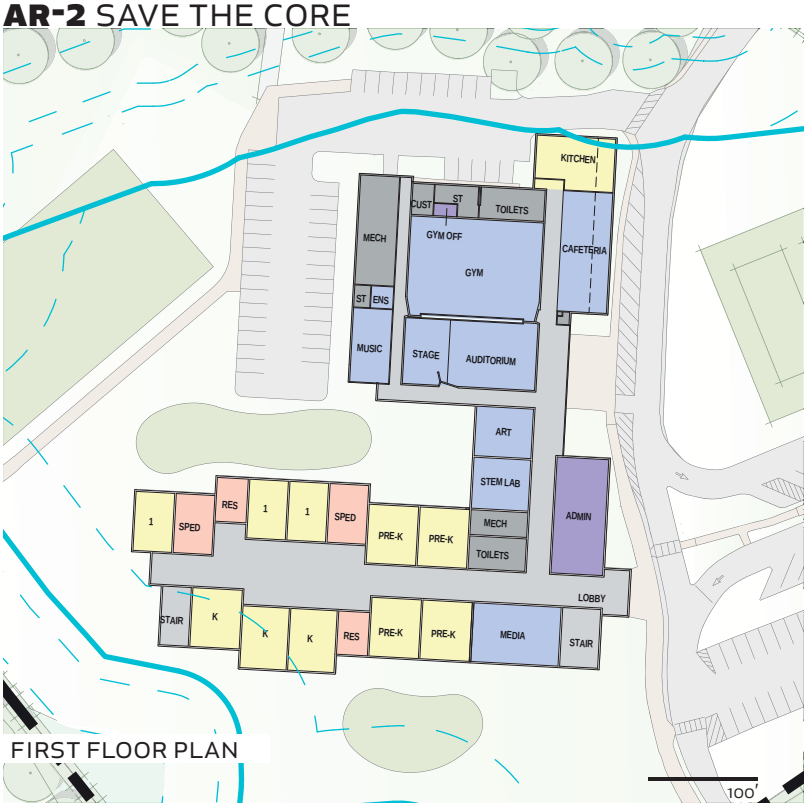
NORTH

## **AR-2** SAVE THE CORE

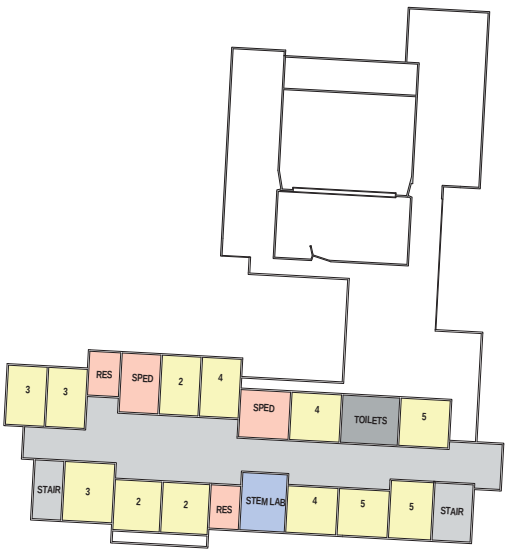





## **AR-2** SAVE THE CORE




FIRST FLOOR PLAN




SECOND FLOOR PLAN

## **N-1** THE PIANO

**PHASE ONE**



NORTH



## **N-1** THE PIANO

**PHASE TWO**



NORTH

# **N-1** THE PIANO

**PHASE THREE**



NORTH

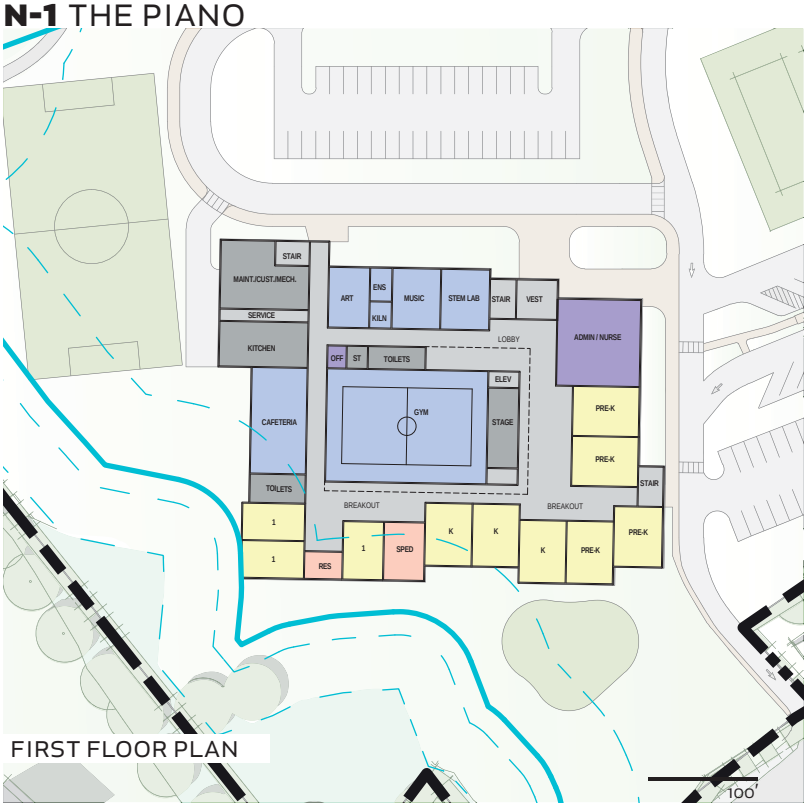


# **N-1** THE PIANO

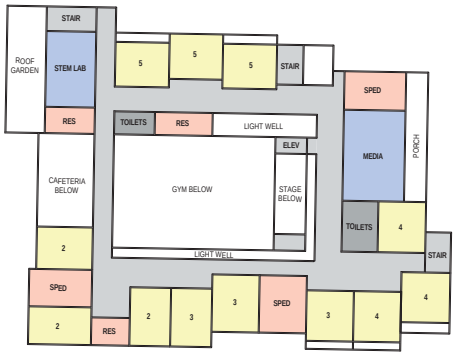



SITE PLAN

## **N-1** THE PIANO




FIRST FLOOR PLAN




SECOND FLOOR PLAN



## **N-3** THE HUB

**PHASE ONE**



NORTH

## **N-3** THE HUB
**PHASE TWO**



NORTH



## **N-3** THE HUB
**PHASE THREE**



NORTH

## **N-3** THE HUB
**PHASE FOUR**



NORTH



## **N-3** THE HUB
**PHASE FIVE**



NORTH

## **N-3** THE HUB




MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

## **N-3** THE HUB




FIRST FLOOR PLAN

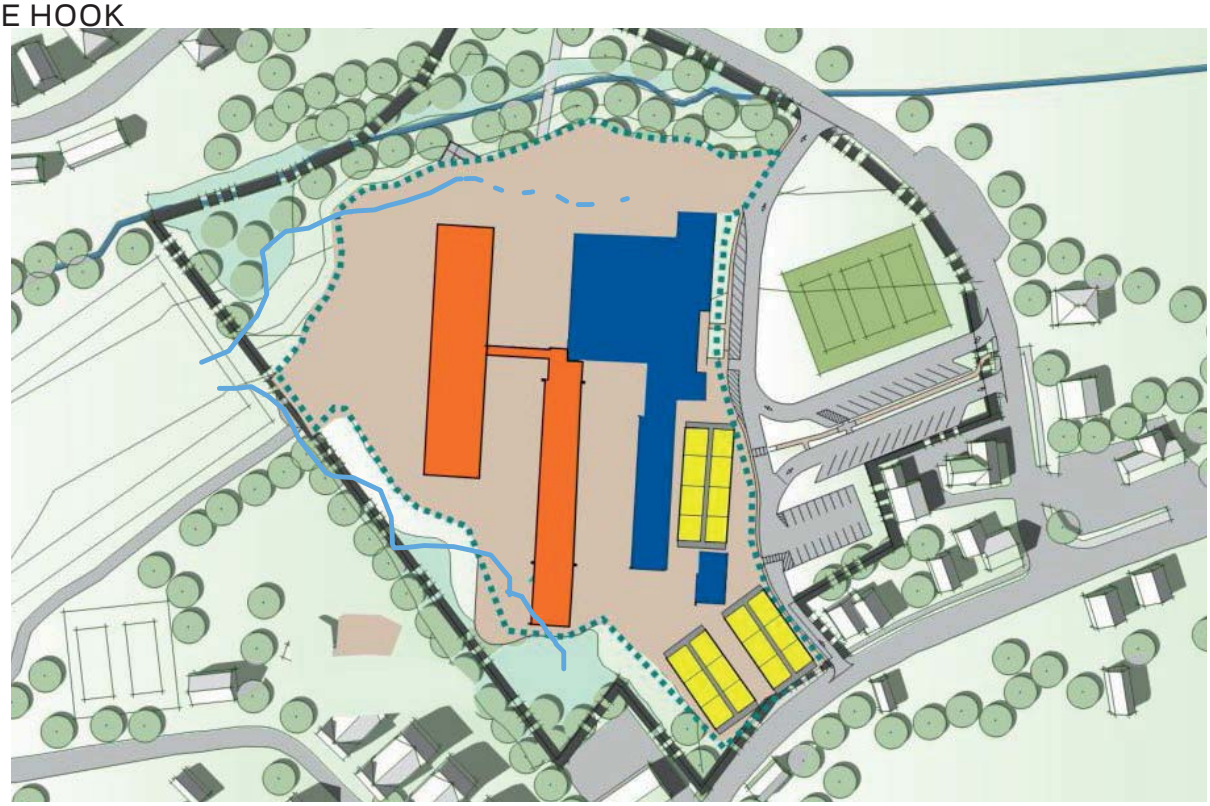



SECOND FLOOR PLAN

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

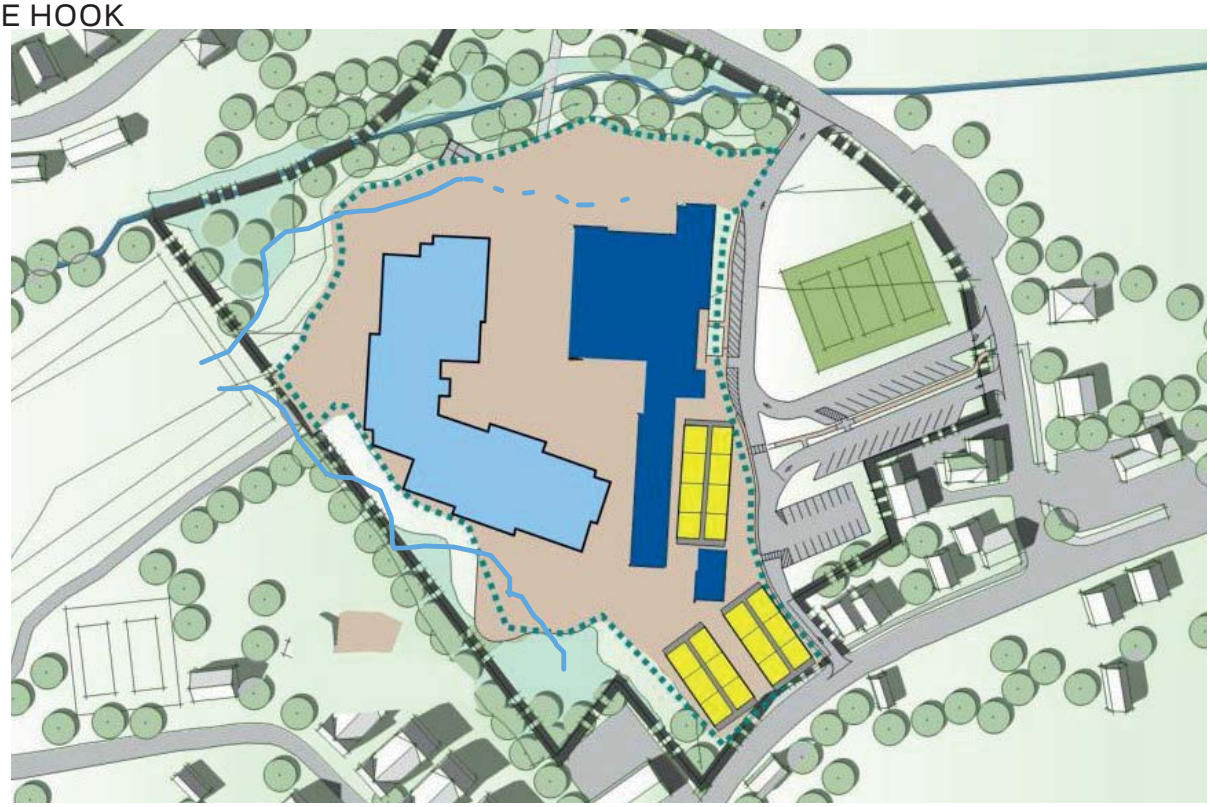
## **N-9** THE HOOK
**PHASE ONE**



NORTH



## **N-9** THE HOOK
**PHASE TWO**



NORTH

## **N-9** THE HOOK
**PHASE THREE**



NORTH



## **N-9** THE HOOK
**PHASE FOUR**



NORTH

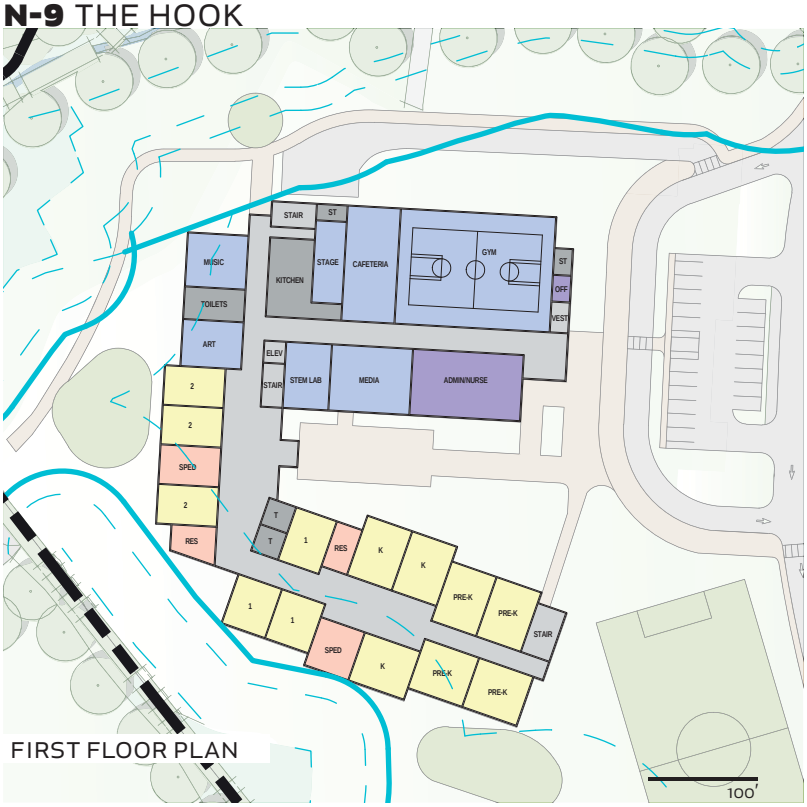
## **N-9** THE HOOK



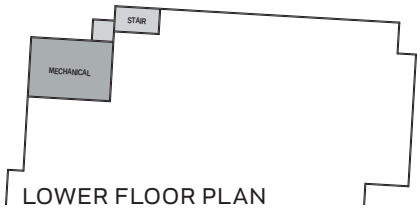

SITE PLAN



## **N-9** THE HOOK




FIRST FLOOR PLAN




LOWER FLOOR PLAN




SECOND FLOOR PLAN

# 7. Next Steps



## TODAY'S AGENDA

### Next Steps

| | |
|---|---|
| 2/1 | SBC-Review Cost Estimates |
| 2/5 | SBC-Select Preferred Option |
| 2/13 | SBC/SC-Joint Committee Approval of PSR |
| 2/21 | Submit PSR to MSBA |
| 3/13 | SBC-CM Prequalification Process |
| 3/27 | SBC-Update on MSBA FAS Meeting |

## 8. Other Topics Not Reasonably Anticipated (48 hours prior to meeting)



## 9. Public Comments

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

## 10. Adjourn



# THANK YOU

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

# APPROVED MODIFICATIONS

| | | | A | B | B-A=C | C*1.45=D | E | D*E | |
|---|---|---|---|---|---|---|---|---|---|
| Item | Description | Included in Existing School | Baseline MSBA SF | Proposed SF | NSF Impact | GSF Impact | $psf (NEW) | Construction Cost | MSBA Reimbursable |
| | MSBA Guideline SF (based on 335 Students) | | | | 41,962 | 58,932 | $ 450 | $ 26,519,438 | YES |
| 1 | General Classrooms (15 vs 12) | YES | 11,400 | 14,250 | 2,850 | 4,133 | $ 450 | $ 1,859,625 | YES |
| 2 | Pre-K Classrooms (4) | YES (2) | 0 | 4,800 | 4,800 | 6,960 | $ 450 | $ 3,132,000 | YES |
| 3 | Pre-K Storage | YES | 0 | 450 | 450 | 653 | $ 450 | $ 293,625 | YES |
| 4 | Enlarge Parent/Teacher Conf. (300 sf vs 250 sf) | YES | 250 | 300 | 50 | 73 | $ 450 | $ 32,625 | YES |
| 5 | Self Contained SPED Classroom (4 vs 3) | YES | 2,850 | 3,800 | 950 | 1,378 | $ 450 | $ 619,875 | YES |
| 6 | Self Contained SPED Toilet (4 vs 3) | YES | 180 | 240 | 60 | 87 | $ 450 | $ 39,150 | YES |
| 7 | STEM / Maker Classroom w/ Storage (2) | NO | 0 | 2,400 | 2,400 | 3,480 | $ 450 | $ 1,566,000 | YES |
| 8 | Music Lessons Room (1 Room @ 200 sf) | NO | 150 | 200 | 50 | 73 | $ 450 | $ 32,625 | YES |
| **Subtotal** | | | | | **11,610** | **16,835** | | **7,575,525** | |
| 9 | Enlarge Gymnasium | NO | 6,000 | 7,600 | 1,600 | 2,320 | $ 450 | $ 1,044,000 | Potential |
| 10 | Dedicated Shower (Nurse's Suite) | NO | 0 | 50 | 50 | 73 | $ 450 | $ 32,625 | Potential |
| **Subtotal** | | | | | **1,650** | **2,393** | | **1,076,625** | |
| 11 | Manchester Parks & Rec Area w/ Storage | YES | 0 | 1,800 | 1,800 | 2,610 | $ 450 | $ 1,174,500 | NO |
| **Subtotal** | | | | | **1,800** | **2,610** | | **1,174,500** | |
| **Total** | | | | | **15,060** | **21,837** | | **9,826,650** | |
| | MSBA Guideline SF (from above) | | | | 41,962 | 58,932 | | | |
| | **Total Building SF** | | | | **57,022** | **80,770** | | | |

***AMOUNTS EXCLUDE SITE OR SWING SPACE COSTS**

# MEETING MINUTES

MANAGEMENT PARTNERS, LLC

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 2/1/2018 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | C.Shefferman |

| Present | Name | Affiliation | Present | Name | Affiliation |
|---|---|---|---|---|---|
| ✓ | Caroline Weld * | SBC Co-Chair | ✓ | Jim LaPosta | JCJ |
| ✓ | Ann Cameron * | SBC Co-Chair | ✓ | Daniel Ruiz | JCJ |
| ✓ | Pam Beaudoin * | Superintendent | ✓ | Lauren Braren | JCJ |
| ✓ | Avi Urbas * | Dir. of Fin. & Ops | | Emily Czarnecki | JCJ |
| ✓ | Alva Ingaharro * | Essex | ✓ | Mike Burton | DWMP |
| ✓ | John Willis * | Principal MMES | ✓ | Steven Brown | DWMP |
| ✓ | Jay Pagliarulo | Dir. of Facilities | ✓ | Christina Shefferman | DWMP |
| ✓ | Andy Oldeman * | Man. Fin. Comm. | | | |
| ✓ | Lisa O'Donnell * | Essex B.O.S. | | | |
| ✓ | Remko Brueker * | Manchester | | | |
| ✓ | Adam Zaiger * | Manchester | | | |
| ✓ | Tyler Virden * | Essex | | | |
| | George Scharfe * | Manchester | | | |
| ✓ | Gordon Brewster * | Manchester | | | |
| ✓ | Charlie Hay * | Essex | | | |
| ✓ | Sarah Creighton * | Manchester | | | |
| ✓ | Maggie Tomaiolo * | Essex | | | |
| ✓ | Jake Foster * | Essex | | | |

**Action Items:**

| Item No. | Responsible Party: | Description |
|---|---|---|
| 7.11 | P. Beaudoin | Site: Swing space availability |

** SBC Voting Member*

PROJECT MANAGERS
ARCHITECTS

Newburyport, MA 01950
260 Merrimac Street Bldg 7
978.499.2999 ph
978.499.2944 fax

www.doreandwhittier.com

| Item No. | Description | Action |
|---|---|---|
| 19.1 | Call to Order: 7:04 pm meeting was called to order by the SBC Co-Chair Caroline Weld with 16 of 17 voting members in attendance. S. Brown of DWMP notes the meeting will follow the Power Point presentation that is being projected on the screen and to follow the agenda that was provided to the SBC prior to the meeting via Dropbox. | Record |
| 19.2.1 | Previous Topics & Approval of January 22, 2018 Meeting Minutes: S. Brown explains and reviews the one previous item requiring action. A review of the item is noted below. | Record |
| 7.11 | Site Understanding: (For previous history of this item, refer to previous meeting minutes)<br><br>…Additional details and follow up will be provided to the SBC at our next meeting.<br>11/14/2017: P. Beaudoin states that she has a meeting scheduled with the Mayor of the Town of Beverly on 11/20/17. P. Beaudoin is also in communication with St. Mary's in Beverly, and is waiting for a formal response from the school on whether it will fit the needs of MMES. P. Beaudoin is still waiting to hear from Father Jim in Gloucester. P. Beaudoin will continue to pursue these options and will report back to the SBC once she has additional information.<br>11/28/2017: P. Beaudoin states that there are still 3 possible options. Briscoe School in Beverly, The Cummings Center in Beverly, and St. Mary's in Beverly. P. Beaudoin met with officials from Beverly's mayor office, and is waiting to hear whether they would be willing to wait a year before someone would possibly occupy the school. The Cummings Center approached P. Beaudoin and stated that they might have an option that would fit their needs. The Cummings Center is working on putting together a quote and space availability between their many available spaces. P. Beaudoin is still waiting to hear if St. Mary's can provide an estimate for the space. After discussion, the SBC agreed that overall, they would steer towards an option that can either have kids on site or off site based on phasing, modulars, and or an offsite temporary campus. P. Beaudoin to continue development of potential swing spaces.<br>12/12/2017: P. Beaudoin states Cummings Properties has confirmed that they have nothing that fits the District's space needs for the time frame needed. No update from Gloucester or St. Mary's prospect at this time.<br>12/18/2017: No update at this time.<br>1/10/2018: No update at this time.<br>1/22/2018: No update at this time.<br>2/1/2018: No update at this time. | P. Beaudoin |
| 19.2.2 | Previous Topics & Approval of January 22, 2018 Meeting Minutes: A motion to approve the 1/10/2018 meeting minutes as submitted made by A. Oldeman and seconded by A. Ingaharro. Discussion: None. Vote: All in favor: Motion passes, minutes approved. | Record |
| 19.3 | Design Update: J. Laposta provides the SBC with a design/project update. JCJ recaps Community Meeting No. 3 that occurred yesterday, Wednesday 1/31/18, in the MMES auditorium. JCJ brought the scheme boards to tonight's meeting if any member of the SBC would like to see the comments that were left by community members. J. Laposta states there was a lot of conversation about the school, the auditorium, enrichment programs, etc. | Record |
| 19.4.1 | Review Cost Estimates: M. Burton provides cost estimate information to the SBC. M. Burton states that as part of the PSR submission, both the designer and the OPM are required to | Record |

| | | |
|---|---|---|
| | provide cost estimates in the submission. Once estimates are received, they are reconciled, and then provided to the SBC as part of the submission. M. Burton discusses the cost estimate sheet that was handed out to the SBC. A recap of the discussion is outlined below:<br>➢ The #'s are conservative, and as design is developed, the #'s will change.<br>➢ Orange box is soft costs<br>➢ Blue box is construction costs<br>➢ The estimates are sf driven<br>➢ Modular's are non-reimbursable<br>➢ Legal fees are an estimate<br>➢ OPM fee is at a 3.5% cap set by the MSBA<br>➢ The Designer feel is at a 10% cap set by the MSBA<br>➢ Owners contingency is estimated at 5% of construction cost<br>➢ CM @ Risk for preconstruction services is estimated at $100k.<br>➢ The MSBA has caps on site work at 8% of total construction, total construction cost is capped at $336 a sf, and FF&E/Technology are capped at $2400 total per student.<br>➢ MMES will receive 1 incentive point from the MSBA for CM @ Risk since the project started as the MSBA was removing this incentive point. | |
| 19.4.2 | Review Cost Estimates: After reviewing the information provided in the cost estimate sheet, the SBC discussed the information at length. A recap of the discussion is outlined below:<br>➢ The costs have room for improvement as sf could be removed<br>➢ R-1 does not meet the space summary sheet<br>➢ AR-2-renovating a partial existing building would mean in 50 years that it partially will be 100 years old<br>➢ AR-2-gymnasium and auditorium do not meet the space summary<br>➢ AR-2 would be a substantial renovation, with significant seismic upgrade, bracing, etc.<br>➢ N-9-phasing and construction have longest time frames of all schemes<br>➢ N-1 does not provide independent access to community space<br>➢ N-3 offers potential for addition if bubble occurs<br>➢ N-3 has separate access from community wing vs academic wing | Record |
| 19.5 | Preferred Option Discussion: A motion was made by S. Creighton and seconded by L. O'Donnell to select N-3 as the preferred option as part of the Preferred Schematic Report submission to the MSBA. Discussion: A. Urbas would like to take the time to further evaluate and review the cost review sheet provided to the SBC. Financially though, A. Urbas felt that N-3 is the most supportive. A. Oldeman also believed that N-3 offers a lot of flexibility in terms of budget and design. S. Creighton reiterates that the SBC needs to be reminded that this is not the final budget, but a conservative tool for the SBC to review and understand at this point of the project. All in favor: Unanimous, vote passes. | Record |
| 19.6 | Schedule/Look Ahead: S. Brown discusses the 2-month calendar slides. The information is outlined below:<br>➢ The SBC meeting scheduled for 2/5/18 is no longer needed since the preferred option was selected tonight.<br>➢ 2/13/18-Joint SBC/SC Meeting-Approve PSR Submission<br>➢ 2/21/18-Submit PSR to MSBA<br>➢ 3/13/18-SBC Meeting-CM @ Risk Prequalification Process | Record |

| | | |
|---|---|---|
| | ➢ 3/27/18-SBC Meeting-Update on MSBA FAS Meeting | |
| 19.7 | Next Steps: See information above in 19.6. | Record |
| 19.8 | Other Topics Not Reasonably Anticipated (48 hours prior to meeting): None. | Record |
| 19.9.1 | Public Comment: A member from the public, Eli Boling, a Town of Manchester Selectmen, provided comments on the schemes. An outline of the discussion is below:<br>➢ R-1 is politically dead on arrive. It doesn't provide a future for the school. No improvement of educational spaces.<br>➢ N-9 doesn't offer a vastly different advantage to the town and district. Politically won't get support since its $6 million more than the other new options.<br>➢ N-3 best option since it offers separate community access, and potential for expansion.<br>➢ Voters are looking for flexibility and future expansion which N-3 offers. | Record |
| 19.9.2 | Public Comment: A member from the public, Andre Kuehne, from the Town of Manchester, stated he preferred N-3. | Record |
| 19.9.3 | Public Comment: A member from the public, Steven Bates, from the Town of Manchester, provided comments on the schemes. An outline of the discussion is below:<br>➢ Afraid of losing a space like the auditorium since it has the acoustical capabilities.<br>➢ Potential for an option for a new gym and leave auditorium<br>J. Laposta provided an answer by stating that the challenge is to keep just the auditorium, structurally cannot be supported since the gym and the auditorium share a joint wall. The gymatorium can be designed to address acoustics, sound implications, and be used for performances where it actually can accommodate everyone from the school. Just to renovate the auditorium would cost significantly in seismic updates. | Record |
| 19.9.4 | Public Comment: A member from the public, Erin Greenland, from the Town of Manchester inquired when construction will start? M. Burton provides an answer by stating that in each scheme the # of phases, and timeframe were considered and evaluated as part of the cost estimates. N-1 is the quickest since the whole building will be built in one phase, N-3 is the second quickest since it has two phases, and N-9 being the longest with 3 phases. N-3 has potential to not have any modulars, which can be a large cost savings. It is anticipated to start construction in Fall of 2019, and the school to be completed 2-3 years from then. | Record |
| 19.9.5 | Public Comment: A member from the public, Axel Magnuson, from the Town of Manchester, asked what the teachers from the SBC feel is the best design? M. Tomaiolo responds by stating she preferred N-3 the most. The classrooms are nicely grouped, the specialists are put together, it feels welcoming, and likes that the community space has separate access. P. Beaudoin states she also prefers N-3 the most and likes it for the same reason M. Tomaiolo stated, and that it also feels very warm and welcoming. | Record |
| 19.9.6 | Public Comment: A member from the public, Miriam Bradford, from the Town of Manchester, inquired if the vote doesn't pass for the project, what happens? P. Beaudoin responds stating that they would need to vote again in the spring if it doesn't pass. A failing vote though puts the project in jeopardy and loss of funding from the MSBA if it doesn't get approval in the 120-day window set by the MSBA. Project delay means escalation, and more money for the towns to pay. L. O'Donnell states that a failed vote means costs for | Record |

| | | |
|---|---|---|
| | maintaining the existing structure that will be very expensive and potential threat for the students and staff to be affected by these existing issues. | |
| 19.9.7 | Public Comment: A member from the public, Shannon Erdmann, a MERSD School Committee Member, stated that based on the #'s provided tonight, and that price of the building at $49 million, makes sense with current trends and current market prices. M. Burton states there is information on the MSBA website that reflects trends, past and current projects, and pricing for their project. | Record |
| 19.9.8 | Public Comment: A member from the pubic, Greg Federspiel, the Town of Manchester Administrator, asked whether they would be able to get MSBA to say they will not pay or contribute to a reno, then it would help stop the debate on whether R-1 would be a viable option. The team stated that the data is there, the sf provided in the R-1 scheme does not meet the space summary qualifications set forth by the district as part of their educational plan. | Record |
| 19.10 | Adjourn: A motion was made by S. Creighton and seconded by A. Zaiger to adjourn the meeting. Discussion: None. Vote: Unanimous to approve. Meeting adjourned at 9:12 pm. | Record |

**Attached:**
*SBC Meeting Agenda,Sign In Sheet, SBC Meeting No. 18 1/22/18 Meeting Minutes, Manchester Memorial Elementary School Presentation 2/1/18, Cost Review Sheet*

**DORE AND WHITTIER MANAGEMENT PARTNERS, LLC.**



Christina Shefferman
Assistant Project Manager
Cc: Attendees, File

**The above is my summation of our meeting. If you have any additions and/or corrections, please contact me for incorporation into these minutes.**

## PRELIMINARY SCHEMATIC REPORT PHASE PROJECT MEETINGS

- November 28, 2017 – SBC Meeting #14
- December 4, 2017 – MEP Systems Sub-Committee Meeting
- December 12, 2017 – SBC Meeting #15
- December 18, 2017 – SBC Meeting #16
- January 10, 2018 – SBC Meeting #17
- January 22, 2018 – SBC Meeting #18
- January 31, 2018 – Community Meeting #3
- February 1, 2018 – SBC Meeting #19
- February 13, 2018 – Joint SBC and School Committee Meeting #1

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# AGENDA

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee Meeting | Meeting Date: | 2/13/2018 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | S. Brown |

1. Call to Order
2. Previous Topics & Approval of February 1, 2018 Meeting Minutes
3. Invoices & Commitments for Review/Approval
    i. DWMP Invoice #11 in the amount of $14,939.00
    ii. JCJ Invoice #6 in the amount of $24,285.00
    iii. Minuteman Press Invoice #87487 in the amount of $349.20
4. Preferred Option Review & Discussion
5. PSR MSBA Submission Review & Approval (*vote anticipated*)
6. Other Topics Not Reasonably Anticipated 48 hours prior to Meeting
7. Public Comments
8. Adjourn

MANAGEMENT PARTNERS, LLC

PROJECT MANAGERS
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www.doreandwhittier.com

# Manchester Memorial Elementary School

## Feasibility Phase - SBC Meeting #20

**February 13, 2018**



1. Call to Order
2. Previous Topics & Approval of **February 1, 2018 Meeting Minutes**
3. Design Update / Community Meeting Feedback
4. Review Cost Estimates
5. Preferred Option Discussion (vote anticipated)
6. Schedule/Look Ahead
7. Next Steps
8. Other Topics Not Reasonably Anticipated 48 hours prior to Meeting
9. Public Comments
10. Adjourn

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

# 1. Call to Order



# 2. Previous Topics & Approval of February 1, 2018 Minutes

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

# 3. Design Update/Community Meeting Feedback



# 4. Review Cost Estimates

# 5. Preferred Option Discussion (vote expected)



## OPTIONS ANALYSIS
### UPDATED 2/13/18

- ● FAVORABLE
- ◉ NEUTRAL
- ○ UNFAVORABLE

| | Option R-1 *"Four Walls"* | Option AR-2 *"Save the Core"* | Option N-1 *"The Piano"* | Option N-3 *"The Hub"* | Option N-9 *"The Hook"* |
|---|---|---|---|---|---|
| |  |  |  |  |  |
| **Educational** | | | | | |
| Meets District's Space Program Goals | ○ | ◉ | ● | ● | ● |
| Provides Flexibility for Future Building Expansion | ○ | ○ | ○ | ● | ● |
| Flexibility for Grade Level Re-Configuration (Bubble Grades) | ◉ | ● | ● | ● | ● |
| Minimizes Impact to Students During Construction | ◉ | ◉ | ◉ | ◉ | ○ |
| Provides Separated Whole School Gathering Space w/ Stage | ○ | ○ | ● | ● | ● |
| **Community** | | | | | |
| Provides Independent Access to Community Used Space | ● | ● | ○ | ● | ● |
| Allows for Competition Size Gym with Bleachers | ○ | ○ | ● | ● | ● |
| **Site** | | | | | |
| Increases Amount of Play Areas/ Fields | ◉ | ● | ● | ● | ● |
| Welcoming Street Presence | ◉ | ● | ● | ● | ◉ |
| Improves Parent Drop-Off/ Pick-Up Queuing | ◉ | ◉ | ● | ● | ● |
| Improves Impact to Riverfront Resource Areas | ◉ | ◉ | ● | ● | ◉ |
| Minimizes Potential Pedestrian/ Vehicular Conflicts | ◉ | ◉ | ● | ● | ● |
| **Building** | | | | | |
| Optimizes Building Area to Perimeter Ratio | ○ | ◉ | ● | ● | ◉ |
| **Costs and Schedule** | | | | | |
| Total Project Budget (Estimated) | $ 35.8 M | $ 55.8 M | $ 57.0 M | $ 55.6 M | $ 62.6 M |
| District Share (Estimated) | $ 24.2 M | $ 39.6 M | $ 42.4 M | $ 41.6 M | $ 47.8 M |

