Sherwood Middle School

30 Sherwood Avenue, Shrewsbury, Massachusetts

MSBA

Schematic Design Submission

11 DECEMBER 2009

OWNER
Town of Shrewsbury
Shrewsbury, Massachusetts

OPM
PMA Consultants LLC
Braintree, Massachusetts

Prepared by:

LAMOUREUX · PAGANO
ASSOCIATES, ARCHITECTS

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SCHEMATIC DESIGN

INTRODUCTION

At the September 30, 2009 MSBA Board Meeting, the District was authorized to proceed through Schematic Design with a 130,000 sf, 900 student, Grades 5 & 6 new construction Middle School. In its recommendation, the Board agreed with the Building Committee Preferred Solution and cited the following reasons:

- Satisfies all current code requirements and does not rely on AAB code relief
- More energy efficient facility estimated to be 20% more efficient than a renovation/addition option; based on initial estimates the cost savings could be on the order of $2.5 million over 20 years
- Strengthens the connection to the Oak Middle School enabling increased sharing of resources between the middle schools
- Best meets the modified educational program
- Better addresses site deficiencies
- Less disruption to students and staff and a shorter construction schedule.

With the authorization to proceed, the Design Team progressed with the design documents to meet or exceed MSBA requirements for Schematic Design.

Several televised public presentations were made by the Building Committee, the OPM, and LPA with the objective of outlining the Feasibility Study and Schematic Design process and conclusions and encouraging public discussion of any related issues. At each meeting, images of the existing Sherwood School and the proposed were presented along with an outline of the MSBA process and expectations. The presentations were as follows:

- November 18, 2009 Shrewsbury School Committee Meeting
- November 23, 2009 Sherwood Building Committee Public Hearing
- November 30, 2009 Shrewsbury Board of Selectmen Meeting

On November 17, 2009, the Schematic Design drawings, outline specifications, and Room Data Sheets were distributed to the Design Team cost estimator and the OPM cost estimator and their reports are included in Section 1.15.N. of this report.

In addition to the following report, the Schematic Design submission includes an electronic file with the following documents not included in this report due to size:

- Room Data Sheets (11/17/09)
- Schematic Design Drawings dated November 17, 2009
- Outline Specifications dated December 11, 2009

Also in the electronic file is a copy of this report.

This submission is scheduled to be reviewed at the January 28, 2010 MSBA Board Meeting for authorization to proceed through construction.

1.14 FINAL DESIGN PROGRAM FOR PREFERRED SCHEMATIC DESIGN

A. Philosophy Statement
B. Room Data Sheets
C. Space Summary Template
D. Instructional Technology
   Security and Visual Access Requirements
E. Site Development Requirements
F. Sustainable Design Objectives
G. School Committee Approval of Program

1.14 FINAL DESIGN PROGRAM FOR PREFERRED SCHEMATIC DESIGN

A. Philosophy Statement

- Program Goals
- Special Education Program

Mission: *The Shrewsbury Public Schools in partnership with the community will provide students with the skills and knowledge for the 21st century, an appreciation of our democratic tradition and the desire to continue to learn throughout life.*

The Shrewsbury Public Schools recognize that the purpose of grouping is to create learning environments that best meet the needs of students. As a result, the school district supports flexible grouping practices at all levels.

In order to deal effectively with mixed ability groups and students with special needs, teachers must be classroom managers, using a variety of instructional practices. These may include pretest and post-test evaluations, small group lesions, learning stations, cooperative learning, peer tutoring, independent study, and the use of technology.

The Shrewsbury Public Schools recognize that students grow and change during their years in school and that school programs must respond accordingly. Students must not be categorized and tracked in such a way as to limit their potential growth. Consequently, each level in the system develops flexible grouping strategies based upon the ages and the needs of its students.

Middle school students are members of heterogeneous, interdisciplinary teams designed to include all achievement and ability levels. The teachers on the teams make decisions about the groups within their teams and utilize a variety of grouping strategies throughout the school year.

Recognizing the developmental needs of the young adolescent Sherwood Middle School must ensure that students are prepared to be successful, productive, and contributing members of an ever-changing global society. In this context, students will demonstrate communication skills, facility n social interaction as a team member, problem solving, decision-making and analytic capabilities, civic responsibility, personal skill in developing and maintaining wellness, and the use of technology as a tool for learning.

All students are assigned to teacher teams, typically with adjoining rooms. These teachers work together to deliver the core curriculum to each student. They have common planning time and work closely together planning instructional units, seeking coordination wherever appropriate. Several teams work together in pods. Pods are groups together and share common space and planning time in the building. This allows for teams to work together on interdisciplinary units, field trips, and special events.

- Program Goals

Working with the Shrewsbury School District Mission Statement, LPA collaborated with the School District representatives to develop the appropriate program for the new 900 student Grades 5 and 6 school. The following priorities were established:

- Develop a "neighborhood" concept of five clusters of 6-8 general classrooms supported by one Special Education resource room and a multipurpose "Common Room" for team projects as well as tutorials. In this manner, the 900 student school will have a more intimate, approachable design aesthetic.

- Design the classroom clusters with the possibility of adding one classroom to each in the future, should the need arise

- Integrate flexibility as much as possible by:
  - using structural systems that easily allow for future partition changes
  - appoint classrooms uniformly for schedule adaptability
  - design cafeteria, and gym to accommodate extended day and summer programs, assembly, community and school meetings as well as daily activities

- Support the team teaching concept with communicating doors between classrooms and connection to the Common Rooms

- Maximize the utilization rate for academic rooms to minimize the quantity of instructional spaces required

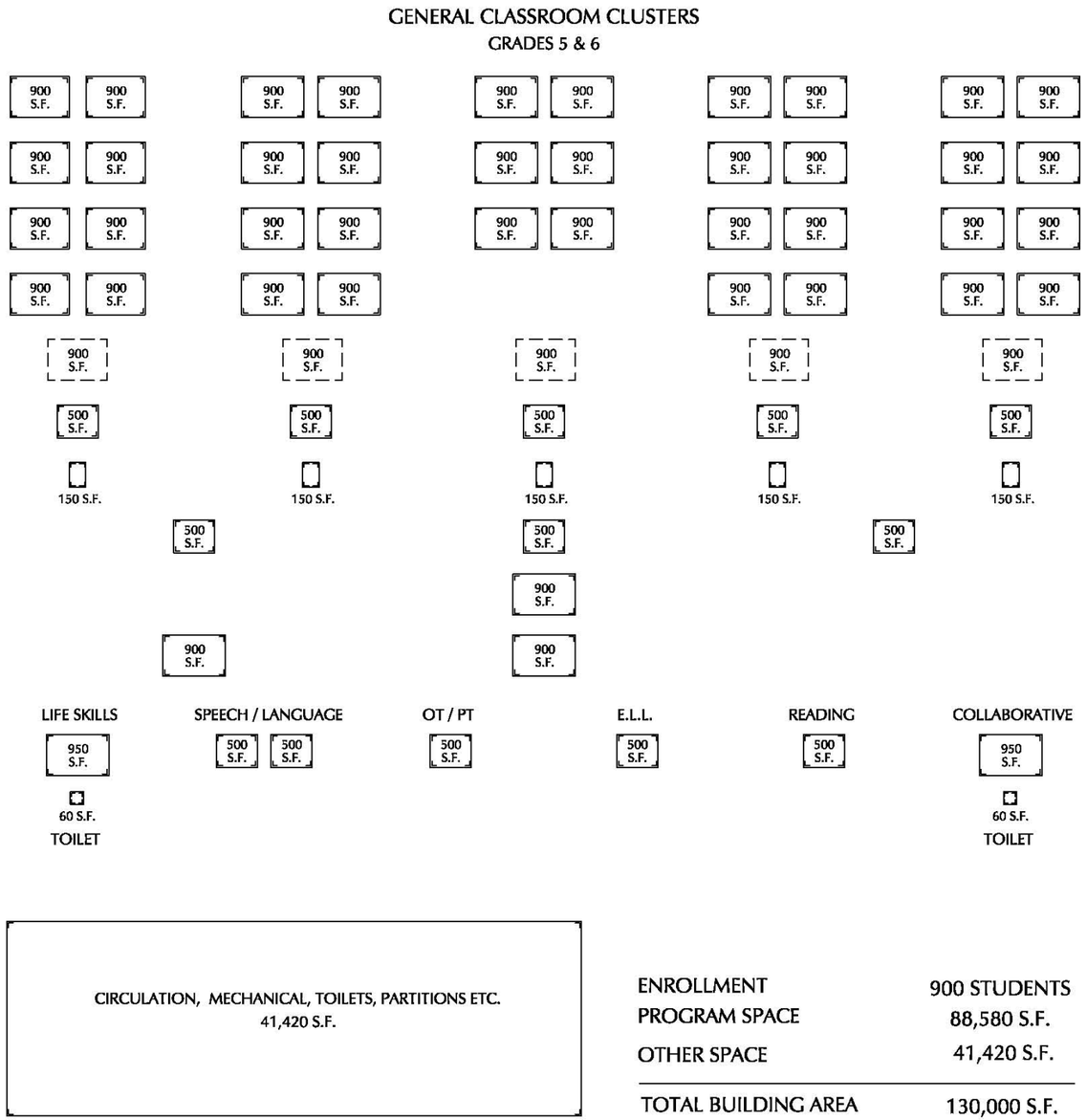
- Group spaces used after hours so that academic wings can be secured at the end of the school day

- Consider and reinforce the ability to share space and faculty at the Oak Middle School through site design

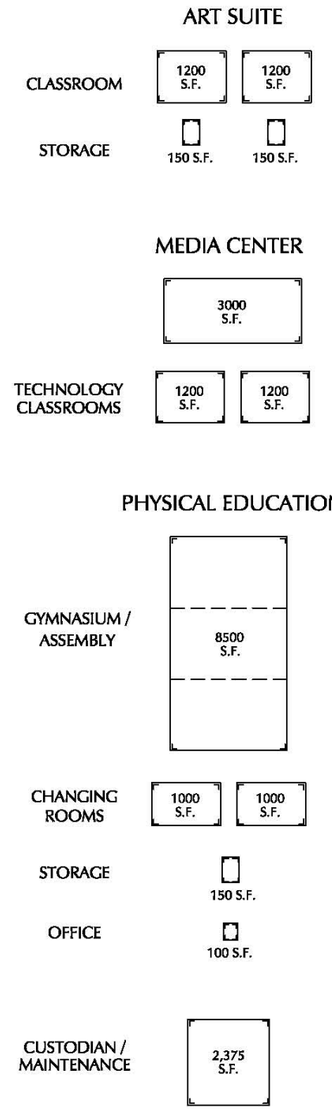
- Distribute special education spaces throughout the school to limit travel time for students

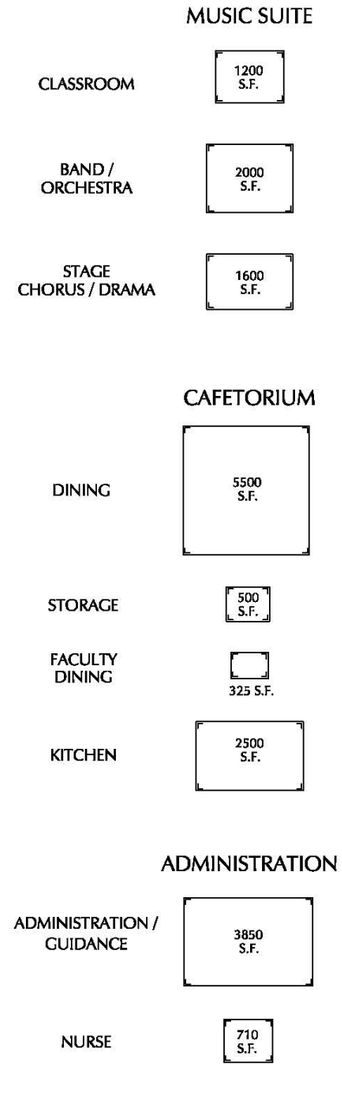
- Design the Media Center as an easily accessible core facility with prominence

The following spatial diagram illustrates the program goals as they were developed for the final schematic design.



ENROLLMENT	900 STUDENTS
PROGRAM SPACE	88,580 S.F.
OTHER SPACE	41,420 S.F.
TOTAL BUILDING AREA	130,000 S.F.





SHREWSBURY PUBLIC SCHOOLS

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Director of School Governance
Department of Elementary and Secondary Education
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40 Broad St.
Boston, MA 02109

November 10, 2009

Dear Ms. Lynch:

Please accept this letter and accompanying information as documentation regarding how the proposed new Sherwood Middle School in Shrewsbury is designed to meet the learning needs of students with disabilities. Sherwood Middle School currently houses all fifth and sixth grade students who attend school within the Shrewsbury Public Schools, and the proposed new building would include the same two grades. The Shrewsbury Public Schools strives to meet all state and federal requirements for special education, and the Department of Elementary and Secondary Education's (DESE) coordinated program review audit in the spring of 2009 confirmed that we have a very high level of compliance with regulations. However, this audit did identify a problem with speech and language instruction sharing space with a regular classroom at Sherwood Middle School.

Our goal is to go beyond compliance in order to provide every one of our students with an excellent education. Our results on the Massachusetts Comprehensive Assessment System (MCAS) tests indicate that our special needs population performs well above state averages, and we were recently cited by a Rennie Center study as a school district whose students with disabilities exceed expectations. However, as with most districts, we are struggling to meet the No Child Left Behind mandate of "adequate yearly progress" (AYP) for our special education subgroup as the performance standard moves closer to an expectation of 100% proficiency for all students. Sherwood Middle School was identified for improvement for special needs students in mathematics in 2005, improved performance enough to remove this designation in 2008, but did not achieve AYP for special education students in 2009 in both mathematics and English language arts. Failure to achieve AYP in 2010 in either subject for special education subgroups will return the school to improvement status with the DESE.

The Sherwood Middle School's special education population, as of the October 1, 2009 enrollment report, is 142 out of 909 students, or 15.6%. This is a consistent percentage compared to the rest of the district (16.6%) and the state (17.1%).

Shrewsbury Public Schools is committed to providing comprehensive programs for students with disabilities. The school system subscribes to the philosophy that all students can learn and that the

purpose of special education is to minimize the impact of disability and maximize the students' ability to achieve success in the least restrictive environment with the greatest access to the general curriculum.

In order to achieve these goals, the district supports a variety of special education programs consistent with the philosophy of educating children in the least restrictive environment.

Current Program: Programs that support students at Sherwood Middle School currently include:

- **Full inclusion**: Students with disabilities who can access the curriculum with modifications and accommodations supported by a special educator who works directly in the classroom with the regular educator. The classroom, a student, or a group of students may also have a paraprofessional in the classroom to support student success. Examples of students who benefit from this program include students with Asperger's Syndrome, specific learning disabilities, intellectual delays, Attention Deficit Hyperactivity Disorder, and/or communication disorders.

It is important to note that in 2007**,** the administration of Sherwood Middle School, in consultation with the special education department, made the decision to convert funding for six special education paraprofessional positions in order to provide two special education teachers. This choice permitted one special education teacher to be assigned to every two regular education teams (teams are two teachers who each teach two core subjects: English language arts and social studies or mathematics and science). These teachers spend more time in the regular education classrooms than in the past, meet regularly with the regular education teachers, and even have their desks placed in one of their team classrooms.

- **Co-Teaching:** Co-teaching is an instructional delivery approach in which general and special educators share responsibility for planning, delivery and evaluation of instructional techniques for a group of students. General and special educators work in a coactive and coordinated fashion, which involves the joint teaching of academically and behaviorally heterogeneous groups of students in integrated settings. The teacher to student ratio is decreased thus providing support to all students in the classroom. This program was primarily designed for students with language Based Learning Disabilities who may have required an out of district placement that specialized in language based instructional practices. However, other students with learning disabilities also benefit from this program.

- **Essential Skills**: Students who require specially designed instruction in the areas of Math and English Language Arts have an opportunity to learn at their own pace and instructional level with a special educator. These students receive their instruction at the same time as their peers, but in a different classroom. The same content is taught, but the instruction for each student is modified to ensure the successful acquisition of the content. The special educator meets weekly with the regular educator to coordinate the lesson plans and content being taught. The special educator also consults to the classroom teachers regarding the differentiation of instruction in the other content areas as well as modifies the curriculum for students who are included during that instructional period.

- **Life Skills:** Students with severe disabilities (such as those on the autism spectrum, with Down Syndrome, etc.) who may require significant modifications to their instruction, behavior support, and who may require instruction in the areas of independent living skills, daily living skills, and vocational skills in order to make effective progress in their educational program receive coordination and instruction in a

separate classroom(s) by a special educator. This is a unique program in that there are opportunities across the day for many of these students to participate with their typical peers in a class or classes as well as all allied arts classes. These students typically have 1:1 or 1:2 supports by a paraprofessional to ensure access to programming throughout their day.

- **Ancillary Services**: As is likely the case in every public school district, Sherwood Middle School provides students with ancillary special education services, including speech and language therapy, occupational therapy, physical therapy, adaptive physical education, psychological services, etc.

Shrewsbury continues to seek creative ways to educate students in the least restrictive environment. This requires strategic planning regarding the use of space and the ability to plan for the increase in the number of students that require specialized programs in order to meet their educational goals.

Of the five elementary schools in Shrewsbury, three have programs that support students on the autism spectrum with intensive special needs. These students will all require continued support academically and behaviorally. The space identified in the new building project will provide the classrooms needed for these students to succeed while minimizing the need to seek out of district placements.

In addition, the position of district-wide clinical coordinator provides access to the curriculum for students with behavioral challenges. This role, staffed by a master's level behavior analyst, supports students in regular education and special education requiring clinical services and support. The clinical coordinator's primary responsibility in regular education is to assist the classroom teacher identify students who may be engaging in challenging behaviors that interfere with learning, conduct a functional behavior assessment, develop positive behavior support plans, train staff to implement the plans, and follow-up when needed. The primary responsibility in special education is to develop procedural consistencies, develop accountability and reliability procedures, supervise home support programs, consult to district wide programs, and provide professional development. The addition of this position further supports Shrewsbury's ability to educate children with more intensive special needs at the middle school level.

Proposed Program:

The district administration and building administration worked with the architects regarding the current and future needs of the special education program. While a similar approach to the one described above will be used, a movement towards a more inclusive program is intended, both because of trends in best practice and because the new building will have larger general classrooms and more suitable specialized instructional spaces that provide the opportunity for special education support that aligns with inclusionary practices.

There are no plans to move other special education programming from other locations in the district to the new building.
The MSBA's October 5 space summary evaluation letter noted that the proposed new building has 2,540sf less space allocated to special education than the MSBA space guidelines provide. It is our belief in Shrewsbury that the proposed design of the new Sherwood Middle School provides the appropriate instructional and support spaces for the special education program, while providing flexibility as this program changes over time to respond to the needs of students and updates regarding best practices in the

field. In addition to designated separate spaces, we believe that the design of the common spaces in each classroom wing provides additional flexibility for small group instruction, emphasizing inclusion and co-teaching models. A description of the proposed spaces follows:

• Self-contained, full size special education classrooms (2 @ 950sf): One of these classes will be designed to accommodate the life skills program, and will include a bathroom and be located next to the nurses office, which is intentional due to the medically complex nature of some of these students (autism spectrum, neurological, intellectual disabilities, etc.). The other is designed to flexibly accommodate a student population that is not appropriate for a more inclusive program (e.g., autism spectrum, behavioral needs, significant learning disabilities such as dyslexia, etc.)

• Resource rooms (5 @ 500sf): These classes are designed to provide an alternative learning space for students who spend most time in the regular classroom but require small group instruction for pre-teaching, reinforcement, and other support. Each of the five classroom wings has one of these rooms.

• Small group/reading rooms (4 @ 500sf): These rooms are labeled "reading" to match the MSBA template language. These four rooms would be used for the following functions: Two for speech and language services, one for continuation of the school program's reading intervention program (regular education/response to intervention program), and one for providing services to English language learners.

• Occupational therapy/physical therapy room (1 @ 500sf): This room will be used for occupational and physical therapy service delivery.

• Adaptive physical education space (portion of gymnasium @ 2,833sf): The building proposal includes a gymnasium divided into three teaching stations; one of these stations is intended to be used as needed for adaptive physical education programming.

• Common space within classroom wings: The building design includes common space in each of the five classroom wings (colored gray on the floor plan). This space is intended to be used flexibly throughout the day and to include opportunities for the instruction of small groups of students, including but not limited to special education students who will be included in the regular education classrooms surrounding the space.

Thank you for reviewing this information, and please do not hesitate to contact me if I can answer questions or be of any further assistance.