# EVALUATING THE OPTIONS

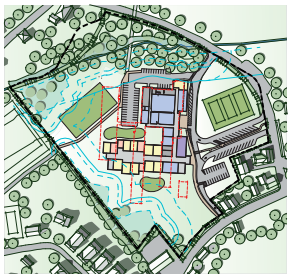
RECOMMENDED FOR FURTHER DEVELOPMENT

## R-1 FOUR WALLS



**RENOVATION ONLY**

## AR-2 SAVE THE CORE



**ADDITION/RENOVATION**
RETAIN CORE BLOCK ONLY

## N-1 THE PIANO



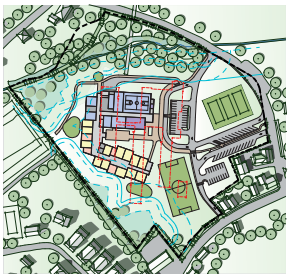
**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

## N-3 THE HUB



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE

## N-9 THE HOOK



**NEW CONSTRUCTION**
PHASED - STUDENTS ON-SITE



## R-1 FOUR WALLS

**PHASE ONE**



## **R-1** FOUR WALLS

**PHASE TWO**





## **R-1** FOUR WALLS

**PHASE THREE**



## **R-1** FOUR WALLS

**PHASE FOUR**





## **R-1** FOUR WALLS




SITE PLAN

## **R-1** FOUR WALLS






## **AR-2** SAVE THE CORE

**PHASE ONE**



NORTH

## **AR-2** SAVE THE CORE

**PHASE TWO**



NORTH



## **AR-2** SAVE THE CORE

**PHASE THREE**



NORTH

## **AR-2** SAVE THE CORE

**PHASE FOUR**



NORTH



## **AR-2** SAVE THE CORE

**PHASE FIVE**



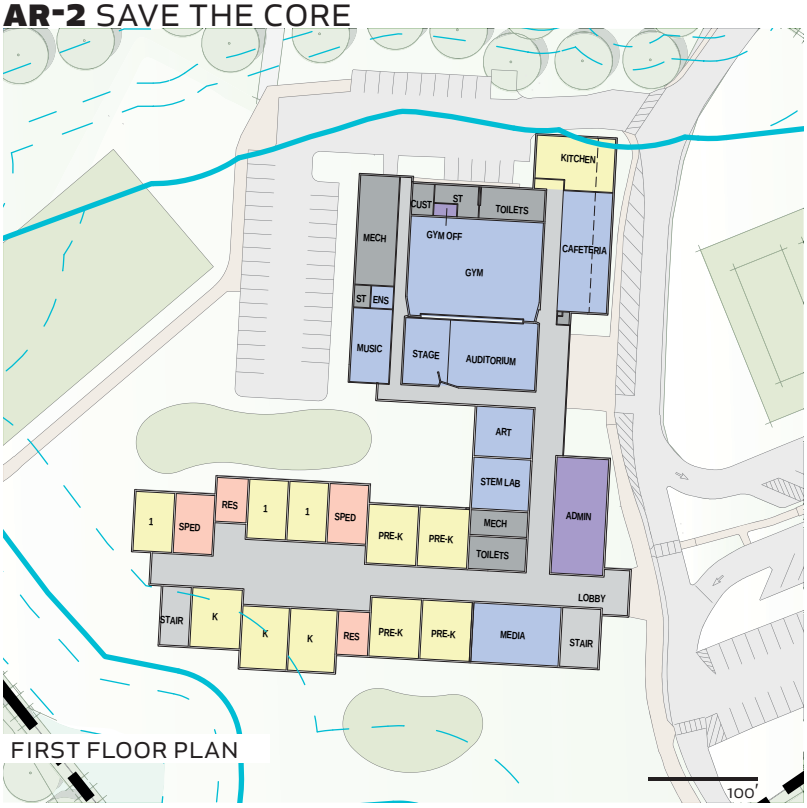
NORTH

## **AR-2** SAVE THE CORE

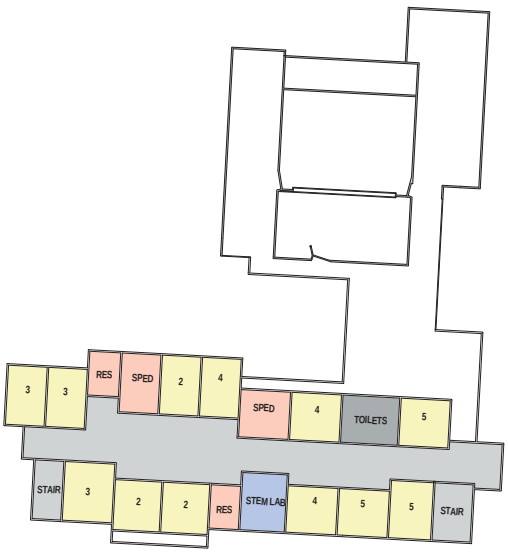





## **AR-2** SAVE THE CORE




FIRST FLOOR PLAN




SECOND FLOOR PLAN

## **N-1** THE PIANO

**PHASE ONE**



NORTH



## **N-1** THE PIANO

**PHASE TWO**



NORTH

## **N-1** THE PIANO

**PHASE THREE**



NORTH

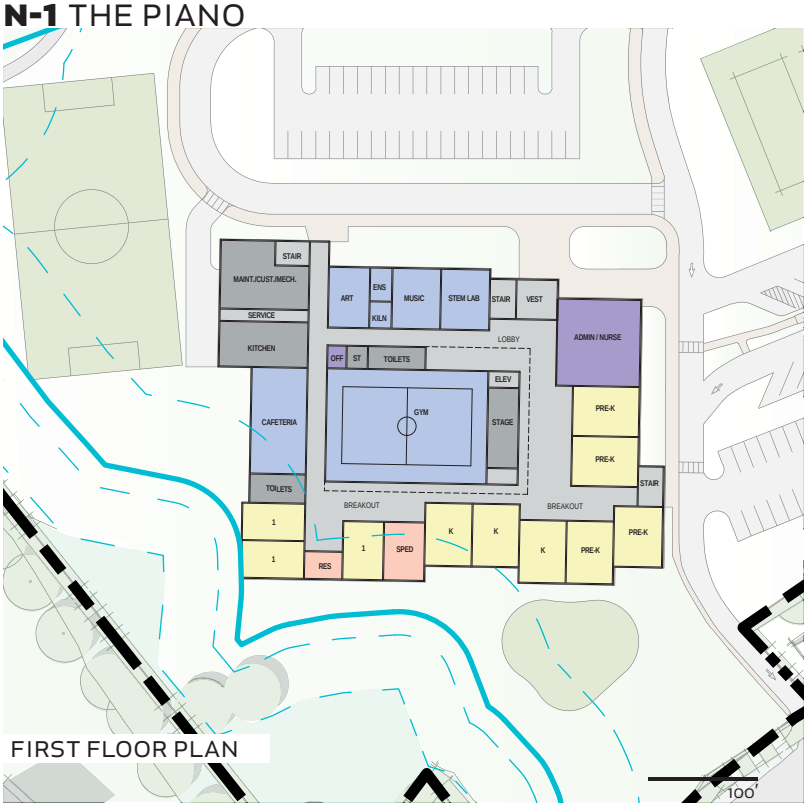


## **N-1** THE PIANO

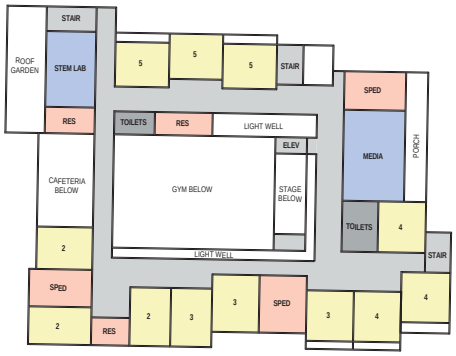



SITE PLAN

## **N-1** THE PIANO




FIRST FLOOR PLAN




SECOND FLOOR PLAN



## **N-3** THE HUB

**PHASE ONE**



NORTH

## **N-3** THE HUB
**PHASE TWO**



NORTH



## **N-3** THE HUB
**PHASE THREE**



NORTH

## **N-3** THE HUB
**PHASE FOUR**



NORTH



## **N-3** THE HUB
**PHASE FIVE**



NORTH

## **N-3** THE HUB




MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

## **N-3** THE HUB




FIRST FLOOR PLAN

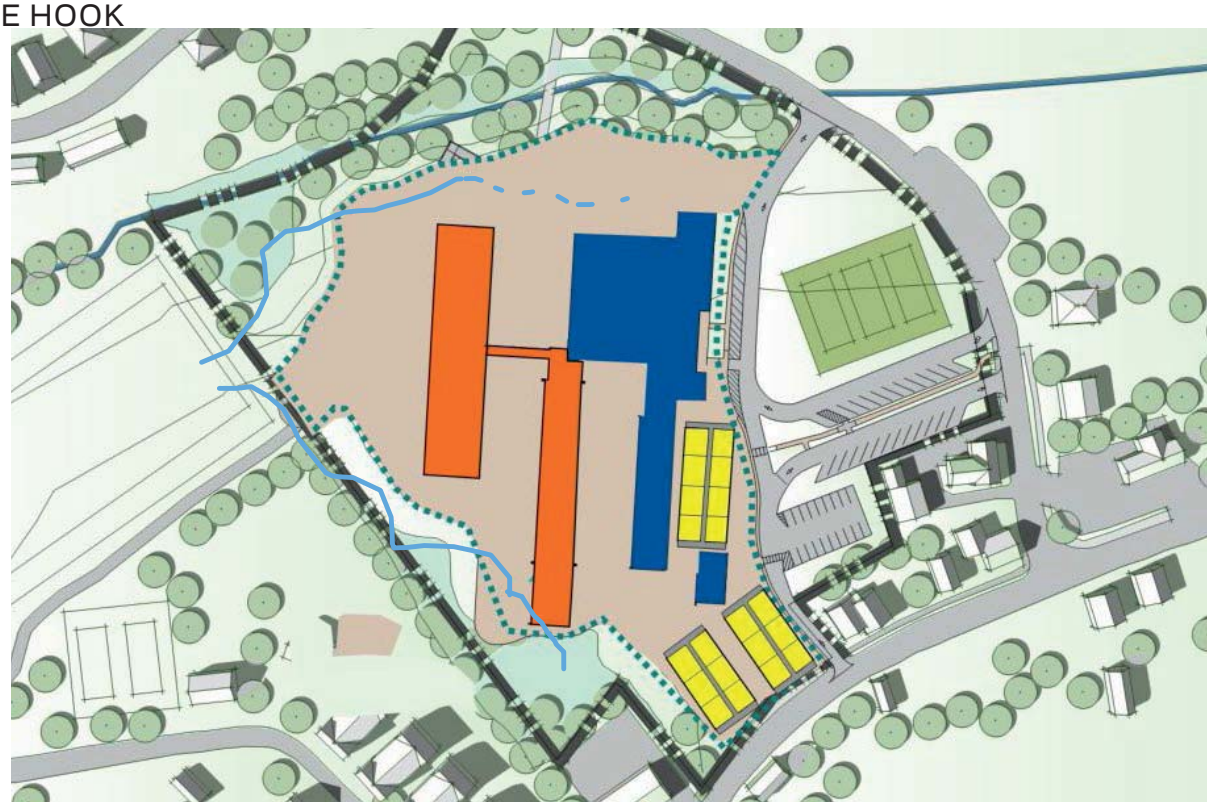



SECOND FLOOR PLAN

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

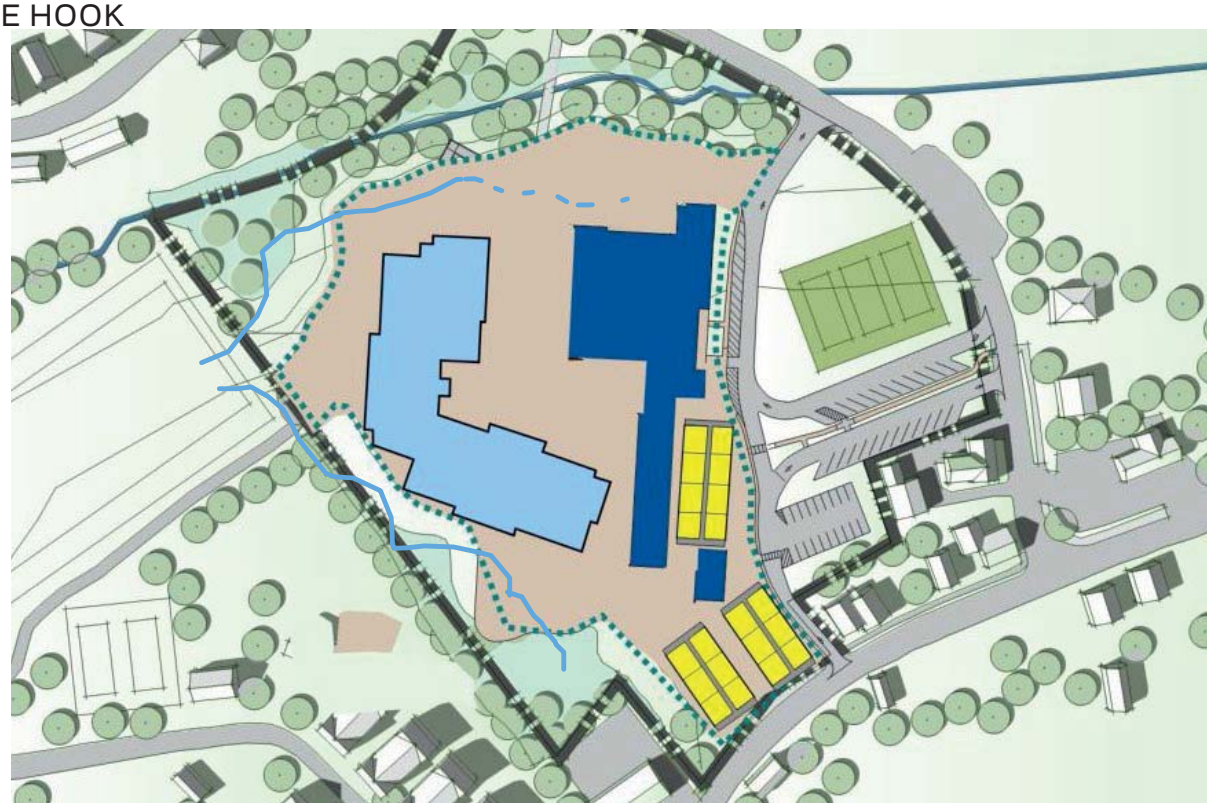
## **N-9** THE HOOK
**PHASE ONE**



NORTH



## **N-9** THE HOOK
**PHASE TWO**



NORTH

## **N-9** THE HOOK
**PHASE THREE**



NORTH



## **N-9** THE HOOK
**PHASE FOUR**



NORTH

## **N-9** THE HOOK



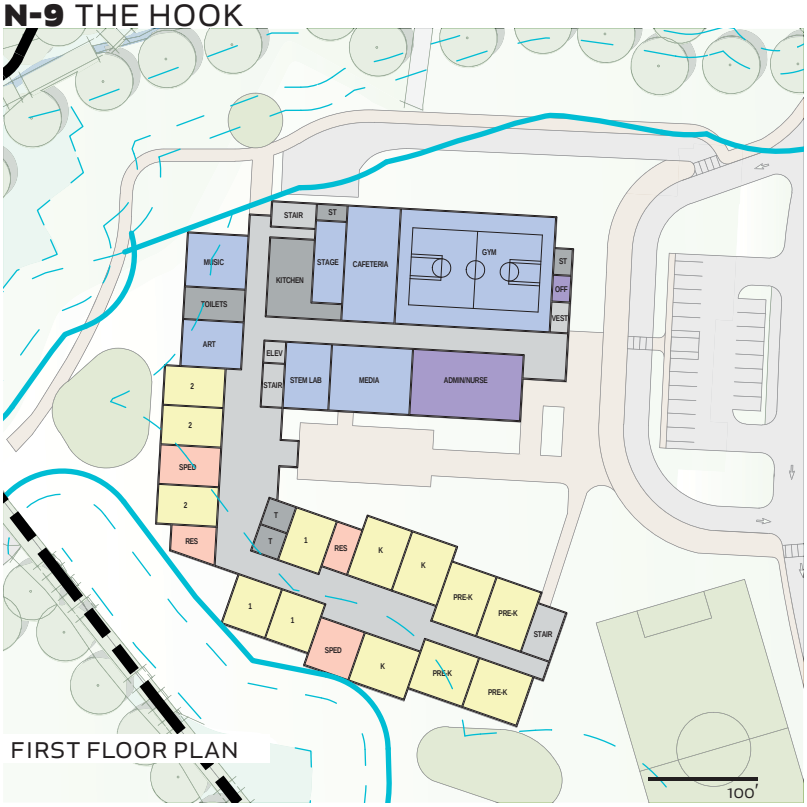

SITE PLAN

MANCHESTER MEMORIAL ELEMENTARY SCHOOL

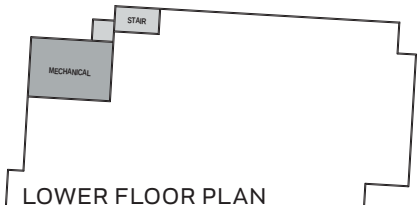
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

## **N-9** THE HOOK




FIRST FLOOR PLAN




LOWER FLOOR PLAN




SECOND FLOOR PLAN

MANCHESTER MEMORIAL ELEMENTARY SCHOOL

MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

# 7. Next Steps



## TODAY'S AGENDA

### Next Steps

| | |
|---|---|
| 2/1 | SBC-Review Cost Estimates |
| 2/5 | SBC-Select Preferred Option |
| 2/13 | SBC/SC-Joint Committee Approval of PSR |
| 2/21 | Submit PSR to MSBA |
| 3/13 | SBC-CM Prequalification Process |
| 3/27 | SBC-Update on MSBA FAS Meeting |

## 8. Other Topics Not Reasonably Anticipated (48 hours prior to meeting)



## 9. Public Comments

## 10. Adjourn



# THANK YOU

MANCHESTER MEMORIAL ELEMENTARY SCHOOL
MANCHESTER-ESSEX REGIONAL SCHOOL DISTRICT, MASSACHUSETTS

JCJARCHITECTURE

# APPROVED MODIFICATIONS

| | | | A | B | B-A=C | C*1.45=D | E | D*E | |
|---|---|---|---|---|---|---|---|---|---|
| Item | Description | Included in Existing School | Baseline MSBA SF | Proposed SF | NSF Impact | GSF Impact | $psf (NEW) | Construction Cost | MSBA Reimbursable |
| | MSBA Guideline SF (based on 335 Students) | | | | 41,962 | 58,932 | $ 450 | $ 26,519,438 | YES |
| 1 | General Classrooms (15 vs 12) | YES | 11,400 | 14,250 | 2,850 | 4,133 | $ 450 | $ 1,859,625 | YES |
| 2 | Pre-K Classrooms (4) | YES (2) | 0 | 4,800 | 4,800 | 6,960 | $ 450 | $ 3,132,000 | YES |
| 3 | Pre-K Storage | YES | 0 | 450 | 450 | 653 | $ 450 | $ 293,625 | YES |
| 4 | Enlarge Parent/Teacher Conf. (300 sf vs 250 sf) | YES | 250 | 300 | 50 | 73 | $ 450 | $ 32,625 | YES |
| 5 | Self Contained SPED Classroom (4 vs 3) | YES | 2,850 | 3,800 | 950 | 1,378 | $ 450 | $ 619,875 | YES |
| 6 | Self Contained SPED Toilet (4 vs 3) | YES | 180 | 240 | 60 | 87 | $ 450 | $ 39,150 | YES |
| 7 | STEM / Maker Classroom w/ Storage (2) | NO | 0 | 2,400 | 2,400 | 3,480 | $ 450 | $ 1,566,000 | YES |
| 8 | Music Lessons Room (1 Room @ 200 sf) | NO | 150 | 200 | 50 | 73 | $ 450 | $ 32,625 | YES |
| **Subtotal** | | | | | **11,610** | **16,835** | | **7,575,525** | |
| 9 | Enlarge Gymnasium | NO | 6,000 | 7,600 | 1,600 | 2,320 | $ 450 | $ 1,044,000 | Potential |
| 10 | Dedicated Shower (Nurse's Suite) | NO | 0 | 50 | 50 | 73 | $ 450 | $ 32,625 | Potential |
| **Subtotal** | | | | | **1,650** | **2,393** | | **1,076,625** | |
| 11 | Manchester Parks & Rec Area w/ Storage | YES | 0 | 1,800 | 1,800 | 2,610 | $ 450 | $ 1,174,500 | NO |
| **Subtotal** | | | | | **1,800** | **2,610** | | **1,174,500** | |
| **Total** | | | | | **15,060** | **21,837** | | **9,826,650** | |
| | MSBA Guideline SF (from above) | | | | 41,962 | 58,932 | | | |
| | **Total Building SF** | | | | **57,022** | **80,770** | | | |

***AMOUNTS EXCLUDE SITE OR SWING SPACE COSTS**

# MEETING MINUTES

MANAGEMENT PARTNERS, LLC

| | | | |
|---|---|---|---|
| Project: | Manchester Memorial Elementary School | Project No: | MP17-114 |
| Subject: | School Building Committee/School Committee Meeting | Meeting Date: | 2/13/2018 |
| Location: | Manchester MS/HS – Library | Time: | 7:00 PM |
| Distribution: | Attendees, Project File | Prepared By: | C.Shefferman |

| Present | Name | Affiliation | Present | Name | Affiliation |
|---|---|---|---|---|---|
| ✓ | Caroline Weld * | SBC Co-Chair | ✓ | Jim LaPosta | JCJ |
| ✓ | Ann Cameron * | SBC Co-Chair | ✓ | Daniel Ruiz | JCJ |
| ✓ | Pam Beaudoin * | Superintendent | | Lauren Braren | JCJ |
| ✓ | Avi Urbas * | Dir. of Fin. & Ops | | Emily Czarnecki | JCJ |
| ✓ | Alva Ingaharro * | Essex | ✓ | Mike Burton | DWMP |
| ✓ | John Willis * | Principal MMES | ✓ | Steven Brown | DWMP |
| ✓ | Jay Pagliarulo | Dir. of Facilities | ✓ | Christina Shefferman | DWMP |
| | Andy Oldeman * | Man. Fin. Comm. | ✓ | Shannon Erdmann | School Committee |
| ✓ | Lisa O'Donnell * | Essex B.O.S. | ✓ | Ken Warnock | School Committee |
| ✓ | Remko Brueker * | Manchester | ✓ | Rachel Fitzgibbon | School Committee |
| ✓ | Adam Zaiger * | Manchester | ✓ | Sarah Wolf | School Committee |
| ✓ | Tyler Virden * | Essex | | | |
| ✓ | George Scharfe * | Manchester | | | |
| ✓ | Gordon Brewster * | Manchester | | | |
| ✓ | Charlie Hay * | Essex | | | |
| ✓ | Sarah Creighton * | Manchester | | | |
| | Maggie Tomaiolo * | Essex | | | |
| ✓ | Jake Foster * | Essex | | | |

**Action Items:**

| Item No. | Responsible Party: | Description |
|---|---|---|
| 7.11 | P. Beaudoin | Site: Swing space availability |

** SBC Voting Member*

PROJECT MANAGERS
ARCHITECTS

Newburyport, MA 01950
260 Merrimac Street Bldg 7
978.499.2999 ph
978.499.2944 fax

www.doreandwhittier.com

| Item No. | Description | Action |
|---|---|---|
| 20.1 | Call to Order: 7:04 pm meeting was called to order by the SBC Co-Chair Caroline Weld with 15 of 17 voting members in attendance. S. Brown of DWMP notes the meeting will follow the Power Point presentation that is being projected on the screen and to follow the agenda that was provided to the SBC prior to the meeting via Dropbox. | Record |
| 20.2.1 | Previous Topics & Approval of February 1, 2018 Meeting Minutes: S. Brown explains and reviews the one previous item requiring action. A review of the item is noted below. | Record |
| 7.11 | Site Understanding: (For previous history of this item, refer to previous meeting minutes)<br><br>…Additional details and follow up will be provided to the SBC at our next meeting.<br>11/14/2017: P. Beaudoin states that she has a meeting scheduled with the Mayor of the Town of Beverly on 11/20/17. P. Beaudoin is also in communication with St. Mary's in Beverly, and is waiting for a formal response from the school on whether it will fit the needs of MMES. P. Beaudoin is still waiting to hear from Father Jim in Gloucester. P. Beaudoin will continue to pursue these options and will report back to the SBC once she has additional information.<br>11/28/2017: P. Beaudoin states that there are still 3 possible options. Briscoe School in Beverly, The Cummings Center in Beverly, and St. Mary's in Beverly. P. Beaudoin met with officials from Beverly's mayor office, and is waiting to hear whether they would be willing to wait a year before someone would possibly occupy the school. The Cummings Center approached P. Beaudoin and stated that they might have an option that would fit their needs. The Cummings Center is working on putting together a quote and space availability between their many available spaces. P. Beaudoin is still waiting to hear if St. Mary's can provide an estimate for the space. After discussion, the SBC agreed that overall, they would steer towards an option that can either have kids on site or off site based on phasing, modulars, and or an offsite temporary campus. P. Beaudoin to continue development of potential swing spaces.<br>12/12/2017: P. Beaudoin states Cummings Properties has confirmed that they have nothing that fits the District's space needs for the time frame needed. No update from Gloucester or St. Mary's prospect at this time.<br>12/18/2017: No update at this time.<br>1/10/2018: No update at this time.<br>1/22/2018: No update at this time.<br>2/1/2018: No update at this time.<br>2/13/2018: No update at this time. | P. Beaudoin |
| 20.2.2 | Previous Topics & Approval of February 1, 2018 Meeting Minutes: A motion to approve the 2/1/2018 meeting minutes as submitted made by C. Weld and seconded by L. O'Donnell. Discussion: None. Vote: All in favor: Motion passes, minutes approved. | Record |
| 20.3.1 | Invoices & Commitments for Approval: DWMP invoice no. 11 in the amount of $14,939.00 (invoice attached) vote expected. Motion made by C. Weld to approve invoice no. 11 in the amount of $14,939.00, 2nd by J. Foster. Discussion: None. Vote: Unanimous to approve. | Record |
| 20.3.2 | Invoice & Commitments for Approval: JCJ invoice no. 6 for Designer Feasibility services in the amount of $24,285.00 (invoice attached) vote expected. Motion made by C. Weld to | Record |

| | | |
|---|---|---|
| | approve invoice no. 6 in the amount of $24,285.00, 2nd by J. Foster. Discussion: None. Vote: Unanimous to approve. | |
| 20.3.3 | Invoice & Commitments for Approval: Minuteman invoice no. 87487 for mailers in the amount of $349.00 (invoice attached) vote expected. Motion made by C. Weld to approve invoice no. 87487 in the amount of $349.00, 2nd by J. Foster. Discussion: None. Vote: Unanimous to approve. | Recorf |
| 20.4 | Preferred Option Discussion: The SBC and SC reviewed the options/scheme slides and had a few comments. The comments are outlined below:<br>➢ N-3: Potential to further reduce the # of modulars<br>➢ PSR Documents on Dropbox: Still developing files, will let SBC know as it is updated and further developed<br>➢ Page 12 language of the PSR document needs to be changed to state .funded by the "Town of Manchester"<br>➢ SC has been kept up to date with project details through the process. Fully aware and have reviewed the information | Record |
| 20.5 | PSR MSBA Submission Review & Approval: A motion was made to approve the PSR MSBA Submission of the scheme N-3 known as "The Hub". Discussion: None. Vote: 15 SBC members and 6 SC members in favor. Unanimous to approve. Motion passes. | Record |
| 20.6 | Other Topics Not Reasonably Anticipated (48 hours prior to meeting): None. | Record |
| 20.7 | Public Comments: None. | |
| 20.8 | Adjourn: A motion was made by J. Foster and seconded by C. Weld to adjourn the meeting. Discussion: None. Vote: Unanimous to approve. Meeting adjourned at 7:16 pm. | Record |

**Attached:**
*SBC Meeting Agenda, Sign In Sheet, SBC Meeting No. 19 2/1/18 Meeting Minutes, Manchester Memorial Elementary School Presentation 2/13/18*

**DORE AND WHITTIER MANAGEMENT PARTNERS, LLC.**

Christina Shefferman
Assistant Project Manager
Cc: Attendees, File

**The above is my summation of our meeting. If you have any additions and/or corrections, please contact me for incorporation into these minutes.**

MANCHESTER ESSEX REGIONAL SCHOOL DISTRICT
**Office of the Superintendent**
P.O. Box 1407
Manchester-by-the-Sea, MA 01944

Tel. (978) 526-4919
Fax: (978) 526-7585
beaudoinp@mersd.org

PAMELA BEAUDOIN
SUPERINTENDENT OF SCHOOLS

February 21, 2018

Ms. Diane Sullivan
Senior Capital Program Manager
40 Broad Street
Boston, Massachusetts 02109

Dear Ms. Sullivan:

The Manchester Essex Regional School District School Building Committee ("SBC") has completed its review of the Feasibility Study Preferred Schematic Report for the Manchester Memorial Elementary school project (the "Project"), and on February 13, 2018 the SBC voted to approve and authorize the Owner's Project Manager to submit the Feasibility Study related materials to the MSBA for its consideration. A certified copy of the SBC meeting minutes, which includes the specific language of the vote and the number of votes in favor, opposed, and abstained, are attached.

Since the MSBA's Board of Directors invited the District to conduct a Feasibility Study on September 28, 2016, the SBC has held 13 meetings (all held at 7:00pm in the MERSD MS/HS Media Center) regarding the proposed project, in compliance with the state Open Meeting Law. These meetings include:

- **March 28, 2017**
- **May 9, 2017**
- **June 13, 2017**
- **July 11, 2017**
- **July 25, 2017**
- **August 8, 2017**
- **August 29, 2017**
- **September 12, 2017**
- **September 26, 2017**
- **October 10, 2017**
- **October 24, 2017**
- **November 6, 2017**
- **November 14, 2017**
- **November 28, 2017**
- **December 12 ,2017**
- **December 18, 2017**
- **January 10, 2018**
- **January 22, 2018**
- **February 1, 2018**
- **February 13, 2018**

Notices for these meetings were posted and made available for public review in Manchester-by-the-Sea Town Hall (10 Central Street #4), as well as Essex Town Hall (20 Martin Street). Notices were also made available on each Town's website.

In addition to the SBC meetings listed above, the District held six public meetings (all held in the MMES Auditorium), which were posted in compliance with the state Open Meeting Law, at which the Project was discussed. These meetings include:

- **October 4, 2017 at 9:00a** – Community forum with Owner's Project Manager DWMP, and Designer JCJ Architecture, and Superintendent of Schools Pamela Beaudoin. Topics discussed: Capital projects master plan, MSBA process, project schedule, PDP process review, next steps/look ahead.

The Manchester Essex Regional School District does not discriminate in its programs, activities or employment practices based on race, color, age, national origin, religion, gender, sexual orientation or disability.

- **October 4, 2017 at 7:00p** – Community forum with Owner's Project Manager DWMP, and Designer JCJ Architecture, and Superintendent of Schools Pamela Beaudoin. Topics discussed: Capital projects master plan, MSBA process, project schedule, PDP process review, and next steps/look ahead.
- **November 1, 2017 at 9:00a** – Community forum with Owner's Project Manager DWMP, and Designer JCJ Architecture, and Superintendent of Schools Pamela Beaudoin. Topics discussed: Capital projects master plan, MSBA process update, project schedule, PDP process review, PDP site & building options review, next steps/look ahead.
- **November 1, 2017 at 7:00p** – Community forum with Owner's Project Manager DWMP, and Designer JCJ Architecture, and Superintendent of Schools Pamela Beaudoin. Topics discussed: Capital projects master plan, MSBA process update, project schedule, PDP process review, PDP site & building options review, next steps/look ahead.
- **January 31 ,2018 at 9:00a** – Community forum with Owner's Project Manager DWMP, and Designer JCJ Architecture, and Superintendent of Schools Pamela Beaudoin. Topics discussed: Organization/project team, process and schedule, options explored, feedback exercise, discussion, next steps.
- **January 31, 2018 at 7:00p** – Community forum with Owner's Project Manager DWMP, and Designer JCJ Architecture, and Superintendent of Schools Pamela Beaudoin. Topics discussed: Organization/project team, process and schedule, options explored, feedback exercise, discussion, next steps.

The presentation materials for each meeting, meeting minutes, and summary materials related to the Project are available locally for public review by visiting the school district's website:

**www.mersd.org > *quick links* > *Building Committee***
(www.mersd.org/domain/767)

To the best of my knowledge and belief, each of the meetings listed above complied with the requirements of the Open Meeting Law, M.G.L. c. 30A, §§ 18-25 and 940 CMR 29 *et seq*.

If you have any questions or require any additional information, please contact the Owner's Project Manager, Dore & Whittier Management Partners, at (978) 499-2999.

By signing this Local Action and Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete, and accurate.

**By:** Pamela Beaudoin

**Title: Chief Executive Officer**

**Date:** 2/13/18

By signing this Local Action and Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete, and accurate.

**By:** Pamela Beaudoin

**Title: Superintendent of Schools**

**Date:** 2/13/18

By signing this Local Action and Approval Certification, I hereby certify that, to the best of my knowledge and belief, the information supplied by the District in this Certification is true, complete, and accurate.

**By:** Ann O. Cameron

**Title: Chair of the School Committee**

**Date:** 2/13/18

# APPENDIX

SECTION 3.3.6

A1

### 3.3.6 – APPENDIX 1

- Preliminary Schematic Report Phase Estimate – VJ Associates (Designer)
- Preliminary Schematic Report Phase Estimate – PM & C (OPM)

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**MANCHESTER MEMORIAL ELEMENTARY SCHOOL**
**MANCHESTER BY THE SEA, MA**
**PRELIMINARY CONCEPT ESTIMATE**

**01/31/2017**

**ALTERNATE R-1**

Scope: Renovation of existing Manchester Memorial Elementary School, phased

| | GSF | Bldg Cost | Bldg Cost/SF | Site Cost | Total Construction Cost | Total Construction Cost/SF |
|---|---|---|---|---|---|---|
| Work Area of Existing to be Renovated | 66,573 | $24,863,954 | $373 | $1,864,500 | $26,728,454 | |
| Work Area of New Construction | - | $0 | $0 | $0 | $0 | |
| | 66,573 | $24,863,954 | | $1,864,500 | $26,728,454 | $401.49 |
| Modular classrooms req'd | | | | ADD | $1,400,000 | |

**OR**

**ALTERNATE AR-2**

Scope: Renovation of existing Manchester Memorial Elementary School w/ new addition, phased

| | GSF | Bldg Cost | Bldg Cost/SF | Site Cost | Total Construction Cost | Total Construction Cost/SF |
|---|---|---|---|---|---|---|
| Work Area of Existing to be Renovated | 21,200 | $8,030,463 | $379 | $0 | $8,030,463 | |
| Work Area of New Construction | 69,900 | $32,121,851 | $460 | $3,667,529 | $35,789,381 | |
| | 91,100 | $40,152,314 | | $3,667,529 | $43,819,844 | $481.01 |
| Modular classrooms req'd | | | | ADD | $1,700,000 | |

**OR**

**ALTERNATE N-1**

Scope: PreK-3, New Construction, phased

| | GSF | Bldg Cost | Bldg Cost/SF | Site Cost | Total Construction Cost | Total Construction Cost/SF |
|---|---|---|---|---|---|---|
| Work Area of Existing to be Renovated | - | $0 | $0 | $0 | $0 | |
| Work Area of New Construction | 88,900 | $40,656,485 | $457 | $4,226,848 | $44,883,333 | |
| | 88,900 | $40,656,485 | | $4,226,848 | $44,883,333 | $504.87 |
| Modular classrooms req'd | | | | ADD | $1,300,000 | |

**OR**

**ALTERNATE N-3**

Scope: PreK-3, New Construction, phased

| | GSF | Bldg Cost | Bldg Cost/SF | Site Cost | Total Construction Cost | Total Construction Cost/SF |
|---|---|---|---|---|---|---|
| Work Area of Existing to be Renovated | - | $0 | $0 | $0 | $0 | |
| Work Area of New Construction | 82,800 | $40,174,965 | $485 | $4,330,285 | $44,505,251 | |
| | 82,800 | $40,174,965 | | $4,330,285 | $44,505,251 | $537.50 |
| Modular classrooms req'd | | | | ADD | $650,000 | |

**OR**

**ALTERNATE N-9**

Scope: PreK-3, New Construction, phased

| | GSF | Bldg Cost | Bldg Cost/SF | Site Cost | Total Construction Cost | Total Construction Cost/SF |
|---|---|---|---|---|---|---|
| Work Area of Existing to be Renovated | - | $0 | $0 | $0 | $0 | |
| Work Area of New Construction | 87,700 | $44,794,857 | $511 | $4,378,943 | $49,173,800 | |
| | 87,700 | $44,794,857 | | $4,378,943 | $49,173,800 | $560.70 |
| Modular classrooms req'd | | | | ADD | $2,000,000 | |

**MANCHESTER MEMORIAL ELEMENTARY SCHOOL**
**MANCHESTER BY THE SEA, MA**
**PRELIMINARY CONCEPT ESTIMATE**

**01/31/2017**

**ALTERNATE R-1**

| | | | |
|---|---|---|---|
| Scope: | Renovation of existing Manchester Memorial Elementary School, phased | 66,573 | GSF |

| SECTION | DESCRIPTION | COST | COST/SF |
|---|---|---|---|
| **A** | **SUBSTRUCTURE** | | |
| A10 | FOUNDATIONS | | |
| A1010 | Standard Foundations | $90,000 | $1.35 |
| A40 | SLABS ON GRADE | | |
| A4010 | Standard Slabs on Grade | $199,719 | $3.00 |
| **B** | **SHELL** | | |
| B10 | SUPER STRUCTURE | | |
| B1010 | Floor Construction | $0 | $0.00 |
| B1020 | Roof Construction | $233,006 | $3.50 |
| B1080 | Stairs | $270,000 | $4.06 |
| B20 | EXTERIOR VERTICAL ENCLOSURES | | |
| B2010 | Exterior Walls | $1,800,000 | $27.04 |
| B2020 | Exterior Windows | $1,200,000 | $18.03 |
| B2030 | Exterior Doors & Grilles | $75,000 | $1.13 |
| B30 | EXTERIOR HORIZONTAL ENCLOSURES | | |
| B3010 | Roofing | $1,531,179 | $23.00 |
| **C** | **INTERIORS** | | |
| C10 | INTERIOR CONSTRUCTION | | |
| C1010 | Partitions | $600,000 | $9.01 |
| C1020 | Interior Windows | $75,000 | $1.13 |
| C1030 | Interior Doors | $200,000 | $3.00 |
| C1090 | Interior Specialties | $150,000 | $2.25 |
| C20 | INTERIOR FINISHES | | |
| C2010 | Wall Finishes | $332,900 | $5.00 |
| C2030 | Floor Finishes | $532,600 | $8.00 |
| C2040 | Stair Finishes | $8,500 | $0.13 |
| C2050 | Ceiling Finishes | $466,100 | $7.00 |
| **D** | **SERVICES** | | |
| D10 | CONVEYING | | |
| D1010 | Vertical Conveying Systems | $125,200 | $1.88 |
| D20 | PLUMBING | | |
| D2010 | Domestic Water Distribution | $1,331,460 | $20.00 |
| D30 | HVAC | | |
| D3000 | HVAC Systems, General | $2,996,000 | $45.00 |
| D40 | FIRE PROTECTION | | |
| D4010 | Fire Suppression | $532,584 | $6.00 |
| D50 | ELECTRICAL | | |
| D5010 | Electrical Power Generation | $70,000 | $1.05 |
| D5020 | Lighting & Branch Wiring | $732,400 | $11.00 |
| D5030 | Communications & Security | $700,000 | $10.51 |
| D5090 | Other Electrical Systems | $150,000 | $2.25 |
| D5090 | PV Array (Infrastructure Only) | $300,000 | $4.51 |
| **E** | **EQUIPMENT & FURNISHINGS** | | |
| E10 | EQUIPMENT | | |
| E1020 | Institutional Equipment | $250,000 | $3.76 |
| E20 | FURNISHINGS | | |
| E2010 | Fixed Furnishings | $200,000 | $3.00 |
| **F** | **SPECIAL CONSTRUCTION & DEMOLITION** | | |
| F20 | SELECTIVE BUILDING DEMOLITION | | |
| F2010 | Building Elements Demolition | $665,800 | $13.00 |
| F2020 | Hazard Materials Abatement & Removals | $1,051,900 | $15.80 |

**MANCHESTER MEMORIAL ELEMENTARY SCHOOL**
**MANCHESTER BY THE SEA, MA**
**PRELIMINARY CONCEPT ESTIMATE**

**01/31/2017**

**ALTERNATE R-1**

Scope: Renovation of existing Manchester Memorial Elementary School, phased 66,573 GSF

| SECTION | DESCRIPTION | | COST | COST/SF |
|---|---|---|---|---|
| | **SUB-TOTAL BUILDING** | | **$16,869,348** | **$253.40** |
| **G** | **BUILDING SITEWORK** | | | |
| G10 | SITE PREPARATION | | | |
| G1010 | Site Clearing | | $20,000 | $0.30 |
| G1050 | Site Remediation & Abatement | | $40,000 | $0.60 |
| G1070 | Site Earthwork | | $75,000 | $1.13 |
| G20 | SITE IMPROVEMENTS | | | |
| G2010 | Roadways | | $0 | $0.00 |
| G2020 | Parking Lots | | $100,000 | $1.50 |
| G2030 | Pedestrian Plazas & Walkways | | $125,000 | $1.88 |
| G2060 | Site Development | | $650,000 | $9.76 |
| G2080 | Landscaping | | $30,000 | $0.45 |
| G30 | SITE UTILITIES | | | |
| G3010 | Water Utilities | | $75,000 | $1.13 |
| G3020 | Sanitary Sewerage Utilities | | $30,000 | $0.45 |
| G3030 | Storm Drainage Utilities | | $50,000 | $0.75 |
| G3050 | Site Energy Distribution | | $0 | $0.00 |
| G3060 | Site Fuel Distribution | | $0 | $0.00 |
| G40 | ELECTRICAL SITE IMPROVEMENTS | | | |
| G4050 | Site Lighting | | $60,000 | $0.90 |
| G50 | SITE COMMUNICATIONS | | | |
| G5010 | Site Communications Systems | | $10,000 | $0.15 |
| | **SUB-TOTAL SITE** | | **$1,265,000** | **$19.00** |
| | **SUBTOTAL FOR SITE & BUILDING COSTS** | | **$18,134,348** | **$272.40** |
| | **Markups** | | | |
| | Escalation Contingency | 4.50% | $816,046 | |
| | Design Contingency | 12.00% | $2,274,047 | |
| | CMR/GMP Contingency | 2.50% | $453,359 | |
| | General Conditions, CMR | 10.00% | $2,122,444 | |
| | General Requirement, CMR | 4.00% | $725,374 | |
| | Insurances & Bonds, CMR | 3.00% | $544,030 | |
| | Building Permit, waived | 0.00% | $0 | |
| | Phasing Premium | 5.00% | $906,717 | |
| | CMR Fee | 3.00% | $752,089 | |
| | **TOTAL CONSTRUCTION COST** | | **$26,728,454** | **$401.49** |

**MANCHESTER MEMORIAL ELEMENTARY SCHOOL**
**MANCHESTER BY THE SEA, MA**
**PRELIMINARY CONCEPT ESTIMATE**

**01/31/2017**

**ALTERNATE AR-2**

| | | | |
|---|---|---|---|
| Scope: | Renovation of existing Manchester Memorial Elementary School w/ new addition, phased | 91,100 | GSF |

| SECTION | DESCRIPTION | COST | COST/SF |
|---|---|---|---|
| **A** | **SUBSTRUCTURE** | | |
| A10 | FOUNDATIONS | | |
| A1010 | Standard Foundations | $1,822,000 | $20.00 |
| A1020 | Foundation support system | $546,600 | $6.00 |
| A40 | SLABS ON GRADE | | |
| A4010 | Standard Slabs on Grade | $1,184,300 | $13.00 |
| **B** | **SHELL** | | |
| B10 | SUPER STRUCTURE | | |
| B1010 | Floor Construction | $3,644,000 | $40.00 |
| B1020 | Roof Construction | $1,366,500 | $15.00 |
| B1080 | Stairs | $59,795 | $0.66 |
| B20 | EXTERIOR VERTICAL ENCLOSURES | | |
| B2010 | Exterior Walls | $2,277,500 | $25.00 |
| B2020 | Exterior Windows | $1,457,600 | $16.00 |
| B2030 | Exterior Doors & Grilles | $91,100 | $1.00 |
| B30 | EXTERIOR HORIZONTAL ENCLOSURES | | |
| B3010 | Roofing | $501,050 | $5.50 |
| **C** | **INTERIORS** | | |
| C10 | INTERIOR CONSTRUCTION | | |
| C1010 | Partitions | $273,300 | $3.00 |
| C1020 | Interior Windows | $91,100 | $1.00 |
| C1030 | Interior Doors | $113,875 | $1.25 |
| C1090 | Interior Specialties | $182,200 | $2.00 |
| C20 | INTERIOR FINISHES | | |
| C2010 | Wall Finishes | $91,100 | $1.00 |
| C2030 | Floor Finishes | $273,300 | $3.00 |
| C2040 | Stair Finishes | $91,051 | $1.00 |
| C2050 | Ceiling Finishes | $159,425 | $1.75 |
| **D** | **SERVICES** | | |
| D10 | CONVEYING | | |
| D1010 | Vertical Conveying Systems | $178,000 | $1.95 |
| D20 | PLUMBING | | |
| D2010 | Domestic Water Distribution | $1,275,400 | $14.00 |
| D30 | HVAC | | |
| D3000 | HVAC Systems, General | $4,099,500 | $45.00 |
| D40 | FIRE PROTECTION | | |
| D4010 | Fire Suppression | $409,950 | $4.50 |
| D50 | ELECTRICAL | | |
| D5010 | Electrical Power Generation | $728,800 | $8.00 |
| D5020 | Lighting & Branch Wiring | $819,900 | $9.00 |
| D5030 | Communications & Security | $911,000 | $10.00 |
| D5090 | Other Electrical Systems | $182,200 | $2.00 |
| D5090 | PV Array (Infrastructure Only) | $300,000 | $3.29 |
| **E** | **EQUIPMENT & FURNISHINGS** | | |
| E10 | EQUIPMENT | | |
| E1020 | Institutional Equipment | $3,000,000 | $32.93 |
| E20 | FURNISHINGS | | |
| E2010 | Fixed Furnishings | $683,250 | $7.50 |
| **F** | **SPECIAL CONSTRUCTION & DEMOLITION** | | |
| F20 | SELECTIVE BUILDING DEMOLITION | | |
| F2010 | Building Elements Demolition | $455,500 | $5.00 |
| F2020 | Hazard Materials Abatement & Removals | $1,051,900 | $11.55 |

**MANCHESTER MEMORIAL ELEMENTARY SCHOOL**
**MANCHESTER BY THE SEA, MA**
**PRELIMINARY CONCEPT ESTIMATE**

**01/31/2017**

**ALTERNATE AR-2**

| | | | |
|---|---|---|---|
| Scope: | Renovation of existing Manchester Memorial Elementary School w/ new addition, phased | 91,100 | GSF |

| SECTION | DESCRIPTION | | COST | COST/SF |
|---|---|---|---|---|
| | **SUB-TOTAL BUILDING** | | **$28,321,196** | **$310.88** |
| **G** | **BUILDING SITEWORK** | | | |
| G10 | SITE PREPARATION | | | |
| G1010 | Site Clearing | | $136,650 | $1.50 |
| G1050 | Site Remediation & Abatement | | $0 | $0.00 |
| G1070 | Site Earthwork | | $182,200 | $2.00 |
| G20 | SITE IMPROVEMENTS | | | |
| G2010 | Roadways | | $90,000 | $0.99 |
| G2020 | Parking Lots | | $170,000 | $3.70 |
| G2030 | Pedestrian Plazas & Walkways | | $100,000 | $1.70 |
| G2060 | Site Development | | $364,400 | $4.00 |
| G2080 | Landscaping | | $282,410 | $3.10 |
| G30 | SITE UTILITIES | | | |
| G3010 | Water Utilities | | $154,870 | $1.70 |
| G3020 | Sanitary Sewerage Utilities | | $154,870 | $1.70 |
| G3030 | Storm Drainage Utilities | | $546,600 | $6.00 |
| G3050 | Site Energy Distribution | | $250,000 | $2.74 |
| G3060 | Site Fuel Distribution | | $0 | $0.00 |
| G40 | ELECTRICAL SITE IMPROVEMENTS | | | |
| G4050 | Site Lighting | | $91,100 | $1.00 |
| G50 | SITE COMMUNICATIONS | | | |
| G5010 | Site Communications Systems | | $63,770 | $0.70 |
| | **SUB-TOTAL SITE** | | **$2,586,870** | **$28.40** |
| | **SUBTOTAL FOR SITE & BUILDING COSTS** | | **$30,908,066** | **$339.28** |
| | **Markups** | | | |
| | Escalation Contingency | 4.50% | $1,390,863 | |
| | Design Contingency | 12.00% | $3,875,871 | |
| | CMR/GMP Contingency | 2.50% | $772,702 | |
| | General Conditions, CMR | 7.00% | $2,532,236 | |
| | General Requirement, CMR | 4.00% | $1,236,323 | |
| | Insurances & Bonds, CMR | 3.00% | $927,242 | |
| | Building Permit, waived | 0.00% | $0 | |
| | Phasing Premium | 3.00% | $927,242 | |
| | CMR Fee | 3.00% | $1,249,299 | |
| | **TOTAL CONSTRUCTION COST** | | **$43,819,844** | **$481.01** |

**MANCHESTER MEMORIAL ELEMENTARY SCHOOL**
**MANCHESTER BY THE SEA, MA**
**PRELIMINARY CONCEPT ESTIMATE**

**01/31/2017**

**ALTERNATE N-1**

Scope: PreK-3, New Construction, phased 88,900 GSF

| SECTION | DESCRIPTION | | COST | COST/SF |
|---|---|---|---|---|
| **A** | **SUBSTRUCTURE** | | | |
| A10 | FOUNDATIONS | | | |
| A1010 | Standard Foundations | | $1,511,300 | $17.00 |
| A1020 | Foundation support system | | $660,000 | $7.42 |
| A40 | SLABS ON GRADE | | | |
| A4010 | Standard Slabs on Grade | | $884,000 | $9.94 |
| **B** | **SHELL** | | | |
| B10 | SUPER STRUCTURE | | | |
| B1010 | Floor Construction | | $1,778,000 | $20.00 |
| B1020 | Roof Construction | | $1,955,800 | $22.00 |
| B1080 | Stairs | | $160,000 | $1.80 |
| B20 | EXTERIOR VERTICAL ENCLOSURES | | | |
| B2010 | Exterior Walls | | $2,133,600 | $24.00 |
| B2020 | Exterior Windows | | $1,422,400 | $16.00 |
| B2030 | Exterior Doors & Grilles | | $111,125 | $1.25 |
| B30 | EXTERIOR HORIZONTAL ENCLOSURES | | | |
| B3010 | Roofing | | $1,689,100 | $19.00 |
| **C** | **INTERIORS** | | | |
| C10 | INTERIOR CONSTRUCTION | | | |
| C1010 | Partitions | | $1,689,100 | $19.00 |
| C1020 | Interior Windows | | $311,150 | $3.50 |
| C1030 | Interior Doors | | $533,400 | $6.00 |
| C1090 | Interior Specialties | | $800,100 | $9.00 |
| C20 | INTERIOR FINISHES | | | |
| C2010 | Wall Finishes | | $889,000 | $10.00 |
| C2030 | Floor Finishes | | $622,300 | $7.00 |
| C2040 | Stair Finishes | | $88,852 | $1.00 |
| C2050 | Ceiling Finishes | | $711,200 | $8.00 |
| **D** | **SERVICES** | | | |
| D10 | CONVEYING | | | |
| D1010 | Vertical Conveying Systems | | $178,000 | $2.00 |
| D20 | PLUMBING | | | |
| D2010 | Domestic Water Distribution | | $1,333,500 | $15.00 |
| D30 | HVAC | | | |
| D3000 | HVAC Systems, General | | $3,911,600 | $44.00 |
| D40 | FIRE PROTECTION | | | |
| D4010 | Fire Suppression | | $400,050 | $4.50 |
| D50 | ELECTRICAL | | | |
| D5010 | Electrical Power Generation | | $711,200 | $8.00 |
| D5020 | Lighting & Branch Wiring | | $800,100 | $9.00 |
| D5030 | Communications & Security | | $800,100 | $9.00 |
| D5090 | Other Electrical Systems | | $88,900 | $1.00 |
| D5090 | PV Array (Infrastructure Only) | | $300,000 | $3.37 |
| **E** | **EQUIPMENT & FURNISHINGS** | | | |
| E10 | EQUIPMENT | | | |
| E1020 | Institutional Equipment | | $622,300 | $7.00 |
| E20 | FURNISHINGS | | | |
| E2010 | Fixed Furnishings | | $800,100 | $9.00 |
| **F** | **SPECIAL CONSTRUCTION & DEMOLITION** | | | |
| F20 | SELECTIVE BUILDING DEMOLITION | | | |
| F2010 | Building Elements Demolition | | $466,011 | $5.24 |
| F2020 | Hazard Materials Abatement & Removals | | $977,900 | $11.00 |

**MANCHESTER MEMORIAL ELEMENTARY SCHOOL**
**MANCHESTER BY THE SEA, MA**
**PRELIMINARY CONCEPT ESTIMATE**

**01/31/2017**

**ALTERNATE N-1**

Scope: PreK-3, New Construction, phased — 88,900 GSF

| SECTION | DESCRIPTION | | COST | COST/SF |
|---|---|---|---|---|
| | **SUB-TOTAL BUILDING** | | **$29,340,188** | **$330.04** |
| **G** | **BUILDING SITEWORK** | | | |
| G10 | SITE PREPARATION | | | |
| G1010 | Site Clearing | | $88,900 | $1.00 |
| G1050 | Site Remediation & Abatement | | $0 | $0.00 |
| G1070 | Site Earthwork | | $266,700 | $3.00 |
| G20 | SITE IMPROVEMENTS | | | |
| G2010 | Roadways | | $177,800 | $2.00 |
| G2020 | Parking Lots | | $266,700 | $3.00 |
| G2030 | Pedestrian Plazas & Walkways | | $177,800 | $2.00 |
| G2060 | Site Development | | $622,300 | $7.00 |
| G2080 | Landscaping | | $266,700 | $3.00 |
| G30 | SITE UTILITIES | | | |
| G3010 | Water Utilities | | $88,900 | $1.00 |
| G3020 | Sanitary Sewerage Utilities | | $177,800 | $2.00 |
| G3030 | Storm Drainage Utilities | | $355,600 | $4.00 |
| G3050 | Site Energy Distribution | | $250,000 | $2.81 |
| G3060 | Site Fuel Distribution | | $0 | $0.00 |
| G40 | ELECTRICAL SITE IMPROVEMENTS | | | |
| G4050 | Site Lighting | | $222,250 | $2.50 |
| G50 | SITE COMMUNICATIONS | | | |
| G5010 | Site Communications Systems | | $88,900 | $1.00 |
| | **SUB-TOTAL SITE** | | **$3,050,350** | **$34.31** |
| | **SUBTOTAL FOR SITE & BUILDING COSTS** | | **$32,390,538** | **$364.35** |
| | **Markups** | | | |
| | Escalation Contingency | 4.50% | $1,457,574 | |
| | Design Contingency | 12.00% | $4,061,773 | |
| | CMR/GMP Contingency | 2.50% | $809,763 | |
| | General Conditions, CMR | 6.00% | $2,274,593 | |
| | General Requirement, CMR | 4.00% | $1,295,622 | |
| | Insurances & Bonds, CMR | 3.00% | $971,716 | |
| | Building Permit, waived | 0.00% | $0 | |
| | Phasing Premium | 1.00% | $323,905 | |
| | CMR Fee | 3.00% | $1,297,847 | |
| | **TOTAL CONSTRUCTION COST** | | **$44,883,333** | **$504.87** |

**MANCHESTER MEMORIAL ELEMENTARY SCHOOL**
**MANCHESTER BY THE SEA, MA**
**PRELIMINARY CONCEPT ESTIMATE**

**01/31/2017**

**ALTERNATE N-3**

Scope: PreK-3, New Construction, phased 82,800 GSF

| SECTION | DESCRIPTION | | COST | COST/SF |
|---|---|---|---|---|
| **A** | **SUBSTRUCTURE** | | | |
| A10 | FOUNDATIONS | | | |
| A1010 | Standard Foundations | | $1,407,600 | $17.00 |
| A1020 | Foundation support system | | $660,000 | $7.97 |
| A40 | SLABS ON GRADE | | | |
| A4010 | Standard Slabs on Grade | | $952,000 | $11.50 |
| **B** | **SHELL** | | | |
| B10 | SUPER STRUCTURE | | | |
| B1010 | Floor Construction | | $1,656,000 | $20.00 |
| B1020 | Roof Construction | | $1,821,600 | $22.00 |
| B1080 | Stairs | | $165,600 | $2.00 |
| B20 | EXTERIOR VERTICAL ENCLOSURES | | | |
| B2010 | Exterior Walls | | $2,070,000 | $25.00 |
| B2020 | Exterior Windows | | $1,324,800 | $16.00 |
| B2030 | Exterior Doors & Grilles | | $124,200 | $1.50 |
| B30 | EXTERIOR HORIZONTAL ENCLOSURES | | | |
| B3010 | Roofing | | $1,573,200 | $19.00 |
| **C** | **INTERIORS** | | | |
| C10 | INTERIOR CONSTRUCTION | | | |
| C1010 | Partitions | | $1,821,600 | $22.00 |
| C1020 | Interior Windows | | $289,800 | $3.50 |
| C1030 | Interior Doors | | $496,800 | $6.00 |
| C1090 | Interior Specialties | | $745,200 | $9.00 |
| C20 | INTERIOR FINISHES | | | |
| C2010 | Wall Finishes | | $828,000 | $10.00 |
| C2030 | Floor Finishes | | $579,600 | $7.00 |
| C2040 | Stair Finishes | | $82,756 | $1.00 |
| C2050 | Ceiling Finishes | | $662,400 | $8.00 |
| **D** | **SERVICES** | | | |
| D10 | CONVEYING | | | |
| D1010 | Vertical Conveying Systems | | $178,000 | $2.15 |
| D20 | PLUMBING | | | |
| D2010 | Domestic Water Distribution | | $1,449,000 | $17.50 |
| D30 | HVAC | | | |
| D3000 | HVAC Systems, General | | $3,726,000 | $45.00 |
| D40 | FIRE PROTECTION | | | |
| D4010 | Fire Suppression | | $372,600 | $4.50 |
| D50 | ELECTRICAL | | | |
| D5010 | Electrical Power Generation | | $662,400 | $8.00 |
| D5020 | Lighting & Branch Wiring | | $745,200 | $9.00 |
| D5030 | Communications & Security | | $828,000 | $10.00 |
| D5090 | Other Electrical Systems | | $248,400 | $3.00 |
| D5090 | PV Array (Infrastructure Only) | | $300,000 | $3.62 |
| **E** | **EQUIPMENT & FURNISHINGS** | | | |
| E10 | EQUIPMENT | | | |
| E1020 | Institutional Equipment | | $828,000 | $10.00 |
| E20 | FURNISHINGS | | | |
| E2010 | Fixed Furnishings | | $331,200 | $4.00 |
| **F** | **SPECIAL CONSTRUCTION & DEMOLITION** | | | |
| F20 | SELECTIVE BUILDING DEMOLITION | | | |
| F2010 | Building Elements Demolition | | $455,400 | $5.50 |
| F2020 | Hazard Materials Abatement & Removals | | $910,800 | $11.00 |

**MANCHESTER MEMORIAL ELEMENTARY SCHOOL**
**MANCHESTER BY THE SEA, MA**
**PRELIMINARY CONCEPT ESTIMATE**

**01/31/2017**

**ALTERNATE N-3**

Scope: PreK-3, New Construction, phased — 82,800 GSF

| SECTION | DESCRIPTION | | COST | COST/SF |
|---|---|---|---|---|
| | **SUB-TOTAL BUILDING** | | **$28,296,156** | **$341.74** |
| **G** | **BUILDING SITEWORK** | | | |
| G10 | SITE PREPARATION | | | |
| G1010 | Site Clearing | | $163,944 | $1.98 |
| G1050 | Site Remediation & Abatement | | $0 | $0.00 |
| G1070 | Site Earthwork | | $248,400 | $3.00 |
| G20 | SITE IMPROVEMENTS | | | |
| G2010 | Roadways | | $450,000 | $5.43 |
| G2020 | Parking Lots | | $248,400 | $3.00 |
| G2030 | Pedestrian Plazas & Walkways | | $165,600 | $2.00 |
| G2060 | Site Development | | $621,000 | $7.50 |
| G2080 | Landscaping | | $248,400 | $3.00 |
| G30 | SITE UTILITIES | | | |
| G3010 | Water Utilities | | $165,600 | $2.00 |
| G3020 | Sanitary Sewerage Utilities | | $165,600 | $2.00 |
| G3030 | Storm Drainage Utilities | | $165,600 | $2.00 |
| G3050 | Site Energy Distribution | | $117,576 | $1.42 |
| G3060 | Site Fuel Distribution | | $0 | $0.00 |
| G40 | ELECTRICAL SITE IMPROVEMENTS | | | |
| G4050 | Site Lighting | | $207,000 | $2.50 |
| G50 | SITE COMMUNICATIONS | | | |
| G5010 | Site Communications Systems | | $82,800 | $1.00 |
| | **SUB-TOTAL SITE** | | **$3,049,920** | **$36.83** |
| | **SUBTOTAL FOR SITE & BUILDING COSTS** | | **$31,346,076** | **$378.58** |
| | **Markups** | | | |
| | Escalation Contingency | 4.50% | $1,410,573 | |
| | Design Contingency | 12.00% | $3,930,798 | |
| | CMR/GMP Contingency | 2.50% | $783,652 | |
| | General Conditions, CMR | 8.00% | $2,934,996 | |
| | General Requirement, CMR | 4.00% | $1,253,843 | |
| | Insurances & Bonds, CMR | 3.00% | $940,382 | |
| | Building Permit, waived | 0.00% | $0 | |
| | Phasing Premium | 2.00% | $626,922 | |
| | CMR Fee | 3.00% | $1,278,010 | |
| | **TOTAL CONSTRUCTION COST** | | **$44,505,251** | **$537.50** |

**MANCHESTER MEMORIAL ELEMENTARY SCHOOL**
**MANCHESTER BY THE SEA, MA**
**PRELIMINARY CONCEPT ESTIMATE**

**01/31/2017**

**ALTERNATE N-9**

Scope: PreK-3, New Construction, phased 87,700 GSF

| SECTION | DESCRIPTION | | COST | COST/SF |
|---|---|---|---|---|
| **A** | **SUBSTRUCTURE** | | | |
| A10 | FOUNDATIONS | | | |
| A1010 | Standard Foundations | | $2,543,300 | $29.00 |
| A1020 | Foundation support system | | $660,000 | $7.53 |
| A40 | SLABS ON GRADE | | | |
| A4010 | Standard Slabs on Grade | | $789,300 | $9.00 |
| **B** | **SHELL** | | | |
| B10 | SUPER STRUCTURE | | | |
| B1010 | Floor Construction | | $1,754,000 | $20.00 |
| B1020 | Roof Construction | | $1,578,600 | $18.00 |
| B1080 | Stairs | | $175,400 | $2.00 |
| B20 | EXTERIOR VERTICAL ENCLOSURES | | | |
| B2010 | Exterior Walls | | $2,543,300 | $29.00 |
| B2020 | Exterior Windows | | $1,578,600 | $18.00 |
| B2030 | Exterior Doors & Grilles | | $131,550 | $1.50 |
| B30 | EXTERIOR HORIZONTAL ENCLOSURES | | | |
| B3010 | Roofing | | $2,017,100 | $23.00 |
| **C** | **INTERIORS** | | | |
| C10 | INTERIOR CONSTRUCTION | | | |
| C1010 | Partitions | | $1,929,400 | $22.00 |
| C1020 | Interior Windows | | $263,100 | $3.00 |
| C1030 | Interior Doors | | $526,200 | $6.00 |
| C1090 | Interior Specialties | | $877,000 | $10.00 |
| C20 | INTERIOR FINISHES | | | |
| C2010 | Wall Finishes | | $877,000 | $10.00 |
| C2030 | Floor Finishes | | $613,900 | $7.00 |
| C2040 | Stair Finishes | | $87,653 | $1.00 |
| C2050 | Ceiling Finishes | | $701,600 | $8.00 |
| **D** | **SERVICES** | | | |
| D10 | CONVEYING | | | |
| D1010 | Vertical Conveying Systems | | $178,000 | $2.03 |
| D20 | PLUMBING | | | |
| D2010 | Domestic Water Distribution | | $1,315,500 | $15.00 |
| D30 | HVAC | | | |
| D3000 | HVAC Systems, General | | $3,858,800 | $44.00 |
| D40 | FIRE PROTECTION | | | |
| D4010 | Fire Suppression | | $394,650 | $4.50 |
| D50 | ELECTRICAL | | | |
| D5010 | Electrical Power Generation | | $964,700 | $11.00 |
| D5020 | Lighting & Branch Wiring | | $789,300 | $9.00 |
| D5030 | Communications & Security | | $877,000 | $10.00 |
| D5090 | Other Electrical Systems | | $175,400 | $2.00 |
| D5090 | PV Array (Infrastructure Only) | | $300,000 | $3.42 |
| **E** | **EQUIPMENT & FURNISHINGS** | | | |
| E10 | EQUIPMENT | | | |
| E1020 | Institutional Equipment | | $789,300 | $9.00 |
| E20 | FURNISHINGS | | | |
| E2010 | Fixed Furnishings | | $877,000 | $10.00 |
| **F** | **SPECIAL CONSTRUCTION & DEMOLITION** | | | |
| F20 | SELECTIVE BUILDING DEMOLITION | | | |
| F2010 | Building Elements Demolition | | $466,011 | $5.31 |
| F2020 | Hazard Materials Abatement & Removals | | $1,051,900 | $11.99 |

**MANCHESTER MEMORIAL ELEMENTARY SCHOOL**
**MANCHESTER BY THE SEA, MA**
**PRELIMINARY CONCEPT ESTIMATE**

**01/31/2017**

**ALTERNATE N-9**

Scope: PreK-3, New Construction, phased — 87,700 GSF

| SECTION | DESCRIPTION | | COST | COST/SF |
|---|---|---|---|---|
| | **SUB-TOTAL BUILDING** | | **$31,684,564** | **$361.28** |
| **G** | **BUILDING SITEWORK** | | | |
| G10 | SITE PREPARATION | | | |
| G1010 | Site Clearing | | $100,000 | $1.14 |
| G1050 | Site Remediation & Abatement | | $0 | $0.00 |
| G1070 | Site Earthwork | | $250,000 | $2.85 |
| G20 | SITE IMPROVEMENTS | | | |
| G2010 | Roadways | | $200,000 | $2.28 |
| G2020 | Parking Lots | | $250,000 | $2.85 |
| G2030 | Pedestrian Plazas & Walkways | | $175,000 | $2.00 |
| G2060 | Site Development | | $657,750 | $7.50 |
| G2080 | Landscaping | | $263,100 | $3.00 |
| G30 | G3010 | | | |
| G3010 | Water Utilities | | $105,240 | $1.20 |
| G3020 | Sanitary Sewerage Utilities | | $175,400 | $2.00 |
| G3030 | Storm Drainage Utilities | | $438,500 | $5.00 |
| G3050 | Site Energy Distribution | | $175,400 | $2.00 |
| G3060 | Site Fuel Distribution | | $0 | $0.00 |
| G40 | ELECTRICAL SITE IMPROVEMENTS | | | |
| G4050 | Site Lighting | | $219,250 | $2.50 |
| G50 | SITE COMMUNICATIONS | | | |
| G5010 | Site Communications Systems | | $87,700 | $1.00 |
| | **SUB-TOTAL SITE** | | **$3,097,340** | **$35.32** |
| | **SUBTOTAL FOR SITE & BUILDING COSTS** | | **$34,781,904** | **$396.60** |
| | **Markups** | | | |
| | Escalation Contingency | 4.50% | $1,565,186 | |
| | Design Contingency | 12.00% | $4,361,651 | |
| | CMR/GMP Contingency | 2.50% | $869,548 | |
| | General Conditions, CMR | 7.50% | $3,053,156 | |
| | General Requirement, CMR | 4.00% | $1,391,276 | |
| | Insurances & Bonds, CMR | 3.00% | $1,043,457 | |
| | Building Permit, waived | 0.00% | $0 | |
| | Phasing Premium | 2.00% | $695,638 | |
| | CMR Fee | 3.00% | $1,411,985.30 | |
| | **TOTAL CONSTRUCTION COST** | | **$49,173,800** | **$560.70** |