Respectfully,

Joseph M. Sawyer, Ed.D.	Melissa Maguire	Jane O. Lizotte
Superintendent of Schools	Director of Special Education	Principal, Sherwood Middle School

cc: John Jumpe, MSBA Project Manager
Kathryn DeCristofaro, MSBA Field Coordinator
Henry Fitzgerald, Chair, Sherwood Middle School Building Committee
Daniel Morgado, Town Manager
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1.14 FINAL DESIGN PROGRAM FOR PREFERRED SCHEMATIC DESIGN

B. Room Data Sheets

Sherwood Middle School

30 Sherwood Avenue, Shrewsbury, Massachusetts

SCHEMATIC DESIGN

1.14 FINAL DESIGN PROGRAM FOR PREFERRED SCHEMATIC DESIGN

B. Room Data Sheets

11 DECEMBER 2009

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SCHEMATIC DESIGN
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SCHEMATIC DESIGN
Introduction

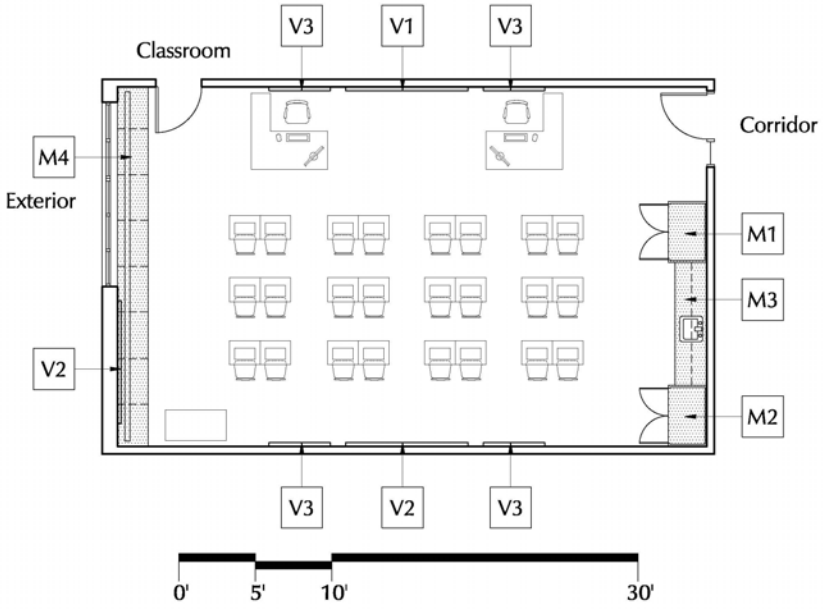
The following Room Data Sheets are intended to outline programmatic details for each major space including intended uses, adjacency requirements, standard and specialized features to meet the school's objectives. The program data included is the result of multiple meetings with District staff and faculty, Shrewsbury town officials and department heads, and consultants to determine the most appropriate elements for the Grades 5 and 6 educational program needs.

Many features are shown in this document to supplement the drawings and outline specifications where more detail is warranted. In particular, the millwork, visual display boards, and telecommunications requirements are delineated.

The following key further describes the millwork components shown within this document:
* All sink units and millwork to comply with accessibility guidelines.

M1	48"w x 84"h lockable teacher wardrobe with clothes pole and 5 shelves for storage
M2	48"w x 84"h supply cabinet with lockable doors, center divider and 5 adjustable shelves
M3	36"h base cabinet with drawers and doors and plastic laminate counter top and backsplash 30"h wall cabinet with doors See individual Room Data Sheets for length
M4	32" high open shelving unit with plastic laminate counter/backsplash, pencil grille at base and top 24" d light shelf at bottom elevation of topmost window full length of windows See individual Room Data Sheets for length
M5	Plastic laminate adjustable shelving on heavy duty brackets and standards with vertical every 36", 4" high base, and plastic laminate cap
M6	36"h base cabinet with doors and drawers and plastic laminate counter top and backsplash 30" high wall open shelving units
M7	30"d x 48" w x 84" high open paper shelving unit with (8) adjustable shelves
M8	Plastic laminate shelf unit with 1-1/2"d. coat rod and brackets
M9	30" high base unit with doors and plastic laminate counter with 12"d x 5"w x 12" h mailbox open cubby units with label holders
M10	Custom 30"h desk unit with 12" h deal shelf above. All counters solid surface with grommets for wire management. Drawer/door and file base units.
M11	36" h base cabinet with doors and drawers, epoxy counter and backsplash
M12	36" h ADA compliant base cabinets and plastic laminate counter and backsplash 30" h wall cabinets with doors

SCHEMATIC DESIGN
1. General Classrooms



GENERAL CRITERIA

Description: Typical classroom intended to support team teaching concept. Intended to be scheduled for health and foreign language instruction as well as general 5th and 6th grades.

Area: 875 – 905sf, (1@992sf)

Quantity: 41
Users: Students/Teachers including aides
Occupant Load: 22-24 students
Adjacencies: Common Room, general classroom cluster

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC Contract):
M1 – Teacher wardrobe
M2 – Storage unit
M3 – 8lf base/wall cab. Unit
M4 – 24lf under window shelving cabinet

Furniture (Not in GC contract):
(24) flat top student desks and chairs
(2) teacher desks and chairs

Equipment (In GC contract):
V1 – Smartboard unit
V2 – (2) 8′ markerboard
V3 – (4) 4′ markerboard

OTHER INFORMATION

Window shades

SCHEMATIC DESIGN
1. General Classrooms

TECHNICAL CRITERIA

Architectural: Communicating door to facilitate team teaching

Plumbing: Sink for projects, handwashing

Mechanical: Radiation at ext. wall, no AC

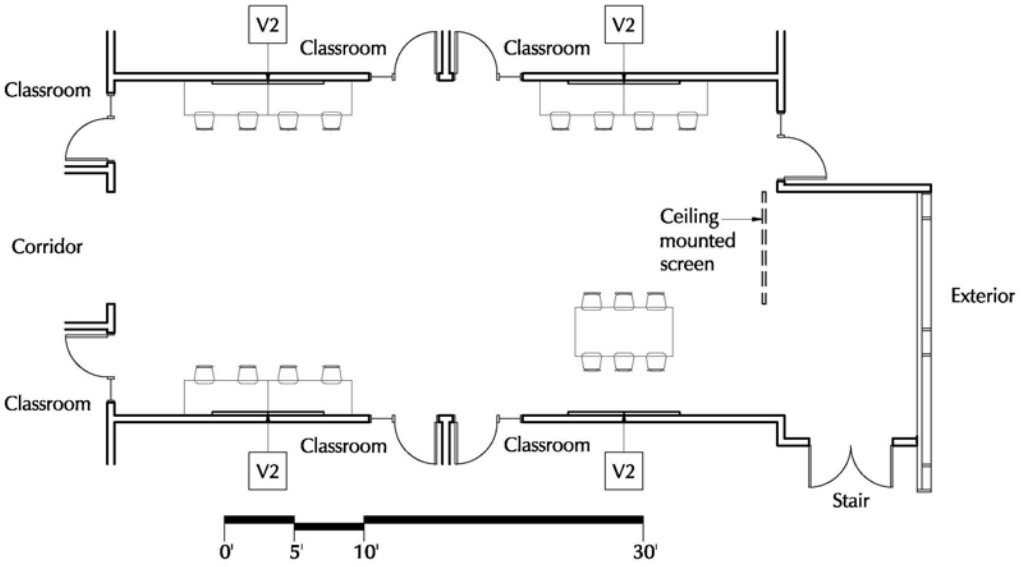
Electrical:
Lighting:
- (4) 16′ Direct/indirect dual switched fluorescent fixtures with (1) occupancy and (1) day light sensors.
- (1) 6″ Round LED emergency down light fixture.

Electrical:
- (2) Duplex receptacles for smart boards.
- (2) GFCI duplex receptacles for counter top.
- (5) Quad receptacles for computer stations.
- (2) TVSS receptacles for lap top carts. (every other classroom)

Low Voltage:
- (1) Audio/visual fire alarm device with a candela rating of 110cd.
- (1) Classroom panel clock/speaker combination unit.

Communications:
- (2) Voice outlets for telephones.
- (6) Data outlets for computer stations. (2) Data outlets for smart board/access points.

SCHEMATIC DESIGN
2. Common Room



GENERAL CRITERIA

Description: Multipurpose spaces centrally located in classroom clusters for team projects, team presentations, tutorials, teacher planning, etc.

Area: 1150sf

Quantity: 5
Users: Students/teachers/aides/community
Occupant Load: 72 max. in chairs
Adjacencies: General Classroom clusters, view to outside desirable

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):

Furniture (Not in GC contract):
(8) 24"x72" tables and 18 chairs for flexible arrangements

Equipment (In GC contract):
Ceiling mounted 8'x8' retractable projection screen
V2 – (4) 8' markerboards

Equipment (Not in GC Contract):

OTHER INFORMATION

Window shades

SCHEMATIC DESIGN
2. Common Room

TECHNICAL CRITERIA

Architectural:

Plumbing:

Mechanical: Pedestal radiation at windows

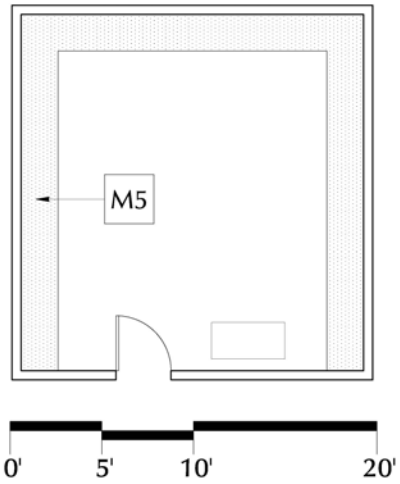
Electrical:
Lighting:
- (6) 6″ Round LED down light fixtures.
- (2) 6″ Round LED emergency down light fixtures.

Electrical:
- (1) Duplex outlet for projector.
- (1) Projector.
- (1) Power connection for the projection screen with up/dn switch.
- (7) Quad receptacles for computer stations.
- (2) Floor mounted quad receptacles for computer stations.

Low Voltage:
- (1) Audio/visual fire alarm device with a candela rating of 110cd.
- (2) Smoke detectors.
- (2) Paging speakers
- (1) Wall clock.

Communications:
- (2) WIFI access point outlets.
- (2) AV outlets for projector.
- (1) Data outlet for projector.
- (1) Voice outlet for telephone.
- (14) Data outlets for computer stations.
- (2) Floor mounted (2) data outlets for computer stations.

SCHEMATIC DESIGN
3. Prep Room



GENERAL CRITERIA

Description: Storage Room centrally located near each classroom cluster for storage/prep of curriculum material (ie Science, seasonal curriculum, etc.)

Area: 165 - 362sf
Quantity: 5
Users: Teachers/aides
Occupant Load:
Adjacencies: Classroom clusters

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M5 - 50 lf Shelving units with 5 adj. shelves

Furniture (Not in GC contract):

Equipment (In GC contract):

Equipment (Not in GC Contract):
Laptop charging cart
Wheeled cart

TECHNICAL CRITERIA

Architectural:
Plumbing:
Mechanical:

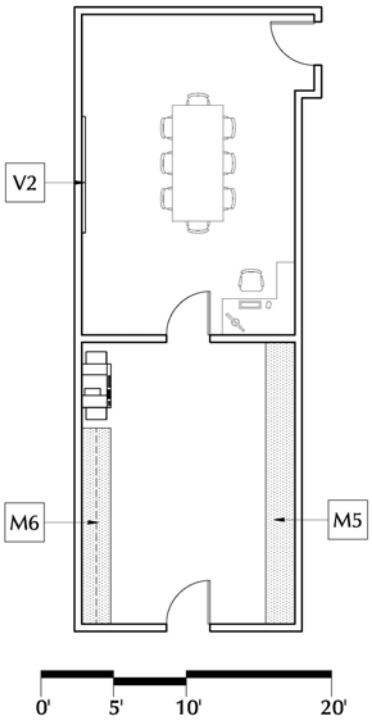
Electrical: 2circuit charging station for 24 laptop cart
Lighting:
- (4) 2'x4' Motion switched fluorescent fixtures.

Electrical:
- (4) Duplex receptacles for general use.

Low Voltage:
- (1) Paging speaker with volume control.
- (1) Wall clock.

OTHER INFORMATION

SCHEMATIC DESIGN
4. Seminar/Work Room



GENERAL CRITERIA

Description: Seminar used for small group instruction, teacher planning and meeting, and curriculum coordinator station. Work Room facilitates supply storage, copier, laminator work space, etc.

Area: 324 - 550sf Seminar
210 - 284sf Work Room

Quantity: 3
Users: Teachers/students/parents
Occupant Load:
Adjacencies: Centrally located on each floor for easy access

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
Work Room:
M5 - 19lf 18" d. adj. Shelving units
M6 - 13lf base/wall cabinet unit

Furniture (Not in GC contract):
Seminar Room:
Table and chairs for 8
Teacher desk

Equipment (In GC contract):
V2 (1) 8' markerboard in Seminar Room

Equipment (Not in GC Contract):
Copier
Laminator

OTHER INFORMATION

SCHEMATIC DESIGN
4. Seminar/Work Room

TECHNICAL CRITERIA

Architectural:

Plumbing:

Mechanical:

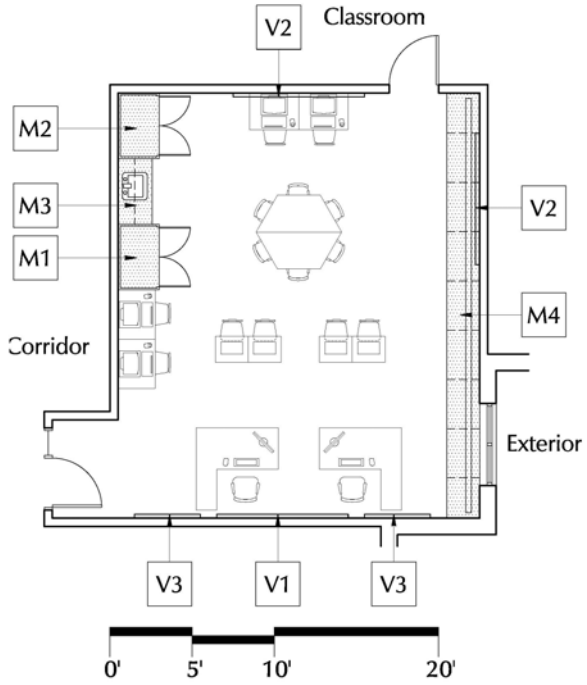
Electrical:
Lighting:
- (1) 12′ Direct/indirect single switched fluorescent fixture with (1) occupancy sensor.
- (5) 6″ Round LED dimmable switched down light fixtures.
- (1) 6″ Round LED emergency down light fixture.

Electrical:
- (3) Duplex receptacles for general use.
- (1) Quad receptacle for computer station.

Low Voltage:
- (1) Visual fire alarm device with a candela rating of 75cd.
- (1) Paging speaker with volume control.
- (1) Wall clock.

Communications:
- (4) Voice outlets for telephones.
- (5) Data outlets for computer station/access points.

SCHEMATIC DESIGN
5. SPED Resource Room



GENERAL CRITERIA

Description: Intended to support inclusive SPED programs, these rooms are positioned to be an integral part of classroom clusters.

Area: 622 – 636sf

Quantity: 5
Users: Students/teachers
Occupant Load: 12 students
Adjacencies: General classroom clusters

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M1 – Teacher wardrobe
M2 – 4lf base and wall cab.
M3 – Storage
M4 – 26 lf under window shelving unit
Furniture (Not in GC contract):
(2) Teacher desks and chairs
(4) Flat top student desks and chairs
(2) Trapezoid tables and (3) chairs each
(4) Computer stations and chairs
Equipment (In GC contract):
V1 – Smartboard unit
V2 – (2) 8′ markerboards
V3 – (2) 4′ markerboards
Equipment (Not in GC Contract):

OTHER INFORMATION

Window shades

SCHEMATIC DESIGN
5. SPED Resource Room

TECHNICAL CRITERIA

Architectural: Communicating door to adjacent classroom

Plumbing: Sink for hand washing and projects

Mechanical: Radiation at window wall, no AC

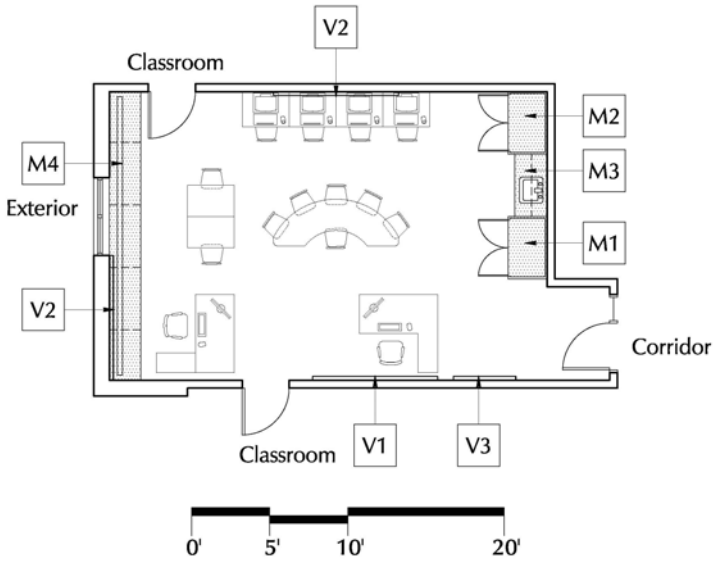
Electrical:
Lighting:
- (3) 16′ Direct/indirect dual switched fluorescent fixtures with (1) occupancy and (1) day light sensors.
- (1) 6″ Round LED emergency down light fixture.

Electrical:
- (1) Duplex receptacle for smart board.
- (1) GFCI duplex receptacle for counter top.
- (5) Quad receptacles for computer stations.
- (2) TVSS receptacles for lap top carts.

Low Voltage:
- (1) Audio/visual fire alarm device with a candela rating of 75cd.
- (1) Classroom panel clock/speaker combination unit with volume control.

Communications:
- (2) Voice outlets for telephones.
- (10) Data outlets for computer stations.
- (1) Data outlet for smart board/access point.

SCHEMATIC DESIGN
6. Reading/Speech



GENERAL CRITERIA

Description: Small group Special Education spaces for English Language Learners, Remedial Reading, Speech and Language instruction.

Area: 518 – 544sf

Quantity: 4
Users: Students/Teachers
Occupant Load: 12 students
Adjacencies: Best if centrally located for easy access by all students

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M1 – Teacher wardrobe
M2 – 4lf base/wall cab. Unit
M3 – Storage Unit
M4 – 18lf under window shelving unit

Furniture (Not in GC contract):
(2) Teacher desks and chairs
(2) Flat top student desks and chairs
(1) Half round table and (6) chairs
(4) Computer stations

Equipment (In GC contract):
V1 – Smartboard Unit
V2 – (2) 8' markerboards
V3 – (1) 4' markerboard

Equipment (Not in GC Contract):

SCHEMATIC DESIGN
6. Reading/Speech

TECHNICAL CRITERIA

Architectural: Communicating door to adjacent classroom

Plumbing: Sink

Mechanical: Radiation under windows (where applicable),AC for interior spaces (where applicable)

Electrical:
Lighting:
- (3) 16′ Direct/indirect dual switched fluorescent fixtures with (1) occupancy and (1) day light sensors.
- (1) 6″ Round LED emergency down light fixture.

Electrical:
- (1) Duplex receptacle for smart board.
- (1) GFCI duplex receptacle for counter top.

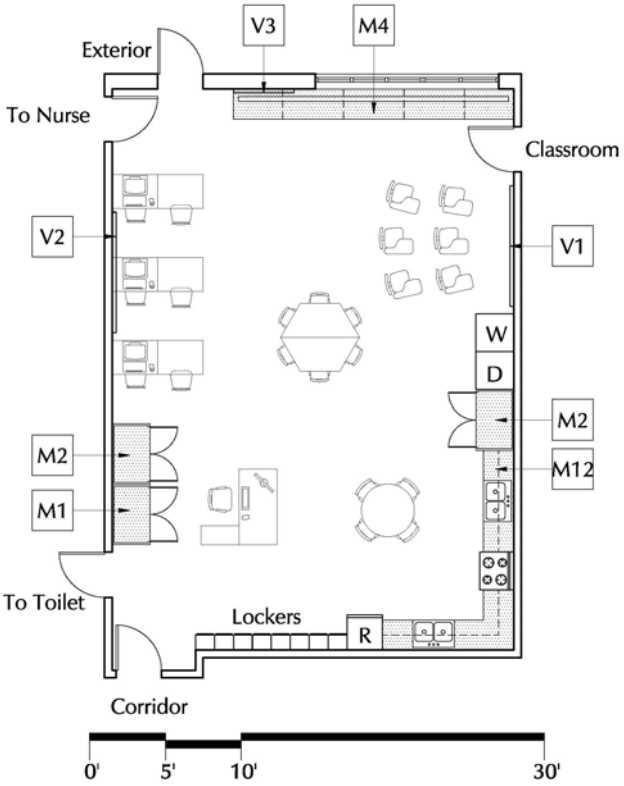
Low Voltage:
- (1) Audio/visual fire alarm device with a candela rating of 75cd.
- (1) Classroom panel clock/speaker combination unit with volume control.