## Feasibility Design Estimate

# Manchester Memorial Elementary School

## Design Options

Manchester-on-the Sea, MA

**PM&C LLC**
20 Downer Ave, Suite 1C
Hingham, MA 02043
(T) 781-740-8007
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Prepared for:

**Dore + Whittier Architects, Inc.**

January 30, 2018

PM&C

**Manchester Memorial Elementary School**
Design Options
Manchester-on-the Sea, MA

30-Jan-18

**Feasibility Design Estimate**

**MAIN CONSTRUCTION COST SUMMARY**

| | Construction Start | | Gross Floor Area | $/sf | Estimated Construction Cost |
|---|---|---|---|---|---|
| **OPTION R1 CODE REQUIRED RENOVATION** | | | | | |
| | Jun-19 | | | | |
| RENOVATIONS TO EXISTING SCHOOL | | | 66,573 | $230.05 | $15,315,293 |
| REMOVE HAZARDOUS MATERIALS | | | | | $873,500 |
| SITEWORK | | | | | $1,130,833 |
| SUB-TOTAL | | | 66,573 | $260.16 | $17,319,626 |
| ESCALATION - (assumed 3% PA) | 4.5% | | | | $779,383 |
| DESIGN AND PRICING CONTINGENCY | 12% | | | | $2,171,881 |
| SUB-TOTAL | | | 66,573 | $304.49 | $20,270,890 |
| GENERAL CONDITIONS | | 24 | MTHS | $90,000 | $2,160,000 |
| GENERAL REQUIREMENTS | 4.0% | | | | $810,836 |
| BONDS | 1.25% | | | | $253,386 |
| INSURANCE | 1.80% | | | | $422,912 |
| PERMIT | | | | | Waived |
| FEE | 3.0% | | | | $717,541 |
| GMP CONTINGENCY | 2.5% | | | | $506,772 |
| PHASING PREMIUM | 5.00% | | | | $1,013,545 |
| **TOTAL OF ALL CONSTRUCTION** | | | 66,573 | $392.89 | **$26,155,882** |
| COST FOR MODULARS - Assumed 10 Classrooms | | | | | **$1,390,500** |

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**Manchester Memorial Elementary School**
Design Options
Manchester-on-the Sea, MA

30-Jan-18

**Feasibility Design Estimate**

| | Construction Start | | Gross Floor Area | $/sf | Estimated Construction Cost |
|---|---|---|---|---|---|
| **OPTION AR-2 RENOVATION + ADDITION** | | | | | |
| | Jun-19 | | | | |
| RENOVATIONS TO EXISTING SCHOOL | | | 21,200 | $271.52 | $5,756,192 |
| ADDITIONS | | | 69,900 | $294.26 | $20,568,861 |
| DEMOLISH EXISTING SCHOOL - PARTIAL | | | 45,373 | $10.00 | $453,730 |
| REMOVE HAZARDOUS MATERIALS | | | | | $912,278 |
| SITEWORK | | | | | $2,548,986 |
| SUB-TOTAL | | | 91,100 | $331.94 | $30,240,047 |
| ESCALATION TO MID-POINT - (assumed 3% PA) | 4.5% | | | | $1,360,802 |
| DESIGN AND PRICING CONTINGENCY | 12% | | | | $3,792,102 |
| SUB-TOTAL | | | 91,100 | $388.51 | $35,392,951 |
| GENERAL CONDITIONS | | 30 | MTHS | $90,000 | $2,700,000 |
| GENERAL REQUIREMENTS | 4.0% | | | | $1,415,718 |
| BONDS | 1.25% | | | | $442,412 |
| INSURANCE | 1.80% | | | | $719,119 |
| PERMIT | | | | | Waived |
| FEE | 3.0% | | | | $1,220,106 |
| GMP CONTINGENCY | 2.5% | | | | $884,824 |
| PHASING PREMIUM | 3.00% | | | | $1,061,789 |
| MODULAR COSTS | | | | | See Below |
| **TOTAL OF ALL CONSTRUCTION** | | | 91,100 | $481.20 | **$43,836,919** |

COST FOR MODULARS - Assumed 12 Classrooms **$1,637,700**

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**Manchester Memorial Elementary School**
Design Options
Manchester-on-the Sea, MA

30-Jan-18

**Feasibility Design Estimate**

| | Construction Start | | Gross Floor Area | $/sf | Estimated Construction Cost |
|---|---|---|---|---|---|
| **OPTION N-1 NEW BUILDING** | | | | | |
| | Jun-19 | | | | |
| NEW BUILDING | | | 88,900 | $289.89 | $25,771,591 |
| DEMOLISH EXISTING SCHOOL | | | 66,573 | $7.00 | $466,011 |
| REMOVE HAZARDOUS MATERIALS | | | | | $912,278 |
| SITEWORK | | | | | $2,939,412 |
| SUB-TOTAL | | | 88,900 | $338.46 | $30,089,292 |
| ESCALATION TO MID-POINT - (assumed 3% PA) | 4.5% | | | | $1,354,018 |
| DESIGN AND PRICING CONTINGENCY | 12% | | | | $3,773,197 |
| SUB-TOTAL | | | 88,900 | $396.14 | $35,216,507 |
| GENERAL CONDITIONS | | 22 | MTHS | $90,000 | $1,980,000 |
| GENERAL REQUIREMENTS | 4.0% | | | | $1,408,660 |
| BONDS | 1.25% | | | | $440,206 |
| INSURANCE | 1.80% | | | | $702,817 |
| PERMIT | | | | | Waived |
| FEE | 3.0% | | | | $1,192,446 |
| GMP CONTINGENCY | 2.5% | | | | $880,413 |
| PHASING PREMIUM | 1.00% | | | | $352,165 |
| MODULAR COSTS | | | | | See Below |
| **TOTAL OF ALL CONSTRUCTION** | | | 88,900 | $474.39 | **$42,173,214** |

COST FOR MODULARS - Assumed 14 Classrooms (16 months) **$1,308,100**

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**Manchester Memorial Elementary School**
Design Options
Manchester-on-the Sea, MA

30-Jan-18

**Feasibility Design Estimate**

| | Construction Start | | Gross Floor Area | $/sf | Estimated Construction Cost |
|---|---|---|---|---|---|
| **OPTION N-3 NEW BUILDING** | | | | | |
| | Jun-19 | | | | |
| NEW BUILDING | | | 82,800 | $315.97 | $26,162,203 |
| DEMOLISH EXISTING SCHOOL | | | 66,573 | $7.00 | $466,011 |
| REMOVE HAZARDOUS MATERIALS | | | | | $912,278 |
| SITEWORK | | | | | $3,070,004 |
| SUB-TOTAL | | | 82,800 | $369.69 | $30,610,496 |
| ESCALATION TO MID-POINT - (assumed 3% PA) | 4.5% | | | | $1,377,472 |
| DESIGN AND PRICING CONTINGENCY | 12% | | | | $3,838,556 |
| SUB-TOTAL | | | 82,800 | $432.69 | $35,826,524 |
| GENERAL CONDITIONS | | 30 | MTHS | $90,000 | $2,700,000 |
| GENERAL REQUIREMENTS | 4.0% | | | | $1,433,061 |
| BONDS | 1.25% | | | | $447,832 |
| INSURANCE | 1.80% | | | | $727,334 |
| PERMIT | | | | | Waived |
| FEE | 3.0% | | | | $1,234,043 |
| GMP CONTINGENCY | 2.5% | | | | $895,663 |
| PHASING PREMIUM | 2.00% | | | | $716,530 |
| MODULAR COSTS | | | | | See Below |
| **TOTAL OF ALL CONSTRUCTION** | | | 82,800 | $531.17 | **$43,980,987** |
| COST FOR MODULARS - Assumed 6 Classrooms (16 months) | | | | | **$648,900** |

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**Manchester Memorial Elementary School**
Design Options
Manchester-on-the Sea, MA

30-Jan-18

**Feasibility Design Estimate**

| | Construction Start | | Gross Floor Area | $/sf | Estimated Construction Cost |
|---|---|---|---|---|---|
| **OPTION N-9 NEW BUILDING** | | | | | |
| | Jun-19 | | | | |
| NEW BUILDING | | | 87,700 | $343.97 | $30,166,144 |
| DEMOLISH EXISTING SCHOOL | | | 66,573 | $7.00 | $466,011 |
| REMOVE HAZARDOUS MATERIALS | | | | | $912,278 |
| SITEWORK | | | | | $3,027,930 |
| SUB-TOTAL | | | 87,700 | $394.21 | $34,572,363 |
| ESCALATION TO MID-POINT - (assumed 3% PA) | 4.5% | | | | $1,555,756 |
| DESIGN AND PRICING CONTINGENCY | 12% | | | | $4,335,374 |
| SUB-TOTAL | | | 87,700 | $461.39 | $40,463,493 |
| GENERAL CONDITIONS | | 30 | MTHS | $90,000 | $2,700,000 |
| GENERAL REQUIREMENTS | 4.0% | | | | $1,618,540 |
| BONDS | 1.25% | | | | $505,794 |
| INSURANCE | 1.80% | | | | $815,181 |
| PERMIT | | | | | Waived |
| FEE | 3.0% | | | | $1,383,090 |
| GMP CONTINGENCY | 2.5% | | | | $1,011,587 |
| PHASING PREMIUM | 2.00% | | | | $809,270 |
| MODULAR COSTS | | | | | See Below |
| **TOTAL OF ALL CONSTRUCTION** | | | 87,700 | $562.22 | **$49,306,955** |
| COST FOR MODULARS - Assumed 20 Classrooms (20 months) | | | | | **$2,008,500** |

**Manchester Memorial Elementary School**
Design Options
Manchester-on-the Sea, MA

30-Jan-18

**Feasibility Design Estimate**

This Preferred Schematic Design cost estimate was produced from drawings, narratives and other documentation prepared by JCJ Architecture and their design team dated January 19, 2018. Design and engineering changes occurring subsequent to the issue of these documents have not been incorporated in this estimate.

This estimate includes all direct construction costs, Construction Manager's fee and design contingency. Cost escalation assumes start dates indicated.

Bidding conditions are expected to be public bidding under Chapter 149a of the Massachusetts General Laws to pre-qualified construction managers, and pre-qualified sub-contractors, open specifications for materials and manufactures. If a CM at risk C149a procurement is used costs will increase from the costs presented in this report.

The estimate is based on prevailing wage rates for construction in this market and represents a reasonable opinion of cost. It is not a prediction of the successful bid from a contractor as bids will vary due to fluctuating market conditions, errors and omissions, proprietary specifications, lack or surplus of bidders, perception of risk, etc. Consequently the estimate is expected to fall within the range of bids from a number of competitive contractors or subcontractors, however we do not warrant that bids or negotiated prices will not vary from the final construction cost estimate.

**ITEMS NOT CONSIDERED IN THIS ESTIMATE**

Items not included in this estimate are:

- Land acquisition, feasibility, and financing costs
- All professional fees and insurance
- Site or existing conditions surveys investigations costs, including to determine subsoil conditions
- All Furnishings, Fixtures and Equipment
- Items identified in the design as Not In Contract (NIC)
- Items identified in the design as by others
- Owner supplied and/or installed items as indicated in the estimate
- Utility company back charges, including work required off-site
- Work to City streets and sidewalks, (except as noted in this estimate)
- Construction contingency
- Contaminated soils removal

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**Manchester Memorial Elementary School**
**Design Options**
**Manchester-on-the Sea, MA**

30-Jan-18

**Feasibility Design Estimate**

GFA 66,573

## *CONSTRUCTION COST SUMMARY*

| | *BUILDING SYSTEM* | | *SUB-TOTAL* | *TOTAL* | *$/SF* | *%* |
|---|---|---|---|---|---|---|
| **MMES CODE UPGRADES RENOVATION - OPTION R1** | | | | | | |
| **A10** | **FOUNDATIONS** | | | | | |
| | A1010 | Standard Foundations | $75,000 | | | |
| | A1020 | Special Foundations | $0 | | | |
| | A1030 | Lowest Floor Construction | $209,719 | **$284,719** | $4.28 | 1.9% |
| **B10** | **SUPERSTRUCTURE** | | | | | |
| | B1010 | Upper Floor Construction | $0 | | | |
| | B1020 | Roof Construction | $332,865 | **$332,865** | $5.00 | 2.2% |
| **B20** | **EXTERIOR CLOSURE** | | | | | |
| | B2010 | Exterior Walls | $1,710,620 | | | |
| | B2020 | Windows/Curtainwall | $1,196,600 | | | |
| | B2030 | Exterior Doors | $34,472 | **$2,941,692** | $44.19 | 19.2% |
| **B30** | **ROOFING** | | | | | |
| | B3010 | Roof Coverings | $1,464,606 | | | |
| | B3020 | Roof Openings | $0 | **$1,464,606** | $22.00 | 9.6% |
| **C10** | **INTERIOR CONSTRUCTION** | | | | | |
| | C1010 | Partitions | $366,152 | | | |
| | C1020 | Interior Doors | $332,865 | | | |
| | C1030 | Specialties/Millwork | $369,481 | **$1,068,498** | $16.05 | 7.0% |
| **C20** | **STAIRCASES** | | | | | |
| | C2010 | Stair Construction | $0 | | | |
| | C2020 | Stair Finishes | $0 | **$0** | $0.00 | 0.0% |
| **C30** | **INTERIOR FINISHES** | | | | | |
| | C3010 | Wall Finishes | $199,719 | | | |
| | C3020 | Floor Finishes | $732,303 | | | |
| | C3030 | Ceiling Finishes | $665,730 | **$1,597,752** | $24.00 | 10.4% |
| **D10** | **CONVEYING SYSTEMS** | | | | | |
| | D1010 | Elevator | $0 | **$0** | $0.00 | 0.0% |
| **D20** | **PLUMBING** | | | | | |
| | D20 | Plumbing | $798,876 | **$798,876** | $12.00 | 5.2% |
| **D30** | **HVAC** | | | | | |
| | D30 | HVAC | $3,195,504 | **$3,195,504** | $48.00 | 20.9% |
| **D40** | **FIRE PROTECTION** | | | | | |
| | D40 | Fire Protection | $466,011 | **$466,011** | $7.00 | 3.0% |
| **D50** | **ELECTRICAL** | | | | | |
| | D5010 | Electrical Systems | $2,130,336 | **$2,130,336** | $32.00 | 13.9% |
| **E10** | **EQUIPMENT** | | | | | |
| | E10 | Equipment | $80,000 | **$80,000** | $1.20 | 0.5% |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
**Manchester-on-the Sea, MA**

**Feasibility Design Estimate** GFA 66,573

## *CONSTRUCTION COST SUMMARY*

| | *BUILDING SYSTEM* | | *SUB-TOTAL* | *TOTAL* | *$/SF* | *%* |
|---|---|---|---|---|---|---|
| **MMES CODE UPGRADES RENOVATION - OPTION R1** | | | | | | |
| **E20** | **FURNISHINGS** | | | | | |
| | E2010 | Fixed Furnishings | $216,908 | | | |
| | E2020 | Movable Furnishings | NIC | **$216,908** | $3.26 | 1.4% |
| **F10** | **SPECIAL CONSTRUCTION** | | | | | |
| | F10 | Special Construction | $0 | **$0** | $0.00 | 0.0% |
| **F20** | **SELECTIVE BUILDING DEMOLITION** | | | | | |
| | F2010 | Building Elements Demolition | $737,526 | | | |
| | F2020 | Hazardous Components Abatement | $0 | **$737,526** | $11.08 | 4.8% |
| ***TOTAL DIRECT COST (Trade Costs)*** | | | | ***$15,315,293*** | *$230.05* | *100.0%* |

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**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** **GFA** 66,573

| | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| | **MMES CODE UPGRADES RENOVATION - OPTION R1** | | | | | | |
| | ***GROSS FLOOR AREA CALCULATION*** | | | | | | |
| | ***First Floor*** | | | | 66,573 | | |
| | ***TOTAL GROSS FLOOR AREA (GFA)*** | | | | **66,573** ***sf*** | | |
| | ***A10 FOUNDATIONS*** | | | | | | |
| | **A1010 STANDARD FOUNDATIONS** | | | | | | |
| | Allowance for foundation repair | **1** | ls | 75,000.00 | 75,000 | | |
| | SUBTOTAL | | | | | 75,000 | |
| | **A1020 SPECIAL FOUNDATIONS** | | | | | | |
| | No work in this section | | | | | | |
| | SUBTOTAL | | | | | | |
| | **A1030 LOWEST FLOOR CONSTRUCTION** | | | | | | |
| | Cutting and patching | **66,573** | sf | 3.00 | 199,719 | | |
| | Equipment pads | **1** | ls | 10,000.00 | 10,000 | | |
| | SUBTOTAL | | | | | 209,719 | |
| | ***TOTAL - FOUNDATIONS*** | | | | | | **$284,719** |
| | ***B10 SUPERSTRUCTURE*** | | | | | | |
| | **B1010 FLOOR CONSTRUCTION** | | | | | | |
| | SUBTOTAL | | | | | - | |
| | **B1020 ROOF CONSTRUCTION** | | | | | | |
| | Roof Structure - Steel: | | | | | | |
| | New lateral Bracing to roofs for new RTU;s | **66,573** | sf | 5.00 | 332,865 | | |
| | SUBTOTAL | | | | | 332,865 | |
| | ***TOTAL - SUPERSTRUCTURE*** | | | | | | **$332,865** |
| | ***B20 EXTERIOR CLOSURE*** | | | | | | |
| | **B2010 EXTERIOR WALLS** | *27,920* | *sf* | | | | |
| | Repair, repoint and clean all exterior walls | **27,920** | gsf | 34.00 | 949,280 | | |
| | Insulate exterior walls to meet code; new furred walls at perimeter | **27,920** | sf | 12.00 | 335,040 | | |
| | Replace metal wall panels | **6,090** | sf | 70.00 | 426,300 | | |
| | SUBTOTAL | | | | | 1,710,620 | |
| | **B2020 WINDOWS/CURTAINWALL** | | | | | | |
| | Replace existing windows/curtainwall | **11,966** | sf | 100.00 | 1,196,600 | | |
| | SUBTOTAL | | | | | 1,196,600 | |
| | **B2030 EXTERIOR DOORS** | | | | | | |
| | Replace exterior glazed door, double | **3** | pr | 8,000.00 | 24,000 | | |
| | Replace exterior door, single | **4** | ea | 2,000.00 | 8,000 | | |

| | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| | **MMES CODE UPGRADES RENOVATION - OPTION R1** | | | | | | |
| | Backer rod & double sealant | **206** | lf | 9.00 | 1,854 | | |
| | Wood blocking at openings | **206** | lf | 3.00 | 618 | | |
| | SUBTOTAL | | | | | 34,472 | |
| | ***TOTAL - EXTERIOR CLOSURE*** | | | | | | **$2,941,692** |
| | ***B30 ROOFING*** | | | | | | |
| **B3010** | **ROOF COVERINGS** | | | | | | |
| | Replace existing roofing systems | **66,573** | sf | 22.00 | 1,464,606 | | |
| | SUBTOTAL | | | | | 1,464,606 | |
| **B3020** | **ROOF OPENINGS** | | | | | | |
| | **No work in this section** | | | | | | |
| | SUBTOTAL | | | | | - | |
| | ***TOTAL - ROOFING*** | | | | | | **$1,464,606** |
| | ***C10 INTERIOR CONSTRUCTION*** | | | | | | |
| **C1010** | **PARTITIONS** | | | | | | |
| | Anchor the top of all masonry partitions to the underside of the floor or structure above | **66,573** | gsf | 6.00 | Assumed not required by code | | |
| | New partitions at reconfigured areas; assume 25% | **66,573** | gsf | 5.50 | 366,152 | | |
| | SUBTOTAL | | | | | 366,152 | |
| **C1020** | **INTERIOR DOORS** | | | | | | |
| | Remove and replace doors | **66,573** | gsf | 5.00 | 332,865 | | |
| | SUBTOTAL | | | | | 332,865 | |
| **C1030** | **SPECIALTIES / MILLWORK** | | | | | | |
| | Toilet Partitions and accessories | **66,573** | gsf | 0.80 | 53,258 | | |
| | Lockers, full height | **66,573** | gsf | 1.50 | 99,860 | | |
| *055000* | *MISCELLANEOUS METALS* | | | | | | |
| | Miscellaneous metals throughout building | **66,573** | sf | 1.00 | 66,573 | | |
| *061000* | *ROUGH CARPENTRY* | | | | | | |
| | Rough blocking | **66,573** | sf | 0.50 | 33,287 | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Miscellaneous sealants throughout building | **66,573** | sf | 1.50 | 99,860 | | |
| *101400* | *SIGNAGE* | | | | | | |
| | Code compliant signage | **66,573** | sf | 0.25 | 16,643 | | |
| | SUBTOTAL | | | | | 369,481 | |
| | ***TOTAL - INTERIOR CONSTRUCTION*** | | | | | | **$1,068,498** |

| | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| | **MMES CODE UPGRADES RENOVATION - OPTION R1** | | | | | | |
| | ***C20 STAIRCASES*** | | | | | | |
| | **C2010 STAIR CONSTRUCTION** | | | | | | |
| | SUBTOTAL | | | | | - | |
| | **C2020 STAIR FINISHES** | | | | | | |
| | SUBTOTAL | | | | | - | |
| | ***TOTAL - STAIRCASES*** | | | | | | |
| | ***C30 INTERIOR FINISHES*** | | | | | | |
| | **C3010 WALL FINISHES** | | | | | | |
| | Painting | **66,573** | gsf | 3.00 | 199,719 | | |
| | SUBTOTAL | | | | | 199,719 | |
| | **C3020 FLOOR FINISHES** | | | | | | |
| | Allowance to replace floor finishes | **66,573** | gsf | 11.00 | 732,303 | | |
| | SUBTOTAL | | | | | 732,303 | |
| | **C3030 CEILING FINISHES** | | | | | | |
| | Replace existing ceiling finishes | **66,573** | gsf | 10.00 | 665,730 | | |
| | SUBTOTAL | | | | | 665,730 | |
| | ***TOTAL - INTERIOR FINISHES*** | | | | | | **$1,597,752** |
| | ***D10 CONVEYING SYSTEMS*** | | | | | | |
| | **D1010 ELEVATOR** | | | | | | |
| | SUBTOTAL | | | | | - | |
| | ***TOTAL - CONVEYING SYSTEMS*** | | | | | | |
| | ***D20 PLUMBING*** | | | | | | |
| | **D20 PLUMBING, GENERALLY** | | | | | | |
| | Replace existing plumbing systems; existing UG piping to remain | **66,573** | gsf | 12.00 | 798,876 | | |
| | SUBTOTAL | | | | | 798,876 | |
| | ***TOTAL - PLUMBING*** | | | | | | **$798,876** |
| | ***D30 HVAC*** | | | | | | |
| | **D30 HVAC, GENERALLY** | | | | | | |
| | HVAC allowance; 4-pipe system with chilled beams | **66,573** | gsf | 48.00 | 3,195,504 | | |
| | SUBTOTAL | | | | | 3,195,504 | |
| | ***TOTAL - HVAC*** | | | | | | **$3,195,504** |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** **GFA** 66,573

| | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| | **MMES CODE UPGRADES RENOVATION - OPTION R1** | | | | | | |
| | ***D40 FIRE PROTECTION*** | | | | | | |
| | **D40 FIRE PROTECTION, GENERALLY** | | | | | | |
| | New sprinkler system; including crawl | **66,573** | gsf | 7.00 | 466,011 | | |
| | SUBTOTAL | | | | | 466,011 | |
| | ***TOTAL - FIRE PROTECTION*** | | | | | | **$466,011** |
| | ***D50 ELECTRICAL*** | | | | | | |
| | **D5010 ELECTRICAL SYSTEMS** | | | | | | |
| | Allowance for electrical systems | **66,573** | gsf | 32.00 | 2,130,336 | | |
| | SUBTOTAL | | | | | 2,130,336 | |
| | ***TOTAL - ELECTRICAL*** | | | | | | **$2,130,336** |
| | ***E10 EQUIPMENT*** | | | | | | |
| | **E10 EQUIPMENT, GENERALLY** | | | | | | |
| | Gym wall pads | **1** | ls | 10,000.00 | 10,000 | | |
| | Basketball backstops; swing up; electric operated | **4** | loc | 10,000.00 | 40,000 | | |
| | Gymnasium dividing net; electrically operated | **1** | ls | 30,000.00 | 30,000 | | |
| | Telescoping bleachers | **1** | ls | 30,000.00 | ETR | | |
| | SUBTOTAL | | | | | 80,000 | |
| | ***TOTAL - EQUIPMENT*** | | | | | | **$80,000** |
| | ***E20 FURNISHINGS*** | | | | | | |
| | **E2010 FIXED FURNISHINGS** | | | | | | |
| | Window blinds | **11,966** | sf | 7.00 | 83,762 | | |
| | Casework allowance; modifications for ADA | **66,573** | gsf | 2.00 | 133,146 | | |
| | SUBTOTAL | | | | | 216,908 | |
| | **E2020 MOVABLE FURNISHINGS** | | | | | | |
| | All movable furnishings to be provided and installed by owner | | | | | | |
| | SUBTOTAL | | | | | NIC | |
| | ***TOTAL - FURNISHINGS*** | | | | | | **$216,908** |
| | ***F10 SPECIAL CONSTRUCTION*** | | | | | | |
| | **F10 SPECIAL CONSTRUCTION** | | | | | | |
| | SUBTOTAL | | | | | - | |
| | ***TOTAL - SPECIAL CONSTRUCTION*** | | | | | | |
| | ***F20 SELECTIVE BUILDING DEMOLITION*** | | | | | | |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** **GFA** 66,573

| | *DESCRIPTION* | *QTY* | *UNIT* | *UNIT COST* | *EST'D COST* | *SUB TOTAL* | TOTAL COST |
|---|---|---|---|---|---|---|---|
| | **MMES CODE UPGRADES RENOVATION - OPTION R1** | | | | | | |
| | **F2010 BUILDING ELEMENTS DEMOLITION** | | | | | | |
| | Remove exterior glazing | **11,966** | sf | 6.00 | 71,796 | | |
| | Remove roofing | **66,573** | sf | 2.00 | 133,146 | | |
| | Interior demolition | **66,573** | gsf | 6.00 | 399,438 | | |
| | Temporary enclosures/protection | **66,573** | sf | 2.00 | 133,146 | | |
| | SUBTOTAL | | | | | 737,526 | |
| | **F2020 HAZARDOUS COMPONENTS ABATEMENT** | | | | | | |
| | See summary | | | | | | |
| | SUBTOTAL | | | | | | |
| | ***TOTAL - SELECTIVE BUILDING DEMOLITION*** | | | | | | **$737,526** |

**Feasibility Design Estimate**

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| | **SITEWORK OPTION R1** | | | | | | |
| | ***G SITEWORK*** | | | | | | |
| **G10** | **SITE PREPARATION & DEMOLITION** | | | | | | |
| | Allowance for site fencing, gates and contractor lay down | **1** | ls | 25,000.00 | 25,000 | | |
| | Miscellaneous demolition | **1** | ls | 20,000.00 | 20,000 | | |
| | Site Earthwork | | | | | | |
| | Strip topsoil and store | | | | No work - ETR | | |
| | Fine grading at new work | **833** | sy | 1.00 | 833 | | |
| | Cut and Fill | | | | No work - ETR | | |
| | Silt fence/erosion control, wash bays, stock piles, protect wetlands | **1** | ls | 10,000.00 | 10,000 | | |
| | Hazardous Waste Remediation | | | | | | |
| | Remove existing underground fuel storage tanks | | | | NIC | | |
| | Dispose/treat contaminated soils | | | | | | |
| | SUBTOTAL | | | | | 55,833 | |
| **G20** | **SITE IMPROVEMENTS** | | | | | | |
| | Asphalt Paving; parking lot and roadway | *92,000* | *sf* | | | | |
| | Mill & re-pave existing paving | **92,000** | sf | 2.00 | 184,000 | | |
| | VGC | | | | ETR | | |
| | Line painting including crosswalk and hcap space hatching | **1** | ls | 10,000.00 | 10,000 | | |
| | New signage | **1** | ls | 10,000.00 | 10,000 | | |
| | Site Improvements | | | | | | |
| | Flag pole | **1** | ea | 5,000.00 | 5,000 | | |
| | Tennis Courts | | | | No work - ETR | | |
| | Elevated walkways | | | | No work - ETR | | |
| | Play surfacing; allowance of 7,500 SF | **7,500** | sf | 18.00 | 135,000 | | |
| | Play equipment - allowance | **1** | ls | 250,000.00 | 250,000 | | |
| | Allowance for new Greenhouse | **1** | ls | 20,000.00 | 20,000 | | |
| | Site improvements; benches, walls, fences etc. | **1** | ls | 50,000.00 | 50,000 | | |
| | SUBTOTAL | | | | | 664,000 | |
| | Landscaping | | | | | | |
| | Topsoil - amend existing topsoil; minimum 6" | | | | ETR | | |
| | Lawn - aerate and reseed existing | **102,000** | sf | 0.25 | 25,500 | | |
| | Allowance for work at extensive raised planting beds | **1** | ls | 5,000.00 | 5,000 | | |
| | Planting allowance | | | | ETR | | |
| | SUBTOTAL | | | | | 30,500 | |
| **G30** | **CIVIL MECHANICAL UTILITIES** | | | | | | |
| | Water | | | | | | |
| | *Assumes existing water service is sufficient* | | | | | | |
| | New DI piping; 8" Fire | **300** | lf | 85.00 | 25,500 | | |
| | Connect to existing | **1** | loc | 10,000.00 | 10,000 | | |
| | Additional fire hydrants | **3** | ea | 5,000.00 | 15,000 | | |
| | Sanitary | | | | | | |
| | Sanitary; replace all existing grease traps and science waste traps | **1** | ls | 30,000.00 | 30,000 | | |
| | Stormwater | | | | | | |
| | Allowance for new/ modify existing drainage systems | **1** | ls | 250,000.00 | 250,000 | | |
| | Gas service | | | | assume ETR | | |
| | SUBTOTAL | | | | | 330,500 | |

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**Manchester Memorial Elementary School**
Design Options
Manchester-on-the Sea, MA

30-Jan-18

**Feasibility Design Estimate**

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **SITEWORK OPTION R1** | | | | | | | |
| | **G40 ELECTRICAL UTILITIES** | | | | | | |
| | Power; assume new service | **1** | ls | 50,000.00 | 50,000 | | |
| | Communications | | | | assume ETR | | |
| | Security System | | | | assume not required | | |
| | Site Lighting | | | | assume ETR | | |
| | SUBTOTAL | | | | | 50,000 | |
| | **TOTAL - SITE DEVELOPMENT** | | | | | | ***$1,130,833*** |

PM&C

**Manchester Memorial Elementary School**
**Design Options**
**Manchester-on-the Sea, MA**

30-Jan-18

**Feasibility Design Estimate**

GFA 21,200

## *CONSTRUCTION COST SUMMARY*

| | *BUILDING SYSTEM* | | *SUB-TOTAL* | *TOTAL* | *$/SF* | *%* |
|---|---|---|---|---|---|---|
| **OPTION AR-2 RENOVATION** | | | | | | |
| **A10** | **FOUNDATIONS** | | | | | |
| | A1010 | Standard Foundations | $75,000 | | | |
| | A1020 | Special Foundations | $0 | | | |
| | A1030 | Lowest Floor Construction | $137,200 | **$212,200** | $10.01 | 3.7% |
| **B10** | **SUPERSTRUCTURE** | | | | | |
| | B1010 | Upper Floor Construction | $0 | | | |
| | B1020 | Roof Construction | $212,000 | **$212,000** | $10.00 | 3.7% |
| **B20** | **EXTERIOR CLOSURE** | | | | | |
| | B2010 | Exterior Walls | $324,000 | | | |
| | B2020 | Windows/Curtainwall | $462,690 | | | |
| | B2030 | Exterior Doors | $18,232 | **$804,922** | $37.97 | 14.0% |
| **B30** | **ROOFING** | | | | | |
| | B3010 | Roof Coverings | $466,400 | | | |
| | B3020 | Roof Openings | $0 | **$466,400** | $22.00 | 8.1% |
| **C10** | **INTERIOR CONSTRUCTION** | | | | | |
| | C1010 | Partitions | $360,400 | | | |
| | C1020 | Interior Doors | $106,000 | | | |
| | C1030 | Specialties/Millwork | $117,660 | **$584,060** | $27.55 | 10.1% |
| **C20** | **STAIRCASES** | | | | | |
| | C2010 | Stair Construction | $0 | | | |
| | C2020 | Stair Finishes | $0 | **$0** | $0.00 | 0.0% |
| **C30** | **INTERIOR FINISHES** | | | | | |
| | C3010 | Wall Finishes | $63,600 | | | |
| | C3020 | Floor Finishes | $262,200 | | | |
| | C3030 | Ceiling Finishes | $159,000 | **$484,800** | $22.87 | 8.4% |
| **D10** | **CONVEYING SYSTEMS** | | | | | |
| | D1010 | Elevator | $0 | **$0** | $0.00 | 0.0% |
| **D20** | **PLUMBING** | | | | | |
| | D20 | Plumbing | $296,800 | **$296,800** | $14.00 | 5.2% |
| **D30** | **HVAC** | | | | | |
| | D30 | HVAC | $932,800 | **$932,800** | $44.00 | 16.2% |
| **D40** | **FIRE PROTECTION** | | | | | |
| | D40 | Fire Protection | $95,400 | **$95,400** | $4.50 | 1.7% |
| **D50** | **ELECTRICAL** | | | | | |
| | D5010 | Electrical Systems | $678,400 | **$678,400** | $32.00 | 11.8% |
| **E10** | **EQUIPMENT** | | | | | |
| | E10 | Equipment | $523,600 | **$523,600** | $24.70 | 9.1% |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
**Manchester-on-the Sea, MA**