Communications:
- (2) Voice outlets for telephones.
- (10) Data outlets for computer stations.
- (1) Data outlet for smart board/access point.

OTHER INFORMATION

Window shades at exterior windows and borrowed lite windows.

SCHEMATIC DESIGN
7. Life Skills



GENERAL CRITERIA

Description: Special Education space to teach basic life skills. Some students are in the classroom full day, others part of the day.

Area: 992sf

Quantity: 1
Users: Students/teachers/aides
Occupant Load: Varies – typically 6 – 12 students
Adjacencies: General classroom for flexibility if program requires expansion, exterior access for emergency purposes, toilet facilities within the suite.

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M1 – Teacher Wardrobe
M2 – Storage unit
M4 – 20lf under window shelving cabinet
M12 – 19lf base and wall kitchen cabinets
M2 – 48″w cleaning supply cabinet

Furniture (Not in GC contract):
(1) Teacher desk and chair
(6) computer stations and chairs
(1) 48″ round table and (4) chairs
(2) trapezoidal tables and (6) chairs
(6) tablet chairs with retractable tablets
(3) 6′wx6′h portable acoustic partitions

Equipment (In GC contract):
V1 – Smartboard unit
V2 – (1) 8′ markerboard
V3 – (1) 4′ markerboard
(8) double height 15″ wide lockers

Equipment (Not in GC Contract):
Washing machine/Dryer
Full height refrigerator
Range/oven
Dishwasher
Microwave oven

SCHEMATIC DESIGN
7. Life Skills

TECHNICAL CRITERIA

Architectural:

Plumbing: Kitchen sinks, dishwasher, washing machine

Mechanical: Provide dryer venting

Electrical: Provide 220v power for dryer, range, etc.
Lighting:
- (4) 16′ Direct/indirect dual switched fluorescent fixtures with (1) occupancy and (1) day light sensors.
- (1) 6″ Round LED emergency down light fixture.

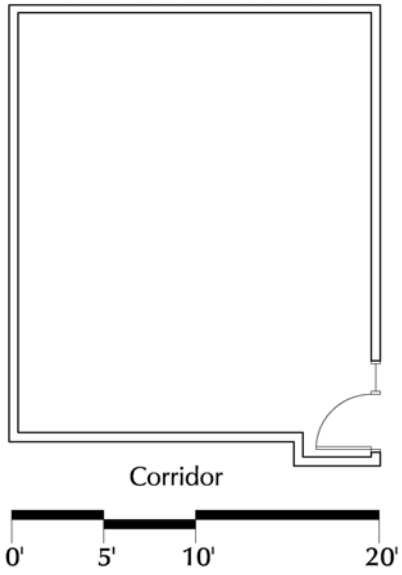
Electrical:
- (1) Duplex receptacles for smart boards.
- (2) GFCI duplex receptacles for counter top.
- (5) Quad receptacles for computer stations.
- (1) duplex outlet for each: refrigerator, microwave oven, dishwasher, washer
- (1) 220V outlet for each: dryer, range/oven

Low Voltage:
- (1) Audio/visual fire alarm device with a candela rating of 110cd.
- (1) Classroom panel clock/speaker combination unit.

Communications:
- (2) Voice outlets for telephones.
- (6) Data outlets for computer stations.
- (1) Data outlets for smart board/access points.

OTHER INFORMATION

Window shades



GENERAL CRITERIA

Description: Special Education space to teach students manual and physical dexterity. Students rotate out of this classroom during the day.

Area: 466sf

Quantity: 1
Users: Students/Teachers/aides
Occupant Load: 3-4 students
Adjacencies: Centrally located for easy access

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):

Furniture (Not in GC contract):

Equipment (In GC contract):

Equipment (Not in GC Contract):
Wall and floor pads
Overhead mounted swing
Small equipment storage unit

OTHER INFORMATION

Provide adequate structure to support overhead mounted swing, etc.

TECHNICAL CRITERIA

Architectural:

Plumbing:

Mechanical: Interior space: provide AC

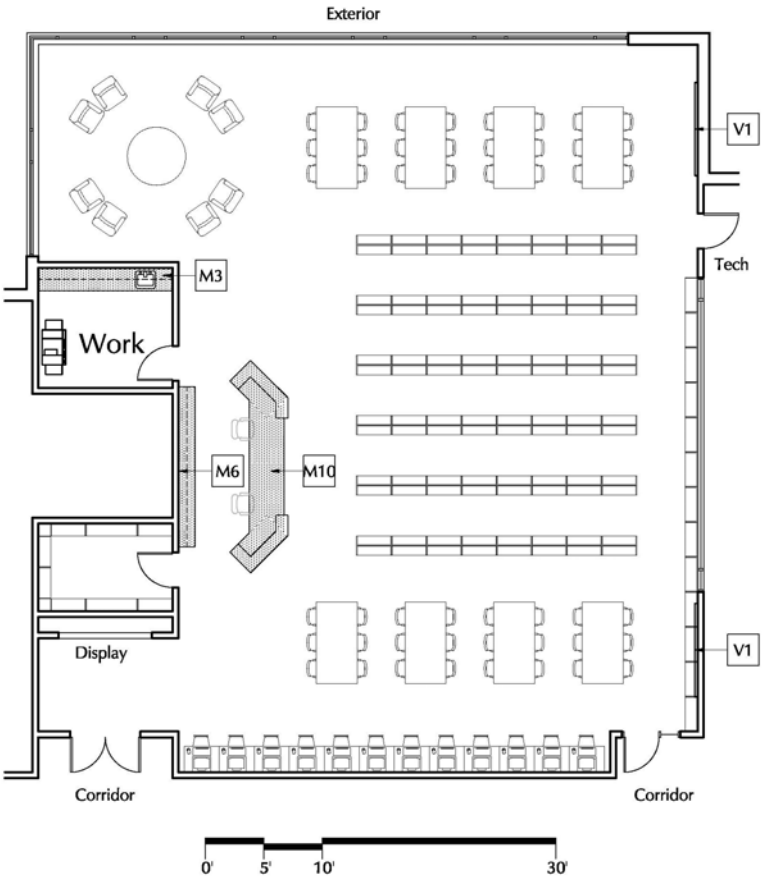
Electrical: Lighting:
- (3) 16′ Direct/indirect dual switched fluorescent fixtures with (1) occupancy and (1) day light sensors.
- (1) 6″ Round LED emergency down light fixture.

Electrical:
- (6) Duplex outlets

Low Voltage:
- (1) Audio/visual fire alarm device with a candela rating of 75cd.
- (1) Classroom panel clock/speaker combination unit with volume control.

Communications:
- (2) Voice outlets for telephones.
- (4) Data outlets for computer stations. (1) Data outlet for smart board/access point.

SCHEMATIC DESIGN
9. Media Center



GENERAL CRITERIA

Description: Resource center for the entire school population, the Media Center can be used by 2 classrooms, is a repository for books and other media, is a meeting space with instructional capabilities.

Area: 3,194sf
15,000 vols. Books
6,000 vols. Textbooks

Quantity: 1
Users: Students/Teachers/Staff/Community
Occupant Load: 50 students
Adjacencies: Lobby area, Technology Labs, centrally located for classroom access

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M3 – 10lf base/wall cab. Unit
M6 – 12lf base/wall cab. – lockable
M10 – 18lf custom desk unit

Furniture (Not in GC contract):
(48) - 36″wx42″h double sided shelving units
(13) – 36″wx42″h single sided shelving units
(8) – 36″wx72″h single sided shelving units
(8) – 36″x72″ tables and (48) chairs
(8) lounge chairs and table
(12) computer stations

Equipment (In GC contract):
V1 – (2) smartboard units

Equipment (Not in GC Contract):
Copier

SCHEMATIC DESIGN
9. Media Center

TECHNICAL CRITERIA

Architectural: Glazing and communicating door to adjacent Technology Lab

Plumbing: Workroom sink

Mechanical: Air conditioning, pedestal radiation at windows

Electrical:
Lighting:
- (1) 8', (4) 36' & (2) 48' Direct/indirect dual switched fluorescent fixtures with (2) occupancy and (1) day light sensors.
- (2) 6" Round LED emergency down light fixtures.

Electrical:
- (2) Duplex receptacles for smart boards.
- (4) Duplex receptacles for general use.
- (6) Quad receptacles for computer stations.
- (2) Floor mounted quad receptacles for computer stations.

Low Voltage:
- (4) Audio/visual fire alarm devices with candela ratings of 75cd.
- (2) Classroom panel clock/speaker combination units with (2) volume controls.

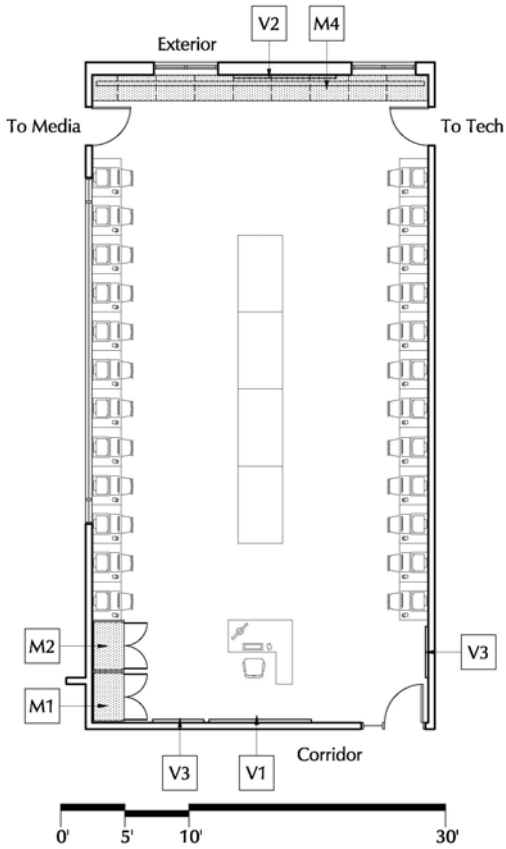
Communications:
- (2) Voice outlets for telephones.
- (19) Data outlets for computer stations.
- (2) Floor mounted (1) telephone/(2) data outlets for computer stations.
- (2) Data outlets for smart board/access points.
- (1) WIFI access point outlet.

Intrusion System:
- (3) External contact input modules with (4) door contacts.

OTHER INFORMATION

Vertical blinds at exterior windows

SCHEMATIC DESIGN
10. Technology Lab



GENERAL CRITERIA

Description: General technology instruction taught to all students including software techniques, hardware technology, production and layout.

Area: 1290sf

Quantity: 2
Users: Students/teachers
Occupant Load: 22-24 students
Adjacencies: Media center for dual use, centrally located

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M1 – Teacher wardrobe
M2 – Storage unit
M4 – 26lf under window shelving cabinet

Furniture (Not in GC contract):
(1) Teacher desk and chair
(24) Computer stations
(4) 36″x72″ tables

Equipment (In GC contract):
V1 - Smartboard Unit
V2 – (1) 8′ markerboard
V3 – (2) 4′ markerboards

Equipment (Not in GC Contract):

SCHEMATIC DESIGN
10. Technology Lab

TECHNICAL CRITERIA

Architectural: Communicating door to adjacent spaces

Plumbing:

Mechanical: Air conditioning

Electrical: Center floor outlets for printers, etc.
Lighting:
- (5) 16′ Direct/indirect dual switched fluorescent fixtures with (1) occupancy and (1) day light sensors.
- (1) 6″ Round LED emergency down light fixture.

Electrical:
- (1) Duplex receptacle for smart board.
- (14) Quad receptacles for computer stations.
- (2) TVSS receptacles for lap top carts. (one tech room)

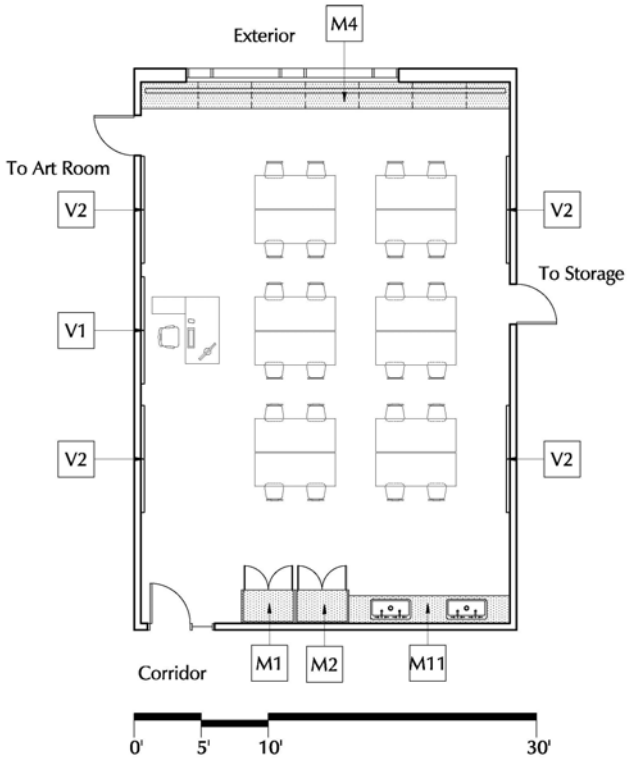
Low Voltage:
- (1) Audio/visual fire alarm device with a candela rating of 110cd.
- (1) Classroom panel clock/speaker combination unit.

Communications:
- (1) Voice outlets for telephone.
- (28) Data outlets for computer stations.
- (1) Data outlet for smart board/access point.
- (1) WIFI access point outlet.

OTHER INFORMATION

Window blinds at exterior and interior (where applicable)

SCHEMATIC DESIGN
11. Art Room



GENERAL CRITERIA

Description: Allied Art instructional program that all students participate in. Curriculum includes general art instruction including drawing, painting, ceramics, etc.

Area: 1,114sf

Quantity: 2
Users: Students/teachers
Occupant Load: 22 – 24 students
Adjacencies: Art Suite grouped together with Art Storage Rooms

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M1 – Teacher wardrobe
M2 – Storage unit
M4 – 28lf under window shelving unit
M11 – 12lf sink base cabinet

Furniture (Not in GC contract):
(1) Teacher desk and chair
(12) 30″x72″ tables and (24) chairs

Equipment (In GC contract):
V1 Smartboard unit
V2 (4) 8′ marker boards

Equipment (Not in GC Contract):

SCHEMATIC DESIGN
11. Art Room

TECHNICAL CRITERIA

Architectural: Unistrut grid at ceiling for art display, ceramic tile at sink wall, communicating door to adjacent art room

Plumbing: Deep trough like sinks with solids interceptors

Mechanical: Radiation at window walls

Electrical: Lighting:
- (4) 20' Direct/indirect dual switched fluorescent fixtures with (1) occupancy and (1) day light sensors.
- (1) 6" Round LED emergency down light fixture.

Electrical:
- (1) Duplex receptacle for smart board.
- (3) GFCI duplex receptacles for counter top.
- (5) Quad receptacles for computer stations.
- (2) TVSS receptacles for lap top carts. (one art room)

Low Voltage:
- (1) Audio/visual fire alarm device with a candela rating of 75cd.
- (1) Classroom panel clock/speaker combination unit.

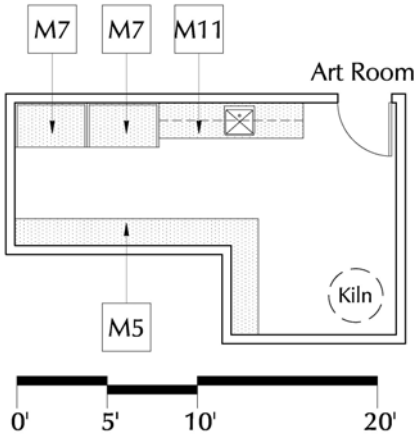
Communications:
- (2) Voice outlets for telephones.
- (6) Data outlets for computer stations.
- (1) Data outlet for smart board/access point.

Intrusion System:
- (1) External contact input module with (1) door contact.

OTHER INFORMATION

Window shades

SCHEMATIC DESIGN
12. Art Storage



GENERAL CRITERIA

Description: Storage/prep rooms for art programming

Area: Varies – see plan

Quantity: 2
Users: Teachers
Occupant Load:
Adjacencies: Art Room

TECHNICAL CRITERIA

Architectural:
Plumbing: Sink with solids interceptor
Mechanical: Provide vent for kiln (in one storage room only)
Electrical:
Lighting:
- (4) 2'x4' Motion switched fluorescent fixtures.

Electrical:
- (4) Duplex receptacles for general use.
- (1) Kiln receptacle

Low Voltage:
- (1) Paging speaker with volume control.
- (1) Wall clock.

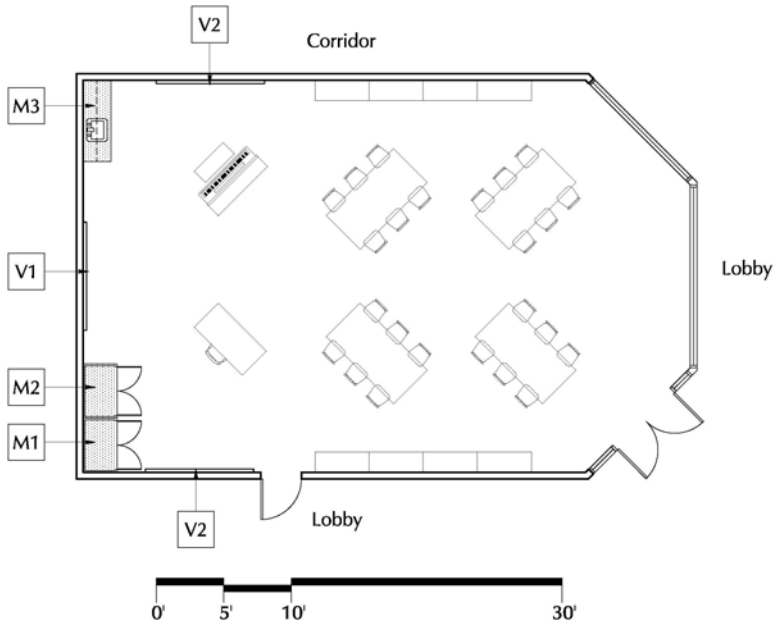
FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M7 – (2) 30" d. x48" w. adj. Shelving units with (8) adj. Shelves each for paper/poster board storage
M11 – (1) 8lf base cab. With wall shelves above
M5 – 18lf shelving unit with (5) adjustable shelves
Furniture (Not in GC contract):

Equipment (In GC contract):
Kiln (in one Storage room only

Equipment (Not in GC Contract):
Wheeled cart

SCHEMATIC DESIGN
13. Music Room



GENERAL CRITERIA

Description: General Music classroom offered to all students for music appreciation instruction. Curriculum includes listening, playing music on xylophones, glockenspiels, etc., dance movement. After hours, the space will be used for faculty and community meetings.

Area: 1250sf

Quantity: 1
Users: Students/Teachers/Community
Occupant Load: 22-24 students
Adjacencies: Music Suite, away from quiet study areas

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M1 – Teacher wardrobe
M2 – Storage Unit
M3 – 6lf base/wallcab. unit

Furniture (Not in GC contract):
Teacher desk and chair
(4) 36″x72″ tables with folding legs
(24) chairs
(8) 30″hx48″l lockable storage units for instruments, music, etc.

Equipment (In GC contract):
V1 – Smartboard Unit
V2 – (2) 8′ markerboards, one with staff lines

Equipment (Not in GC Contract):
(1) Teacher digital keyboard

SCHEMATIC DESIGN
13. Music Room

TECHNICAL CRITERIA

Architectural: 40lf 4′ high acoustic tack wall panels

Plumbing: Sink

Mechanical: Interior space ventilation considerations

Electrical:
Lighting:
- (4) 20′ Direct/indirect dual switched fluorescent fixtures with (1) occupancy sensor.
- (2) 6″ Round LED emergency down light fixtures.

Electrical:
- (1) Duplex receptacle for smart board.
- (2) Duplex receptacles for general use.
- (2) GFCI duplex receptacles for counter top.
- (2) Quad receptacles for computer stations.
- (2) TVSS receptacles for lap top carts.

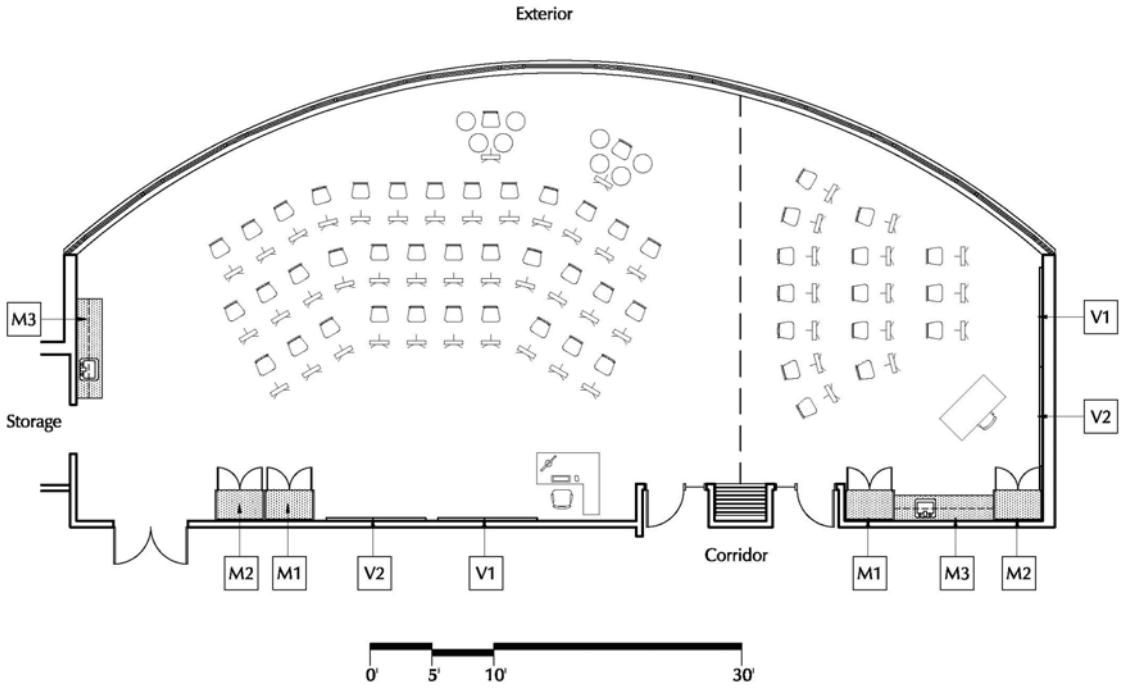
Low Voltage:
- (1) Audio/visual fire alarm device with a candela rating of 110cd.
- (1) Classroom panel clock/speaker combination unit.

Communications:
- (2) Voice outlets for telephones.
- (4) Data outlets for computer stations.
- (1) Data outlet for smart board/access point.

OTHER INFORMATION

Vertical blinds at windows

SCHEMATIC DESIGN
14. Band/Orchestra



GENERAL CRITERIA

Description: Combination Band/Orchestra Room to serve portions of the musical groups on a regular basis, but be able to accommodate the full group 2-3 times per year.

Area: 2412sf

Quantity: 1
Users: Students/Teachers
Occupant Load: 90 students total 2-3 times per year
Daily 30 – 40 total
Adjacencies: Music Suite, platform, away from quiet activities

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M1 - (2) Teacher Wardrobes
M2 - (2) Storage Units
M3 - (1) 8lf and (1) 7lf base/wall cab. unit

Furniture (Not in GC contract):
(2) Teacher desks and chairs
(90) student chairs and music stands
(2) 4 dwr. file cabs for music storage

Equipment (In GC contract):
V1 – (2) smartboards
V2 – (2) 8' markerboards with staff lines

Equipment (Not in GC Contract):
(2) digital keyboards for teacher instruction
(2) conducting podia
Instrument storage units

SCHEMATIC DESIGN
14. Band/Orchestra

TECHNICAL CRITERIA

Architectural: Electrically powered 8′ high modular acoustic partition with pass door

Plumbing: 2 sinks

Mechanical: Pedestal radiation at window

Electrical:
Lighting:
- (3) 24′, (1) 20′ & (1) 12′ Direct/indirect dual switched fluorescent fixtures with (1) occupancy and (1) day light sensors.
- (1) 24′ & (1) 20′ Direct/indirect dual switched fluorescent fixtures with (1) occupancy and (1) day light sensors.
- (2) 6″x4′ Single switched fluorescent fixtures.

Electrical:
- (2) Duplex receptacles for smart boards.
- (4) Duplex receptacles for general use.
- (6) GFCI duplex receptacles for counter tops.
- (3) Quad receptacles for computer stations.
- (2) TVSS receptacles for lap top carts.
- (1) Power connection for partition.

Low Voltage:
- (3) Audio/visual fire alarm devices with candela ratings of 75cd.
- (1) Visual fire alarm device with a candela rating of 75cd.
- (2) Classroom panel clock/speaker combination units.

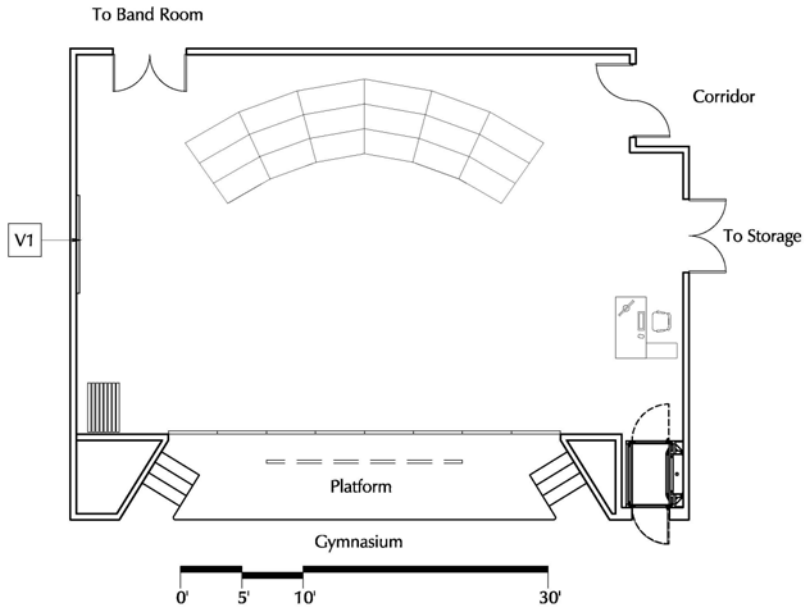
Communications:
- (3) Voice outlets for telephones.
- (6) Data outlets for computer stations.
- (2) Data outlets for smart board/access points.

Intrusion System:
- (4) Break glass sensors.

OTHER INFORMATION

Window shades

SCHEMATIC DESIGN
15. Choral/Drama



GENERAL CRITERIA

Description: Multipurpose space with raised platform performance area for assembly events, choral rehearsals, and drama class.

Area: 1500sf

Quantity: 1
Users: Students/Teachers/Community
Occupant Load: Chorus: 50 – 60 daily; 100 2-3 times per year, Drama: 22-24
Adjacencies: Music Suite, Gymnasium, Main Lobby area, storage room for costumes, props, podium, sound equipment, etc.

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):

Furniture (Not in GC contract):
(1) Teacher desk and chair

Equipment (In GC contract):
V1 – Smartboard unit
Stage curtain
Recessed 12'x16' projection screen motorized
Wheelchair lift device

Equipment (Not in GC Contract):
Portable choral risers

OTHER INFORMATION

SCHEMATIC DESIGN
15. Choral/Drama

TECHNICAL CRITERIA

Architectural: Hardwood floor at platform thrust and stairs, painted MDF floor behind proscenium.
Electrically powered acoustic modular partition with pass door and marker board on classroom side.

Plumbing:

Mechanical: Interior space: AC required

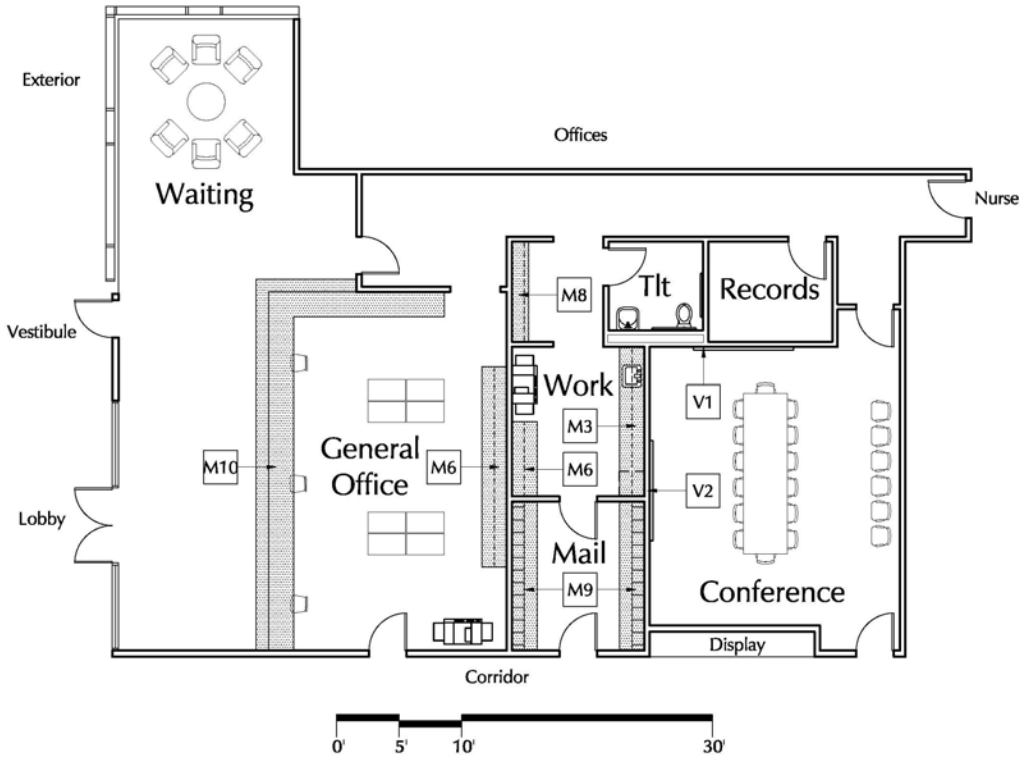
Electrical:
Lighting:
- (15) 8″ Round dimmable switched fixtures with (1) occupancy sensor.
- (3) 8″ Round emergency fixtures.
- Education standard stage lighting system

Electrical:
- (1) Duplex receptacle for smart board.
- (2) Duplex receptacles for general use.
- (2) Quad receptacles for computer stations.
- (3) Flush floor outlets.
- (1) Power connection for partition.
- (1) Power connection for stage lift.

Low Voltage:
- (2) Audio/visual fire alarm devices with candela ratings of 75cd.
- (1) Classroom panel clock/speaker combination unit with volume control.

Communications:
- (2) Voice outlets for telephones.
- (4) Data outlets for computer stations.
- (1) Data outlet for smart board/access point.
- Education standard sound system.

SCHEMATIC DESIGN
16. Main Administration Suite



GENERAL CRITERIA

Description: The Main Administration Suite functions to support the centralized administration for the school. It is the control point for public access to the building. School wide communications are centered here.

Area: 2017sf

Quantity: 1
Users: Administration/public/staff/students
Occupant Load: Varies
Adjacencies: Main Lobby, Entry Vestibule, visibility to exterior, Principal, Asst. Principal, Adjustment Counselors, Nurse Suite

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M10 - 40 lf General Office work counter
M8 - 8lf clothes pole and shelf
M3 - 12lf base/wall kitchen cabinet unit
M6 - 6lf base/wall supply cabinet unit
M6 - 16lf base/wall supply cabinet unit
M9 - 24lf base cabinet with 130 mail cubbie units above

Furniture (Not in GC contract):
(3) General office secretarial chairs
(6) Waiting area lounge chairs and (1) table
(8) 36" wide lateral file units
(1) 12' conference table and (20) chairs
Records file cabinets

Equipment (In GC contract):
V1 – Smartboard Unit
V2 – (1) 8' markerboard

Equipment (Not in GC Contract):
(2) copiers
Undercounter refrigerator
Microwave oven
Coffee maker

SCHEMATIC DESIGN
16. Main Administration Suite

TECHNICAL CRITERIA

Architectural: Waiting area for 6-8 people
General Office area with public counter, copier, files, communications/security consoles, etc.
Work area with copier, supply storage, kitchenette
Mail room with corridor access and 130 mail slots
Secured records storage for testing materials
Conference room for 14.

Plumbing: Accessible unisex toilet room.
Kitchenette sink

Mechanical: AC required due to year round use. Pedestal radiation at windows

OTHER INFORMATION

Vertical blinds at windows.
Direct access to Entry Vestibule to control access during school hours.

CONFERENCE ROOM TECHNICAL CRITERIA

Electrical:
Lighting:
- (1) 12′ Direct/indirect single switched fluorescent fixture with (1) occupancy sensor.
- (5) 6″ Round LED dimmable switched down light fixtures.
- (1) 6″ Round LED emergency down light fixture.

Electrical:
- (4) Duplex receptacles for general use.
- (1) Duplex receptacles for smart boards.

Low Voltage:
- (1) Visual fire alarm device with a candela rating of 75cd.
- (1) Paging speaker with volume control.
- (1) Wall clock.

Communications:
- (4) Voice outlets for telephones.
- (4) Data outlets for computer stations.

GENERAL OFFICE TECHNICAL CRITERIA

Electrical:
Lighting:
- (5) 2′x4′ Dual three-way switched fluorescent fixtures with occupancy sensor.
- (1) 2′x4′ Emergency fluorescent fixture with emergency lighting control unit.
- (1) Single sided exit sign.

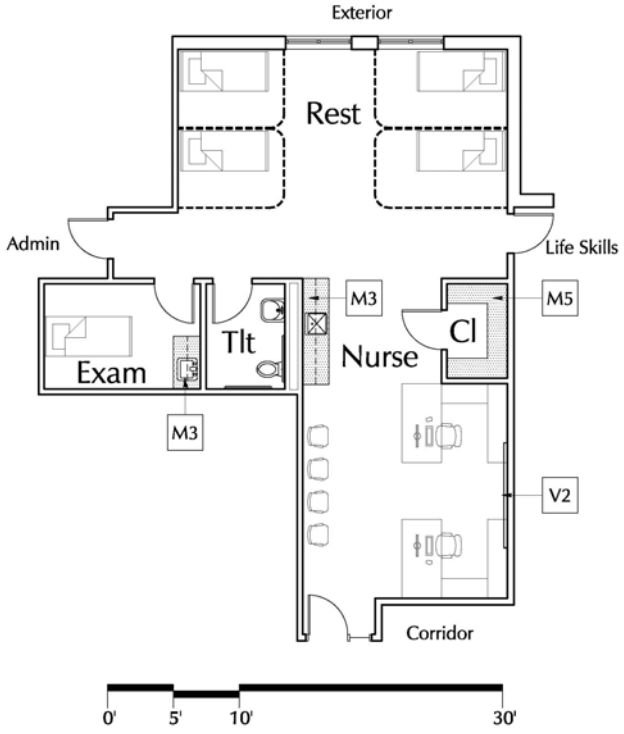
Electrical:
- (5) Duplex receptacles for general use.
- (4) Quad receptacles for computer stations.

Low Voltage:
- (1) Smoke detector.
- (1) Paging speaker with volume control.
- (1) Wall clock.

Communications:
- (4) Voice outlets for telephones.
- (4) Data outlets for computer stations.

Intrusion System:
- (1) Motion sensor.
- (1) Door release button.

SCHEMATIC DESIGN
17. Nurse Suite



GENERAL CRITERIA

Description: Centrally located nurse suite to serve students and staff physical health. Duties include dispensation of daily medication, administering to injuries and illness. Suite includes Open office area for Nurse and Assistant Nurse, waiting area, Exam Room, Toilet Room, (4) Rest bed areas, securable medicine and supply closet.

Area: 984sf

Quantity: 1
Users: Nurses/students/staff
Occupant Load: 4-8 students
Adjacencies: Main Admin. Suite, near play areas, near cafeteria, Life Skills adjacency desirable

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M3 - (1) 4lf, (1) 8lf base/wall cab. Unit
M5 – 13lf adjustable shelving 5 shelves high

Furniture (Not in GC contract):
(2) Office desks and chairs
(6) Waiting room chairs
(1) Exam Room bed
(4) Rest beds

Equipment (In GC contract):
V2 – (1) 8' markerboard

Equipment (Not in GC Contract):
(2) wheeled carts for eye exam equipment, etc.

SCHEMATIC DESIGN
17. Nurse Suite

TECHNICAL CRITERIA

Architectural:

Plumbing: (2) sinks

Mechanical: Air conditioning

Electrical:
Lighting:
- (4) 2'x4' Dual three-way switched fluorescent fixtures with (2) occupancy sensors.
- (2) 2'x4' Emergency fluorescent fixtures with emergency lighting control unit.
- (2) Single sided exit signs.

Electrical:
- (7) Duplex receptacles for general use.
- (2) GFCI duplex receptacles for counter top.

Low Voltage:
- (1) Audio/visual fire alarm device with a candela rating of 75cd.
- (1) Visual fire alarm device with a candela rating of 75cd.
- (1) Classroom panel clock/speaker combination unit with volume control.

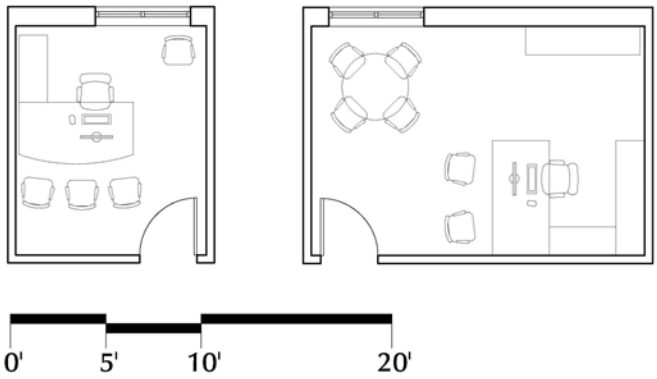
Communications:
- (2) Voice outlets for telephones.
- (2) Data outlets for computer stations.

Intrusion System:
- (1) Break glass sensor.

OTHER INFORMATION

Vertical blinds at windows
Ceiling mounted cubicle curtain track at rest areas

SCHEMATIC DESIGN
18. Office



GENERAL CRITERIA

Description: Administrative offices for Principal, Asst. Principals, Adjustment Counselors, SPED Curriculum Coordinator, Extended Day Program/Asst. Nurse, Testing, Gym Teachers used year round

Area: 80 – 198sf

Quantity: 11
Users: Administrators/Parent, community, student visitors
Occupant Load: 1 per 100gsf
Adjacencies: Primarily grouped in the Main Administration Suite, but an administrative presence on each floor

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):

Furniture (Not in GC contract):
Desk and chair
Side chairs
Table and 4 chairs at Prin. Office
Files
3lf bookshelves

Equipment (In GC contract):

Equipment (Not in GC Contract):

OTHER INFORMATION

Vertical blinds at windows

SCHEMATIC DESIGN
18. Office

TECHNICAL CRITERIA

Architectural:

Plumbing:

Mechanical: AC at Main Administration Suite

Electrical:
Lighting:
- (2) 2'x4' Dual motion switched fluorescent fixtures.