**Feasibility Design Estimate** GFA 21,200

## *CONSTRUCTION COST SUMMARY*

| | *BUILDING SYSTEM* | | *SUB-TOTAL* | *TOTAL* | *$/SF* | *%* |
|---|---|---|---|---|---|---|
| **OPTION AR-2 RENOVATION** | | | | | | |
| **E20** | **FURNISHINGS** | | | | | |
| | E2010 | Fixed Furnishings | $224,190 | | | |
| | E2020 | Movable Furnishings | NIC | **$224,190** | $10.58 | 3.9% |
| **F10** | **SPECIAL CONSTRUCTION** | | | | | |
| | F10 | Special Construction | $0 | **$0** | $0.00 | 0.0% |
| **F20** | **SELECTIVE BUILDING DEMOLITION** | | | | | |
| | F2010 | Building Elements Demolition | $240,620 | | | |
| | F2020 | Hazardous Components Abatement | $0 | **$240,620** | $11.35 | 4.2% |
| ***TOTAL DIRECT COST (Trade Costs)*** | | | | ***$5,756,192*** | *$271.52* | *100.0%* |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** **GFA** 21,200

| | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| | **OPTION AR-2 RENOVATION** | | | | | | |
| | ***GROSS FLOOR AREA CALCULATION*** | | | | | | |
| | First Floor | | | | 21,200 | | |
| | Second Floor | | | | - | | |
| | ***TOTAL GROSS FLOOR AREA (GFA)*** | | | | **21,200** ***sf*** | | |
| | ***A10 FOUNDATIONS*** | | | | | | |
| | **A1010 STANDARD FOUNDATIONS** | | | | | | |
| | Allowance for foundation repair | **1** | ls | 75,000.00 | 75,000 | | |
| | SUBTOTAL | | | | | 75,000 | |
| | **A1020 SPECIAL FOUNDATIONS** | | | | | | |
| | No work in this section | | | | | | |
| | SUBTOTAL | | | | | | |
| | **A1030 LOWEST FLOOR CONSTRUCTION** | | | | | | |
| | Cutting and patching | **21,200** | sf | 6.00 | 127,200 | | |
| | Equipment pads | **1** | ls | 10,000.00 | 10,000 | | |
| | SUBTOTAL | | | | | 137,200 | |
| | ***TOTAL - FOUNDATIONS*** | | | | | | **$212,200** |
| | ***B10 SUPERSTRUCTURE*** | | | | | | |
| | **B1010 FLOOR CONSTRUCTION** | | | | | | |
| | No work to this section | | | | | | |
| | SUBTOTAL | | | | | - | |
| | **B1020 ROOF CONSTRUCTION** | | | | | | |
| | Roof Structure - Steel: | | | | | | |
| | New lateral Bracing to roofs | **21,200** | sf | 10.00 | 212,000 | | |
| | SUBTOTAL | | | | | 212,000 | |
| | ***TOTAL - SUPERSTRUCTURE*** | | | | | | **$212,000** |
| | ***B20 EXTERIOR CLOSURE*** | | | | | | |
| | **B2010 EXTERIOR WALLS** | *11,130* | *sf* | | | | |
| | Repair, repoint and clean all exterior walls | **11,130** | gsf | 34.00 | NIC | | |
| | Insulate exterior walls to meet code; new furred walls at perimeter | **11,130** | sf | 12.00 | NIC | | |
| | New exterior wall at areas where existing building removed | **3,600** | sf | 90.00 | 324,000 | | |
| | SUBTOTAL | | | | | 324,000 | |
| | **B2020 WINDOWS/CURTAINWALL** | *4,770* | | | - | | |
| | Replace existing punched windows | **4,293** | sf | 95.00 | 407,835 | | |
| | New windows/CW | **477** | sf | 115.00 | 54,855 | | |
| | SUBTOTAL | | | | | 462,690 | |

| | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| | **OPTION AR-2 RENOVATION** | | | | | | |
| | **B2030 EXTERIOR DOORS** | | | | | | |
| | Replace exterior door, double | **2** | pr | 4,000.00 | 8,000 | | |
| | Replace exterior door, single | **4** | ea | 2,000.00 | 8,000 | | |
| | Backer rod & double sealant | **186** | lf | 9.00 | 1,674 | | |
| | Wood blocking at openings | **186** | lf | 3.00 | 558 | | |
| | SUBTOTAL | | | | | 18,232 | |
| | ***TOTAL - EXTERIOR CLOSURE*** | | | | | | **$804,922** |
| | ***B30 ROOFING*** | | | | | | |
| | **B3010 ROOF COVERINGS** | | | | | | |
| | Replace existing roofing systems | **21,200** | sf | 22.00 | 466,400 | | |
| | SUBTOTAL | | | | | 466,400 | |
| | **B3020 ROOF OPENINGS** | | | | | | |
| | **No work in this section** | | | | | | |
| | SUBTOTAL | | | | | - | |
| | ***TOTAL - ROOFING*** | | | | | | **$466,400** |
| | ***C10 INTERIOR CONSTRUCTION*** | | | | | | |
| | **C1010 PARTITIONS** | | | | | | |
| | Anchor the top of all masonry partitions to the underside of the floor or structure above | **21,200** | gsf | 6.00 | 127,200 | | |
| | New partitions; assume 50% new | **21,200** | gsf | 11.00 | 233,200 | | |
| | SUBTOTAL | | | | | 360,400 | |
| | **C1020 INTERIOR DOORS** | | | | | | |
| | Remove and replace doors | **21,200** | gsf | 5.00 | 106,000 | | |
| | SUBTOTAL | | | | | 106,000 | |
| | **C1030 SPECIALTIES / MILLWORK** | | | | | | |
| | Toilet Partitions and accessories | **21,200** | gsf | 0.80 | 16,960 | | |
| | Lockers, full height | **21,200** | gsf | 1.50 | 31,800 | | |
| *055000* | *MISCELLANEOUS METALS* | | | | | | |
| | Miscellaneous metals throughout building | **21,200** | sf | 1.00 | 21,200 | | |
| *061000* | *ROUGH CARPENTRY* | | | | | | |
| | Rough blocking | **21,200** | sf | 0.50 | 10,600 | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Miscellaneous sealants throughout building | **21,200** | sf | 1.50 | 31,800 | | |
| *101400* | *SIGNAGE* | | | | | | |
| | Code compliant signage | **21,200** | sf | 0.25 | 5,300 | | |
| | SUBTOTAL | | | | | 117,660 | |

| | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| | **OPTION AR-2 RENOVATION** | | | | | | |
| | ***TOTAL - INTERIOR CONSTRUCTION*** | | | | | | **$584,060** |
| | ***C20 STAIRCASES*** | | | | | | |
| | **C2010 STAIR CONSTRUCTION** | | | | | | |
| | No work in this section | | | | | | |
| | SUBTOTAL | | | | | - | |
| | **C2020 STAIR FINISHES** | | | | | | |
| | No work in this section | | | | | | |
| | SUBTOTAL | | | | | - | |
| | ***TOTAL - STAIRCASES*** | | | | | | |
| | ***C30 INTERIOR FINISHES*** | | | | | | |
| | **C3010 WALL FINISHES** | | | | | | |
| | Painting | **21,200** | gsf | 3.00 | 63,600 | | |
| | SUBTOTAL | | | | | 63,600 | |
| | **C3020 FLOOR FINISHES** | | | | | | |
| | New linoleum flooring throughout including floor prep | **12,540** | sf | 10.00 | 125,400 | | |
| | New shock-absorbing wood gym floor | **7,600** | sf | 18.00 | 136,800 | | |
| | SUBTOTAL | | | | | 262,200 | |
| | **C3030 CEILING FINISHES** | | | | | | |
| | Replace existing ACT | **21,200** | sf | 7.50 | 159,000 | | |
| | SUBTOTAL | | | | | 159,000 | |
| | ***TOTAL - INTERIOR FINISHES*** | | | | | | **$484,800** |
| | ***D10 CONVEYING SYSTEMS*** | | | | | | |
| | **D1010 ELEVATOR** | | | | | | |
| | No work in this section | | | | | | |
| | SUBTOTAL | | | | | - | |
| | ***TOTAL - CONVEYING SYSTEMS*** | | | | | | |
| | ***D20 PLUMBING*** | | | | | | |
| | **D20 PLUMBING, GENERALLY** | | | | | | |
| | Plumbing, complete | **21,200** | sf | 14.00 | 296,800 | | |
| | SUBTOTAL | | | | | 296,800 | |
| | ***TOTAL - PLUMBING*** | | | | | | **$296,800** |
| | ***D30 HVAC*** | | | | | | |

| | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| | **OPTION AR-2 RENOVATION** | | | | | | |
| | **D30 HVAC, GENERALLY** | | | | | | |
| | HVAC, complete; assumed displacement | **21,200** | sf | 44.00 | 932,800 | | |
| | SUBTOTAL | | | | | 932,800 | |
| | ***TOTAL - HVAC*** | | | | | | **$932,800** |
| | ***D40 FIRE PROTECTION*** | | | | | | |
| | **D40 FIRE PROTECTION, GENERALLY** | | | | | | |
| | Fire Protection, complete | **21,200** | sf | 4.50 | 95,400 | | |
| | SUBTOTAL | | | | | 95,400 | |
| | ***TOTAL - FIRE PROTECTION*** | | | | | | **$95,400** |
| | ***D50 ELECTRICAL*** | | | | | | |
| | **D5010 ELECTRICAL SYSTEMS** | | | | | | |
| | Electrical, complete | **21,200** | sf | 32.00 | 678,400 | | |
| | SUBTOTAL | | | | | 678,400 | |
| | ***TOTAL - ELECTRICAL*** | | | | | | **$678,400** |
| | ***E10 EQUIPMENT*** | | | | | | |
| | **E10 EQUIPMENT, GENERALLY** | | | | | | |
| | Gym wall pads | **1** | ls | 20,000.00 | 20,000 | | |
| | Basketball backstops; swing up; electric operated | **6** | loc | 10,000.00 | 60,000 | | |
| | Gymnasium dividing net; electrically operated | **1** | ls | 30,000.00 | 30,000 | | |
| | Volleyball net and standards | **1** | ls | 5,000.00 | 5,000 | | |
| | Telescoping bleachers | **1** | ls | 30,000.00 | 30,000 | | |
| | Stage curtain and rigging | **1** | ls | 35,000.00 | 35,000 | | |
| | Food Service equipment | **1,618** | sf | 200.00 | 323,600 | | |
| | Loading dock equipment | **1** | ls | 20,000.00 | 20,000 | | |
| | SUBTOTAL | | | | | 523,600 | |
| | ***TOTAL - EQUIPMENT*** | | | | | | **$523,600** |
| | ***E20 FURNISHINGS*** | | | | | | |
| | **E2010 FIXED FURNISHINGS** | | | | | | |
| | Window blinds | **4,770** | sf | 7.00 | 33,390 | | |
| | Casework allowance | **21,200** | gsf | 9.00 | 190,800 | | |
| | SUBTOTAL | | | | | 224,190 | |
| | **E2020 MOVABLE FURNISHINGS** | | | | | | |
| | All movable furnishings to be provided and installed by owner | | | | | | |
| | SUBTOTAL | | | | | NIC | |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** **GFA** 21,200

| | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| | **OPTION AR-2 RENOVATION** | | | | | | |
| | ***TOTAL - FURNISHINGS*** | | | | | | **$224,190** |
| | ***F10 SPECIAL CONSTRUCTION*** | | | | | | |
| | **F10 SPECIAL CONSTRUCTION** | | | | | | |
| | SUBTOTAL | | | | | - | |
| | ***TOTAL - SPECIAL CONSTRUCTION*** | | | | | | |
| | ***F20 SELECTIVE BUILDING DEMOLITION*** | | | | | | |
| | **F2010 BUILDING ELEMENTS DEMOLITION** | | | | | | |
| | Remove exterior glazing | **4,770** | sf | 6.00 | 28,620 | | |
| | Remove roofing | **21,200** | sf | 2.00 | 42,400 | | |
| | Interior demolition | **21,200** | gsf | 6.00 | 127,200 | | |
| | Temporary enclosures/protection | **21,200** | sf | 2.00 | 42,400 | | |
| | SUBTOTAL | | | | | 240,620 | |
| | **F2020 HAZARDOUS COMPONENTS ABATEMENT** | | | | | | |
| | See summary | | | | | | |
| | SUBTOTAL | | | | | | |
| | ***TOTAL - SELECTIVE BUILDING DEMOLITION*** | | | | | | **$240,620** |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** GFA 69,900

## *CONSTRUCTION COST SUMMARY*

| | *BUILDING SYSTEM* | | *SUB-TOTAL* | *TOTAL* | *$/SF* | *%* |
|---|---|---|---|---|---|---|
| **OPTION AR-2 NEW ADDITION** | | | | | | |
| **A10** | **FOUNDATIONS** | | | | | |
| | A1010 | Standard Foundations | $816,142 | | | |
| | A1020 | Special Foundations | $478,800 | | | |
| | A1030 | Lowest Floor Construction | $481,278 | **$1,776,220** | $25.41 | 8.6% |
| **A20** | **BASEMENT CONSTRUCTION** | | | | | |
| | A2010 | Basement Excavation | $0 | | | |
| | A2020 | Basement Walls | $0 | **$0** | $0.00 | 0.0% |
| **B10** | **SUPERSTRUCTURE** | | | | | |
| | B1010 | Upper Floor Construction | $1,170,700 | | | |
| | B1020 | Roof Construction | $1,441,560 | **$2,612,260** | $37.37 | 12.7% |
| **B20** | **EXTERIOR CLOSURE** | | | | | |
| | B2010 | Exterior Walls | $1,858,260 | | | |
| | B2020 | Windows | $1,207,190 | | | |
| | B2030 | Exterior Doors | $81,792 | **$3,147,242** | $45.02 | 15.3% |
| **B30** | **ROOFING** | | | | | |
| | B3010 | Roof Coverings | $1,277,580 | | | |
| | B3020 | Roof Openings | $32,500 | **$1,310,080** | $18.74 | 6.4% |
| **C10** | **INTERIOR CONSTRUCTION** | | | | | |
| | C1010 | Partitions | $1,537,800 | | | |
| | C1020 | Interior Doors | $349,500 | | | |
| | C1030 | Specialties/Millwork | $501,820 | **$2,389,120** | $34.18 | 11.6% |
| **C20** | **STAIRCASES** | | | | | |
| | C2010 | Stair Construction | $54,000 | | | |
| | C2020 | Stair Finishes | $12,574 | **$66,574** | $0.95 | 0.3% |
| **C30** | **INTERIOR FINISHES** | | | | | |
| | C3010 | Wall Finishes | $489,300 | | | |
| | C3020 | Floor Finishes | $768,900 | | | |
| | C3030 | Ceiling Finishes | $524,250 | **$1,782,450** | $25.50 | 8.7% |
| **D10** | **CONVEYING SYSTEMS** | | | | | |
| | D1010 | Elevator | $130,000 | **$130,000** | $1.86 | 0.6% |
| **D20** | **PLUMBING** | | | | | |
| | D20 | Plumbing | $978,600 | **$978,600** | $14.00 | 4.8% |
| **D30** | **HVAC** | | | | | |
| | D30 | HVAC | $3,075,600 | **$3,075,600** | $44.00 | 15.0% |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** GFA 69,900

## *CONSTRUCTION COST SUMMARY*

| | *BUILDING SYSTEM* | | *SUB-TOTAL* | *TOTAL* | *$/SF* | *%* |
|---|---|---|---|---|---|---|
| **OPTION AR-2 NEW ADDITION** | | | | | | |
| **D40** | **FIRE PROTECTION** | | | | | |
| | D40 | Fire Protection | $314,550 | **$314,550** | $4.50 | 1.5% |
| **D50** | **ELECTRICAL** | | | | | |
| | D5010 | Complete System | $2,236,800 | **$2,236,800** | $32.00 | 10.9% |
| **E10** | **EQUIPMENT** | | | | | |
| | E10 | Equipment | $20,000 | **$20,000** | $0.29 | 0.1% |
| **E20** | **FURNISHINGS** | | | | | |
| | E2010 | Fixed Furnishings | $729,365 | | | |
| | E2020 | Movable Furnishings | NIC | **$729,365** | $10.43 | 3.5% |
| **F10** | **SPECIAL CONSTRUCTION** | | | | | |
| | F10 | Special Construction | $0 | **$0** | $0.00 | 0.0% |
| **F20** | **HAZMAT REMOVALS** | | | | | |
| | F2010 | Building Elements Demolition | $0 | | | |
| | F2020 | Hazardous Components Abatement | $0 | **$0** | $0.00 | 0.0% |
| ***TOTAL DIRECT COST (Trade Costs)*** | | | | ***$20,568,861*** | *$294.26* | *100.0%* |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION AR-2 NEW ADDITION** | | | | | | | |
| | ***GROSS FLOOR AREA CALCULATION*** | | | | | | |
| | First Floor | | | 39,900 | | | |
| | Second Floor | | | 30,000 | | | |
| | ***TOTAL GROSS FLOOR AREA (GFA)*** | | | | **69,900** | ***sf*** | |
| ***A10*** | ***FOUNDATIONS*** | | | | | | |
| **A1010** | **STANDARD FOUNDATIONS** | | | | | | |
| *033000* | *CONCRETE* | | | | | | |
| | Strip Footings | *188* | *CY* | | | | |
| | Foundation Walls | *251* | *CY* | | | | |
| | Spread Footings | *343* | *CY* | | | | |
| | Piers | *68* | *CY* | | | | |
| | Total Foundation Concrete | *850* | *CY* | | | | |
| | Strip footings and grade beams | | | | | | |
| | Formwork | **3,620** | sf | 11.00 | 39,820 | | |
| | Re-bar | **19,150** | lbs. | 1.20 | 22,980 | | |
| | Concrete material; 3,000 psi | **188** | cy | 130.00 | 24,440 | | |
| | Placing concrete | **188** | cy | 70.00 | 13,160 | | |
| | Foundation walls | | | | | | |
| | Formwork | **9,680** | sf | 12.50 | 121,000 | | |
| | Re-bar | **24,200** | lbs. | 1.20 | 29,040 | | |
| | Concrete material; 3,000 psi | **251** | cy | 130.00 | 32,630 | | |
| | Placing concrete | **251** | cy | 70.00 | 17,570 | | |
| | Form shelf | **1,210** | lf | 10.00 | 12,100 | | |
| | Spread Footings | | | | | | |
| | Formwork | **4,758** | sf | 14.00 | 66,612 | | |
| | Re-bar | **23,700** | lbs. | 1.20 | 28,440 | | |
| | Concrete material; 3,000 psi | **343** | cy | 130.00 | 44,590 | | |
| | Placing concrete | **343** | cy | 70.00 | 24,010 | | |
| | Set anchor bolts grout plates | **80** | ea | 150.00 | 12,000 | | |
| | Piers/Pilasters | | | | | | |
| | Formwork | **2,346** | sf | 14.00 | 32,844 | | |
| | Re-bar | **8,160** | lbs | 1.20 | 9,792 | | |
| | Concrete material; 3,000 psi | **68** | cy | 130.00 | 8,840 | | |
| | Placing concrete | **68** | cy | 80.00 | 5,440 | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Dampproofing at brick shelf | **7,260** | sf | 3.00 | 21,780 | | |
| *072100* | *THERMAL INSULATION* | | | | | | |
| | Insulation | **4,840** | sf | 3.00 | 14,520 | | |
| *312000* | *EARTHWORK* | | | | | | |
| | Strip footings | | | | | | |
| | Excavation | **1,902** | cy | 15.00 | 28,530 | | |
| | Remove off site | **1,902** | cy | 12.00 | 22,824 | | |
| | Backfill with imported material | **1,463** | cy | 30.00 | 43,890 | | |
| | Spread footings | | | | | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION AR-2 NEW ADDITION** | | | | | | | |
| | Excavation | **1,295** | cy | 16.00 | 20,720 | | |
| | Remove off site | **1,295** | cy | 12.00 | 15,540 | | |
| | Backfill with imported material | **952** | cy | 30.00 | 28,560 | | |
| | Miscellaneous | | | | | | |
| | Gravel fill beneath footings, 12" | **423** | cy | 30.00 | 12,690 | | |
| | Perimeter drain | **1,210** | lf | 18.00 | 21,780 | | |
| | Underslab E&B for plumbing | **1** | ls | 15,000.00 | 15,000 | | |
| | Dewatering for foundation work | **1** | ls | 25,000.00 | 25,000 | | |
| | SUBTOTAL | | | | | 816,142 | |
| **A1020** | **SPECIAL FOUNDATIONS** | | | | | | |
| | Rammed Aggregate Piers | **39,900** | sf | 12.00 | 478,800 | | |
| | SUBTOTAL | | | | | 478,800 | |
| **A1030** | **LOWEST FLOOR CONSTRUCTION** | | | | | | |
| | New Slab on grade, 5" thick | | | | | | |
| | Structural fill, 8" | **990** | cy | 36.00 | 35,640 | | |
| | Gravel fill, 8" | **990** | cy | 40.00 | 39,600 | | |
| | Rigid insulation | **39,900** | sf | 2.25 | 89,775 | | |
| | Vapor barrier | **39,900** | sf | 0.75 | 29,925 | | |
| | Compact existing sub-grade | **39,900** | sf | 0.50 | 19,950 | | |
| | Mesh reinforcing 15% lap | **45,885** | sf | 0.80 | 36,708 | | |
| | Concrete - 5" thick; 4,000 psi | **652** | cy | 125.00 | 81,500 | | |
| | Placing concrete | **652** | cy | 45.00 | 29,340 | | |
| | Finishing and curing concrete | **39,900** | sf | 1.50 | 59,850 | | |
| | Control joints - saw cut | **39,900** | sf | 0.10 | 3,990 | | |
| | Miscellaneous | | | | | | |
| | Elevator pit | **1** | ea | 35,000.00 | 35,000 | | |
| | Connect to existing building | **1** | ls | 20,000.00 | 20,000 | | |
| | SUBTOTAL | | | | | 481,278 | |
| | ***TOTAL - FOUNDATIONS*** | | | | | | **$1,776,220** |
| ***A20*** | ***BASEMENT CONSTRUCTION*** | | | | | | |
| **A2010** | **BASEMENT EXCAVATION** | | | | | | |
| | **No Work in this section** | | | | | | |
| | SUBTOTAL | | | | | - | |
| **A2020** | **BASEMENT WALLS** | | | | | | |
| | **No Work in this section** | | | | | | |
| | SUBTOTAL | | | | | - | |
| | ***TOTAL - BASEMENT CONSTRUCTION*** | | | | | | |
| ***B10*** | ***SUPERSTRUCTURE*** | | | | | | |
| | | 13.73 | lbs/sf | | - | | |
| **B1010** | **FLOOR CONSTRUCTION** | 480 | tns | | - | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION AR-2 NEW ADDITION** | | | | | | | |
| | Floor Structure - Steel: | | | | | | |
| | Steel beams and columns, 13#/SF | **195** | tns | 3,800.00 | 741,000 | | |
| | Premium for HSS | **49** | tns | 300.00 | 14,700 | | |
| | Shear studs | **6,000** | ea | 2.50 | 15,000 | | |
| | Floor Structure | | | | | | |
| | 2" 18 Ga. Metal galvanized floor Deck | **30,000** | sf | 3.75 | 112,500 | | |
| | WWF reinforcement | **34,500** | sf | 0.80 | 27,600 | | |
| | Concrete Fill to metal deck; 5-1/4" Light Weight | **510** | cy | 160.00 | 81,600 | | |
| | Place and finish concrete | **30,000** | sf | 2.00 | 60,000 | | |
| | Rebar to decks | **9,000** | lbs | 1.20 | 10,800 | | |
| | Misc. angles | **30,000** | sf | 0.50 | 15,000 | | |
| | Miscellaneous | | | | | | |
| | Fire proofing to columns and beams | **30,000** | sf | 2.25 | 67,500 | | |
| | Fire stopping floors | **1** | ls | 25,000.00 | 25,000 | | |
| | SUBTOTAL | | | | | 1,170,700 | |
| **B1020** | **ROOF CONSTRUCTION** | | | | | | |
| | Roof Structure - Steel: | | | | | | |
| | Steel beams and columns, 13#/SF | **285** | tns | 3,800.00 | 1,083,000 | | |
| | Premium for HSS | **71** | tns | 300.00 | 21,300 | | |
| | Roof Structure | | | | | | |
| | 1-1/2" 20 Ga. galvanized Metal Roof Deck | **33,990** | sf | 3.50 | 118,965 | | |
| | 2" 18 Ga. Metal galvanized roof Deck | **9,900** | sf | 3.75 | 37,125 | | |
| | Miscellaneous | | | | | | |
| | Concrete at lower level roof | **9,900** | sf | 8.00 | 79,200 | | |
| | Fire proofing to columns, beams and deck | **33,990** | sf | 3.00 | 101,970 | | |
| | SUBTOTAL | | | | | 1,441,560 | |
| | ***TOTAL - SUPERSTRUCTURE*** | | | | | | **$2,612,260** |
| ***B20*** | ***EXTERIOR CLOSURE*** | | | | | | |
| **B2010** | **EXTERIOR WALLS** | | | | | | |
| | **Exterior Wall Area - Solid Assume 70%** | *24,255* | sf | | | | |
| *042000* | *MASONRY* | | | | | | |
| | Brick veneer, 3 color; 85% of solid area | **20,617** | sf | 38.00 | 783,446 | | |
| | Staging to exterior wall | **34,650** | sf | 4.00 | 138,600 | | |
| *055000* | *MISC. METALS* | | | | | | |
| | Stainless steel sign at main entrance | **1** | ls | 10,000.00 | 10,000 | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Air barrier | **24,255** | sf | 6.50 | 157,658 | | |
| | Air barrier/flashing at windows | **6,115** | lf | 6.25 | 38,219 | | |
| | Miscellaneous sealants to closure | **24,255** | sf | 1.00 | 24,255 | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION AR-2 NEW ADDITION** | | | | | | | |
| *072100* | *THERMAL INSULATION* | | | | | | |
| | Insulation | **24,255** | sf | 2.25 | 54,574 | | |
| *076400* | *CLADDING* | | | | | | |
| | Metal panel; 15% of solid area | **3,638** | sf | 65.00 | 236,470 | | |
| | Roof equipment screen | **1** | ls | 50,000.00 | 50,000 | | |
| *092900* | *GYPSUM BOARD ASSEMBLIES* | | | | | | |
| | 6" metal stud backup | **24,255** | sf | 9.00 | 218,295 | | |
| | Gypsum Sheathing | **24,255** | sf | 2.75 | 66,701 | | |
| | Drywall lining to interior face of stud backup | **24,255** | sf | 3.30 | 80,042 | | |
| | SUBTOTAL | | | | | 1,858,260 | |
| **B2020** | **WINDOWS** | | | | | | |
| | **Exterior Wall Area - Glazed Assume 30%** | *10,395* | sf | | | | |
| *061000* | *ROUGH CARPENTRY* | | | | | | |
| | Wood blocking at openings | **6,115** | lf | 12.00 | 73,380 | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Backer rod & double sealant | **6,115** | lf | 9.00 | 55,035 | | |
| *080001* | *METAL WINDOWS* | | | | | | |
| | Windows, double glazed; 80% of glazed area | **8,316** | sf | 90.00 | 748,440 | | |
| | Curtainwall, double glazed; 20% of glazed area | **2,079** | sf | 115.00 | 239,085 | | |
| | Sunshades; horizontal | **1** | ls | 75,000.00 | 75,000 | | |
| *089000* | *LOUVERS* | | | | | | |
| | Louvers | **250** | sf | 65.00 | 16,250 | | |
| | SUBTOTAL | | | | | 1,207,190 | |
| **B2030** | **EXTERIOR DOORS** | | | | | | |
| | Glazed entrance doors including frame and hardware; double door | **6** | pr | 8,000.00 | 48,000 | | |
| | Glazed entrance doors including frame and hardware; single door | **8** | ea | 4,000.00 | 32,000 | | |
| | Backer rod & double sealant | **256** | lf | 4.00 | 1,024 | | |
| | Wood blocking at openings | **256** | lf | 3.00 | 768 | | |
| | SUBTOTAL | | | | | 81,792 | |
| | ***TOTAL - EXTERIOR CLOSURE*** | | | | | | **$3,147,242** |
| ***B30*** | ***ROOFING*** | | | | | | |
| **B3010** | **ROOF COVERINGS** | | | | | | |
| | New roofing complete | **43,890** | sf | 22.00 | 965,580 | | |
| | New fascia/soffits | **1,560** | lf | 200.00 | 312,000 | | |
| | SUBTOTAL | | | | | 1,277,580 | |
| **B3020** | **ROOF OPENINGS** | | | | | | |
| | Skylights, allow | **1** | ls | 30,000.00 | 30,000 | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION AR-2 NEW ADDITION** | | | | | | | |
| | Roof hatch | **1** | loc | 2,500.00 | 2,500 | | |
| | SUBTOTAL | | | | | 32,500 | |
| | ***TOTAL - ROOFING*** | | | | | | **$1,310,080** |
| ***C10*** | ***INTERIOR CONSTRUCTION*** | | | | | | |
| **C1010** | **PARTITIONS** | | | | | | |
| | Interior partitions | **69,900** | gsf | 22.00 | 1,537,800 | | |
| | SUBTOTAL | | | | | 1,537,800 | |
| **C1020** | **INTERIOR DOORS** | | | | | | |
| | Interior doors, frames and hardware | **69,900** | gsf | 5.00 | 349,500 | | |
| | SUBTOTAL | | | | | 349,500 | |
| **C1030** | **SPECIALTIES / MILLWORK** | | | | | | |
| | Toilet Partitions and accessories | **69,900** | gsf | 0.80 | 55,920 | | |
| | Backer panels in electrical closets | **1** | ls | 1,000.00 | 1,000 | | |
| | Marker boards/tackboards in classrooms, offices, conference rooms, library and MP rooms | **69,900** | sf | 1.00 | 69,900 | | |
| | Room Signs | **69,900** | gsf | 0.40 | 27,960 | | |
| | Fire extinguisher cabinets | **23** | ea | 350.00 | 8,050 | | |
| | Lockers | **69,900** | gsf | 1.60 | 111,840 | | |
| | Janitors Work Shop Accessories | **1** | ls | 1,500.00 | 1,500 | | |
| | Janitors Closet Accessories | **3** | rms | 300.00 | 900 | | |
| | *Media* | | | | | | |
| | Reception desks | **2** | loc | 25,000 | 50,000 | | |
| | Library shelving at perimeters 7' Tall | | | | F,F & E | | |
| | Library shelving at perimeters 3' Tall | | | | F,F & E | | |
| | Display cases | **69,900** | gsf | 0.25 | 17,475 | | |
| | Miscellaneous metals throughout building | **69,900** | sf | 1.25 | 87,375 | | |
| | Miscellaneous sealants throughout building | **69,900** | sf | 1.00 | 69,900 | | |
| | SUBTOTAL | | | | | 501,820 | |
| | ***TOTAL - INTERIOR CONSTRUCTION*** | | | | | | **$2,389,120** |
| ***C20*** | ***STAIRCASES*** | | | | | | |
| **C2010** | **STAIR CONSTRUCTION** | | | | | | |
| | Metal pan stair; egress stair | **2** | flt | 25,000.00 | 50,000 | | |
| | Concrete fill to stairs | **2** | flt | 2,000.00 | 4,000 | | |
| | SUBTOTAL | | | | | 54,000 | |
| **C2020** | **STAIR FINISHES** | | | | | | |
| | High performance coating to stairs including all railings etc. | **2** | flt | 3,000.00 | 6,000 | | |
| | Rubber tile at stairs - landings | **200** | sf | 10.00 | 2,000 | | |
| | Rubber tile at stairs - treads & risers | **240** | lft | 19.06 | 4,574 | | |
| | SUBTOTAL | | | | | 12,574 | |
| | ***TOTAL - STAIRCASES*** | | | | | | **$66,574** |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION AR-2 NEW ADDITION** | | | | | | | |
| | ***C30 INTERIOR FINISHES*** | | | | | | |
| **C3010** | **WALL FINISHES** | | | | | | |
| | Wall finishes | **69,900** | sf | 7.00 | 489,300 | | |
| | SUBTOTAL | | | | | 489,300 | |
| **C3020** | **FLOOR FINISHES** | | | | | | |
| | Floor finishes | **69,900** | sf | 11.00 | 768,900 | | |
| | SUBTOTAL | | | | | 768,900 | |
| **C3030** | **CEILING FINISHES** | | | | | | |
| | Ceiling finishes | **69,900** | sf | 7.50 | 524,250 | | |
| | SUBTOTAL | | | | | 524,250 | |
| | ***TOTAL - INTERIOR FINISHES*** | | | | | | **$1,782,450** |
| | ***D10 CONVEYING SYSTEMS*** | | | | | | |
| **D1010** | **ELEVATOR** | | | | | | |
| | New elevator; 2 stop; passenger | **1** | ea | 130,000.00 | 130,000 | | |
| | SUBTOTAL | | | | | 130,000 | |
| | ***TOTAL - CONVEYING SYSTEMS*** | | | | | | **$130,000** |
| | ***D20 PLUMBING*** | | | | | | |
| **D20** | **PLUMBING, GENERALLY** | | | | | | |
| | Plumbing, complete | **69,900** | sf | 14.00 | 978,600 | | |
| | SUBTOTAL | | | | | 978,600 | |
| | ***TOTAL - PLUMBING*** | | | | | | **$978,600** |
| | ***D30 HVAC*** | | | | | | |
| **D30** | **HVAC, GENERALLY** | | | | | | |
| | HVAC, complete; assumed displacement | **69,900** | sf | 44.00 | 3,075,600 | | |
| | SUBTOTAL | | | | | 3,075,600 | |
| | ***TOTAL - HVAC*** | | | | | | **$3,075,600** |
| | ***D40 FIRE PROTECTION*** | | | | | | |
| **D40** | **FIRE PROTECTION, GENERALLY** | | | | | | |
| | Fire Protection, complete | **69,900** | sf | 4.50 | 314,550 | | |
| | SUBTOTAL | | | | | 314,550 | |
| | ***TOTAL - FIRE PROTECTION*** | | | | | | **$314,550** |
| | ***D50 ELECTRICAL*** | | | | | | |
| **D5010** | **ELECTRICAL SYSTEMS** | | | | | | |
| | Electrical, complete | **69,900** | sf | 32.00 | 2,236,800 | | |
| | SUBTOTAL | | | | | 2,236,800 | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION AR-2 NEW ADDITION** | | | | | | | |
| | ***TOTAL - ELECTRICAL*** | | | | | | **$2,236,800** |
| ***E10*** | ***EQUIPMENT*** | | | | | | |
| **E10** | **EQUIPMENT, GENERALLY** | | | | | | |
| | Kiln | **1** | ea | 5,000.00 | 5,000 | | |
| | Electrically operated projection screens | **1** | loc | 15,000.00 | 15,000 | | |
| | SUBTOTAL | | | | | 20,000 | |
| | ***TOTAL - EQUIPMENT*** | | | | | | **$20,000** |
| ***E20*** | ***FURNISHINGS*** | | | | | | |
| **E2010** | **FIXED FURNISHINGS** | | | | | | |
| | Entry mats & frames - recessed with carpet/rubber strips | **500** | sf | 55.00 | 27,500 | | |
| | Window blinds | **10,395** | sf | 7.00 | 72,765 | | |
| | Counters, base cabinets, tall storage in classrooms and other rooms | **69,900** | gsf | 9.00 | 629,100 | | |
| | SUBTOTAL | | | | | 729,365 | |
| **E2020** | **MOVABLE FURNISHINGS** | | | | | | |
| | All movable furnishings to be provided and installed by owner | | | | | | |
| | SUBTOTAL | | | | | NIC | |
| | ***TOTAL - FURNISHINGS*** | | | | | | **$729,365** |
| ***F10*** | ***SPECIAL CONSTRUCTION*** | | | | | | |
| **F10** | **SPECIAL CONSTRUCTION** | | | | | | |
| | No items in this section | | | | | | |
| | SUBTOTAL | | | | | | |
| | ***TOTAL - SPECIAL CONSTRUCTION*** | | | | | | |
| ***F20*** | ***SELECTIVE BUILDING DEMOLITION*** | | | | | | |
| **F2010** | **BUILDING ELEMENTS DEMOLITION** | | | | | | |
| | No items in this section | | | | | | |
| | SUBTOTAL | | | | | | |
| **F2020** | **HAZARDOUS COMPONENTS ABATEMENT** | | | | | | |
| | See main summary for HazMat allowance | | | | See Summary | | |
| | SUBTOTAL | | | | | | |
| | ***TOTAL - SELECTIVE BUILDING DEMOLITION*** | | | | | | |