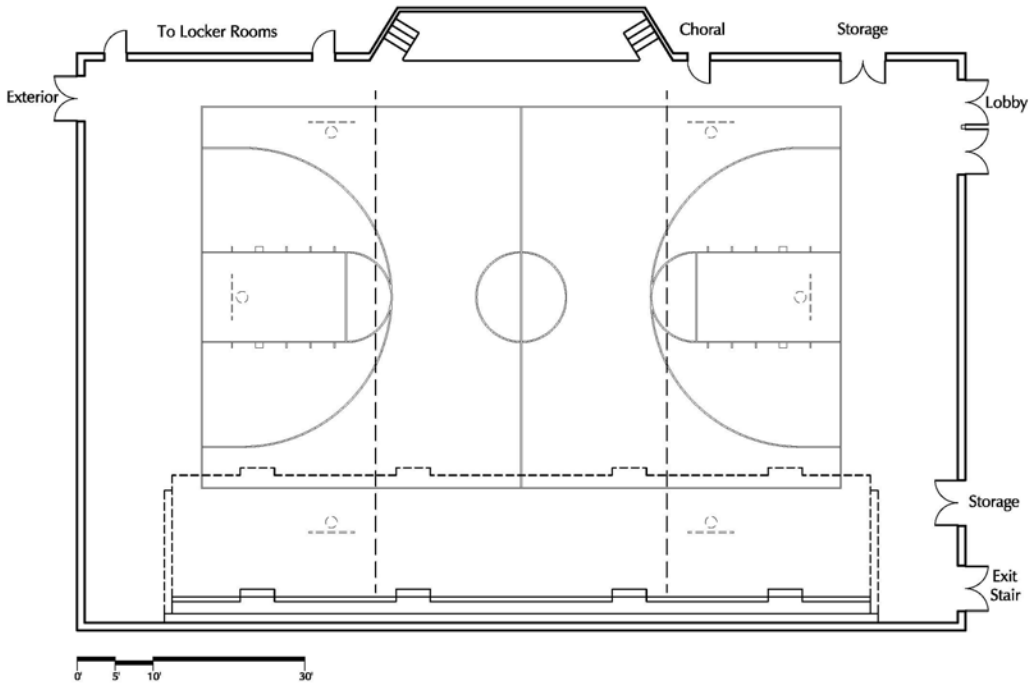
Electrical:
- (3) Duplex receptacles for general use.

Low Voltage:
- (1) Paging speaker with volume control.
- (1) Wall clock.

Communications:
- (2) Voice outlets for telephones.
- (2) Data outlets for computers.

Intrusion System:
- (1) Break glass sensor. (perimeter offices only)

SCHEMATIC DESIGN
19. Gymnasium



GENERAL CRITERIA

Description: Multipurpose space for Physical Education program, adaptive physical education, assembly for 550, community use.

Area: 8,510sf

Quantity: 1
Users: Students/Teachers/Community
Occupant Load: 550
Adjacencies: Main Lobby, Locker Rooms, Platform, Gym Storage

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):

Furniture (Not in GC contract):

Equipment (In GC contract): Full perimeter 7′ high wall pads
(6) electric adjustable basketball backstops
Scoreboard
Volleyball standard sleeves
(2) curtain room dividers, ceiling mounted
Bleachers for 550

Equipment (Not in GC Contract):
Gymnasium sports equipment

OTHER INFORMATION

Maximize between floor sound isolation

SCHEMATIC DESIGN
19. Gymnasium

TECHNICAL CRITERIA

Architectural: 16′ h. abuse resistant acoustical panels full perimeter

Plumbing:

Mechanical: Heat at exterior overhang, solar collector

Electrical:
Lighting:
- (45) 2′x4′ High bay dual switched fluorescent fixtures.
- (9) 2′x4′ High bay emergency fluorescent fixtures.
- (4) Single sided exit signs with wire guards.

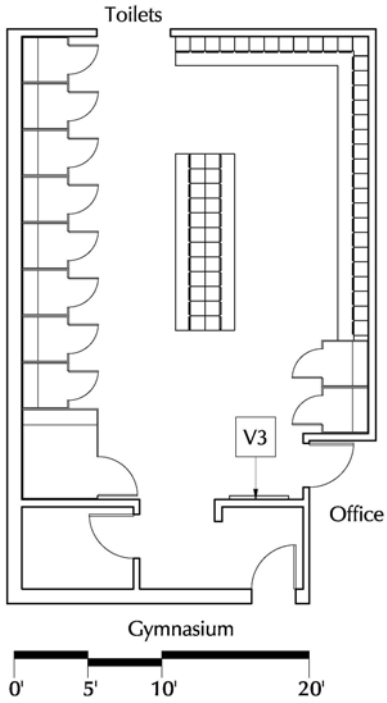
Electrical:
- (6) Duplex receptacles for general use.
- (2) Power connections for the motorized curtains.
- (1) Power connection for the score board.

Low Voltage:
- (4) Audio/visual fire alarm devices with a candela rating of 110cd.
- (2) Fire alarm pull stations.
- (2) Paging horn speakers with wire guards.
- (2) Sound sphere speakers with wire guards and (2) microphone jacks.
- (2) Wall clocks with wire guards.

Communications:
- (2) WIFI access point outlets.

Intrusion System:
- (1) External contact input module with (2) door contacts.
- (1) Proximity card reader.
- (1) Motion sensor.

SCHEMATIC DESIGN
20. Locker Room



GENERAL CRITERIA

Description: Teacher supervised male and female student changing, for PE use.

Area: 782 – 1057sf

Quantity: 2
Users: Students/Gym Teachers
Occupant Load:
Adjacencies: Gymnasium, toilet and shower areas, teacher office

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
50lf bench at base of lockers

Furniture (Not in GC contract):

Equipment (In GC contract):
(225) basket type lockers
V3 – (1) 4'markerboard

Equipment (Not in GC Contract):

OTHER INFORMATION

SCHEMATIC DESIGN
20. Locker Room

TECHNICAL CRITERIA

Architectural: Solid plastic changing room partitions with integral bench (11 @ girls, 3@ boys)

Plumbing:

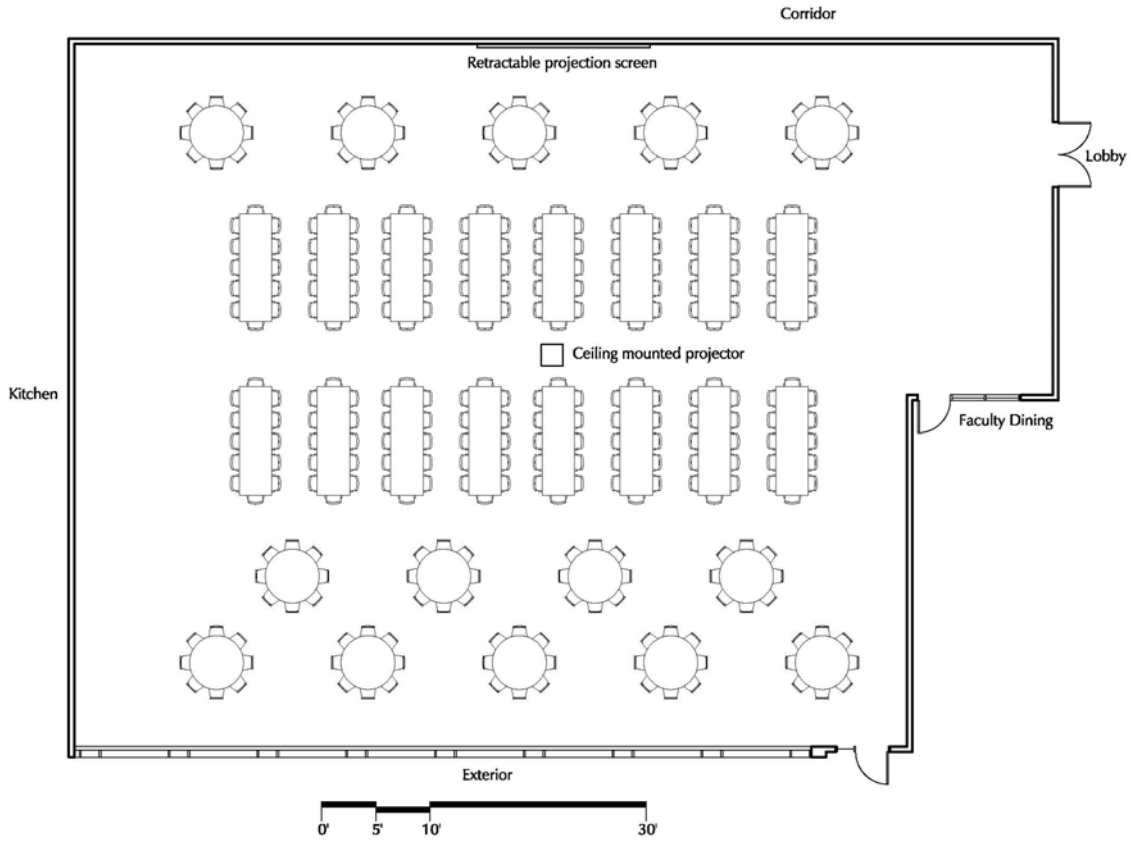
Mechanical:

Electrical:
Lighting:
- (6) 2'x4' Vapor tight single switched fluorescent fixtures.
- (2) 2'x4' Vapor tight emergency fluorescent fixtures with emergency lighting control unit.
- (1) 8" Round water proof single switched fixture for the shower.
- (1) Single sided exit sign.

Electrical:8
- (1) Duplex receptacle for general use.

Low Voltage:
- (2) Paging speakers.
- (1) Wall clock.
- (1) Audio/visual fire alarm device with a candela rating of 75cd.
- (1) Visual fire alarm device with a candela rating of 75cd.

SCHEMATIC DESIGN
21. Cafeteria



GENERAL CRITERIA

Description: Multipurpose assembly space used for (3) lunch servings each day, extended day and summer programs, faculty and community meetings

Area: 5400sf

Quantity: 1
Users: Students/Staff/Faculty/Community
Occupant Load: 346 at tables and chairs; 520 at chairs only
Adjacencies: Kitchen, Main Lobby area, exterior

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):

Furniture (Not in GC contract):
Tables and chairs for 300 with a mix of table styles

Equipment (In GC contract):
Ceiling mounted 8'x12' retractable projection screen

Equipment (Not in GC Contract):

SCHEMATIC DESIGN
21. Cafeteria

TECHNICAL CRITERIA

Architectural: 6′ h. abuse resistant acoustic wall panels full perimeter

Plumbing:

Mechanical: Pedestal radiation at windows

Electrical:
Lighting:
- (22) 2′x4′ Dual switched fluorescent fixtures.
- (7) 2′x4′ Emergency fluorescent fixtures.
- (20) 6″ Round LED dimmable switched down light fixtures.
- (2) Single sided exit signs.

Electrical:
- (7) Duplex receptacles for general use.
- (2) Dedicated circuits for coffee makers.
- (1) Duplex outlet for the projector.
- (4) Flush floor outlets @ cashier stations.
- (1) Projector.
- (1) Power connection for the projection screen with up/dn switch.

Low Voltage:
- (4) Audio/visual fire alarm devices with a candela rating of 110cd.
- (4) Paging speakers with volume control.
- (1) Wall clock.

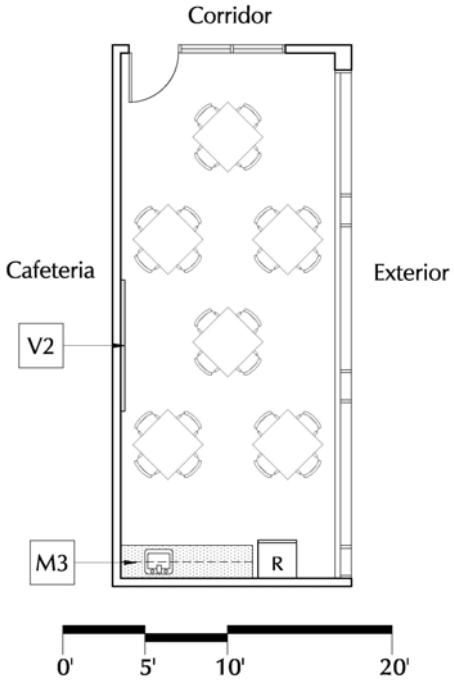
Communications:
- (2) WIFI access point outlets.
- (2) AV outlets for projector.
- (1) Data outlet for projector.

Intrusion System:
- (4) Break glass sensors.

OTHER INFORMATION

Acoustical separation between gym and cafeteria desirable

SCHEMATIC DESIGN
22. Faculty Dining



GENERAL CRITERIA

Description: Multipurpose Room used for Faculty Dining at lunch time, meetings and assembly staging area at other times.

Area: 416 sf

Quantity: 1
Users: Primarily faculty/staff
Occupant Load: 26 at tables and chairs
Adjacencies: Cafeteria

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M3 – 8lf base and wall cabinet unit

Furniture (Not in GC contract):
(6) 36"x36" tables and (24) chairs for flexible arrangements

Equipment (In GC contract):
V2 – (1) 8' markerboard

Equipment (Not in GC Contract):
Full height refrigerator
Microwave oven

OTHER INFORMATION

Window shades at exterior, vertical blinds at door sidelights

22. Faculty Dining

TECHNICAL CRITERIA

Architectural:

Plumbing: Sink

Mechanical: Pedestal radiation at windows

Electrical:
Lighting:
- (2) 12′ Direct/indirect single switched fluorescent fixture with (1) occupancy sensor.
- (5) 6″ Round LED dimmable switched down light fixtures.
- (1) 6″ Round LED emergency down light fixture.

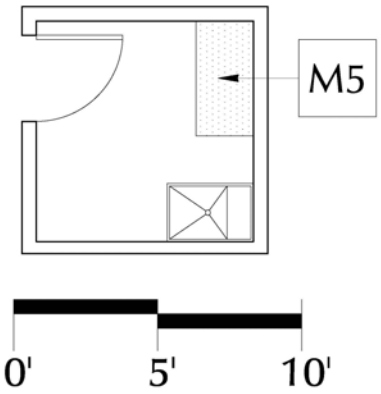
Electrical:
- (3) Duplex receptacles for general use.
- (1) Quad receptacle for computer station.
- (1) Duplex receptacle for each: refrigerator, microwave oven

Low Voltage:
- (2) Visual fire alarm device with a candela rating of 75cd.
- (1) Paging speaker with volume control.
- (1) Wall clock.

Communications:
- (1) Voice outlets for telephones.
- (2) Data outlets for computer station/access points.

Intrusion System:
- (2) Break glass sensors.

SCHEMATIC DESIGN
23. Janitor Closet



GENERAL CRITERIA

Description: Maintenance supply closet and floor sink

Area: 50sf

Quantity: 4
Users: Janitorial staff
Occupant Load:
Adjacencies: Centrally located for easy access on each floor; kitchen suite

FIXTURES/FURNITURE/EQUIPMENT

Millwork (In GC contract):
M5 – 4lf 24"d. adj. Shelving unit with 5 shelves

Furniture (Not in GC contract):

Equipment (In GC contract):

Equipment (Not in GC Contract):
Mop rack

TECHNICAL CRITERIA

Architectural:

Plumbing: Floor sink

Mechanical:

Electrical: Lighting:
- (1) 2'x4' Motion switched fluorescent fixtures.
  Electrical:
- (2) Duplex receptacles for general use.

Low Voltage:
- (1) Paging speaker with volume control.

OTHER INFORMATION

1.14 FINAL DESIGN PROGRAM FOR PREFERRED SCHEMATIC DESIGN

C. Space Summary Template

Proposed Space Summary - Middle Schools

MIDDLE SCHOOL	Existing Conditions			PROPOSED									MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total						
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			**0**			**0**			**39,329**			**0**			**42,590**	
(List classrooms of different sizes seperately)																
Classroom - Health							875	1	875							
Classroom - Foreign Language							875	2	1,750							
Classroom - General							875	12	10,500							
Classroom - General							905	25	22,625							
Classroom - General							992	1	992				950	33	31,350	850 SF min - 950 SF max
Small Group Seminar (20-30 seats)/ Resource							324	2	648							
Small Group Seminar (20-30 seats)/ Resource							550	1	550				500	2	1,000	
Science Classroom / Lab													1,200	8	9,600	1 period / day / student
Prep Room							165	1	165							
Prep Room							250	2	500							
Prep Room							362	2	724				80	8	640	
SPECIAL EDUCATION						**0**			**7,718**			**0**			**9,560**	
(List classrooms of different sizes seperately)																
Self-Contained SPED							875	1	875				950	6	5,700	assumed 8% of pop. in self-contained SPED
Self-Contained SPED - Lifeskills							992	1	992							
Self-Contained SPED - O.P./ P.T.							466	1	466							
Self-Contained SPED Toilet							60	2	120				60	6	360	
Resource Room							625	1	625							
Resource Room							622	2	1,244							
Resource Room							636	2	1,272				500	5	2,500	1/2 size Genl. Clrm.
Small Group Room / E.L.L.							544	1	544							
Small Group Room / Speech - Language							544	1	544							
Small Group Room / Speech - Language							518	1	518							
Small Group Room / Reading							518	1	518				500	2	1,000	1/2 size Genl. Clrm.
ART & MUSIC						**0**			**6,458**			**0**			**4,800**	
Art Classroom							1,114	2	2,228				1,200	2	2,400	assumed use - 50% population 2 times / week
Art Workroom w/ Storage							122	1	122							
Art Workroom w/ Storage & kiln							200	1	200				150	2	300	
General Music Classroom							1,250	1	1,250							
Band / Orchestra - 100 seats							2,412	1	2,412				1,500	1	1,500	assumed use - 50% population 2 times / week
Music Practice / Ensemble													200	3	600	
Music Office																
Music Storage							246	1	246							
VOCATIONS & TECHNOLOGY						**0**			**2,580**			**0**			**6,400**	
Tech. Clrm. - (E.G. Drafting, Business)							1,290	2	2,580				1,200	2	2,400	Assumed use - 25% Population - 5 times/week
Tech. Shop - (E.G. Consumer, Wood)													2,000	2	4,000	Assumed use - 25% Population - 5 times/week
HEALTH & PHYSICAL EDUCATION						**0**			**11,299**			**0**			**8,400**	
Gymnasium							8,510	1	8,510				6,000	1	6,000	
Gym Storeroom							440	1	440							
Gym Storeroom							350	1	350				150	1	150	
Health Instructor's Office w/Shower & Toilet							80	2	160				250	1	250	
Changing Rooms - Girls w/Toilets							1,057	1	1,057							
Changing Rooms - Boys w/Toilets							782	1	782				1,000	2	2,000	

Proposed Space Summary - Middle Schools

MIDDLE SCHOOL	Existing Conditions			PROPOSED									MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total						
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
MEDIA CENTER						**0**			**3,314**			**0**			**5,555**	
Media Center/Reading Room							3,194	1	3,194				5,555	1	5,555	
Media - Work Room							120	1	120							
DINING & FOOD SERVICE						**0**			**11,278**			**0**			**11,375**	
Cafetorium/Dining							5,400	1	5,400				6,750	1	6,750	1/2 Enrollment @ 15 SF/Seat
Stage - Drama Classroom							1,500	1	1,500				1,600	1	1,600	
Stage - Drama Storage							320	1	320							
Chair/Table/Equipment Storage							500	1	500				500	1	500	
Kitchen							3,142	1	3,142				2,200	1	2,200	1600 SF for first 300 + 1 SF/student Add'l
Staff Lunch Room							416	1	416				325	1	325	20 SF/Occupant
MEDICAL						**0**			**984**			**0**			**710**	
Medical Suite Toilet							60	1	60				60	1	60	
Nurses' Office/Waiting Room							394	1	394				250	1	250	
Rest Area - (4 Beds)							435	1	435				100	4	400	
Examination Room / Resting							95	1	95							
ADMINISTRATION & GUIDANCE						**0**			**3,965**			**0**			**3,850**	
General Office / Waiting Room/Toilet							1,240	1	1,240				550	1	550	
Teachers' Mail and Time Room							126	1	126				100	1	100	
Duplicating Room							126	1	126				200	1	200	
Records Room							80	1	80				200	1	200	
Principal's Office w/ Conference Area							198	1	198				375	1	375	
Principal's Secretary / Waiting													125	1	125	
Assistant Principal's Office - AP1							120	1	120				150	1	150	
Assistant Principal's Office - AP2							120	1	120				150	1	150	
Supervisory / Spare Office							140	1	140				150	1	150	
Conference Room							445	1	445				350	1	350	
Guidance Office							2	106	212							
Guidance Office							2	120	240							
Guidance Office							1	140	140				150	5	750	
Guidance Waiting Room													100	1	100	
Guidance Storeroom													50	1	50	
Teachers' Work Room							1	210	210							
Teachers' Work Room							2	284	568				600	1	600	
CUSTODIAL & MAINTENANCE						**0**			**1,878**			**0**			**2,375**	
Custodian's Office							1	178	178				150	1	150	
Custodian's Workshop							1	210	210				250	1	250	
Custodian's Storage							1	385	385				375	1	375	
Recycling Room / Trash													400	1	400	
Receiving and General Supply							1	380	380				400	1	400	
Storeroom							1	585	585				600	1	600	
Network/Telecom Room							1	140	140				200	1	200	
OTHER						**0**			**0**			**0**			**0**	
Other *(specify)*																
Total Building Net Floor Area (NFA)						**0**			**88,803**						**95,615**	
Proposed Student Capacity/Enrollment									**900**						**900**	
Total Building Gross Floor Area (GFA)[2]									**130,000**						**144,000**	
Grossing factor (GFA/NFA)									**1.46**						**1.51**	

Proposed Space Summary - Middle Schools

MIDDLE SCHOOL	Existing Conditions			PROPOSED									MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
				Existing to Remain/Renovated			New			Total						
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

[1] **Individual Room Net Floor Area (NFA)** Includes the net square footage measured from the inside face of the perimeter walls and includes all specific spaces assigned to a particular program area including such spaces as non-communal toilets and storage rooms.

[2] **Total Building Gross Floor Area (GFA)** Includes the entire building gross square footage measured from the outside face of exterior walls

Architect Certification

I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and in accordance with the 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: Lamoureux, Pagano & Associates, Inc.

Name of Principal Architect: Michael A. Pagano, AIA

Signature of Principal Architect:

Date: 9-Dec-09

D. Instructional Technology Security and Visual Access Requirements

TECHNOLOGY MISSION STATEMENT

Shrewsbury Public School is committed to the use of technology to create optimal learning opportunities for all students and staff. We strive to continuously improve our electronic infrastructure, which supports the use of appropriate technology for curriculum, management, communications, and professional development. Shrewsbury Public Schools, through the effective and appropriate integration of technology, strives to:

1) provide appropriate and sufficient technology for all teachers and students

2) create a seamless electronic infrastructure connecting schools, the community and the world

3) provide opportunities for students to use technology in meaningful ways, both in the classroom and in preparation for careers

4) develop learning outcomes for students and competencies for staff

5) provide high quality professional development for teachers, establish partnerships with town departments and businesses

6) maintain a broad-based technology task force.

SHREWSBURY'S HISTORY

Shrewsbury's schools, as well as the community, have been leaders in the area of developing technology options. From the establishment of Shrewsbury's Cable Co. and a strong Instructional Technology and Media Department for the schools, to the implementation of technology in the classroom and the professional development of teachers, Shrewsbury has been a model for others to follow.

SHREWSBURY'S PLAN

Shrewsbury's Plan, Setting a Vision for the Future, was developed through a partnership between school department staff, business leaders and community members. The plan includes assessment for the present state of our technology, guidelines for future growth, expectations for professionals and students as well as a plan to fund future needs.

See the Electrical specifications, Room Data Sheets, and Electrical drawings for more details regarding IT, security, and audio visual systems planned for the new 900 student school. Among some of the progressive features included are:

- Smartboards with integrated projectors and speakers are planned for all instructional spaces
- Wireless communications throughout
- Wireless intrusion detection at perimeter openings
- Climate controlled District server room
- Laptop carts with recharging stations for instructional areas

1.14 FINAL DESIGN PROGRAM FOR PREFERRED SCHEMATIC DESIGN

E. Site Development Requirements

SCHEMATIC DESIGN

VEHICULAR ISSUES

Bus traffic: Careful consideration must be made for separate bus and parent pick up traffic circulation patterns

- 33- 35 buses service both Oak and Sherwood at the same time
- 75 – 100 parent pick up cars at each school max.
- Crescent St. access road to be sized for bike lane, 2 lanes of traffic to allow for queuing space during pick-up/drop off time periods and auxiliary parking for heavy community use events. Traffic signage and pedestrian crosswalk required at Crescent St. intersection, but not signals.

Parking:

- 140 - 150 staff parking spaces at Sherwood
  135 - 150 staff parking spaces at Oak
- 10 – 15 visitor parking spaces at each school
- 60 additional spaces for community use events (Note that Oak Auditorium events require max. site parking)

Service:

- Loading dock required for Sherwood
- Dumpster pad and space for pick up
- Emergency generator pad with access for refueling
- Transformer pad with access for service
- Deliveries typically box trucks, but sometimes semi-trailer; regular deliveries to kitchen, sporadic deliveries for office, mechanical, instructional equipment and supplies
- Ability to drive into Mechanical Room for servicing boilers critical

Pedestrians:

- Walkways between Sherwood and Oak to facilitate faculty/student use for shared facilities and parent pick-up/drop off at each school
- Accessible walkways to athletic fields for gym and community use
- Consideration of safe pedestrian travel during construction

Fire Access:

- Min. 20’ wide paved road full perimeter access (does not need to be contiguous) for fire trucks

SCHEMATIC DESIGN

ATHLETIC FIELDS

The following existing fields have been recently upgraded with irrigation, drainage, surfaces, etc. and are heavily scheduled for school and community use and will be maintained for use during construction:

- Football field
- Running track

- Softball: The existing softball field will be reconfigured to a baseball/lacrosse field with irrigation, fencing etc. similar to the existing baseball field.

- Baseball: The existing baseball/lacrosse field will be used as a staging area for the construction and reconfigured to a softball/lacrosse field at the end of the construction period.

- Irrigation: The existing irrigation system will have expanded controls to include the new baseball/lacrosse field and the existing well will continue to be the source of water.

Recess area features:

- Located with access from the cafeteria
- Paved area that can be plowed in the winter
- (2) half court basketball units
- (300) students each recess for a 10 minute exercise period

Physical Education features:

- Typically Oak and Sherwood have designated fields for Physical Education. Easy access is important to keep class periods effective.
- Storage for outdoor equipment (4'x8' space) required
- For emergency purposes, speakers directed toward athletic fields important
- Adventure challenge course desirable
- Exterior drinking fountain

SCHEMATIC DESIGN

UTILITIES

- Existing overhead wires to Sherwood to be relocated to underground location
- New Electric service to come overhead from Sherwood Avenue and underground at site property line to west end of new building
- Water service is adequate for anticipated fire protection and plumbing needs
- Exterior grease trap required at Sherwood
- Gas service upgrade is probably required to service kitchen and HVAC needs(to be confirmed)
- Town water and sewer
- Sanitary to be gravity fed to Crescent St. connection
- Fire hydrants to be located at the front and back of the new building
- Town electric/cable TV/telephone (SELCO)
- Site lighting at parking and pedestrian walks near school only, not at athletic fields
- Dark Sky exterior lighting

CURRICULUM

The Sherwood wooded area is used for some science curriculum

MATERIALS

- Bituminous concrete paving: DPW recommends 18″ gravel base, 2-1/2″base coat, and 1-1/2″ topcoat paving system
- Cape Cod berm except granite at building sidewalk edge
- Concrete pavement walks
- Concrete utility/dumpster pads
- Landscaping to be trees and lawn only – no shrubs
- Under drainage system for new athletic fields similar to existing
- Replicate wetlands as required to accommodate Crescent St. access
- Metal guards, handrails, bollards, etc

1.14 FINAL DESIGN PROGRAM FOR PREFERRED SCHEMATIC DESIGN

F. Sustainable Design Objectives

The Green Engineer, LLP
Sustainable Design Consulting

Meeting Notes

Project: **Sherwood Middle School, Shrewsbury, MA**

Date: **October 14, 2009**
Location: **LPA Offices**

Re: **Schematic Design Meeting and Sustainability Overview**

Attendees:
Chris Schaffner - TGE – chris@greenengineer.com
***Marie Nolan – TGE – marie@greenengineer.com**
Michael Pagano – LPA – mpagano@lamoureuxpagano.com
Katie Crockett – LPA – kcrockett@lamoureuxpagano.com
Anup Khatra – AKAL Engineering – khatra@akalengineering.com
Jerimy Moran - Seaman Engineering - jerimy@seamanengineers.com
Kevin Seaman - Seaman Engineering - kevin@seamanengineers.com
Azim Rawji – ART Engineering – azim@artec.us.com
William Maher - Nitsch Engineering - wmaher@nitscheng.com

PROJECT INFORMATION:

- Katie Crockett provided an update of the Sherwood Middle School (SMS) project.
- Town authorized LPA to complete Schematic Design for a new 130,000 gsf building. The complete package is due 12-30-09. Outline specs and cost estimates are due early December. Building is west of existing school and east of Oak Middle School. Existing ball field is on site that will be relocated south of the building (softball and baseball fields are being built).
- Three levels: basement, first and second floors; classroom clusters on each floor. Air conditioning will be in administrative areas, media center, tech labs and any other interior occupied spaces as required. Lobby is two-story open glazing facing south and closed at third level.
- Exterior will be insulated metal sheathing with some brick; Centria system up to 3" continuous insulation.
- Reduced number of classrooms, classroom size to 900 sf/classroom, and cafeteria size.
- Significantly less exterior wall and roof in new building compared to Oak School.
- No discussion by town of school acting as an emergency shelter.
- Gym, cafeteria and couple of classrooms will be used during the summer.
- 900 students, 135 staff? 300 seats in cafeteria, 3 lunches
- Town wants to take advantage of the 2% financing provided by the State for being a MA CHPS school.

DELIVERABLES FOR MA-CHPS:

- Current design, Scorecard, back-up narrative, statement from school saying affirming decision to go for MA-CHPS and earn at least 34 points.
- Question: Does MSBA or MA CHPS have LCCA requirement for this stage?

Potential Mechanical Systems:

- Current thinking is hydronic heating with heat recovery units, low temperature condensing boiler, ventilation system and possible package AC unit on roof.
- Supplemental geothermal heating-only unit may be assessed. Would make more sense if used for heating and cooling. Negative aspect - having to maintain 2 pump systems.
- Solar wall on gym for heating makeup air and ventilation planned. Centria System.
- Goal when choosing mechanical system: Pick what works with limited budget and desire for limited maintenance.
- Bob Cox, Shrewsbury Facilities Director wants low cost, easy maintenance solutions.
- Solar on roof is separate decision. Could have "solar ready" building. Power Purchase Agreements exist for placing solar on existing schools; can take advantage of federal tax credits.

Energy Use:

- Buildings over 40% glazed are not energy efficient.
- Energy efficiency is driven by building envelope/insulation and lighting. Need to target LPD; code is 1.0 watts/sf so may want to specify 0.7 wsf.
- Need to coordinate AC with lighting
- Specify Energy Star efficient equipment, premium motors
- Having little AC will not get the project more energy points as design case will be compared to non-AC base case.
- Variable speed exhaust for hood in cafeteria with makeup air.
- Remote condensing for walk-in refrigerator.
- No shop, no pool - so unlikely will have use for solar thermal system. Solar thermal has a long payback and requires more maintenance compared to PV.

Water Use:

- Project can easily achieve 30% reduction; adult sized fixtures
- Waterless urinals - Good to have this discussion with client. Get fumes if not maintained properly. Best to have waterline hookup ready in case there are problems.
- TGE recommends low flow urinal - 0.8 gallon flush
- Water closet can be dual flush or low flush
- Design sinks in all classrooms and a couple of showers in building
- Aerators for hand washing and automatic sensors (timing or motion), could be innovation credit if high % savings
- On town sewer, with no water treatment or storage preferred by maintenance staff.
- Continue irrigation of ball fields? Specify appropriate soils and drought tolerant grasses for new ball fields
- No permanent irrigation after establishing drought-resistant plants on non playing fields to achieve WC2.1.
- Consider rain barrels for water collection
- LPA will be doing landscape design through SD

Site Characteristics / Land Use:

- School will be built on existing school land
- Determine if crossing a wetland; federal requirements are 2:1 ratio if filling in a wetland
- If building new driveway, add bike lane

- Parking will be increased over minimum local zoning requirements as is case now for the existing school
- CHPS stormwater requirement is stricter than MA DEP and LEED, so "no" for SC3 credit.
- Need 30% of non roof surfaces to have shade or light-colored materials for SC4.1 credit, shade is calculated using a 5-year tree canopy.
- White roofs are generally better than dark colored in the U.S., heat gain of building is minimal but heat island impact is important. Cool roof is better for package equipment.
- Exterior light pollution reduction issues- Are lights on timers? Are there lights at the ball fields? School is in neighborhood and may have a covenant with residents.

Materials:

- Need adequate central storage for recyclables. How will recyclables be collected? Need bins in classrooms and cafeterias.
- If the building chooses a product that minimizes waste, there is not a credit for it but an innovation credit could be submitted.
- The demolition of the existing building is key to MC1 compliance. Figure out how the demolition fits into the project schedule and track the C&D waste.
- Local asphalt, paving and landscaping is included in MC3.
- MA CHPS wants as many MA products specified as possible.
- MC3 involves a complicated calculation; next CHPS version will go back to LEED approach.
- Subs give information on steel, concrete, gypsum, metal studs, etc. to contractor.

Indoor Air Quality:

- Sherwood uses a service for cleaning buildings. Janitor storage areas need their own exhaust.
- IEQP 9 - No gas pilot lights including kitchen equipment; limit use of duct liners and use good quality.
- IEQP 14 - MA CHPS recognizes that complying with AHRAE thermal comfort standards can be tricky with no AC.
- IEQ1.1 - Views are to include administrative areas but not meeting rooms.
- No returns will be out of classrooms, plenum returns?
- IEQ2.3 - Check with Maintenance about MERV 13 filters, higher efficiency but costs more.
- Can specify vacuuming carpeted area prior to completion - IEQ2.4
- IEQ3 - acoustical performance in classrooms - no ventilators so maybe max 30 NC
- Can provide for temperature/light control for a certain range
- Alternate cost estimate could be for using LED lighting.
- Daylight dimming in schools is an option; required to have double switching by code.
- Lights in parking lots - what is required by Shrewsbury code?

Summary of Key Issues:

1. Landscape design as it relates to parking lot and shade
2. Water use - reductions to propose to owner
3. Landscape design as it relates to irrigation
4. Lighting design
5. Mechanical system design
6. Demolition of existing school

7. Daylighting analysis of classrooms
8. Acoustical requirements

Innovation Credits - only get 3:

- Higher percentage water reduction
- Selection of materials to reduce waste
- Low mercury lighting
- Combining education with green building - solar wall, efficient envelope, computer in lobby
- Solar LED site lighting
- Dishwashing in cafeteria

Solar PV as part of construction:

- Purchase Power Agreement is a possibility; MTC funding is not possible.
- Could invite proposals for a PPA using federal tax credits
- TGE will put together a brief narrative of our discussion about alternative energy sources and the reasons they were discounted for this project.

NEXT STEPS:

- Update MA CHPS Scorecard
- Assign responsibility of credits to team members

ATTACHMENTS:

- REVISED MA-CHPS Checklist for the Sherwood Middle School.
- Currently at a total project score of 40

The forgoing discussions of this meeting are recorded as understood by the writer (marked by *), who should be notified of any omissions or corrections. Unless the writer is notified to the contrary, this report is presumed correct.

1.14 FINAL DESIGN PROGRAM FOR PREFERRED SCHEMATIC DESIGN

G. School Committee Approval of Program

SHREWSBURY PUBLIC SCHOOLS
100 MAPLE AVENUE
SHREWSBURY, MASSACHUSETTS

MINUTES OF SCHOOL COMMITTEE MEETING

WEDNESDAY, NOVEMBER 18, 2009

Present: Ms. Erin Canzano, Chairperson; Mr. John Samia, Vice Chairperson; Ms. Sandra Fryc, Secretary; Mr. Steve Levine; Mr. Mark Murray; Dr. Joseph Sawyer, Superintendent of Schools; Dr. Jay Cummings, Assistant Superintendent; Ms. Anne Mahan, Director of Business Services; and Mr. Thomas Kennedy, Director of Human Resources.

The meeting was convened at 7:04 PM.

I. Public Participation: None

II. Chairperson's Report/Members' Report:

Mr. Samia advised that the School Committee; the Board of Selectman; Mr. Daniel Morgado, Town Manager and Dr. Joseph Sawyer met on November 12, 2009 to discuss the current status of the FY10 budget process, as well as the upcoming FY11budget and beyond. Topics of discussion included stimulus money, long term fiscal planning and charter school funding. The taped meeting will air on Channel 30.

Mr. Samia announced that the November edition of "School Talk" was recently taped and the topic of discussion was the school budget. This program will also air on Channel 30.

Mr. Levine reported that the Transportation Task Force met today and may be ready to bring forward their final recommendations to the School Committee in December, 2009.

Ms. Canzano announced that the town is looking for poll workers for the 2010 elections. Interested candidates should contact the Town Clerk's office. Mrs. Canzano stated that there would be a public hearing on the Sherwood Middle School Building project on November 23, 2009 at the Town Hall. On November 30, 2009 the School Committee will make a presentation regarding the Sherwood building project to the Selectman. December 8th the Sherwood Building Committee will vote on the schematic design plan.

III. Superintendent's Report:

Dr. Sawyer thanked the Rotary Club for their participation and generosity surrounding the annual reading day that took place in all second grade classrooms throughout the district. Rotary members read a book to the class, which was followed by a discussion about community service. Each second grader was given a book donated by the Rotary Club.

Dr. Sawyer announced that on November 17, 2009 the Alumni Association awarded (19) grants, (17) of which went to special academic projects submitted by high school students and their faculty advisors. He thanked members of the Alumni Association Executive Board and the Grant Selection Committee.

Dr. Sawyer recognized many high school athletic teams for the recent accomplishments. The Girls' Volleyball team and the Girls' Soccer teams qualified for district playoffs. The Field Hockey team won the District Championship but lost in the State Semi-Finals. Both the Boys and Girls' Cross Country teams finished third in the Districts and qualified for state competition.

Dr. Sawyer said he was very pleased and proud of the community spirit and support shown by faculty, students and administrators in our schools to families in need. Dr. Sawyer advised the committee about a recent matter concerning a family who had fallen on hard times. When the faculty at the student's particular school learned of the family's current problems, they helped them locate the necessary services to assist the family. Dr. Sawyer pointed out that our schools do more than provide education to our students, but also display a high level of compassion, care and service to others in need.

IV. Time Scheduled Appointments:

A. Spring Street School Student Presentation

The School Committee welcomed Spring Street School students, Sam Brownstein, Anthony Shea, and Christopher Stephenson whose essays were chosen as winners in Representative Karyn Polito's "Defining the American Dream" essay contest. Mrs. Barbara Luby, Grade 4 teacher at Spring Street School and Mr. Bryan Mabie, Principal of Spring Street School, gave a brief overview of the contest as well as the connection with the student's social studies work and the Rigby reading program. Each student read their essay and was presented a certificate by members of the School Committee.

B. Sherwood Middle School Building Project: Presentation and Vote

Mr. Henry Fitzgerald, Chair of the Sherwood Middle School Building Committee recapped the past six months of the Sherwood School Building process since it was brought forward again in May 2009. Mrs. Jane Lizotte, Principal at Sherwood Middle School provided the committee with an "existing-conditions" overview. Ms. Katie Crockett, Architect, Lamoureaux Pagano Associates, addressed health and safety issues as well as the financial costs associated in renovating the building verses building a new school. Mr. Michael Pagano, Architect, Lamoureaux Pagano Associates presented the schematic design for the proposed new Sherwood Middle School building and the possibility of new traffic patterns and circulation routes. As required for a building project to be approved by the MSBA, the School Committee then had to formally vote to approve the proposed program that would be supported by the project. On a motion from Mr. Samia, seconded by Ms. Fryc, the School Committee voted unanimously to "approve the Design and Educational Program and the Budget Statement for Educational Objectives for the Sherwood Middle School Building Project."

C. Shrewsbury High School Class of 2009 Future Plans Report

Dr. Jay Cummings introduced Mr. Greg Nevader, Director of Guidance at Shrewsbury High School who provided data regarding post-high school plans for the Class of 2009.

D. Update on Special Education Programs

Ms. Melissa Maguire, Director of Special Education and Pupil Personnel Services, presented an update on special education programming. Dr. Sawyer advised that the report will be posted on the district website as it contains useful information regarding the special education program.

V. Curriculum – None

VI. Policy – None

VII. Budget – None

VIII. Old Business – None

IX. New Business – None

X. Approval of Minutes
On a motion from Mr. Samia, seconded by Mr. Levine, the School Committee voted five to zero to approve the minutes from the November 4, 2009 meeting.

XI. Executive Session - None

XII. Information Enclosures - None

XIII. Adjournment

On a motion from Mr. Samia, seconded by Mr. Murray, the meeting was adjourned at 9:16 PM. On a roll call vote: Mr. Murray, yes; Mr. Levine, yes; Ms. Fryc, yes; Mr. Samia, yes; Ms. Canzano, yes.