**Feasibility Design Estimate**

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **SITEWORK OPTION AR2** | | | | | | | |
| | ***G SITEWORK*** | | | | | | |
| **G10** | **SITE PREPARATION & DEMOLITION** | | | | | | |
| | Site construction fence/barricades | **1,800** | lf | 12.00 | 21,600 | | |
| | Site construction fence gates | **1** | ls | 7,500.00 | 7,500 | | |
| | Stabilized construction entrance | **2,000** | sf | 6.00 | 12,000 | | |
| | Pavement/curbing removal | **43,500** | sf | 1.00 | 43,500 | | |
| | Miscellaneous demolition including utilities | **1** | ls | 30,000.00 | 30,000 | | |
| | Site Earthwork | | | | | | |
| | Strip topsoil and store | **3,704** | cy | 12.00 | 44,448 | | |
| | Fine grading | **4,928** | sy | 1.00 | 4,928 | | |
| | Cut and Fill; assume balanced site | **9,933** | cy | 8.00 | 79,464 | | |
| | Silt fence/erosion control, wash bays, stock piles | **1,500** | lf | 12.00 | 18,000 | | |
| | Silt fence maintenance and monitoring | **1** | ls | 10,000.00 | 10,000 | | |
| | Protect existing wetlands | **1** | ls | 10,000.00 | 10,000 | | |
| | Hazardous Waste Remediation | | | | | | |
| | Remove existing underground fuel storage tanks | | | | NIC | | |
| | Dispose/treat contaminated soils | | | | | | |
| | SUBTOTAL | | | | | 281,440 | |
| **G20** | **SITE IMPROVEMENTS** | | | | | | |
| | Asphalt Paving; parking lot and roadway | *10,000* | *sf* | | | | |
| | gravel base; 12" thick | **370** | cy | 40.00 | 14,800 | | |
| | asphalt; 4 1/2" thick | **1,111** | sy | 28.00 | 31,108 | | |
| | Mill & re-pave existing paving | **48,500** | sf | 1.75 | 84,875 | | |
| | VGC | **400** | lf | 38.00 | 15,200 | | |
| | Line painting including crosswalk and hcap space hatching | **1** | ls | 20,000.00 | 20,000 | | |
| | HC curb cuts | **4** | loc | 350.00 | 1,400 | | |
| | Signage | **1** | ls | 10,000.00 | 10,000 | | |
| | Pedestrian Paving | | | | | | |
| | Concrete paving | *6,850* | sf | | | | |
| | gravel base; 12" thick | **254** | cy | 40.00 | 10,160 | | |
| | 4" concrete paving | **6,850** | sf | 9.00 | 61,650 | | |
| | *Assume 50% of existing sidewalks are ETR* | | | | | | |
| | Site Improvements | | | | | | |
| | Flag pole | **1** | ea | 5,000.00 | 5,000 | | |
| | Concrete retaining walls | | | | Assumed not required | | |
| | Tennis Courts | | | | No work - ETR | | |
| | Elevated walkways | | | | No work - ETR | | |
| | Play surfacing; allowance of 7,500 SF | **7,500** | sf | 18.00 | 135,000 | | |
| | Play equipment - allowance | **1** | ls | 250,000.00 | 250,000 | | |
| | Allowance for Greenhouse | **1** | ls | 20,000.00 | 20,000 | | |
| | Site improvements; benches, walls, fences etc. | **1** | ls | 150,000.00 | 150,000 | | |
| | Playing field; MP Field | *20,000* | sf | | | | |
| | Reuse existing topsoil; amended | **370** | cy | 30.00 | 11,100 | | |
| | Gravel drainage base; 12" thick | **741** | cy | 40.00 | 29,640 | | |
| | Sports seeding | **20,000** | sf | 0.35 | 7,000 | | |
| | Fencing/gates | **1** | ea | 30,000.00 | 30,000 | | |
| | SUBTOTAL | | | | | 886,933 | |
| | Landscaping | | | | | | |
| | Topsoil - amend existing topsoil; minimum 6" | **3,704** | cy | 25.00 | 92,600 | | |
| | Lawn - loam & seed | **146,050** | sf | 0.25 | 36,513 | | |
| | Allowance for extensive raised planting beds | **1** | ls | 5,000.00 | 5,000 | | |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
Design Options
Manchester-on-the Sea, MA

**Feasibility Design Estimate**

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **SITEWORK OPTION AR2** | | | | | | | |
| | Planting allowance | **1** | ls | 100,000.00 | 100,000 | | |
| | SUBTOTAL | | | | | 234,113 | |
| | | | | | | | |
| **G30** | **CIVIL MECHANICAL UTILITIES** | | | | | | |
| | Water supply | | | | | | |
| | New DI piping; 8" Main loop | **1,500** | lf | 100.00 | 150,000 | | |
| | New DI piping; 4" Domestic | **300** | lf | 60.00 | 18,000 | | |
| | New DI piping; 8" Fire | **300** | lf | 85.00 | 25,500 | | |
| | Connect to existing | **1** | loc | 10,000.00 | 10,000 | | |
| | FD connection | **1** | ea | 2,000.00 | 2,000 | | |
| | Gate valves | **10** | ea | 750.00 | 7,500 | | |
| | Fire hydrant | **5** | ea | 5,000.00 | 25,000 | | |
| | Sanitary; | | | | | | |
| | Allowance for sanitary sewer including connection to existing Municipal sewer | **1** | ls | 50,000.00 | 50,000 | | |
| | Storm water; Pricing includes E&B and bedding | | | | | | |
| | Allowance for drainage systems at new & existing paving & playing field | **72,850** | sf | 10.00 | 728,500 | | |
| | Gas service | | | | | | |
| | E&B trench for new gas pipe - install by plumbing | | | | assume ETR | | |
| | SUBTOTAL | | | | | 1,016,500 | |
| | | | | | | | |
| **G40** | **ELECTRICAL UTILITIES** | | | | | | |
| | Power | **1** | ls | 50,000.00 | 50,000 | | |
| | Communications | **1** | ls | 30,000.00 | 30,000 | | |
| | Site security system | | | | assume not required | | |
| | Site Lighting | | | | | | |
| | Add to existing site lighting | **1** | ls | 50,000.00 | 50,000 | | |
| | SUBTOTAL | | | | | 130,000 | |
| | | | | | | | |
| | **TOTAL - SITE DEVELOPMENT** | | | | | | ***$2,548,986*** |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** GFA 88,900

## *CONSTRUCTION COST SUMMARY*

| | *BUILDING SYSTEM* | | *SUB-TOTAL* | *TOTAL* | *$/SF* | *%* |
|---|---|---|---|---|---|---|
| **OPTION N-1 NEW BUILDING** | | | | | | |
| **A10** | **FOUNDATIONS** | | | | | |
| | A1010 | Standard Foundations | $935,118 | | | |
| | A1020 | Special Foundations | $624,000 | | | |
| | A1030 | Lowest Floor Construction | $645,410 | **$2,204,528** | $24.80 | 8.6% |
| **A20** | **BASEMENT CONSTRUCTION** | | | | | |
| | A2010 | Basement Excavation | $0 | | | |
| | A2020 | Basement Walls | $0 | **$0** | $0.00 | 0.0% |
| **B10** | **SUPERSTRUCTURE** | | | | | |
| | B1010 | Upper Floor Construction | $1,578,112 | | | |
| | B1020 | Roof Construction | $1,861,365 | **$3,439,477** | $38.69 | 13.3% |
| **B20** | **EXTERIOR CLOSURE** | | | | | |
| | B2010 | Exterior Walls | $1,812,802 | | | |
| | B2020 | Windows | $1,163,641 | | | |
| | B2030 | Exterior Doors | $105,680 | **$3,082,123** | $34.67 | 12.0% |
| **B30** | **ROOFING** | | | | | |
| | B3010 | Roof Coverings | $1,656,700 | | | |
| | B3020 | Roof Openings | $32,500 | **$1,689,200** | $19.00 | 6.6% |
| **C10** | **INTERIOR CONSTRUCTION** | | | | | |
| | C1010 | Partitions | $1,955,800 | | | |
| | C1020 | Interior Doors | $444,500 | | | |
| | C1030 | Specialties/Millwork | $623,670 | **$3,023,970** | $34.02 | 11.7% |
| **C20** | **STAIRCASES** | | | | | |
| | C2010 | Stair Construction | $54,000 | | | |
| | C2020 | Stair Finishes | $12,574 | **$66,574** | $0.75 | 0.3% |
| **C30** | **INTERIOR FINISHES** | | | | | |
| | C3010 | Wall Finishes | $622,300 | | | |
| | C3020 | Floor Finishes | $977,900 | | | |
| | C3030 | Ceiling Finishes | $666,750 | **$2,266,950** | $25.50 | 8.8% |
| **D10** | **CONVEYING SYSTEMS** | | | | | |
| | D1010 | Elevator | $130,000 | **$130,000** | $1.46 | 0.5% |
| **D20** | **PLUMBING** | | | | | |
| | D20 | Plumbing | $1,244,600 | **$1,244,600** | $14.00 | 4.8% |
| **D30** | **HVAC** | | | | | |
| | D30 | HVAC | $3,911,600 | **$3,911,600** | $44.00 | 15.2% |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** GFA 88,900

## *CONSTRUCTION COST SUMMARY*

| | *BUILDING SYSTEM* | | *SUB-TOTAL* | *TOTAL* | *$/SF* | *%* |
|---|---|---|---|---|---|---|
| **OPTION N-1 NEW BUILDING** | | | | | | |
| **D40** | **FIRE PROTECTION** | | | | | |
| | D40 | Fire Protection | $400,050 | **$400,050** | $4.50 | 1.6% |
| **D50** | **ELECTRICAL** | | | | | |
| | D5010 | Complete System | $2,844,800 | **$2,844,800** | $32.00 | 11.0% |
| **E10** | **EQUIPMENT** | | | | | |
| | E10 | Equipment | $570,000 | **$570,000** | $6.41 | 2.2% |
| **E20** | **FURNISHINGS** | | | | | |
| | E2010 | Fixed Furnishings | $897,719 | | | |
| | E2020 | Movable Furnishings | NIC | **$897,719** | $10.10 | 3.5% |
| **F10** | **SPECIAL CONSTRUCTION** | | | | | |
| | F10 | Special Construction | $0 | **$0** | $0.00 | 0.0% |
| **F20** | **HAZMAT REMOVALS** | | | | | |
| | F2010 | Building Elements Demolition | $0 | | | |
| | F2020 | Hazardous Components Abatement | $0 | **$0** | $0.00 | 0.0% |
| ***TOTAL DIRECT COST (Trade Costs)*** | | | | ***$25,771,591*** | *$289.89* | *100.0%* |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-1 NEW BUILDING** | | | | | | | |
| | ***GROSS FLOOR AREA CALCULATION*** | | | | | | |
| | First Floor | | | 52,000 | | | |
| | Second Floor | | | 36,900 | | | |
| | ***TOTAL GROSS FLOOR AREA (GFA)*** | | | | | **88,900** | ***sf*** |
| | ***A10 FOUNDATIONS*** | | | | | | |
| **A1010** | **STANDARD FOUNDATIONS** | | | | | | |
| *033000* | *CONCRETE* | | | | | | |
| | Strip Footings | *184* | *CY* | | | | |
| | Foundation Walls | *237* | *CY* | | | | |
| | Spread Footings | *551* | *CY* | | | | |
| | Piers | *86* | *CY* | | | | |
| | Total Foundation Concrete | *1,058* | *CY* | | | | |
| | Strip footings and grade beams | | | | | | |
| | Formwork | **3,608** | sf | 11.00 | 39,688 | | |
| | Re-bar | **18,490** | lbs. | 1.20 | 22,188 | | |
| | Concrete material; 3,000 psi | **184** | cy | 130.00 | 23,920 | | |
| | Placing concrete | **184** | cy | 70.00 | 12,880 | | |
| | Foundation walls | | | | | | |
| | Formwork | **9,152** | sf | 12.50 | 114,400 | | |
| | Re-bar | **22,880** | lbs. | 1.20 | 27,456 | | |
| | Concrete material; 3,000 psi | **237** | cy | 130.00 | 30,810 | | |
| | Placing concrete | **237** | cy | 70.00 | 16,590 | | |
| | Form shelf | **1,144** | lf | 10.00 | 11,440 | | |
| | Spread Footings | | | | | | |
| | Formwork | **6,730** | sf | 14.00 | 94,220 | | |
| | Re-bar | **30,265** | lbs. | 1.20 | 36,318 | | |
| | Concrete material; 3,000 psi | **551** | cy | 130.00 | 71,630 | | |
| | Placing concrete | **551** | cy | 70.00 | 38,570 | | |
| | Set anchor bolts grout plates | **100** | ea | 150.00 | 15,000 | | |
| | Piers/Pilasters | | | | | | |
| | Formwork | **2,932** | sf | 14.00 | 41,048 | | |
| | Re-bar | **10,320** | lbs | 1.20 | 12,384 | | |
| | Concrete material; 3,000 psi | **86** | cy | 130.00 | 11,180 | | |
| | Placing concrete | **86** | cy | 80.00 | 6,880 | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Dampproofing at brick shelf | **6,864** | sf | 3.00 | 20,592 | | |
| *072100* | *THERMAL INSULATION* | | | | | | |
| | Insulation | **4,576** | sf | 3.00 | 13,728 | | |
| *312000* | *EARTHWORK* | | | | | | |
| | Strip footings | | | | | | |
| | Excavation | **2,016** | cy | 15.00 | 30,240 | | |
| | Remove off site | **2,016** | cy | 12.00 | 24,192 | | |
| | Backfill with imported material | **1,595** | cy | 30.00 | 47,850 | | |
| | Spread footings | | | | | | |
| | Excavation | **1,909** | cy | 16.00 | 30,544 | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-1 NEW BUILDING** | | | | | | | |
| | Remove off site | **1,909** | cy | 12.00 | 22,908 | | |
| | Backfill with imported material | **1,358** | cy | 30.00 | 40,740 | | |
| | Miscellaneous | | | | | | |
| | Gravel fill beneath footings, 12" | **571** | cy | 30.00 | 17,130 | | |
| | Perimeter drain | **1,144** | lf | 18.00 | 20,592 | | |
| | Underslab E&B for plumbing | **1** | ls | 15,000.00 | 15,000 | | |
| | Dewatering for foundation work | **1** | ls | 25,000.00 | 25,000 | | |
| | SUBTOTAL | | | | | 935,118 | |
| **A1020** | **SPECIAL FOUNDATIONS** | | | | | | |
| | Rammed Aggregate Piers | **52,000** | sf | 12.00 | 624,000 | | |
| | SUBTOTAL | | | | | 624,000 | |
| **A1030** | **LOWEST FLOOR CONSTRUCTION** | | | | | | |
| | New Slab on grade, 5" thick | | | | | | |
| | Structural fill, 8" | **1,290** | cy | 36.00 | 46,440 | | |
| | Gravel fill, 8" | **1,290** | cy | 40.00 | 51,600 | | |
| | Rigid insulation | **52,000** | sf | 2.25 | 117,000 | | |
| | Vapor barrier | **52,000** | sf | 0.75 | 39,000 | | |
| | Compact existing sub-grade | **52,000** | sf | 0.50 | 26,000 | | |
| | Mesh reinforcing 15% lap | **59,800** | sf | 0.80 | 47,840 | | |
| | Concrete - 5" thick; 4,000 psi | **849** | cy | 125.00 | 106,125 | | |
| | Placing concrete | **849** | cy | 45.00 | 38,205 | | |
| | Finishing and curing concrete | **52,000** | sf | 1.50 | 78,000 | | |
| | Control joints - saw cut | **52,000** | sf | 0.10 | 5,200 | | |
| | Miscellaneous | | | | | | |
| | Elevator pit | **1** | ea | 35,000.00 | 35,000 | | |
| | Loading dock | **1** | ls | 40,000.00 | 40,000 | | |
| | Equipment pads | **1** | ls | 15,000.00 | 15,000 | | |
| | SUBTOTAL | | | | | 645,410 | |
| | ***TOTAL - FOUNDATIONS*** | | | | | | **$2,204,528** |
| ***A20*** | ***BASEMENT CONSTRUCTION*** | | | | | | |
| **A2010** | **BASEMENT EXCAVATION** | | | | | | |
| | **No Work in this section** | | | | | | |
| | SUBTOTAL | | | | | - | |
| **A2020** | **BASEMENT WALLS** | | | | | | |
| | **No Work in this section** | | | | | | |
| | SUBTOTAL | | | | | - | |
| | ***TOTAL - BASEMENT CONSTRUCTION*** | | | | | | |
| ***B10*** | ***SUPERSTRUCTURE*** | | | | | | |
| | | 14.71 | lbs/sf | | - | | |
| **B1010** | **FLOOR CONSTRUCTION** | 654 | tns | | - | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-1 NEW BUILDING** | | | | | | | |
| | Floor Structure - Steel: | | | | | | |
| | Steel beams and columns, 15#/SF | **277** | tns | 3,800.00 | 1,052,600 | | |
| | Premium for HSS | **69** | tns | 300.00 | 20,700 | | |
| | Shear studs | **7,380** | ea | 2.50 | 18,450 | | |
| | Floor Structure | | | | | | |
| | 2" 18 Ga. Metal galvanized floor Deck | **36,900** | sf | 3.75 | 138,375 | | |
| | WWF reinforcement | **42,435** | sf | 0.80 | 33,948 | | |
| | Concrete Fill to metal deck; 5-1/4" Light Weight | **628** | cy | 160.00 | 100,480 | | |
| | Place and finish concrete | **36,900** | sf | 2.00 | 73,800 | | |
| | Rebar to decks | **11,070** | lbs | 1.20 | 13,284 | | |
| | Misc. angles | **36,900** | sf | 0.50 | 18,450 | | |
| | Miscellaneous | | | | | | |
| | Fire proofing to columns and beams | **36,900** | sf | 2.25 | 83,025 | | |
| | Fire stopping floors | **1** | ls | 25,000.00 | 25,000 | | |
| | SUBTOTAL | | | | | 1,578,112 | |
| **B1020** | **ROOF CONSTRUCTION** | | | | | | |
| | Roof Structure - Steel: | | | | | | |
| | Steel beams and columns, 13-15#/SF | **377** | tns | 3,800.00 | 1,432,600 | | |
| | Premium for HSS | **94** | tns | 300.00 | 28,200 | | |
| | Roof Structure | | | | | | |
| | 1-1/2" 20 Ga. galvanized Metal Roof Deck | **44,596** | sf | 3.50 | 156,086 | | |
| | 2" 18 Ga. Metal galvanized roof Deck | **4,729** | sf | 3.75 | 17,734 | | |
| | Acoustic deck at gym | **7,875** | sf | 7.00 | 55,125 | | |
| | Miscellaneous | | | | | | |
| | Concrete at low level roof | **4,729** | sf | 8.00 | 37,832 | | |
| | Fire proofing to columns, beams and deck | **44,596** | sf | 3.00 | 133,788 | | |
| | SUBTOTAL | | | | | 1,861,365 | |
| | ***TOTAL - SUPERSTRUCTURE*** | | | | | | **$3,439,477** |
| ***B20*** | ***EXTERIOR CLOSURE*** | | | | | | |
| **B2010** | **EXTERIOR WALLS** | | | | | | |
| | **Exterior Wall Area - Solid Assume 70%** | *23,373* | sf | | | | |
| *042000* | *MASONRY* | | | | | | |
| | Brick veneer, 3 color; 85% of solid area | **19,867** | sf | 38.00 | 754,946 | | |
| | at gym, assume 12" | **5,400** | sf | 28.00 | 151,200 | | |
| | Staging to exterior wall | **33,390** | sf | 4.00 | 133,560 | | |
| *055000* | *MISC. METALS* | | | | | | |
| | Stainless steel sign at main entrance | **1** | ls | 10,000.00 | 10,000 | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Air barrier | **23,373** | sf | 6.50 | 151,925 | | |
| | Air barrier/flashing at windows | **5,892** | lf | 6.25 | 36,825 | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-1 NEW BUILDING** | | | | | | | |
| | Miscellaneous sealants to closure | **23,373** | sf | 1.00 | 23,373 | | |
| *072100* | *THERMAL INSULATION* | | | | | | |
| | Insulation | **23,373** | sf | 2.25 | 52,589 | | |
| *076400* | *CLADDING* | | | | | | |
| | Metal panel; 15% of solid area | **3,506** | sf | 65.00 | 227,890 | | |
| *092900* | *GYPSUM BOARD ASSEMBLIES* | | | | | | |
| | 6" metal stud backup | **17,973** | sf | 9.00 | 161,757 | | |
| | Gypsum Sheathing | **17,973** | sf | 2.75 | 49,426 | | |
| | Drywall lining to interior face of stud backup | **17,973** | sf | 3.30 | 59,311 | | |
| | SUBTOTAL | | | | | 1,812,802 | |
| **B2020** | **WINDOWS** | | | | | | |
| | **Exterior Wall Area - Glazed Assume 30%** | *10,017* | sf | | | | |
| *061000* | *ROUGH CARPENTRY* | | | | | | |
| | Wood blocking at openings | **5,892** | lf | 12.00 | 70,704 | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Backer rod & double sealant | **5,892** | lf | 8.50 | 50,082 | | |
| *080001* | *METAL WINDOWS* | | | | | | |
| | Windows, double glazed; 80% of glazed area | **8,014** | sf | 90.00 | 721,260 | | |
| | Curtainwall, double glazed; 20% of glazed area | **2,003** | sf | 115.00 | 230,345 | | |
| | Sunshades; horizontal | **1** | ls | 75,000.00 | 75,000 | | |
| *089000* | *LOUVERS* | | | | | | |
| | Louvers | **250** | sf | 65.00 | 16,250 | | |
| | SUBTOTAL | | | | | 1,163,641 | |
| **B2030** | **EXTERIOR DOORS** | | | | | | |
| | Glazed entrance doors including frame and hardware; double door | **8** | pr | 8,000.00 | 64,000 | | |
| | Glazed entrance doors including frame and hardware; single door | **8** | ea | 4,000.00 | 32,000 | | |
| | HM doors, frames and hardware- Double | **4** | pr | 2,000.00 | 8,000 | | |
| | Backer rod & double sealant | **240** | lf | 4.00 | 960 | | |
| | Wood blocking at openings | **240** | lf | 3.00 | 720 | | |
| | SUBTOTAL | | | | | 105,680 | |
| | ***TOTAL - EXTERIOR CLOSURE*** | | | | | | **$3,082,123** |
| ***B30*** | ***ROOFING*** | | | | | | |
| **B3010** | **ROOF COVERINGS** | | | | | | |
| | New roofing complete | **57,200** | sf | 22.00 | 1,258,400 | | |
| | New fascia/soffits | **1,500** | lf | 150.00 | 225,000 | | |
| | Premium for green roof | **2,610** | sf | 30.00 | 78,300 | | |
| | Rail at green roof | **150** | lf | 300.00 | 45,000 | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-1 NEW BUILDING** | | | | | | | |
| | Roof equipment screen | **1** | ls | 50,000.00 | 50,000 | | |
| | SUBTOTAL | | | | | 1,656,700 | |
| **B3020** | **ROOF OPENINGS** | | | | | | |
| | Skylights, allow | **1** | ls | 30,000.00 | 30,000 | | |
| | Roof hatch | **1** | loc | 2,500.00 | 2,500 | | |
| | SUBTOTAL | | | | | 32,500 | |
| | ***TOTAL - ROOFING*** | | | | | | **$1,689,200** |
| ***C10*** | ***INTERIOR CONSTRUCTION*** | | | | | | |
| **C1010** | **PARTITIONS** | | | | | | |
| | Interior partitions | **88,900** | gsf | 22.00 | 1,955,800 | | |
| | SUBTOTAL | | | | | 1,955,800 | |
| **C1020** | **INTERIOR DOORS** | | | | | | |
| | Interior doors, frames and hardware | **88,900** | gsf | 5.00 | 444,500 | | |
| | SUBTOTAL | | | | | 444,500 | |
| **C1030** | **SPECIALTIES / MILLWORK** | | | | | | |
| | Toilet Partitions and accessories | **88,900** | gsf | 0.80 | 71,120 | | |
| | Backer panels in electrical closets | **1** | ls | 1,000.00 | 1,000 | | |
| | Marker boards/tackboards in classrooms, offices, conference rooms, library and MP rooms | **88,900** | sf | 1.00 | 88,900 | | |
| | Room Signs | **88,900** | gsf | 0.40 | 35,560 | | |
| | Fire extinguisher cabinets | **30** | ea | 350.00 | 10,500 | | |
| | Lockers | **88,900** | gsf | 1.60 | 142,240 | | |
| | Janitors Work Shop Accessories | **1** | ls | 1,500.00 | 1,500 | | |
| | Janitors Closet Accessories | **2** | rms | 300.00 | 600 | | |
| | *Media* | | | | | | |
| | Reception desks | **2** | loc | 25,000 | 50,000 | | |
| | Library shelving at perimeters 7' Tall | | | | F,F & E | | |
| | Library shelving at perimeters 3' Tall | | | | F,F & E | | |
| | Display cases | **88,900** | gsf | 0.25 | 22,225 | | |
| | Miscellaneous metals throughout building | **88,900** | sf | 1.25 | 111,125 | | |
| | Miscellaneous sealants throughout building | **88,900** | sf | 1.00 | 88,900 | | |
| | SUBTOTAL | | | | | 623,670 | |
| | ***TOTAL - INTERIOR CONSTRUCTION*** | | | | | | **$3,023,970** |
| ***C20*** | ***STAIRCASES*** | | | | | | |
| **C2010** | **STAIR CONSTRUCTION** | | | | | | |
| | Metal pan stair; egress stair | **2** | flt | 25,000.00 | 50,000 | | |
| | Concrete fill to stairs | **2** | flt | 2,000.00 | 4,000 | | |
| | SUBTOTAL | | | | | 54,000 | |
| **C2020** | **STAIR FINISHES** | | | | | | |
| | High performance coating to stairs including all railings etc. | **2** | flt | 3,000.00 | 6,000 | | |
| | Rubber tile at stairs - landings | **200** | sf | 10.00 | 2,000 | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-1 NEW BUILDING** | | | | | | | |
| | Rubber tile at stairs - treads & risers | **240** | lft | 19.06 | 4,574 | | |
| | SUBTOTAL | | | | | 12,574 | |
| | ***TOTAL - STAIRCASES*** | | | | | | **$66,574** |
| ***C30*** | ***INTERIOR FINISHES*** | | | | | | |
| **C3010** | **WALL FINISHES** | | | | | | |
| | Wall finishes | **88,900** | sf | 7.00 | 622,300 | | |
| | SUBTOTAL | | | | | 622,300 | |
| **C3020** | **FLOOR FINISHES** | | | | | | |
| | Floor finishes | **88,900** | sf | 11.00 | 977,900 | | |
| | SUBTOTAL | | | | | 977,900 | |
| **C3030** | **CEILING FINISHES** | | | | | | |
| | Ceiling finishes | **88,900** | sf | 7.50 | 666,750 | | |
| | SUBTOTAL | | | | | 666,750 | |
| | ***TOTAL - INTERIOR FINISHES*** | | | | | | **$2,266,950** |
| ***D10*** | ***CONVEYING SYSTEMS*** | | | | | | |
| **D1010** | **ELEVATOR** | | | | | | |
| | New elevator; 2 stop; passenger | **1** | ea | 130,000.00 | 130,000 | | |
| | SUBTOTAL | | | | | 130,000 | |
| | ***TOTAL - CONVEYING SYSTEMS*** | | | | | | **$130,000** |
| ***D20*** | ***PLUMBING*** | | | | | | |
| **D20** | **PLUMBING, GENERALLY** | | | | | | |
| | Plumbing, complete | **88,900** | sf | 14.00 | 1,244,600 | | |
| | SUBTOTAL | | | | | 1,244,600 | |
| | ***TOTAL - PLUMBING*** | | | | | | **$1,244,600** |
| ***D30*** | ***HVAC*** | | | | | | |
| **D30** | **HVAC, GENERALLY** | | | | | | |
| | HVAC, complete; assumed displacement | **88,900** | sf | 44.00 | 3,911,600 | | |
| | SUBTOTAL | | | | | 3,911,600 | |
| | ***TOTAL - HVAC*** | | | | | | **$3,911,600** |
| ***D40*** | ***FIRE PROTECTION*** | | | | | | |
| **D40** | **FIRE PROTECTION, GENERALLY** | | | | | | |
| | Fire protection | **88,900** | sf | 4.50 | 400,050 | | |
| | SUBTOTAL | | | | | 400,050 | |
| | ***TOTAL - FIRE PROTECTION*** | | | | | | **$400,050** |
| ***D50*** | ***ELECTRICAL*** | | | | | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-1 NEW BUILDING** | | | | | | | |
| **D5010** | **ELECTRICAL SYSTEMS** | | | | | | |
| | Electrical, complete | **88,900** | sf | 32.00 | 2,844,800 | | |
| | SUBTOTAL | | | | | 2,844,800 | |
| | ***TOTAL - ELECTRICAL*** | | | | | | **$2,844,800** |
| ***E10*** | ***EQUIPMENT*** | | | | | | |
| **E10** | **EQUIPMENT, GENERALLY** | | | | | | |
| | Gym wall pads | **1** | ls | 20,000.00 | 20,000 | | |
| | Basketball backstops; swing up; electric operated | **6** | loc | 10,000.00 | 60,000 | | |
| | Gymnasium dividing net; electrically operated | **1** | ls | 30,000.00 | 30,000 | | |
| | Volleyball net and standards | **1** | ls | 5,000.00 | 5,000 | | |
| | Telescoping bleachers | **1** | ls | 30,000.00 | 30,000 | | |
| | Kiln | **1** | ea | 5,000.00 | 5,000 | | |
| | Stage curtain and rigging | **1** | ls | 35,000.00 | 35,000 | | |
| | Food Service equipment | **1** | ls | 350,000.00 | 350,000 | | |
| | Loading dock equipment | **1** | ls | 20,000.00 | 20,000 | | |
| | Electrically operated projection screens | **1** | loc | 15,000.00 | 15,000 | | |
| | SUBTOTAL | | | | | 570,000 | |
| | ***TOTAL - EQUIPMENT*** | | | | | | **$570,000** |
| ***E20*** | ***FURNISHINGS*** | | | | | | |
| **E2010** | **FIXED FURNISHINGS** | | | | | | |
| | Entry mats & frames - recessed with carpet/rubber strips | **500** | sf | 55.00 | 27,500 | | |
| | Window blinds | **10,017** | sf | 7.00 | 70,119 | | |
| | Counters, base cabinets, tall storage in classrooms and other rooms | **88,900** | gsf | 9.00 | 800,100 | | |
| | SUBTOTAL | | | | | 897,719 | |
| **E2020** | **MOVABLE FURNISHINGS** | | | | | | |
| | All movable furnishings to be provided and installed by owner | | | | | | |
| | SUBTOTAL | | | | | NIC | |
| | ***TOTAL - FURNISHINGS*** | | | | | | **$897,719** |
| ***F10*** | ***SPECIAL CONSTRUCTION*** | | | | | | |
| **F10** | **SPECIAL CONSTRUCTION** | | | | | | |
| | No items in this section | | | | | | |
| | SUBTOTAL | | | | | | |
| | ***TOTAL - SPECIAL CONSTRUCTION*** | | | | | | |
| ***F20*** | ***SELECTIVE BUILDING DEMOLITION*** | | | | | | |
| **F2010** | **BUILDING ELEMENTS DEMOLITION** | | | | | | |
| | No items in this section | | | | | | |
| | SUBTOTAL | | | | | | |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** GFA 88,900

| | CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|---|
| | **OPTION N-1 NEW BUILDING** | | | | | | | |
| 372 | **F2020** | **HAZARDOUS COMPONENTS ABATEMENT** | | | | | | |
| 373 | | See main summary for HazMat allowance | | | | See Summary | | |
| 374 | | SUBTOTAL | | | | | | |
| 375 | | | | | | | | |
| 376 | | ***TOTAL - SELECTIVE BUILDING DEMOLITION*** | | | | | | |