Respectfully submitted
Kathleen Granados, Clerk

1.15 PREFERRED SCHEMATIC DESIGN

A. Site Plan Development
B. Environmental Assessment
C. Geotechnical Analysis
D. Utility Analysis
E. Code Outline
F. Massing Study
G. Schematic Design Drawing List
H. Schematic Floor Plans
I. Schematic Exterior Elevations
J. Building Systems Narratives
K. MA-CHPS Scorecard
L. Outline Specifications
M. Project Schedule
N. Proposed Total Project Budget
O. OPM Review of SD Documents

1.15 PREFERRED SCHEMATIC DESIGN

A. Site Plan Development

- Traffic Analysis
- Site Features Narrative
- Site Plan

Nitsch Engineering

Sherwood Middle School

Traffic Impact and Access Study

October 28, 2009

Prepared for:

Lamoureux Pagano Associates
14 East Worcester Street
Worcester, MA 01604

Submitted by:

Nitsch Engineering
186 Lincoln Street, Suite 200
Boston, MA 02111

Nitsch Engineering Project #7683

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TRAFFIC IMPACT AND ACCESS STUDY
SHERWOOD MIDDLE SCHOOL
SHREWSBURY, MASSACHUSETTS
Nitsch Project #7683
October 28, 2009

INTRODUCTION

General/Site Location

Nitsch Engineering has been retained by Lamoureux Pagano Associates to prepare a qualitative assessment of safety, traffic circulation, traffic access/egress, and parking impacts, for the proposed construction of a new Sherwood Middle School in Shrewsbury, Massachusetts. The project consists of approximately 130,000 square feet middle school buildings.

The existing Sherwood Middle School abuts the Oak Middle School and both share athletic fields and parking. The area surrounding the middle schools generally consists of residential neighborhoods. The major access roads within the study area are: Oak Street, that extends from Maple Avenue to South Quinsigamond Avenue and runs in the North/South directions, Crescent Street, that begins at Maple Avenue and ends at Boston Worcester Turnpike (Route 9), and Maple Avenue, that extends from Main Street to Boston Worcester Turnpike (Route 9) and runs in the East/West directions. The local access roads to the Middle Schools include Sherwood Avenue, Hutchins Street, and Oak Street.
Figure 1 shows the site locus map. The proposed option contains the following design changes:

1. Construct a new building west of the existing building
2. Introduce a new access road to Sherwood Middle School from Crescent Street
3. Reconfigure parking

The construction of an access point off of Crescent Street will shift traffic patterns around the site. Impacts generated by the site will be derived from the change in traffic due to student enrollment and traffic redistribution due to the new access to the proposed building. Figure 2 shows the proposed Sherwood Middle School.

Figure 1 - Locus Map - Existing Sherwood Middle School

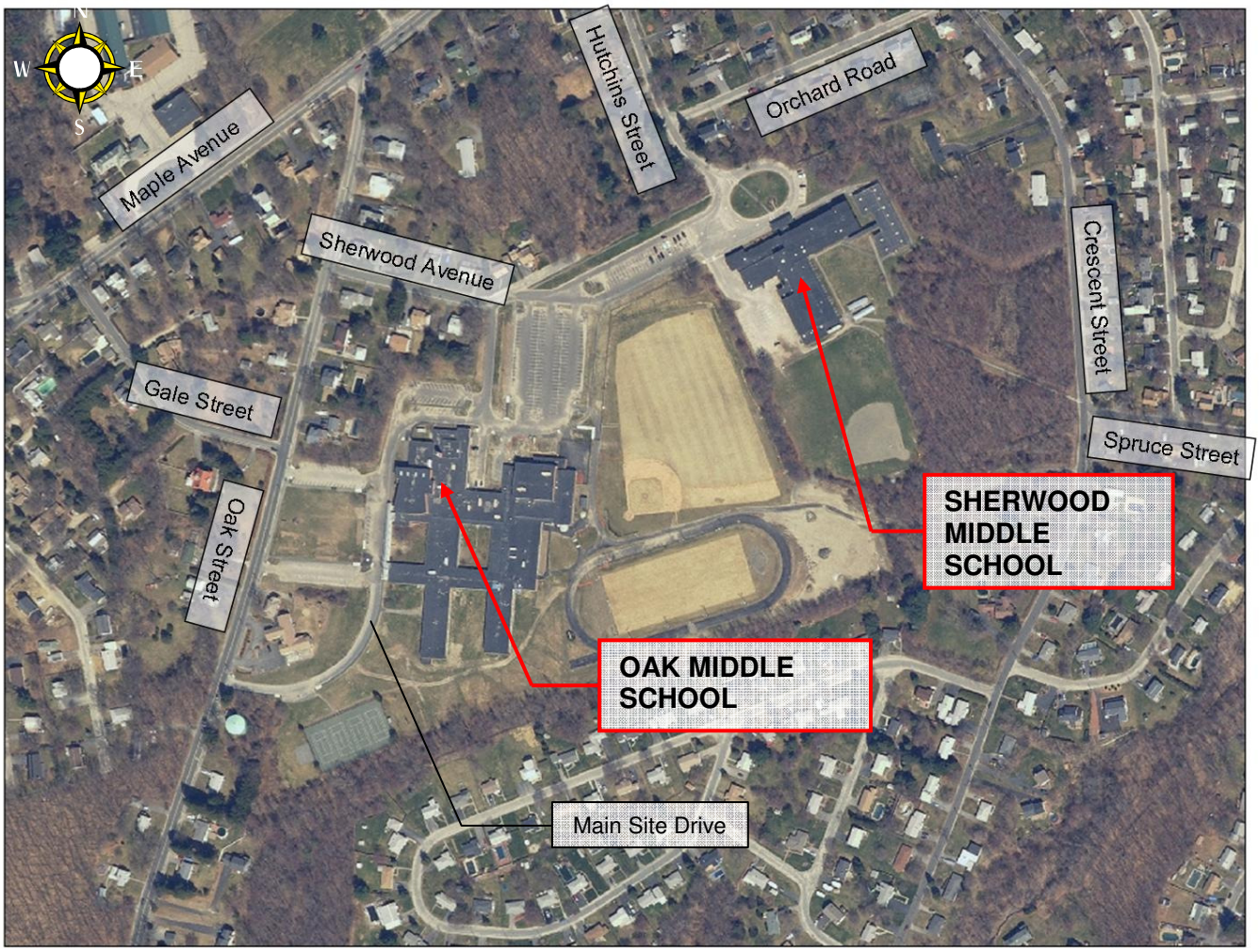
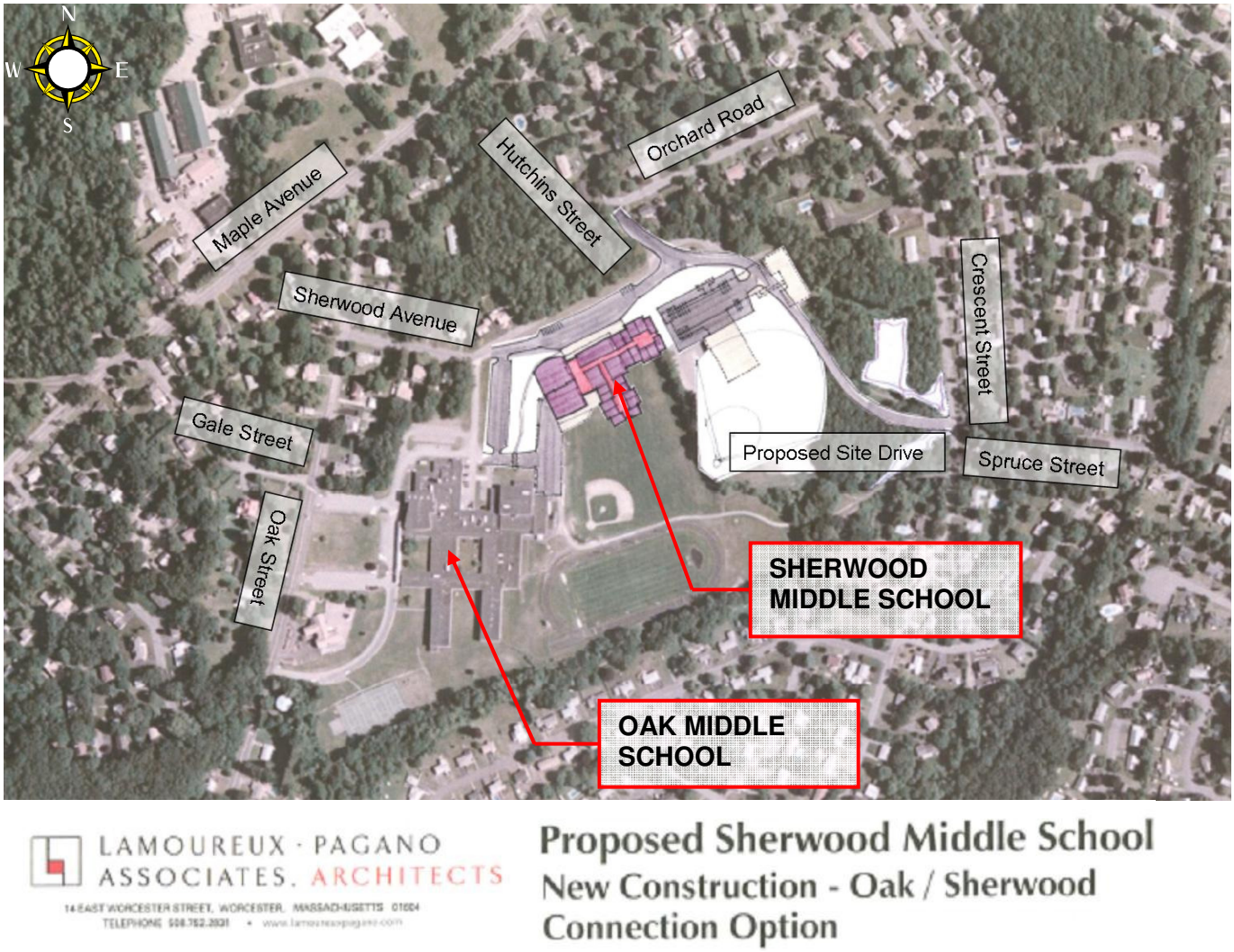


Figure 2 - Proposed - Sherwood Middle School



EXISTING CONDITIONS

Field Reconnaissance

Nitsch Engineering conducted field reconnaissance on Thursday July 30, Wednesday September 16, Thursday September 17, and Monday October 26, 2009 to observe traffic operations, geometric conditions, parking accommodations, pedestrian accommodations, signing, pavement markings, local site access/egress, and overall roadway and intersection conditions.

The following external intersections were included in the study area; all intersections are unsignalized:

- Oak Street/Gale Avenue
- Oak Street/Sherwood Avenue

- Hutchins Street/Orchard Road
- Crescent Street/Spruce Street

In addition, the internal circulation of the site was reviewed, including the intersection of:

- Sherwood Avenue/Site Drive

Below is a description of each of the study area intersections with corresponding photos of the locations.

Oak Street /Gale Avenue

This four-legged unsignalized intersection consists of Oak Street approaching from the north and south, Gale Avenue approaching from the west, and the School Driveway approaching from the East. Gale Avenue intersects Oak Street adjacent to the School Driveway, on the northern side. Cars traveling between Gale Avenue and the School Driveway must turn right and then left, rather than travelling straight through. Along the school side of Oak Street, and along the south side of Gale Street, 4-foot wide sidewalks exist that are separated from the road by a narrow strip of grass. A 6-foot wide crosswalk is marked across Oak Street, between School Street and Gale Avenue. Pedestrian ramps are present on the School Driveway sidewalk, but there are no ramps facing the crosswalk, or on the western side of the street. The pavement is cracked at the end of the crosswalk. There were no speed limit signs posted on any of the approaches.

Oak Street northbound and southbound has a double yellow centerline separating two (2) 14-foot wide travel lanes. There is no shoulder provided from the edge of pavement. We observed warning signs that inform drivers of a school crossing at the intersection. Oak Street allows travel is both directions.

The School Driveway only allows passenger vehicles to travel west towards Oak Street, the only incoming traffic allowed are buses. The School Driveway is 19 feet wide with no lane markings. Gale Avenue is 20 feet wide with no lane markings.

Aside from Oak Street traffic, the primary land uses in the vicinity of this intersection include residential uses.

Oak Street, looking north

Gale Avenue, looking east

Oak Street/Sherwood Avenue

This three-legged unsignalized intersection consists of Oak Street approaching from the north and south and Sherwood Avenue approaching from the east. 4-foot wide sidewalks exist along the east side of Oak Street

and along both sides of Sherwood Avenue separated from the edge of pavement by a narrow strip of grass. Although there are no crosswalks within the intersection, pedestrian ramps are present on both sides of the Sherwood Avenue, but do not comply with MassHighway and ADA guidelines.

Oak Street has a double yellow centerline separating a 15-foot and a 14-foot wide travel lane in the north and southbound directions respectively. No edgeline pavement markings are present. Oak Street allows travel in both directions. At this intersection, Oak Street is the major street; therefore no stop lines are marked on either approach, and there is no stop sign necessary. We observed a warning sign, located north of the intersection, advising drivers to slow for school children. In addition, there are "SLOW" and "SCHOOL" pavement markings on the southbound side of Oak Street. Sherwood Avenue westbound is 24 feet wide with no lane markings. Both streets allow two-way traffic.

Aside from Oak Street traffic, the primary land uses in the vicinity of this intersection include residential uses.

Oak Street, looking north

Sherwood Avenue, looking west

Hutchins Street/Orchard Road

This three-legged intersection consists of Hutchins Street approaching from the north and south, and Orchard Road approaching from the east. Along both sides of the northbound approach of Hutchins Street, and along the south side of Orchard Road is a 6-foot wide sidewalk. A 4-foot wide sidewalk is present along the southbound side of Orchard Road. A wide strip of grass and trees separates the sidewalk and the pavement. Although there are no crosswalks within the intersection, pedestrian ramps are present on both sides of Orchard Road, but do not comply with MassHighway and ADA guidelines.

Hutchins Street has a single white centerline separating 13-foot and 14-foot wide travel lanes in the northbound direction. There is no shoulder provided from the edge of pavement. Hutchins Street allows travel in both directions, but only during off-peak hours. During the hours of 7:00 AM to 8:30 AM, and 2:00 PM to 3:30PM, there is no southbound traffic allowed on Hutchins Street. There is a stop sign and stop line located on both the Hutchins Street northbound and the Orchard Road westbound approaches. There are regulatory signs along the southbound approach of Hutchins Street, restricting traffic during school hours. The speed limit on Hutchins Street is indicated by a 15 mile per hour sign located to the south of the intersection.

Orchard Road is 24 feet wide with no lane markings. We observed a regulatory sign, located on the west side of the intersection, across from Orchard Road, restricting left turns during the hours of 7:00 AM to 8:30 AM, and 2:00 PM to 8:30 PM. Orchard Road allows two-way traffic.

The primary land uses in the vicinity of this intersection are residential uses.

Hutchins Street, looking south

Orchard Road, looking west

Crescent Street/Spruce Street

This three-legged unsignalized intersection consists of Crescent Street approaching from the north and south and Spruce Street approaching from the east. A 4-foot wide sidewalk exists on the north side of Spruce Street and on the east side of Crescent Street, north of Spruce Street, where it is separated from the edge of pavement by a narrow strip of grass. There is a crosswalk across the north side of Crescent Street that goes to a pedestrian walkway into the site. There are no pedestrian ramps present on either side of Crescent Street, and this does not comply with MassHighway and ADA guidelines.

Crescent Street is 23 feet wide and has no double yellow centerline separating travel in the north and southbound directions. No edgeline pavement markings are present. Crescent Street allows travel in both directions. At this intersection, Crescent Street is the major street; there is a stop line marked on the Spruce Street westbound approach, and there is a stop sign facing this approach as well. Spruce Street westbound is 19 feet wide with no lane markings. Both streets allow two-way traffic.

Aside from Crescent Street traffic, the primary land uses in the vicinity of this intersection include residential uses.

Crescent Street, looking south

Spruce Street, looking west

Sherwood Avenue/Main Site Drive

This four-legged unsignalized intersection consists of Sherwood Avenue approaching from the east and west, and the Main Site Drive approaching from the south and southeast. Site Drive intersects Sherwood Avenue in two adjacent locations on the southern side of Sherwood Avenue. Vehicles continuing along the Site Drive in the eastbound direction must turn right, and vehicles continuing in the southbound direction must turn left, rather than travelling straight through the intersection. A 4-foot wide sidewalk is present along both sides of Sherwood Avenue eastbound, and along the north side of Sherwood Avenue westbound. They are separated from the road by a narrow strip of grass. A 6-foot wide sidewalk runs along the edge between the northbound site drive and the westbound site drive. An 8-foot wide crosswalk is marked across the northbound site drive. Pedestrian ramps are present on both ends of the crosswalk, but they do not comply with ADA guidelines. The pavement is cracked along the edges of the sidewalk and in the middle of the intersection. If left unrepaired, this could worsen the pavement conditions and create safety concerns for traffic and pedestrians.

Sherwood Avenue is 24 feet wide and allows two-way traffic, but has no centerline. There is no shoulder provided at the edge of pavement. A Yield sign controls traffic on Sherwood Avenue eastbound.

The northbound site drive is 24-feet wide and allows two-way traffic, but has no centerlines, no stop line, and no shoulders. The westbound site drive is 30-feet wide, and has a white centerline separating traffic into two 15-foot travel lanes, and a stop line is present on the westbound approach. This site drive allows two-way traffic.

This intersection is where bus traffic conflicts with the parent pick-up drop-off traffic. Buses turn right at this intersection from the northbound site drive and continue eastbound towards Sherwood Middle School. In order for them to navigate the turn safely, all other traffic must come to a stop. This causes problems with traffic operations and results in traffic backing up on Sherwood Avenue, onto Oak Street, and eventually Maple Street.

The primary land uses in the vicinity of this intersection are residential uses.

Sherwood Avenue, looking east

Site Drive, looking north

Internal Circulation

There are two key access routes within the site - one is for parent pick-up drop-off, and one is for buses. Buses enter the site from Oak Street, and exit the site at Hutchins Street. Parents can only enter and exit the site from Sherwood Avenue, and must use the designated pick-up/ drop-off area around the edges of parking lot P10.

Site Drive 1 is located along Oak Street and allows one-way traffic eastbound into the site. This drive travels east for about 150 feet before gradually turning north, becoming the main site drive. Site Drive 2 is located about 270 feet to the north of site drive 1. This access point only allows one-way eastbound travel into the school drive. This segment travels east for about 270 feet before intersecting the Main Site Drive. Site Drive 3 intersects Oak Street about 225 feet to the north of Site Drive 2. This driveway intersects Oak Street adjacent to Gale Avenue at its western end, and intersects the Main Site Drive approximately 225 feet east of Oak Street. Site Drive 3 acts as an exit point for passenger vehicles, and an entrance point for buses. However, it is not wide enough for both buses and passenger vehicles to comfortably maneuver simultaneously.

The main site drive continues north 130 feet, where it turns sharply east and splits into two roads. The southern road is one-way eastbound, and the northern road is one-way westbound, creating a loop around two parking aisles (P5 and P6). To the east of the P5 and P6, the Site Drive turns north again for 270 feet before reaching Sherwood Avenue. There is a large parking lot (P7) to the east of this roadway that contains access points at its southern end, across from P5, and at its northern end off of Sherwood Avenue. This parking lot, P7, is the location of the pick-up/ drop-off area.

To the north of P7, the Site Drive continues east towards Sherwood Middle School. Again, the roadway splits around a parking lot (P8) creating a one-way loop. The eastbound traffic travels along the southern end of the parking lot, and the westbound traffic travels along the northern end of the parking lot.

At the eastern end of P8, the site drive ends at a roundabout, with Hutchins Avenue intersecting the roundabout from the north, and the site drive intersecting the roundabout from the west. To the south of the roundabout, in front of the school, is where buses queue for pick-up/ drop-off. There are currently 33 – 35 buses on site, circulating in a staggered fashion.

The existence of multiple one-way roadway sections is confusing to drivers maneuvering through the site. There are missing centerlines on many of the two-way sections, which cause confusion to drivers. Figure 3 shows the names and locations of the parking areas and internal roadways. Figure 4 depicts the internal traffic circulation.