**Feasibility Design Estimate**

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **SITEWORK N-1 NEW BUILDING** | | | | | | | |
| | | | | | | | |
| *G* | ***SITEWORK*** | | | | | | |
| | | | | | | | |
| **G10** | **SITE PREPARATION & DEMOLITION** | | | | | | |
| | Site construction fence/barricades | **1,800** | lf | 12.00 | 21,600 | | |
| | Site construction fence gates | **1** | ls | 7,500.00 | 7,500 | | |
| | Stabilized construction entrance | **2,000** | sf | 6.00 | 12,000 | | |
| | Pavement/curbing removal | **60,000** | sf | 1.00 | 60,000 | | |
| | Miscellaneous demolition including utilities | **1** | ls | 30,000.00 | 30,000 | | |
| | Site Earthwork | | | | | | |
| | Strip topsoil and store | **3,704** | cy | 12.00 | 44,448 | | |
| | Fine grading | **8,000** | sy | 1.00 | 8,000 | | |
| | Cut and Fill; assume balanced site | **11,111** | cy | 8.00 | 88,888 | | |
| | Silt fence/erosion control, wash bays, stock piles | **1,500** | lf | 12.00 | 18,000 | | |
| | Silt fence maintenance and monitoring | **1** | ls | 10,000.00 | 10,000 | | |
| | Protect existing wetlands | **1** | ls | 10,000.00 | 10,000 | | |
| | Hazardous Waste Remediation | | | | | | |
| | Remove existing underground fuel storage tanks | | | | NIC | | |
| | Dispose/treat contaminated soils | | | | | | |
| | SUBTOTAL | | | | | 310,436 | |
| | | | | | | | |
| **G20** | **SITE IMPROVEMENTS** | | | | | | |
| | Asphalt Paving; parking lot and roadway | *29,000* | *sf* | | | | |
| | gravel base; 12" thick | **1,074** | cy | 40.00 | 42,960 | | |
| | asphalt; 4 1/2" thick | **3,222** | sy | 28.00 | 90,216 | | |
| | Mill & re-pave existing paving | **32,000** | sf | 1.75 | 56,000 | | |
| | VGC | **2,300** | lf | 38.00 | 87,400 | | |
| | Line painting including crosswalk and hcap space hatching | **1** | ls | 20,000.00 | 20,000 | | |
| | HC curb cuts | **6** | loc | 350.00 | 2,100 | | |
| | Signage | **1** | ls | 10,000.00 | 10,000 | | |
| | Pedestrian Paving | | | | | | |
| | Concrete paving | *15,500* | sf | | | | |
| | gravel base; 12" thick | **574** | cy | 40.00 | 22,960 | | |
| | 4" concrete paving | **15,500** | sf | 9.00 | 139,500 | | |
| | Site Improvements | | | | | | |
| | Flag pole | **1** | ea | 5,000.00 | 5,000 | | |
| | Concrete retaining walls | | | | Assumed not required | | |
| | Tennis Courts | | | | No work - ETR | | |
| | Elevated walkways | | | | No work - ETR | | |
| | Play surfacing; allowance of 7,500 SF | **7,500** | sf | 18.00 | 135,000 | | |
| | Play equipment - allowance | **1** | ls | 250,000.00 | 250,000 | | |
| | Allowance for Greenhouse | **1** | ls | 20,000.00 | 20,000 | | |
| | Site improvements; benches, walls, fences etc. | **1** | ls | 150,000.00 | 150,000 | | |
| | Playing field; MP Field | *20,000* | sf | | | | |
| | Reuse existing topsoil; amended | **370** | cy | 30.00 | 11,100 | | |
| | Gravel drainage base; 12" thick | **741** | cy | 40.00 | 29,640 | | |
| | Sports seeding | **20,000** | sf | 0.35 | 7,000 | | |
| | Fencing/gates | **1** | ea | 30,000.00 | 30,000 | | |
| | SUBTOTAL | | | | | 1,108,876 | |
| | | | | | | | |
| | Landscaping | | | | | | |
| | Topsoil - amend existing topsoil; minimum 6" | **3,704** | cy | 25.00 | 92,600 | | |
| | Lawn - loam & seed | **138,000** | sf | 0.25 | 34,500 | | |
| | Allowance for extensive raised planting beds | **1** | ls | 5,000.00 | 5,000 | | |
| | Planting allowance | **1** | ls | 100,000.00 | 100,000 | | |

**Feasibility Design Estimate**

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **SITEWORK N-1 NEW BUILDING** | | | | | | | |
| | SUBTOTAL | | | | | 232,100 | |
| | | | | | | | |
| **G30** | **CIVIL MECHANICAL UTILITIES** | | | | | | |
| | Water supply | | | | | | |
| | New DI piping; 8" Main loop | **1,500** | lf | 100.00 | 150,000 | | |
| | New DI piping; 4" Domestic | **300** | lf | 60.00 | 18,000 | | |
| | New DI piping; 8" Fire | **300** | lf | 85.00 | 25,500 | | |
| | Connect to existing | **1** | loc | 10,000.00 | 10,000 | | |
| | FD connection | **1** | ea | 2,000.00 | 2,000 | | |
| | Gate valves | **10** | ea | 750.00 | 7,500 | | |
| | Fire hydrant | **5** | ea | 5,000.00 | 25,000 | | |
| | Sanitary: | | | | | | |
| | Allowance for sanitary sewer including connection to existing Municipal sewer | **1** | ls | 50,000.00 | 50,000 | | |
| | Storm water; Pricing includes E&B and bedding | | | | | | |
| | Allowance for drainage systems at new & existing paving & playing field | **84,000** | sf | 10.00 | 840,000 | | |
| | Gas service | | | | | | |
| | E&B trench for new gas pipe - install by plumbing | | | | assume ETR | | |
| | SUBTOTAL | | | | | 1,128,000 | |
| | | | | | | | |
| **G40** | **ELECTRICAL UTILITIES** | | | | | | |
| | Power | **1** | ls | 50,000.00 | 50,000 | | |
| | Communications | **1** | ls | 30,000.00 | 30,000 | | |
| | Site security system | | | | assume not required | | |
| | Site Lighting | | | | | | |
| | Site lighting | **1** | ls | 80,000.00 | 80,000 | | |
| | SUBTOTAL | | | | | 160,000 | |
| | | | | | | | |
| | **TOTAL - SITE DEVELOPMENT** | | | | | | ***$2,939,412*** |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** GFA 82,800

## *CONSTRUCTION COST SUMMARY*

| | *BUILDING SYSTEM* | | *SUB-TOTAL* | *TOTAL* | *$/SF* | *%* |
|---|---|---|---|---|---|---|
| **OPTION N-3 NEW BUILDING** | | | | | | |
| **A10** | **FOUNDATIONS** | | | | | |
| | A1010 | Standard Foundations | $1,150,751 | | | |
| | A1020 | Special Foundations | $682,800 | | | |
| | A1030 | Lowest Floor Construction | $697,780 | **$2,531,331** | $30.57 | 9.7% |
| **A20** | **BASEMENT CONSTRUCTION** | | | | | |
| | A2010 | Basement Excavation | $0 | | | |
| | A2020 | Basement Walls | $0 | **$0** | $0.00 | 0.0% |
| **B10** | **SUPERSTRUCTURE** | | | | | |
| | B1010 | Upper Floor Construction | $1,113,712 | | | |
| | B1020 | Roof Construction | $2,196,997 | **$3,310,709** | $39.98 | 12.7% |
| **B20** | **EXTERIOR CLOSURE** | | | | | |
| | B2010 | Exterior Walls | $2,439,720 | | | |
| | B2020 | Windows | $1,551,632 | | | |
| | B2030 | Exterior Doors | $105,680 | **$4,097,032** | $49.48 | 15.7% |
| **B30** | **ROOFING** | | | | | |
| | B3010 | Roof Coverings | $1,799,730 | | | |
| | B3020 | Roof Openings | $32,500 | **$1,832,230** | $22.13 | 7.0% |
| **C10** | **INTERIOR CONSTRUCTION** | | | | | |
| | C1010 | Partitions | $1,821,600 | | | |
| | C1020 | Interior Doors | $414,000 | | | |
| | C1030 | Specialties/Millwork | $584,540 | **$2,820,140** | $34.06 | 10.8% |
| **C20** | **STAIRCASES** | | | | | |
| | C2010 | Stair Construction | $54,000 | | | |
| | C2020 | Stair Finishes | $12,574 | **$66,574** | $0.80 | 0.3% |
| **C30** | **INTERIOR FINISHES** | | | | | |
| | C3010 | Wall Finishes | $579,600 | | | |
| | C3020 | Floor Finishes | $910,800 | | | |
| | C3030 | Ceiling Finishes | $621,000 | **$2,111,400** | $25.50 | 8.1% |
| **D10** | **CONVEYING SYSTEMS** | | | | | |
| | D1010 | Elevator | $130,000 | **$130,000** | $1.57 | 0.5% |
| **D20** | **PLUMBING** | | | | | |
| | D20 | Plumbing | $1,159,200 | **$1,159,200** | $14.00 | 4.4% |
| **D30** | **HVAC** | | | | | |
| | D30 | HVAC | $3,643,200 | **$3,643,200** | $44.00 | 13.9% |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** GFA 82,800

## *CONSTRUCTION COST SUMMARY*

| | *BUILDING SYSTEM* | | *SUB-TOTAL* | *TOTAL* | *$/SF* | *%* |
|---|---|---|---|---|---|---|
| **OPTION N-3 NEW BUILDING** | | | | | | |
| **D40** | **FIRE PROTECTION** | | | | | |
| | D40 | Fire Protection | $372,600 | **$372,600** | $4.50 | 1.4% |
| **D50** | **ELECTRICAL** | | | | | |
| | D5010 | Complete System | $2,649,600 | **$2,649,600** | $32.00 | 10.1% |
| **E10** | **EQUIPMENT** | | | | | |
| | E10 | Equipment | $570,000 | **$570,000** | $6.88 | 2.2% |
| **E20** | **FURNISHINGS** | | | | | |
| | E2010 | Fixed Furnishings | $868,187 | | | |
| | E2020 | Movable Furnishings | NIC | **$868,187** | $10.49 | 3.3% |
| **F10** | **SPECIAL CONSTRUCTION** | | | | | |
| | F10 | Special Construction | $0 | **$0** | $0.00 | 0.0% |
| **F20** | **HAZMAT REMOVALS** | | | | | |
| | F2010 | Building Elements Demolition | $0 | | | |
| | F2020 | Hazardous Components Abatement | $0 | **$0** | $0.00 | 0.0% |
| ***TOTAL DIRECT COST (Trade Costs)*** | | | | ***$26,162,203*** | *$315.97* | *100.0%* |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-3 NEW BUILDING** | | | | | | | |
| | ***GROSS FLOOR AREA CALCULATION*** | | | | | | |
| | First Floor | | | 56,900 | | | |
| | Second Floor | | | 25,900 | | | |
| | ***TOTAL GROSS FLOOR AREA (GFA)*** | | | | | **82,800** | ***sf*** |
| | ***A10 FOUNDATIONS*** | | | | | | |
| **A1010** | **STANDARD FOUNDATIONS** | | | | | | |
| *033000* | *CONCRETE* | | | | | | |
| | Strip Footings | *244* | *CY* | | | | |
| | Foundation Walls | *352* | *CY* | | | | |
| | Spread Footings | *539* | *CY* | | | | |
| | Piers | *103* | *CY* | | | | |
| | Total Foundation Concrete | *1,238* | *CY* | | | | |
| | Strip footings and grade beams | | | | | | |
| | Formwork | **4,592** | sf | 11.00 | 50,512 | | |
| | Re-bar | **23,410** | lbs. | 1.20 | 28,092 | | |
| | Concrete material; 3,000 psi | **244** | cy | 130.00 | 31,720 | | |
| | Placing concrete | **244** | cy | 70.00 | 17,080 | | |
| | Foundation walls | | | | | | |
| | Formwork | **13,568** | sf | 12.50 | 169,600 | | |
| | Re-bar | **33,920** | lbs. | 1.20 | 40,704 | | |
| | Concrete material; 3,000 psi | **352** | cy | 130.00 | 45,760 | | |
| | Placing concrete | **352** | cy | 70.00 | 24,640 | | |
| | Form shelf | **1,696** | lf | 10.00 | 16,960 | | |
| | Spread Footings | | | | | | |
| | Formwork | **7,255** | sf | 14.00 | 101,570 | | |
| | Re-bar | **32,625** | lbs. | 1.20 | 39,150 | | |
| | Concrete material; 3,000 psi | **539** | cy | 130.00 | 70,070 | | |
| | Placing concrete | **539** | cy | 70.00 | 37,730 | | |
| | Set anchor bolts grout plates | **120** | ea | 150.00 | 18,000 | | |
| | Piers/Pilasters | | | | | | |
| | Formwork | **3,518** | sf | 14.00 | 49,252 | | |
| | Re-bar | **12,360** | lbs | 1.20 | 14,832 | | |
| | Concrete material; 3,000 psi | **103** | cy | 130.00 | 13,390 | | |
| | Placing concrete | **103** | cy | 80.00 | 8,240 | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Dampproofing at brick shelf | **10,176** | sf | 3.00 | 30,528 | | |
| *072100* | *THERMAL INSULATION* | | | | | | |
| | Insulation | **6,784** | sf | 3.00 | 20,352 | | |
| *312000* | *EARTHWORK* | | | | | | |
| | Strip footings | | | | | | |
| | Excavation | **2,699** | cy | 15.00 | 40,485 | | |
| | Remove off site | **2,699** | cy | 12.00 | 32,388 | | |
| | Backfill with imported material | **2,103** | cy | 30.00 | 63,090 | | |
| | Spread footings | | | | | | |
| | Excavation | **1,946** | cy | 16.00 | 31,136 | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-3 NEW BUILDING** | | | | | | | |
| | Remove off site | **1,946** | cy | 12.00 | 23,352 | | |
| | Backfill with imported material | **1,407** | cy | 30.00 | 42,210 | | |
| | Miscellaneous | | | | | | |
| | Gravel fill beneath footings, 12" | **646** | cy | 30.00 | 19,380 | | |
| | Perimeter drain | **1,696** | lf | 18.00 | 30,528 | | |
| | Underslab E&B for plumbing | **1** | ls | 15,000.00 | 15,000 | | |
| | Dewatering for foundation work | **1** | ls | 25,000.00 | 25,000 | | |
| | SUBTOTAL | | | | | 1,150,751 | |
| **A1020** | **SPECIAL FOUNDATIONS** | | | | | | |
| | Rammed Aggregate Piers | **56,900** | sf | 12.00 | 682,800 | | |
| | SUBTOTAL | | | | | 682,800 | |
| **A1030** | **LOWEST FLOOR CONSTRUCTION** | | | | | | |
| | New Slab on grade, 5" thick | | | | | | |
| | Structural fill, 8" | **1,412** | cy | 36.00 | 50,832 | | |
| | Gravel fill, 8" | **1,412** | cy | 40.00 | 56,480 | | |
| | Rigid insulation | **56,900** | sf | 2.25 | 128,025 | | |
| | Vapor barrier | **56,900** | sf | 0.75 | 42,675 | | |
| | Compact existing sub-grade | **56,900** | sf | 0.50 | 28,450 | | |
| | Mesh reinforcing 15% lap | **65,435** | sf | 0.80 | 52,348 | | |
| | Concrete - 5" thick; 4,000 psi | **929** | cy | 125.00 | 116,125 | | |
| | Placing concrete | **929** | cy | 45.00 | 41,805 | | |
| | Finishing and curing concrete | **56,900** | sf | 1.50 | 85,350 | | |
| | Control joints - saw cut | **56,900** | sf | 0.10 | 5,690 | | |
| | Miscellaneous | | | | | | |
| | Elevator pit | **1** | ea | 35,000.00 | 35,000 | | |
| | Loading dock | **1** | ls | 40,000.00 | 40,000 | | |
| | Equipment pads | **1** | ls | 15,000.00 | 15,000 | | |
| | SUBTOTAL | | | | | 697,780 | |
| | ***TOTAL - FOUNDATIONS*** | | | | | | **$2,531,331** |
| ***A20*** | ***BASEMENT CONSTRUCTION*** | | | | | | |
| **A2010** | **BASEMENT EXCAVATION** | | | | | | |
| | **No Work in this section** | | | | | | |
| | SUBTOTAL | | | | | - | |
| **A2020** | **BASEMENT WALLS** | | | | | | |
| | **No Work in this section** | | | | | | |
| | SUBTOTAL | | | | | - | |
| | ***TOTAL - BASEMENT CONSTRUCTION*** | | | | | | |
| ***B10*** | ***SUPERSTRUCTURE*** | | | | | | |
| | | 15.07 | lbs/sf | | - | | |
| **B1010** | **FLOOR CONSTRUCTION** | 624 | tns | | - | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-3 NEW BUILDING** | | | | | | | |
| | Floor Structure - Steel: | | | | | | |
| | Steel beams and columns, 15#/SF | **194** | tns | 3,800.00 | 737,200 | | |
| | Premium for HSS | **49** | tns | 300.00 | 14,700 | | |
| | Shear studs | **5,180** | ea | 2.50 | 12,950 | | |
| | Floor Structure | | | | | | |
| | 2" 18 Ga. Metal galvanized floor Deck | **25,900** | sf | 3.75 | 97,125 | | |
| | WWF reinforcement | **29,785** | sf | 0.80 | 23,828 | | |
| | Concrete Fill to metal deck; 5-1/4" Light Weight | **441** | cy | 160.00 | 70,560 | | |
| | Place and finish concrete | **25,900** | sf | 2.00 | 51,800 | | |
| | Rebar to decks | **7,770** | lbs | 1.20 | 9,324 | | |
| | Misc. angles | **25,900** | sf | 0.50 | 12,950 | | |
| | Miscellaneous | | | | | | |
| | Fire proofing to columns and beams | **25,900** | sf | 2.25 | 58,275 | | |
| | Fire stopping floors | **1** | ls | 25,000.00 | 25,000 | | |
| | SUBTOTAL | | | | | 1,113,712 | |
| **B1020** | **ROOF CONSTRUCTION** | | | | | | |
| | Roof Structure - Steel: | | | | | | |
| | Steel beams and columns, 13-15#/SF | **430** | tns | 3,800.00 | 1,634,000 | | |
| | Premium for HSS | **108** | tns | 300.00 | 32,400 | | |
| | Roof Structure | | | | | | |
| | 1-1/2" 20 Ga. galvanized Metal Roof Deck | **31,590** | sf | 3.50 | 110,565 | | |
| | 2" 18 Ga. Metal galvanized roof Deck | **22,792** | sf | 3.75 | 85,470 | | |
| | Acoustic deck at gym | **8,208** | sf | 7.00 | 57,456 | | |
| | Miscellaneous | | | | | | |
| | Concrete at low level roof | **22,792** | sf | 8.00 | 182,336 | | |
| | Fire proofing to columns, beams and deck | **31,590** | sf | 3.00 | 94,770 | | |
| | SUBTOTAL | | | | | 2,196,997 | |
| | ***TOTAL - SUPERSTRUCTURE*** | | | | | | **$3,310,709** |
| ***B20*** | ***EXTERIOR CLOSURE*** | | | | | | |
| **B2010** | **EXTERIOR WALLS** | | | | | | |
| | **Exterior Wall Area - Solid Assume 70%** | *31,829* | sf | | | | |
| *042000* | *MASONRY* | | | | | | |
| | Brick veneer, 3 color; 85% of solid area | **27,055** | sf | 38.00 | 1,028,090 | | |
| | at gym, assume 12" | **5,400** | sf | 28.00 | 151,200 | | |
| | Staging to exterior wall | **45,470** | sf | 4.00 | 181,880 | | |
| *055000* | *MISC. METALS* | | | | | | |
| | Stainless steel sign at main entrance | **1** | ls | 10,000.00 | 10,000 | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Air barrier | **31,829** | sf | 6.50 | 206,889 | | |
| | Air barrier/flashing at windows | **8,024** | lf | 6.25 | 50,150 | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-3 NEW BUILDING** | | | | | | | |
| | Miscellaneous sealants to closure | **31,829** | sf | 1.00 | 31,829 | | |
| | | | | | | | |
| *072100* | *THERMAL INSULATION* | | | | | | |
| | Insulation | **31,829** | sf | 2.25 | 71,615 | | |
| | | | | | | | |
| *076400* | *CLADDING* | | | | | | |
| | Metal panel; 15% of solid area | **4,774** | sf | 65.00 | 310,310 | | |
| | | | | | | | |
| *092900* | *GYPSUM BOARD ASSEMBLIES* | | | | | | |
| | 6" metal stud backup | **26,429** | sf | 9.00 | 237,861 | | |
| | Gypsum Sheathing | **26,429** | sf | 2.75 | 72,680 | | |
| | Drywall lining to interior face of stud backup | **26,429** | sf | 3.30 | 87,216 | | |
| | | | | | | | |
| | SUBTOTAL | | | | | 2,439,720 | |
| | | | | | | | |
| **B2020** | **WINDOWS** | | | | | | |
| | **Exterior Wall Area - Glazed Assume 30%** | *13,641* | sf | | | | |
| | | | | | | | |
| *061000* | *ROUGH CARPENTRY* | | | | | | |
| | Wood blocking at openings | **8,024** | lf | 12.00 | 96,288 | | |
| | | | | | | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Backer rod & double sealant | **8,024** | lf | 8.50 | 68,204 | | |
| | | | | | | | |
| *080001* | *METAL WINDOWS* | | | | | | |
| | Windows, double glazed; 80% of glazed area | **10,913** | sf | 90.00 | 982,170 | | |
| | Curtainwall, double glazed; 20% of glazed area | **2,728** | sf | 115.00 | 313,720 | | |
| | Sunshades; horizontal | **1** | ls | 75,000.00 | 75,000 | | |
| | | | | | | | |
| *089000* | *LOUVERS* | | | | | | |
| | Louvers | **250** | sf | 65.00 | 16,250 | | |
| | SUBTOTAL | | | | | 1,551,632 | |
| | | | | | | | |
| **B2030** | **EXTERIOR DOORS** | | | | | | |
| | Glazed entrance doors including frame and hardware; double door | **8** | pr | 8,000.00 | 64,000 | | |
| | Glazed entrance doors including frame and hardware; single door | **8** | ea | 4,000.00 | 32,000 | | |
| | HM doors, frames and hardware- Double | **4** | pr | 2,000.00 | 8,000 | | |
| | Backer rod & double sealant | **240** | lf | 4.00 | 960 | | |
| | Wood blocking at openings | **240** | lf | 3.00 | 720 | | |
| | SUBTOTAL | | | | | 105,680 | |
| | | | | | | | |
| | ***TOTAL - EXTERIOR CLOSURE*** | | | | | | **$4,097,032** |
| | | | | | | | |
| ***B30*** | ***ROOFING*** | | | | | | |
| | | | | | | | |
| **B3010** | **ROOF COVERINGS** | | | | | | |
| | New roofing complete | **62,590** | sf | 22.00 | 1,376,980 | | |
| | New fascia/soffits | **2,485** | lf | 150.00 | 372,750 | | |
| | Roof equipment screen | **1** | ls | 50,000.00 | 50,000 | | |
| | SUBTOTAL | | | | | 1,799,730 | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-3 NEW BUILDING** | | | | | | | |
| **B3020** | **ROOF OPENINGS** | | | | | | |
| | Skylights, allow | **1** | ls | 30,000.00 | 30,000 | | |
| | Roof hatch | **1** | loc | 2,500.00 | 2,500 | | |
| | SUBTOTAL | | | | | 32,500 | |
| | ***TOTAL - ROOFING*** | | | | | | **$1,832,230** |
| ***C10*** | ***INTERIOR CONSTRUCTION*** | | | | | | |
| **C1010** | **PARTITIONS** | | | | | | |
| | Interior partitions | **82,800** | gsf | 22.00 | 1,821,600 | | |
| | SUBTOTAL | | | | | 1,821,600 | |
| **C1020** | **INTERIOR DOORS** | | | | | | |
| | Interior doors, frames and hardware | **82,800** | gsf | 5.00 | 414,000 | | |
| | SUBTOTAL | | | | | 414,000 | |
| **C1030** | **SPECIALTIES / MILLWORK** | | | | | | |
| | Toilet Partitions and accessories | **82,800** | gsf | 0.80 | 66,240 | | |
| | Backer panels in electrical closets | **1** | ls | 1,000.00 | 1,000 | | |
| | Marker boards/tackboards in classrooms, offices, conference rooms, library and MP rooms | **82,800** | sf | 1.00 | 82,800 | | |
| | Room Signs | **82,800** | gsf | 0.40 | 33,120 | | |
| | Fire extinguisher cabinets | **28** | ea | 350.00 | 9,800 | | |
| | Lockers | **82,800** | gsf | 1.60 | 132,480 | | |
| | Janitors Work Shop Accessories | **1** | ls | 1,500.00 | 1,500 | | |
| | Janitors Closet Accessories | **2** | rms | 300.00 | 600 | | |
| | *Media* | | | | | | |
| | Reception desks | **2** | loc | 25,000 | 50,000 | | |
| | Library shelving at perimeters 7' Tall | | | | F,F & E | | |
| | Library shelving at perimeters 3' Tall | | | | F,F & E | | |
| | Display cases | **82,800** | gsf | 0.25 | 20,700 | | |
| | Miscellaneous metals throughout building | **82,800** | sf | 1.25 | 103,500 | | |
| | Miscellaneous sealants throughout building | **82,800** | sf | 1.00 | 82,800 | | |
| | SUBTOTAL | | | | | 584,540 | |
| | ***TOTAL - INTERIOR CONSTRUCTION*** | | | | | | **$2,820,140** |
| ***C20*** | ***STAIRCASES*** | | | | | | |
| **C2010** | **STAIR CONSTRUCTION** | | | | | | |
| | Metal pan stair; egress stair | **2** | flt | 25,000.00 | 50,000 | | |
| | Concrete fill to stairs | **2** | flt | 2,000.00 | 4,000 | | |
| | SUBTOTAL | | | | | 54,000 | |
| **C2020** | **STAIR FINISHES** | | | | | | |
| | High performance coating to stairs including all railings etc. | **2** | flt | 3,000.00 | 6,000 | | |
| | Rubber tile at stairs - landings | **200** | sf | 10.00 | 2,000 | | |
| | Rubber tile at stairs - treads & risers | **240** | lft | 19.06 | 4,574 | | |
| | SUBTOTAL | | | | | 12,574 | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-3 NEW BUILDING** | | | | | | | |
| | ***TOTAL - STAIRCASES*** | | | | | | **$66,574** |
| | ***C30 INTERIOR FINISHES*** | | | | | | |
| **C3010** | **WALL FINISHES** | | | | | | |
| | Wall finishes | **82,800** | sf | 7.00 | 579,600 | | |
| | SUBTOTAL | | | | | 579,600 | |
| **C3020** | **FLOOR FINISHES** | | | | | | |
| | Floor finishes | **82,800** | sf | 11.00 | 910,800 | | |
| | SUBTOTAL | | | | | 910,800 | |
| **C3030** | **CEILING FINISHES** | | | | | | |
| | Ceiling finishes | **82,800** | sf | 7.50 | 621,000 | | |
| | SUBTOTAL | | | | | 621,000 | |
| | ***TOTAL - INTERIOR FINISHES*** | | | | | | **$2,111,400** |
| | ***D10 CONVEYING SYSTEMS*** | | | | | | |
| **D1010** | **ELEVATOR** | | | | | | |
| | New elevator; 2 stop; passenger | **1** | ea | 130,000.00 | 130,000 | | |
| | SUBTOTAL | | | | | 130,000 | |
| | ***TOTAL - CONVEYING SYSTEMS*** | | | | | | **$130,000** |
| | ***D20 PLUMBING*** | | | | | | |
| **D20** | **PLUMBING, GENERALLY** | | | | | | |
| | Plumbing, complete | **82,800** | sf | 14.00 | 1,159,200 | | |
| | SUBTOTAL | | | | | 1,159,200 | |
| | ***TOTAL - PLUMBING*** | | | | | | **$1,159,200** |
| | ***D30 HVAC*** | | | | | | |
| **D30** | **HVAC, GENERALLY** | | | | | | |
| | HVAC, complete; assumed displacement | **82,800** | sf | 44.00 | 3,643,200 | | |
| | SUBTOTAL | | | | | 3,643,200 | |
| | ***TOTAL - HVAC*** | | | | | | **$3,643,200** |
| | ***D40 FIRE PROTECTION*** | | | | | | |
| **D40** | **FIRE PROTECTION, GENERALLY** | | | | | | |
| | Fire protection | **82,800** | sf | 4.50 | 372,600 | | |
| | SUBTOTAL | | | | | 372,600 | |
| | ***TOTAL - FIRE PROTECTION*** | | | | | | **$372,600** |
| | ***D50 ELECTRICAL*** | | | | | | |
| **D5010** | **ELECTRICAL SYSTEMS** | | | | | | |
| | Electrical, complete | **82,800** | sf | 32.00 | 2,649,600 | | |
| | SUBTOTAL | | | | | 2,649,600 | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-3 NEW BUILDING** | | | | | | | |
| | ***TOTAL - ELECTRICAL*** | | | | | | **$2,649,600** |
| ***E10*** | ***EQUIPMENT*** | | | | | | |
| **E10** | **EQUIPMENT, GENERALLY** | | | | | | |
| | Gym wall pads | **1** | ls | 20,000.00 | 20,000 | | |
| | Basketball backstops; swing up; electric operated | **6** | loc | 10,000.00 | 60,000 | | |
| | Gymnasium dividing net; electrically operated | **1** | ls | 30,000.00 | 30,000 | | |
| | Volleyball net and standards | **1** | ls | 5,000.00 | 5,000 | | |
| | Telescoping bleachers | **1** | ls | 30,000.00 | 30,000 | | |
| | Kiln | **1** | ea | 5,000.00 | 5,000 | | |
| | Stage curtain and rigging | **1** | ls | 35,000.00 | 35,000 | | |
| | Food Service equipment | **1** | ls | 350,000.00 | 350,000 | | |
| | Loading dock equipment | **1** | ls | 20,000.00 | 20,000 | | |
| | Electrically operated projection screens | **1** | loc | 15,000.00 | 15,000 | | |
| | SUBTOTAL | | | | | 570,000 | |
| | ***TOTAL - EQUIPMENT*** | | | | | | **$570,000** |
| ***E20*** | ***FURNISHINGS*** | | | | | | |
| **E2010** | **FIXED FURNISHINGS** | | | | | | |
| | Entry mats & frames - recessed with carpet/rubber strips | **500** | sf | 55.00 | 27,500 | | |
| | Window blinds | **13,641** | sf | 7.00 | 95,487 | | |
| | Counters, base cabinets, tall storage in classrooms and other rooms | **82,800** | gsf | 9.00 | 745,200 | | |
| | SUBTOTAL | | | | | 868,187 | |
| **E2020** | **MOVABLE FURNISHINGS** | | | | | | |
| | All movable furnishings to be provided and installed by owner | | | | | | |
| | SUBTOTAL | | | | | NIC | |
| | ***TOTAL - FURNISHINGS*** | | | | | | **$868,187** |
| ***F10*** | ***SPECIAL CONSTRUCTION*** | | | | | | |
| **F10** | **SPECIAL CONSTRUCTION** | | | | | | |
| | No items in this section | | | | | | |
| | SUBTOTAL | | | | | | |
| | ***TOTAL - SPECIAL CONSTRUCTION*** | | | | | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-3 NEW BUILDING** | | | | | | | |
| | ***F20 SELECTIVE BUILDING DEMOLITION*** | | | | | | |
| | **F2010 BUILDING ELEMENTS DEMOLITION** | | | | | | |
| | No items in this section | | | | | | |
| | SUBTOTAL | | | | | | |
| | **F2020 HAZARDOUS COMPONENTS ABATEMENT** | | | | | | |
| | See main summary for HazMat allowance | | | | See Summary | | |
| | SUBTOTAL | | | | | | |
| | ***TOTAL - SELECTIVE BUILDING DEMOLITION*** | | | | | | |

**Feasibility Design Estimate**

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| | **SITEWORK N-3 NEW BUILDING** | | | | | | |
| | ***G SITEWORK*** | | | | | | |
| **G10** | **SITE PREPARATION & DEMOLITION** | | | | | | |
| | Site construction fence/barricades | **1,800** | lf | 12.00 | 21,600 | | |
| | Site construction fence gates | **1** | ls | 7,500.00 | 7,500 | | |
| | Stabilized construction entrance | **2,000** | sf | 6.00 | 12,000 | | |
| | Pavement/curbing removal | **60,000** | sf | 1.00 | 60,000 | | |
| | Miscellaneous demolition including utilities | **1** | ls | 30,000.00 | 30,000 | | |
| | Site Earthwork | | | | | | |
| | Strip topsoil and store | **3,704** | cy | 12.00 | 44,448 | | |
| | Fine grading | **7,533** | sy | 1.00 | 7,533 | | |
| | Cut and Fill; assume balanced site | **11,111** | cy | 8.00 | 88,888 | | |
| | Silt fence/erosion control, wash bays, stock piles | **1,500** | lf | 12.00 | 18,000 | | |
| | Silt fence maintenance and monitoring | **1** | ls | 10,000.00 | 10,000 | | |
| | Protect existing wetlands | **1** | ls | 10,000.00 | 10,000 | | |
| | Hazardous Waste Remediation | | | | | | |
| | Remove existing underground fuel storage tanks | | | | NIC | | |
| | Dispose/treat contaminated soils | | | | | | |
| | SUBTOTAL | | | | | 309,969 | |
| **G20** | **SITE IMPROVEMENTS** | | | | | | |
| | Asphalt Paving; parking lot and roadway | *27,000* | *sf* | | | | |
| | gravel base; 12" thick | **1,000** | cy | 40.00 | 40,000 | | |
| | asphalt; 4 1/2" thick | **3,000** | sy | 28.00 | 84,000 | | |
| | Mill & re-pave existing paving | **32,000** | sf | 1.75 | 56,000 | | |
| | VGC | **2,230** | lf | 38.00 | 84,740 | | |
| | Line painting including crosswalk and hcap space hatching | **1** | ls | 20,000.00 | 20,000 | | |
| | HC curb cuts | **8** | loc | 350.00 | 2,800 | | |
| | Signage | **1** | ls | 10,000.00 | 10,000 | | |
| | Pedestrian Paving | | | | | | |
| | Concrete paving | *23,300* | sf | | | | |
| | gravel base; 12" thick | **863** | cy | 40.00 | 34,520 | | |
| | 4" concrete paving | **23,300** | sf | 9.00 | 209,700 | | |
| | Site Improvements | | | | | | |
| | Flag pole | **1** | ea | 5,000.00 | 5,000 | | |
| | Concrete retaining walls | | | | Assumed not required | | |
| | Tennis Courts | | | | No work - ETR | | |
| | Elevated walkways | | | | No work - ETR | | |
| | Play surfacing; allowance of 7,500 SF | **7,500** | sf | 18.00 | 135,000 | | |
| | Play equipment - allowance | **1** | ls | 250,000.00 | 250,000 | | |
| | Allowance for Greenhouse | **1** | ls | 20,000.00 | 20,000 | | |
| | Site improvements; benches, walls, fences etc. | **1** | ls | 150,000.00 | 150,000 | | |
| | Playing field; MP Field | *10,000* | sf | | | | |
| | Reuse existing topsoil; amended | **185** | cy | 30.00 | 5,550 | | |
| | Gravel drainage base; 12" thick | **370** | cy | 40.00 | 14,800 | | |
| | Sports seeding | **10,000** | sf | 0.35 | 3,500 | | |
| | Fencing/gates | **1** | ea | 30,000.00 | 30,000 | | |
| | SUBTOTAL | | | | | 1,155,610 | |
| | Landscaping | | | | | | |
| | Topsoil - amend existing topsoil; minimum 6" | **3,704** | cy | 25.00 | 92,600 | | |
| | Lawn - loam & seed | **143,300** | sf | 0.25 | 35,825 | | |
| | Allowance for extensive raised planting beds | **1** | ls | 5,000.00 | 5,000 | | |
| | Planting allowance | **1** | ls | 100,000.00 | 100,000 | | |

**Feasibility Design Estimate**

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **SITEWORK N-3 NEW BUILDING** | | | | | | | |
| | SUBTOTAL | | | | | 233,425 | |
| **G30** | **CIVIL MECHANICAL UTILITIES** | | | | | | |
| | Water supply | | | | | | |
| | New DI piping; 8" Main loop | **1,700** | lf | 100.00 | 170,000 | | |
| | New DI piping; 4" Domestic | **300** | lf | 60.00 | 18,000 | | |
| | New DI piping; 8" Fire | **300** | lf | 85.00 | 25,500 | | |
| | Connect to existing | **1** | loc | 10,000.00 | 10,000 | | |
| | FD connection | **1** | ea | 2,000.00 | 2,000 | | |
| | Gate valves | **10** | ea | 750.00 | 7,500 | | |
| | Fire hydrant | **6** | ea | 5,000.00 | 30,000 | | |
| | Sanitary; | | | | | | |
| | Allowance for sanitary sewer including connection to existing Municipal sewer | **1** | ls | 50,000.00 | 50,000 | | |
| | Storm water; Pricing includes E&B and bedding | | | | | | |
| | Allowance for drainage systems at new & existing paving & playing field | **89,800** | sf | 10.00 | 898,000 | | |
| | Gas service | | | | | | |
| | E&B trench for new gas pipe - install by plumbing | | | | assume ETR | | |
| | SUBTOTAL | | | | | 1,211,000 | |
| **G40** | **ELECTRICAL UTILITIES** | | | | | | |
| | Power | **1** | ls | 50,000.00 | 50,000 | | |
| | Communications | **1** | ls | 30,000.00 | 30,000 | | |
| | Site security system | | | | assume not required | | |
| | Site Lighting | | | | | | |
| | Site lighting | **1** | ls | 80,000.00 | 80,000 | | |
| | SUBTOTAL | | | | | 160,000 | |
| | **TOTAL - SITE DEVELOPMENT** | | | | | | ***$3,070,004*** |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** GFA 87,700

## *CONSTRUCTION COST SUMMARY*

| | *BUILDING SYSTEM* | | *SUB-TOTAL* | *TOTAL* | *$/SF* | *%* |
|---|---|---|---|---|---|---|
| **OPTION N-9 NEW BUILDING** | | | | | | |
| **A10** | **FOUNDATIONS** | | | | | |
| | A1010 | Standard Foundations | $3,966,634 | | | |
| | A1020 | Special Foundations | $696,000 | | | |
| | A1030 | Lowest Floor Construction | $709,514 | **$5,372,148** | $61.26 | 17.8% |
| **A20** | **BASEMENT CONSTRUCTION** | | | | | |
| | A2010 | Basement Excavation | $44,388 | | | |
| | A2020 | Basement Walls | $0 | **$44,388** | $0.51 | 0.1% |
| **B10** | **SUPERSTRUCTURE** | | | | | |
| | B1010 | Upper Floor Construction | $1,275,316 | | | |
| | B1020 | Roof Construction | $2,241,112 | **$3,516,428** | $40.10 | 11.7% |
| **B20** | **EXTERIOR CLOSURE** | | | | | |
| | B2010 | Exterior Walls | $2,437,140 | | | |
| | B2020 | Windows | $1,538,040 | | | |
| | B2030 | Exterior Doors | $105,680 | **$4,080,860** | $46.53 | 13.5% |
| **B30** | **ROOFING** | | | | | |
| | B3010 | Roof Coverings | $1,870,900 | | | |
| | B3020 | Roof Openings | $32,500 | **$1,903,400** | $21.70 | 6.3% |
| **C10** | **INTERIOR CONSTRUCTION** | | | | | |
| | C1010 | Partitions | $1,929,400 | | | |
| | C1020 | Interior Doors | $438,500 | | | |
| | C1030 | Specialties/Millwork | $615,760 | **$2,983,660** | $34.02 | 9.9% |
| **C20** | **STAIRCASES** | | | | | |
| | C2010 | Stair Construction | $81,000 | | | |
| | C2020 | Stair Finishes | $18,862 | **$99,862** | $1.14 | 0.3% |
| **C30** | **INTERIOR FINISHES** | | | | | |
| | C3010 | Wall Finishes | $613,900 | | | |
| | C3020 | Floor Finishes | $964,700 | | | |
| | C3030 | Ceiling Finishes | $657,750 | **$2,236,350** | $25.50 | 7.4% |
| **D10** | **CONVEYING SYSTEMS** | | | | | |
| | D1010 | Elevator | $160,000 | **$160,000** | $1.82 | 0.5% |
| **D20** | **PLUMBING** | | | | | |
| | D20 | Plumbing | $1,227,800 | **$1,227,800** | $14.00 | 4.1% |
| **D30** | **HVAC** | | | | | |
| | D30 | HVAC | $3,858,800 | **$3,858,800** | $44.00 | 12.8% |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** GFA 87,700

## *CONSTRUCTION COST SUMMARY*

| | *BUILDING SYSTEM* | | *SUB-TOTAL* | *TOTAL* | *$/SF* | *%* |
|---|---|---|---|---|---|---|
| **OPTION N-9 NEW BUILDING** | | | | | | |
| **D40** | **FIRE PROTECTION** | | | | | |
| | D40 | Fire Protection | $394,650 | **$394,650** | $4.50 | 1.3% |
| **D50** | **ELECTRICAL** | | | | | |
| | D5010 | Complete System | $2,806,400 | **$2,806,400** | $32.00 | 9.3% |
| **E10** | **EQUIPMENT** | | | | | |
| | E10 | Equipment | $570,000 | **$570,000** | $6.50 | 1.9% |
| **E20** | **FURNISHINGS** | | | | | |
| | E2010 | Fixed Furnishings | $911,398 | | | |
| | E2020 | Movable Furnishings | NIC | **$911,398** | $10.39 | 3.0% |
| **F10** | **SPECIAL CONSTRUCTION** | | | | | |
| | F10 | Special Construction | $0 | **$0** | $0.00 | 0.0% |
| **F20** | **HAZMAT REMOVALS** | | | | | |
| | F2010 | Building Elements Demolition | $0 | | | |
| | F2020 | Hazardous Components Abatement | $0 | **$0** | $0.00 | 0.0% |
| ***TOTAL DIRECT COST (Trade Costs)*** | | | | ***$30,166,144*** | *$343.97* | *100.0%* |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-9 NEW BUILDING** | | | | | | | |
| | ***GROSS FLOOR AREA CALCULATION*** | | | | | | |
| | Lower Level | | | 3,700 | | | |
| | First Floor | | | 58,000 | | | |
| | Second Floor | | | 26,000 | | | |
| | ***TOTAL GROSS FLOOR AREA (GFA)*** | | | | | **87,700** | ***sf*** |
| ***A10*** | ***FOUNDATIONS*** | | | | | | |
| **A1010** | **STANDARD FOUNDATIONS** | | | | | | |
| *033000* | *CONCRETE* | | | | | | |
| | Strip Footings | *866* | *CY* | | | | |
| | Foundation Walls | *288* | *CY* | | | | |
| | Retaining Walls | *218* | *CY* | | | | |
| | Spread Footings | *492* | *CY* | | | | |
| | Piers | *92* | *CY* | | | | |
| | Total Foundation Concrete | *1,956* | *CY* | | | | |
| | Strip footings and grade beams | | | | | | |
| | Formwork | **4,580** | sf | 11.00 | 50,380 | | |
| | Re-bar | **23,350** | lbs. | 1.20 | 28,020 | | |
| | Concrete material; 3,000 psi | **266** | cy | 130.00 | 34,580 | | |
| | Placing concrete | **266** | cy | 70.00 | 18,620 | | |
| | Foundation walls | | | | | | |
| | Formwork | **11,120** | sf | 12.50 | 139,000 | | |
| | Re-bar | **27,800** | lbs. | 1.20 | 33,360 | | |
| | Concrete material; 3,000 psi | **288** | cy | 130.00 | 37,440 | | |
| | Placing concrete | **288** | cy | 70.00 | 20,160 | | |
| | Form shelf | **1,390** | lf | 10.00 | 13,900 | | |
| | Retaining Walls | | | | | | |
| | Formwork | **8,400** | sf | 12.50 | 105,000 | | |
| | Re-bar | **21,000** | lbs. | 130.00 | 2,730,000 | | |
| | Concrete material; 3,000 psi | **218** | cy | 70.00 | 15,260 | | |
| | Placing concrete | **218** | cy | 10.00 | 2,180 | | |
| | Spread Footings | | | | | | |
| | Formwork | **6,570** | sf | 14.00 | 91,980 | | |
| | Re-bar | **29,542** | lbs. | 1.20 | 35,450 | | |
| | Concrete material; 3,000 psi | **492** | cy | 130.00 | 63,960 | | |
| | Placing concrete | **492** | cy | 70.00 | 34,440 | | |
| | Set anchor bolts grout plates | **108** | ea | 150.00 | 16,200 | | |
| | Piers/Pilasters | | | | | | |
| | Formwork | **3,167** | sf | 14.00 | 44,338 | | |
| | Re-bar | **11,040** | lbs | 1.20 | 13,248 | | |
| | Concrete material; 3,000 psi | **92** | cy | 130.00 | 11,960 | | |
| | Placing concrete | **92** | cy | 80.00 | 7,360 | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Dampproofing at brick shelf | **8,340** | sf | 3.00 | 25,020 | | |
| | Waterproofing retaining wall | **1,800** | sf | 7.00 | 12,600 | | |
| *072100* | *THERMAL INSULATION* | | | | | | |
| | Insulation | **6,760** | sf | 3.00 | 20,280 | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-9 NEW BUILDING** | | | | | | | |
| *312000* | *EARTHWORK* | | | | | | |
| | Strip footings | | | | | | |
| | Excavation | **2,802** | cy | 15.00 | 42,030 | | |
| | Remove off site | **2,802** | cy | 12.00 | 33,624 | | |
| | Backfill with imported material | **2,296** | cy | 30.00 | 68,880 | | |
| | Spread footings | | | | | | |
| | Excavation | **2,458** | cy | 16.00 | 39,328 | | |
| | Remove off site | **2,458** | cy | 12.00 | 29,496 | | |
| | Backfill with imported material | **1,966** | cy | 30.00 | 58,980 | | |
| | Miscellaneous | | | | | | |
| | Gravel fill beneath footings, 12" | **638** | cy | 30.00 | 19,140 | | |
| | Perimeter drain | **1,690** | lf | 18.00 | 30,420 | | |
| | Underslab E&B for plumbing | **1** | ls | 15,000.00 | 15,000 | | |
| | Dewatering for foundation work | **1** | ls | 25,000.00 | 25,000 | | |
| | SUBTOTAL | | | | | 3,966,634 | |
| **A1020** | **SPECIAL FOUNDATIONS** | | | | | | |
| | Rammed Aggregate Piers | **58,000** | sf | 12.00 | 696,000 | | |
| | SUBTOTAL | | | | | 696,000 | |
| **A1030** | **LOWEST FLOOR CONSTRUCTION** | | | | | | |
| | New Slab on grade, 5" thick | | | | | | |
| | Structural fill, 8" | **1,439** | cy | 36.00 | 51,804 | | |
| | Gravel fill, 8" | **1,439** | cy | 40.00 | 57,560 | | |
| | Rigid insulation | **58,000** | sf | 2.25 | 130,500 | | |
| | Vapor barrier | **58,000** | sf | 0.75 | 43,500 | | |
| | Compact existing sub-grade | **58,000** | sf | 0.50 | 29,000 | | |
| | Mesh reinforcing 15% lap | **66,700** | sf | 0.80 | 53,360 | | |
| | Concrete - 5" thick; 4,000 psi | **947** | cy | 125.00 | 118,375 | | |
| | Placing concrete | **947** | cy | 45.00 | 42,615 | | |
| | Finishing and curing concrete | **58,000** | sf | 1.50 | 87,000 | | |
| | Control joints - saw cut | **58,000** | sf | 0.10 | 5,800 | | |
| | Miscellaneous | | | | | | |
| | Elevator pit | **1** | ea | 35,000.00 | 35,000 | | |
| | Loading dock | **1** | ls | 40,000.00 | 40,000 | | |
| | Equipment pads | **1** | ls | 15,000.00 | 15,000 | | |
| | SUBTOTAL | | | | | 709,514 | |
| | ***TOTAL - FOUNDATIONS*** | | | | | | **$5,372,148** |
| ***A20*** | ***BASEMENT CONSTRUCTION*** | | | | | | |
| **A2010** | **BASEMENT EXCAVATION** | | | | | | |
| *312000* | *EARTHWORK* | | | | | | |
| | Excavation | **1,644** | cy | 15.00 | 24,660 | | |
| | Remove off site | **1,644** | cy | 12.00 | 19,728 | | |
| | SUBTOTAL | | | | | 44,388 | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-9 NEW BUILDING** | | | | | | | |
| **A2020** | **BASEMENT WALLS** | | | | | | |
| | **w/ Standard Foundations** | | | | see A1010 | | |
| | SUBTOTAL | | | | | - | |
| | ***TOTAL - BASEMENT CONSTRUCTION*** | | | | | | **$44,388** |
| ***B10*** | ***SUPERSTRUCTURE*** | | | | | | |
| | | 15.07 | lbs/sf | | - | | |
| **B1010** | **FLOOR CONSTRUCTION** | 661 | tns | | - | | |
| | Floor Structure - Steel: | | | | | | |
| | Steel beams and columns, 15#/SF | **223** | tns | 3,800.00 | 847,400 | | |
| | Premium for HSS | **56** | tns | 300.00 | 16,800 | | |
| | Shear studs | **5,940** | ea | 2.50 | 14,850 | | |
| | Floor Structure | | | | | | |
| | 2" 18 Ga. Metal galvanized floor Deck | **29,700** | sf | 3.75 | 111,375 | | |
| | WWF reinforcement | **34,155** | sf | 0.80 | 27,324 | | |
| | Concrete Fill to metal deck; 5-1/4" Light Weight | **505** | cy | 160.00 | 80,800 | | |
| | Place and finish concrete | **29,700** | sf | 2.00 | 59,400 | | |
| | Rebar to decks | **8,910** | lbs | 1.20 | 10,692 | | |
| | Misc. angles | **29,700** | sf | 0.50 | 14,850 | | |
| | Miscellaneous | | | | | | |
| | Fire proofing to columns and beams | **29,700** | sf | 2.25 | 66,825 | | |
| | Fire stopping floors | **1** | ls | 25,000.00 | 25,000 | | |
| | SUBTOTAL | | | | | 1,275,316 | |
| **B1020** | **ROOF CONSTRUCTION** | | | | | | |
| | Roof Structure - Steel: | | | | | | |
| | Steel beams and columns, 13-15#/SF | **438** | tns | 3,800.00 | 1,664,400 | | |
| | Premium for HSS | **110** | tns | 300.00 | 33,000 | | |
| | Roof Structure | | | | | | |
| | 1-1/2" 20 Ga. galvanized Metal Roof Deck | **31,800** | sf | 3.50 | 111,300 | | |
| | 2" 18 Ga. Metal galvanized roof Deck | **23,792** | sf | 3.75 | 89,220 | | |
| | Acoustic deck at gym | **8,208** | sf | 7.00 | 57,456 | | |
| | Miscellaneous | | | | | | |
| | Concrete at low level roof | **23,792** | sf | 8.00 | 190,336 | | |
| | Fire proofing to columns, beams and deck | **31,800** | sf | 3.00 | 95,400 | | |
| | SUBTOTAL | | | | | 2,241,112 | |
| | ***TOTAL - SUPERSTRUCTURE*** | | | | | | **$3,516,428** |
| ***B20*** | ***EXTERIOR CLOSURE*** | | | | | | |
| **B2010** | **EXTERIOR WALLS** | | | | | | |
| | **Exterior Wall Area - Solid Assume 70%** | *31,532* | sf | | | | |
| *042000* | *MASONRY* | | | | | | |
| | Brick veneer, 3 color; 85% of solid area | **26,802** | sf | 38.00 | 1,018,476 | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-9 NEW BUILDING** | | | | | | | |
| | CMU backup at gym, assume 12" | **6,900** | sf | 28.00 | 193,200 | | |
| | Staging to exterior wall | **45,046** | sf | 4.00 | 180,184 | | |
| *055000* | *MISC. METALS* | | | | | | |
| | Stainless steel sign at main entrance | **1** | ls | 10,000.00 | 10,000 | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Air barrier | **31,532** | sf | 6.50 | 204,958 | | |
| | Air barrier/flashing at windows | **7,949** | lf | 6.25 | 49,681 | | |
| | Miscellaneous sealants to closure | **31,532** | sf | 1.00 | 31,532 | | |
| *072100* | *THERMAL INSULATION* | | | | | | |
| | Insulation | **31,532** | sf | 2.25 | 70,947 | | |
| *076400* | *CLADDING* | | | | | | |
| | Metal panel; 15% of solid area | **4,730** | sf | 65.00 | 307,450 | | |
| *092900* | *GYPSUM BOARD ASSEMBLIES* | | | | | | |
| | 6" metal stud backup | **24,632** | sf | 9.00 | 221,688 | | |
| | Gypsum Sheathing | **24,632** | sf | 2.75 | 67,738 | | |
| | Drywall lining to interior face of stud backup | **24,632** | sf | 3.30 | 81,286 | | |
| | SUBTOTAL | | | | | 2,437,140 | |
| **B2020** | **WINDOWS** | | | | | | |
| | **Exterior Wall Area - Glazed Assume 30%** | *13,514* | sf | | | | |
| *061000* | *ROUGH CARPENTRY* | | | | | | |
| | Wood blocking at openings | **7,949** | lf | 12.00 | 95,388 | | |
| *070001* | *WATERPROOFING, DAMPPROOFING AND CAULKING* | | | | | | |
| | Backer rod & double sealant | **7,949** | lf | 8.50 | 67,567 | | |
| *080001* | *METAL WINDOWS* | | | | | | |
| | Windows, double glazed; 80% of glazed area | **10,811** | sf | 90.00 | 972,990 | | |
| | Curtainwall, double glazed; 20% of glazed area | **2,703** | sf | 115.00 | 310,845 | | |
| | Sunshades; horizontal | **1** | ls | 75,000.00 | 75,000 | | |
| *089000* | *LOUVERS* | | | | | | |
| | Louvers | **250** | sf | 65.00 | 16,250 | | |
| | SUBTOTAL | | | | | 1,538,040 | |
| **B2030** | **EXTERIOR DOORS** | | | | | | |
| | Glazed entrance doors including frame and hardware; double door | **8** | pr | 8,000.00 | 64,000 | | |
| | Glazed entrance doors including frame and hardware; single door | **8** | ea | 4,000.00 | 32,000 | | |
| | HM doors, frames and hardware- Double | **4** | pr | 2,000.00 | 8,000 | | |
| | Backer rod & double sealant | **240** | lf | 4.00 | 960 | | |
| | Wood blocking at openings | **240** | lf | 3.00 | 720 | | |
| | SUBTOTAL | | | | | 105,680 | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-9 NEW BUILDING** | | | | | | | |
| | ***TOTAL - EXTERIOR CLOSURE*** | | | | | | **$4,080,860** |
| | ***B30 ROOFING*** | | | | | | |
| **B3010** | **ROOF COVERINGS** | | | | | | |
| | New roofing complete | **63,800** | sf | 22.00 | 1,403,600 | | |
| | New fascia/soffits | **2,170** | lf | 150.00 | 325,500 | | |
| | Premium for green roof | **2,160** | sf | 30.00 | 64,800 | | |
| | Rail at green roof | **90** | lf | 300.00 | 27,000 | | |
| | Roof equipment screen | **1** | ls | 50,000.00 | 50,000 | | |
| | SUBTOTAL | | | | | 1,870,900 | |
| **B3020** | **ROOF OPENINGS** | | | | | | |
| | Skylights, allow | **1** | ls | 30,000.00 | 30,000 | | |
| | Roof hatch | **1** | loc | 2,500.00 | 2,500 | | |
| | SUBTOTAL | | | | | 32,500 | |
| | ***TOTAL - ROOFING*** | | | | | | **$1,903,400** |
| | ***C10 INTERIOR CONSTRUCTION*** | | | | | | |
| **C1010** | **PARTITIONS** | | | | | | |
| | Interior partitions | **87,700** | gsf | 22.00 | 1,929,400 | | |
| | SUBTOTAL | | | | | 1,929,400 | |
| **C1020** | **INTERIOR DOORS** | | | | | | |
| | Interior doors, frames and hardware | **87,700** | gsf | 5.00 | 438,500 | | |
| | SUBTOTAL | | | | | 438,500 | |
| **C1030** | **SPECIALTIES / MILLWORK** | | | | | | |
| | Toilet Partitions and accessories | **87,700** | gsf | 0.80 | 70,160 | | |
| | Backer panels in electrical closets | **1** | ls | 1,000.00 | 1,000 | | |
| | Marker boards/tackboards in classrooms, offices, conference rooms, library and MP rooms | **87,700** | sf | 1.00 | 87,700 | | |
| | Room Signs | **87,700** | gsf | 0.40 | 35,080 | | |
| | Fire extinguisher cabinets | **29** | ea | 350.00 | 10,150 | | |
| | Lockers | **87,700** | gsf | 1.60 | 140,320 | | |
| | Janitors Work Shop Accessories | **1** | ls | 1,500.00 | 1,500 | | |
| | Janitors Closet Accessories | **2** | rms | 300.00 | 600 | | |
| | *Media* | | | | | | |
| | Reception desks | **2** | loc | 25,000 | 50,000 | | |
| | Library shelving at perimeters 7' Tall | | | | F,F & E | | |
| | Library shelving at perimeters 3' Tall | | | | F,F & E | | |
| | Display cases | **87,700** | gsf | 0.25 | 21,925 | | |
| | Miscellaneous metals throughout building | **87,700** | sf | 1.25 | 109,625 | | |
| | Miscellaneous sealants throughout building | **87,700** | sf | 1.00 | 87,700 | | |
| | SUBTOTAL | | | | | 615,760 | |
| | ***TOTAL - INTERIOR CONSTRUCTION*** | | | | | | **$2,983,660** |
| | ***C20 STAIRCASES*** | | | | | | |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-9 NEW BUILDING** | | | | | | | |
| **C2010** | **STAIR CONSTRUCTION** | | | | | | |
| | Metal pan stair; egress stair | **3** | flt | 25,000.00 | 75,000 | | |
| | Concrete fill to stairs | **3** | flt | 2,000.00 | 6,000 | | |
| | SUBTOTAL | | | | | 81,000 | |
| **C2020** | **STAIR FINISHES** | | | | | | |
| | High performance coating to stairs including all railings etc. | **3** | flt | 3,000.00 | 9,000 | | |
| | Rubber tile at stairs - landings | **300** | sf | 10.00 | 3,000 | | |
| | Rubber tile at stairs - treads & risers | **360** | lft | 19.06 | 6,862 | | |
| | SUBTOTAL | | | | | 18,862 | |
| | ***TOTAL - STAIRCASES*** | | | | | | **$99,862** |
| ***C30*** | ***INTERIOR FINISHES*** | | | | | | |
| **C3010** | **WALL FINISHES** | | | | | | |
| | Wall finishes | **87,700** | sf | 7.00 | 613,900 | | |
| | SUBTOTAL | | | | | 613,900 | |
| **C3020** | **FLOOR FINISHES** | | | | | | |
| | Floor finishes | **87,700** | sf | 11.00 | 964,700 | | |
| | SUBTOTAL | | | | | 964,700 | |
| **C3030** | **CEILING FINISHES** | | | | | | |
| | Ceiling finishes | **87,700** | sf | 7.50 | 657,750 | | |
| | SUBTOTAL | | | | | 657,750 | |
| | ***TOTAL - INTERIOR FINISHES*** | | | | | | **$2,236,350** |
| ***D10*** | ***CONVEYING SYSTEMS*** | | | | | | |
| **D1010** | **ELEVATOR** | | | | | | |
| | New elevator; 3 stop; passenger | **1** | ea | 160,000.00 | 160,000 | | |
| | SUBTOTAL | | | | | 160,000 | |
| | ***TOTAL - CONVEYING SYSTEMS*** | | | | | | **$160,000** |
| ***D20*** | ***PLUMBING*** | | | | | | |
| **D20** | **PLUMBING, GENERALLY** | | | | | | |
| | Plumbing, complete | **87,700** | sf | 14.00 | 1,227,800 | | |
| | SUBTOTAL | | | | | 1,227,800 | |
| | ***TOTAL - PLUMBING*** | | | | | | **$1,227,800** |
| ***D30*** | ***HVAC*** | | | | | | |
| **D30** | **HVAC, GENERALLY** | | | | | | |
| | HVAC, complete; assumed displacement | **87,700** | sf | 44.00 | 3,858,800 | | |
| | SUBTOTAL | | | | | 3,858,800 | |
| | ***TOTAL - HVAC*** | | | | | | **$3,858,800** |

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-9 NEW BUILDING** | | | | | | | |
| ***D40*** | ***FIRE PROTECTION*** | | | | | | |
| **D40** | **FIRE PROTECTION, GENERALLY** | | | | | | |
| | Fire protection | **87,700** | sf | 4.50 | 394,650 | | |
| | SUBTOTAL | | | | | 394,650 | |
| | ***TOTAL - FIRE PROTECTION*** | | | | | | **$394,650** |
| ***D50*** | ***ELECTRICAL*** | | | | | | |
| **D5010** | **ELECTRICAL SYSTEMS** | | | | | | |
| | Electrical, complete | **87,700** | sf | 32.00 | 2,806,400 | | |
| | SUBTOTAL | | | | | 2,806,400 | |
| | ***TOTAL - ELECTRICAL*** | | | | | | **$2,806,400** |
| ***E10*** | ***EQUIPMENT*** | | | | | | |
| **E10** | **EQUIPMENT, GENERALLY** | | | | | | |
| | Gym wall pads | **1** | ls | 20,000.00 | 20,000 | | |
| | Basketball backstops; swing up; electric operated | **6** | loc | 10,000.00 | 60,000 | | |
| | Gymnasium dividing net; electrically operated | **1** | ls | 30,000.00 | 30,000 | | |
| | Volleyball net and standards | **1** | ls | 5,000.00 | 5,000 | | |
| | Telescoping bleachers | **1** | ls | 30,000.00 | 30,000 | | |
| | Kiln | **1** | ea | 5,000.00 | 5,000 | | |
| | Stage curtain and rigging | **1** | ls | 35,000.00 | 35,000 | | |
| | Food Service equipment | **1** | ls | 350,000.00 | 350,000 | | |
| | Loading dock equipment | **1** | ls | 20,000.00 | 20,000 | | |
| | Electrically operated projection screens | **1** | loc | 15,000.00 | 15,000 | | |
| | SUBTOTAL | | | | | 570,000 | |
| | ***TOTAL - EQUIPMENT*** | | | | | | **$570,000** |
| ***E20*** | ***FURNISHINGS*** | | | | | | |
| **E2010** | **FIXED FURNISHINGS** | | | | | | |
| | Entry mats & frames - recessed with carpet/rubber strips | **500** | sf | 55.00 | 27,500 | | |
| | Window blinds | **13,514** | sf | 7.00 | 94,598 | | |
| | Counters, base cabinets, tall storage in classrooms and other rooms | **87,700** | gsf | 9.00 | 789,300 | | |
| | SUBTOTAL | | | | | 911,398 | |
| **E2020** | **MOVABLE FURNISHINGS** | | | | | | |
| | All movable furnishings to be provided and installed by owner | | | | | | |
| | SUBTOTAL | | | | | NIC | |
| | ***TOTAL - FURNISHINGS*** | | | | | | **$911,398** |

PM&C

**Manchester Memorial Elementary School** 30-Jan-18
**Design Options**
Manchester-on-the Sea, MA

**Feasibility Design Estimate** GFA 87,700

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **OPTION N-9 NEW BUILDING** | | | | | | | |
| | ***F10 SPECIAL CONSTRUCTION*** | | | | | | |
| **F10** | **SPECIAL CONSTRUCTION** | | | | | | |
| | No items in this section | | | | | | |
| | SUBTOTAL | | | | | | |
| | ***TOTAL - SPECIAL CONSTRUCTION*** | | | | | | |
| | ***F20 SELECTIVE BUILDING DEMOLITION*** | | | | | | |
| **F2010** | **BUILDING ELEMENTS DEMOLITION** | | | | | | |
| | No items in this section | | | | | | |
| | SUBTOTAL | | | | | | |
| **F2020** | **HAZARDOUS COMPONENTS ABATEMENT** | | | | | | |
| | See main summary for HazMat allowance | | | | See Summary | | |
| | SUBTOTAL | | | | | | |
| | ***TOTAL - SELECTIVE BUILDING DEMOLITION*** | | | | | | |

**Feasibility Design Estimate**

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **SITEWORK N-9 NEW BUILDING** | | | | | | | |
| | | | | | | | |
| *G* | ***SITEWORK*** | | | | | | |
| | | | | | | | |
| **G10** | **SITE PREPARATION & DEMOLITION** | | | | | | |
| | Site construction fence/barricades | **1,800** | lf | 12.00 | 21,600 | | |
| | Site construction fence gates | **1** | ls | 7,500.00 | 7,500 | | |
| | Stabilized construction entrance | **2,000** | sf | 6.00 | 12,000 | | |
| | Pavement/curbing removal | **60,000** | sf | 1.00 | 60,000 | | |
| | Miscellaneous demolition including utilities | **1** | ls | 30,000.00 | 30,000 | | |
| | Site Earthwork | | | | | | |
| | Strip topsoil and store | **3,704** | cy | 12.00 | 44,448 | | |
| | Fine grading | **8,411** | sy | 1.00 | 8,411 | | |
| | Cut and Fill; assume balanced site | **11,111** | cy | 8.00 | 88,888 | | |
| | Silt fence/erosion control, wash bays, stock piles | **1,500** | lf | 12.00 | 18,000 | | |
| | Silt fence maintenance and monitoring | **1** | ls | 10,000.00 | 10,000 | | |
| | Protect existing wetlands | **1** | ls | 10,000.00 | 10,000 | | |
| | Hazardous Waste Remediation | | | | | | |
| | Remove existing underground fuel storage tanks | | | | NIC | | |
| | Dispose/treat contaminated soils | | | | | | |
| | SUBTOTAL | | | | | 310,847 | |
| | | | | | | | |
| **G20** | **SITE IMPROVEMENTS** | | | | | | |
| | Asphalt Paving; parking lot and roadway | *23,000* | *sf* | | | | |
| | gravel base; 12" thick | **852** | cy | 40.00 | 34,080 | | |
| | asphalt; 4 1/2" thick | **2,556** | sy | 28.00 | 71,568 | | |
| | Mill & re-pave existing paving | **32,000** | sf | 1.75 | 56,000 | | |
| | VGC | **2,000** | lf | 38.00 | 76,000 | | |
| | Line painting including crosswalk and hcap space hatching | **1** | ls | 10,000.00 | 10,000 | | |
| | HC curb cuts | **4** | loc | 350.00 | 1,400 | | |
| | Signage | **1** | ls | 10,000.00 | 10,000 | | |
| | Pedestrian Paving | | | | | | |
| | Concrete paving | *25,200* | sf | | | | |
| | gravel base; 12" thick | **933** | cy | 40.00 | 37,320 | | |
| | 4" concrete paving | **25,200** | sf | 9.00 | 226,800 | | |
| | Site Improvements | | | | | | |
| | Flag pole | **1** | ea | 5,000.00 | 5,000 | | |
| | Concrete retaining walls | | | | Assumed not required | | |
| | Tennis Courts | | | | No work - ETR | | |
| | Elevated walkways | | | | No work - ETR | | |
| | Play surfacing; allowance of 7,500 SF | **7,500** | sf | 18.00 | 135,000 | | |
| | Play equipment - allowance | **1** | ls | 250,000.00 | 250,000 | | |
| | Allowance for Greenhouse | **1** | ls | 20,000.00 | 20,000 | | |
| | Site improvements; benches, walls, fences etc. | **1** | ls | 150,000.00 | 150,000 | | |
| | Playing field; MP Field | *20,000* | sf | | | | |
| | Reuse existing topsoil; amended | **370** | cy | 30.00 | 11,100 | | |
| | Gravel drainage base; 12" thick | **741** | cy | 40.00 | 29,640 | | |
| | Sports seeding | **20,000** | sf | 0.35 | 7,000 | | |
| | Fencing/gates | **1** | ea | 30,000.00 | 30,000 | | |
| | SUBTOTAL | | | | | 1,160,908 | |
| | | | | | | | |
| | Landscaping | | | | | | |
| | Topsoil - amend existing topsoil; minimum 6" | **3,704** | cy | 25.00 | 92,600 | | |
| | Lawn - loam & seed | **134,300** | sf | 0.25 | 33,575 | | |
| | Allowance for extensive raised planting beds | **1** | ls | 5,000.00 | 5,000 | | |
| | Planting allowance | **1** | ls | 100,000.00 | 100,000 | | |

**Feasibility Design Estimate**

| CSI CODE | DESCRIPTION | QTY | UNIT | UNIT COST | EST'D COST | SUB TOTAL | TOTAL COST |
|---|---|---|---|---|---|---|---|
| **SITEWORK N-9 NEW BUILDING** | | | | | | | |
| | SUBTOTAL | | | | | 231,175 | |
| | | | | | | | |
| **G30** | **CIVIL MECHANICAL UTILITIES** | | | | | | |
| | Water supply | | | | | | |
| | New DI piping; 8" Main loop | **1,500** | lf | 100.00 | 150,000 | | |
| | New DI piping; 4" Domestic | **300** | lf | 60.00 | 18,000 | | |
| | New DI piping; 8" Fire | **300** | lf | 85.00 | 25,500 | | |
| | Connect to existing | **1** | loc | 10,000.00 | 10,000 | | |
| | FD connection | **1** | ea | 2,000.00 | 2,000 | | |
| | Gate valves | **10** | ea | 750.00 | 7,500 | | |
| | Fire hydrant | **5** | ea | 5,000.00 | 25,000 | | |
| | Sanitary: | | | | | | |
| | Allowance for sanitary sewer including connection to existing Municipal sewer | **1** | ls | 50,000.00 | 50,000 | | |
| | Storm water; Pricing includes E&B and bedding | | | | | | |
| | Allowance for drainage systems at new & existing paving & playing field | **87,700** | sf | 10.00 | 877,000 | | |
| | Gas service | | | | | | |
| | E&B trench for new gas pipe - install by plumbing | | | | assume ETR | | |
| | SUBTOTAL | | | | | 1,165,000 | |
| | | | | | | | |
| **G40** | **ELECTRICAL UTILITIES** | | | | | | |
| | Power | **1** | ls | 50,000.00 | 50,000 | | |
| | Communications | **1** | ls | 30,000.00 | 30,000 | | |
| | Site security system | | | | assume not required | | |
| | Site Lighting | | | | | | |
| | Site lighting | **1** | ls | 80,000.00 | 80,000 | | |
| | SUBTOTAL | | | | | 160,000 | |
| | | | | | | | |
| | **TOTAL - SITE DEVELOPMENT** | | | | | | ***$3,027,930*** |