Figure 3 - Parking Locations

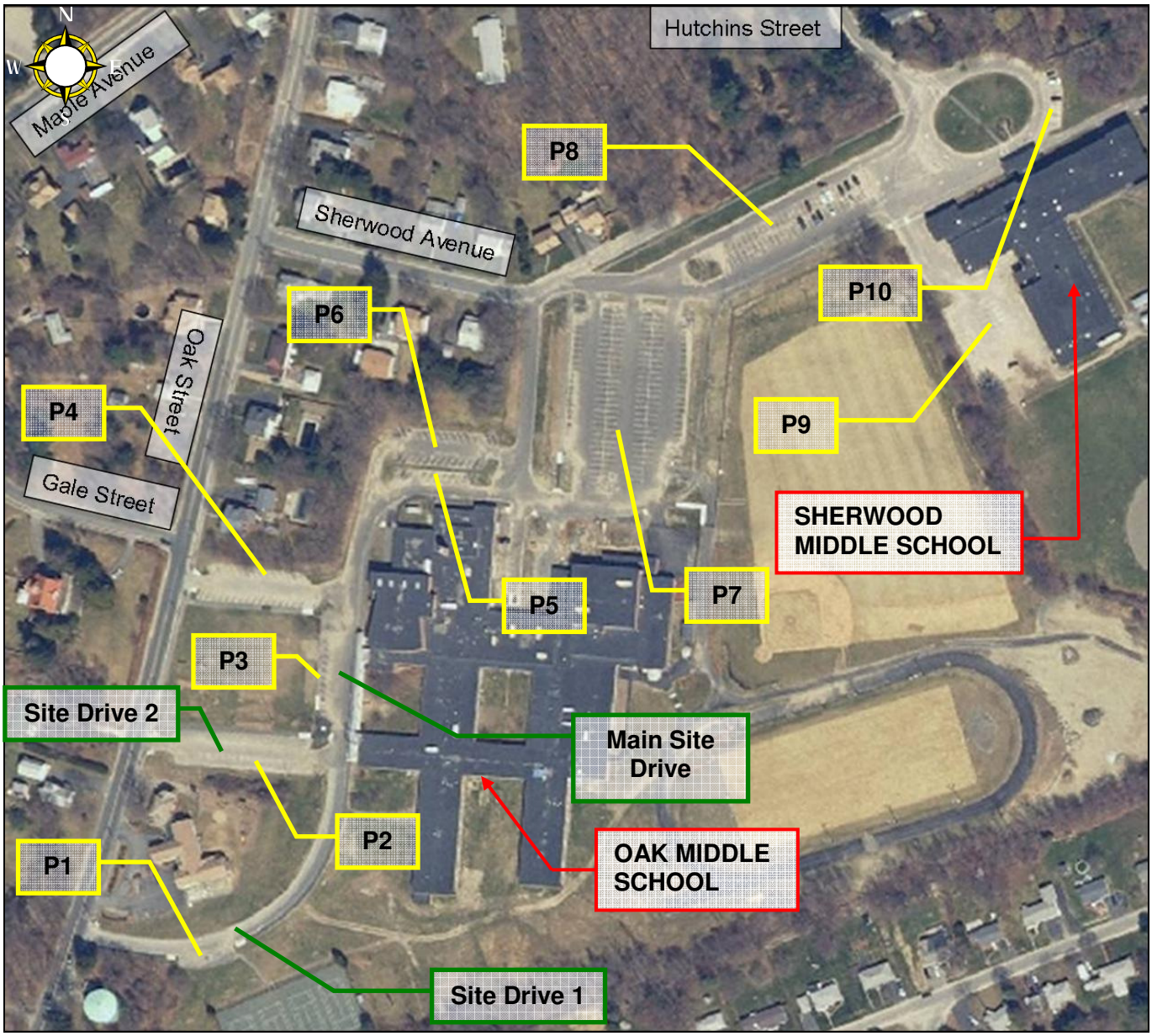
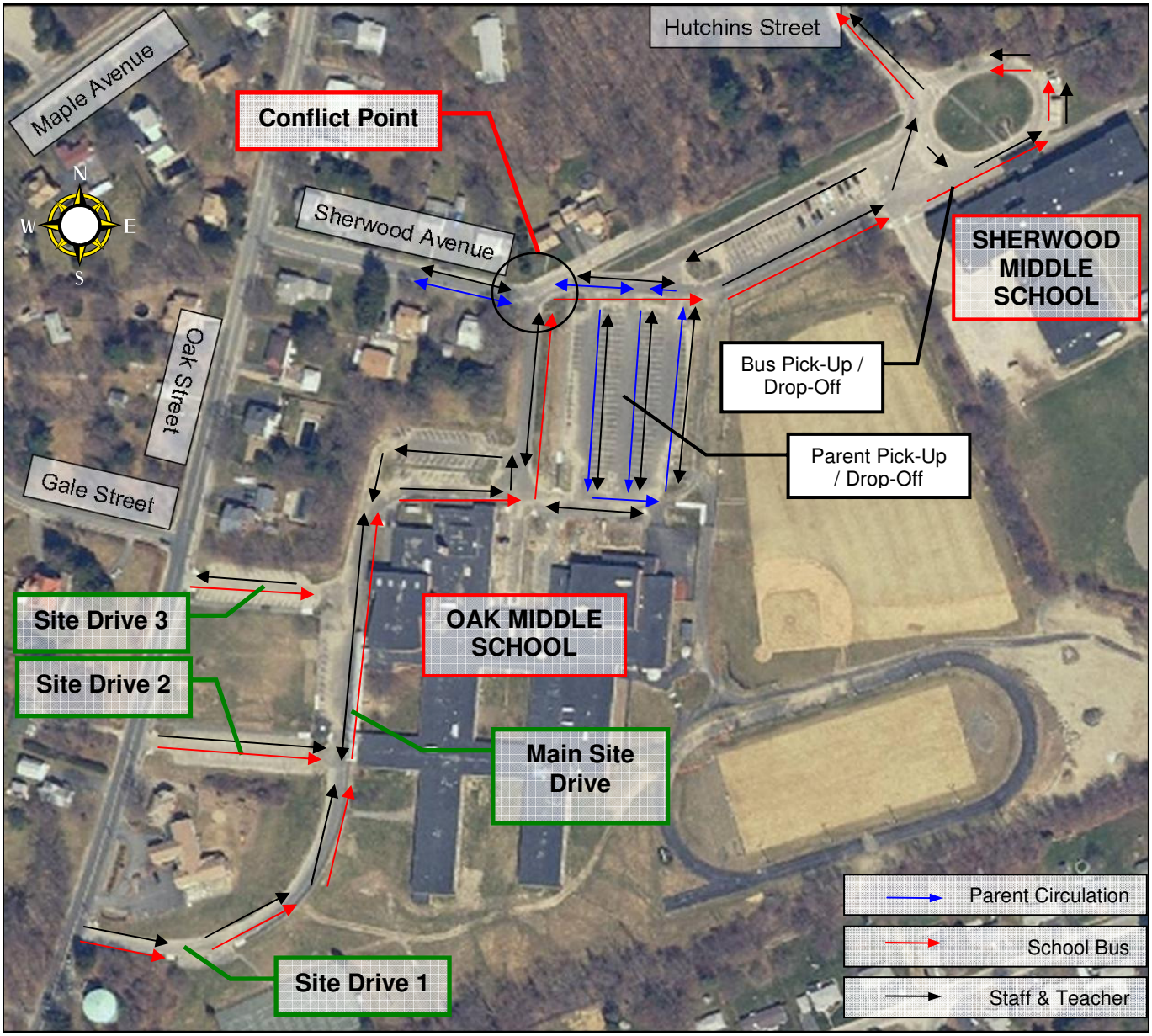


Figure 4 - Circulation



Crash Data

Nitsch Engineering analyzed crash data for the study area intersections. We queried MHD's crash record database for the Town of Shrewsbury, and identified two (2) crashes in 2006, one is at the intersection of Oak Street and Gale Avenue, and one is at the intersection of Oak Street and Sherwood Avenue. Both crashes involved two vehicles and caused property damage only. No reported crashes occurred at the intersection of Hutchins Street/Orchard Road. We did not check the town police records for any crash information. Typically police records are not available for public use at the level of details shown on the MHD database.

In addition, there were a number of Crashes located at intersections along the school access roads. There were six (6) crashes at the intersection of Oak Street and Maple Avenue. Three (3) crashes occurred in 2005, one (1) crash occurred in 2006, and two (2) crashes occurred in 2007. All of the crashes involved two vehicles. Five (5) of the crashes caused property damage only, and one (1) crash caused a non-fatal injury. There was also one (1) crash in 2007 at the intersection of Hutchins Street and Maple Avenue which involved two cars and caused a non-fatal injury. Two (2) other crashes occurred along Oak Street during this time. One crash occurred in 2006 and was a single-vehicle crash involving property damage only. The other crash occurred in 2007, involving two vehicles and caused a non-fatal injury. Table 1 summarizes the results of the crash analyses.

Table 1 - Crash Summary

Location	Number of Crashes		Severity				Manner of Collision					Percent During	
	Total	Year	PD[a]	PI[b]	NR[j]	F[c]	CM[d]	RE[e]	HO[f]	Ped[g]	Other[h]	Peak Hours	Wet/Icy Conditions
Oak Street/ Gale Avenue	1	2006	1	-	-	-	1	-	-	-	-	100%	0%
Oak Street/ Sherwood Avenue	1	2006	1	-	-	-	-	1	-	-	-	100%	0%
Total	2		2	-	-	-	1	1	-	-	-	100%	0%

[a]Property Damage Only; [b]Personal Injury; [c]Fatality; [d]Cross Movement (or angle); [e]Rear end; [f]Head on; [g]Pedestrian [j]Not reported or unknown in term of severity; [h]Sideswipe, opposite direction; sideswipe, same direction, signal vehicle crash, not reported, unknown etc.

Sight Distance Evaluation

Nitsch Engineering performed a stopping sight distance (SSD) and Intersection sight distance (ISD) evaluation at the intersection of Crescent Street and Spruce Street. SSD is the minimum visibility required for a vehicle on the major street to observe the presence, and safely stop the vehicle to prevent collision with an object/vehicle from the minor street. ISD is the minimum visibility for a vehicle stopped on the minor street to observe and assess the major street traffic to enter the intersection. We used the Project Development and Design Guide[1] to establish the required minimum SSD and ISD. We used the Existing Conditions Plan, prepared by Waterman Design Associates, Sheet CO.04, along with Ortho imagery from Google Earth to determine the available SSD and ISD.

[1] Project Development and Design Guide, Massachusetts Highway Department, 2006

Table 2 - Sight Distance Evaluation

Intersection	Posted Speed Limit	Stopping Sight Distance (SSD)		Intersection Sight Distance (ISD)	
	Speed[1] (in mph)	Required[2]	Available[3]	Required	Available
Crescent Street/Spruce Street					
Crescent Street, south of Intersection	25	115	310		
Crescent Street, north of Intersection	25	115	395		
Spruce Street, looking left	25*			280	330
Spruce Street, looking right	25*			240	285

[1] Posted in miles per hour (mph).
[2] Required in feet (ft) - Project Development and Design Guide, Massachusetts Highway Department, *Chapter 3 – Basic Design*
[3] Measured in feet (ft), rounded to the nearest five feet
* Speed limit assumed based on cross street speed limit and area characteristics.

As seen from Table 2, the available SSD and ISD exceeds the required minimum. Additionally, there were no crashes at this intersection from 2005-2007, which does not indicate safety deficiencies from lack of sight distance.

2009 Existing Traffic Data

Nitsch Engineering collected Turning Movement Counts (TMCs) on Wednesday September 16 and Thursday September 17, 2009 while school was in session. The TMC data was collected from 7:00 AM to 9:00 AM, during school drop-off session, and from 2:15 PM to 4:15 PM, during school pick-up session. The data collected included all vehicle volumes at the intersection of Sherwood Avenue and the Site Drive. This intersection is the conflict point in Figure 4.

The traffic consists of three groups, buses, parent pick-up/drop-off, and employees. The buses come from the south (Site Drive) and turn east to continue on toward Sherwood Middle School. The incoming pick-up/drop-off traffic comes from the west, and turns right into the designated parking area. The outgoing pick-up/drop-off traffic comes from the parking lot to the south of the intersection, and generally turns left to exit via Sherwood Avenue. Some traffic turns right and continues through the site to Hutchins Street, although this movement is prohibited. The incoming employees generally come in from Sherwood Avenue, and continue straight through the site towards the teacher parking lot. The outgoing employees come from the eastern Site Drive and continue straight onto Sherwood Avenue.

Based on the data collected, the AM peak hour at the Sherwood Avenue and Site Drive intersection occurs from 7:15 AM to 8:15 AM and the PM peak hour occurs from 2:15 PM to 3:15 PM. During the pick up period in the afternoon, many vehicles come early and wait for the students, so the peak hour for the incoming traffic does not correspond to the peak hour for the outgoing traffic. The outgoing traffic indicates the total number of students picked up and the exiting traffic from the parking lot, since some of the vehicles had arrived before the counts took place. This includes all the pick-up/ drop-off traffic, all the bus traffic, and a portion of the employee traffic for both Sherwood and Oak Middle Schools.

Table 3 shows the breakdown of traffic at this intersection during the peak hours. This includes all the pick-up/ drop-off traffic, all the bus traffic, and a portion of the employee traffic for both Sherwood and Oak Middle Schools.

Table 3 - TMC Data Summary

Time Period	Buses	Incoming Pick-Up/ Drop-Off	Outgoing Pick-Up/ Drop-Off	Incoming Employees	Outgoing Employees
AM Peak 7:15 AM – 8:15 AM	35	217	183	74	15
PM Peak 2:15 PM – 3:15 PM	32	93	130	28	36

In addition to TMCs, there were Automatic Traffic Recorder (ATR) counts taken from September 17 to September 20, 2009. The ATR data included 96-hour continuous traffic counts on Oak Street, Crescent Street, and Sherwood Avenue. Oak Street and Sherwood Avenue are access roads to the middle school campus. Crescent Street is the location of a future access road. Hutchins Street allows only outgoing traffic, and was not included in the study due to the low volume of traffic and unchanging nature of the access. Table 4 provides a summary of our observations.

Table 4 - Peak Hour and Daily (Weekday) Traffic Volumes by Location

Location	School AM Peak		School PM Peak		ADT[1] (vpd)	"k" factor	Direction	Directional Distribution
	Hour	Volume	Hour	Volume				
Oak Street -north of Sherwood Avenue	7:45 – 8:45	549	2:45 – 3:45	395	3,742	0.15	NB/SB	AM: 43%/57% PM: 51%/49% DAILY: 49%/51%
Crescent Street -north of Spruce Street	7:15 – 8:15	160	2:15 – 3:15	147	1,772	0.09	NB/SB	AM: 39%/61% PM: 32%/68% DAILY: 34%/66%
Sherwood Avenue -east of Oak Street	7:15 – 8:15	502	2:30 – 3:30	305	1,294	0.39	EB/WB	AM: 63%/37% PM: 54%/46% DAILY: 61%/39%

[1]Average Daily Traffic

Table 4 indicates that the volumes on Oak Street are approximately twice as high as the Crescent Street volumes, which are approximately 30% higher than Sherwood Avenue volumes, except during the peak hours, when volumes on Sherwood Avenue are significantly higher than those on Crescent Street. The Highway Capacity Manual (HCM) defines the k-factor as the percentage of daily traffic flowing during the single highest peak hour on an average day. Engineers use the k-factor to compute crash rate at an intersection in the absence of field data. The k-factors on Oak Street, Crescent Street, and Sherwood Avenue were 0.15, 0.09, and 0.39 respectively. The normal range of k-factors is 0.07 to 0.11. Both Oak Street and Sherwood Avenue have a greater than normal k-factor. This is due to the school peak hours creating a spike in volumes on streets which otherwise experiences low volumes.

Directional distribution of traffic on Oak Street is 49% traveling northbound and 51% traveling southbound. Oak Street and Crescent Street are a local roads providing access to Maple Avenue in the north and Route 9 in the south. Except during school peak hours, Nitsch Engineering anticipates traffic on Oak Street to be cut-through traffic from Route 9 to access points east and west on Maple Avenue. Directional distribution on Crescent Street is 34% traveling northbound and 66% traveling southbound. During the school AM peak hour, we observed 61% of traffic heading south on Crescent Street. During the school PM peak hour, we observed 68% of traffic heading south on Crescent Street indicating a more balanced distribution during the AM peak hour than the PM peak hour. Sherwood Avenue is a local road that provides access from Oak Street to Oak Middle School and Sherwood Middle School. Nitsch Engineering anticipates traffic on

Sherwood Avenue to be primarily school related at all hours of the day, with minimal residential and cut-through traffic. Directional distribution on Sherwood Avenue shows 61% travelling eastbound and 39% travelling westbound. This is because traffic can exit the school site via both Sherwood Avenue and Hutchins Street, but traffic can only enter the site from Sherwood Avenue during school hours.

Based on the ATR data, the AM peak hour on Oak Street is from 7:45 to 8:45 AM and the PM peak hour is from 2:45 to 3:45 PM. The AM peak hour on Crescent Street is from 7:15 to 8:15 AM. We observed the PM peak traffic to be from 5:15 PM to 6:15 PM. The PM peak period on Crescent Street also experienced a spike from 2:15 to 3:15 PM coinciding with the school PM peak hour, but the volumes during 5:15 to 6:15 PM were slightly higher than the school peak hour volumes. The AM peak hour on Sherwood Avenue occurs between 7:15 and 8:15 AM, and the PM peak occurs between 2:30 and 3:30 PM. This is fairly consistent with the peak hour determined by the turning movement counts taken on Sherwood Avenue.

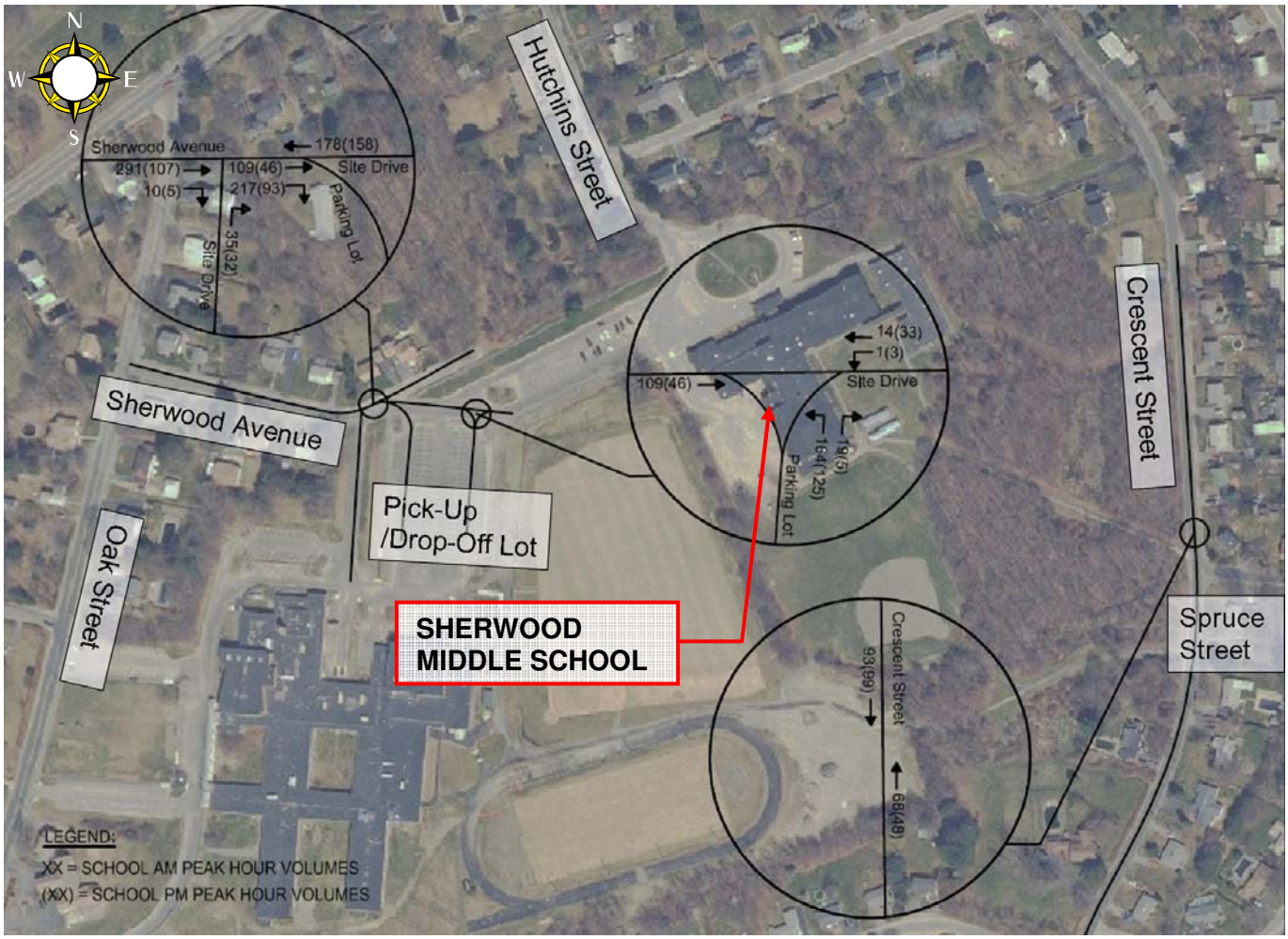
The Average Daily Traffic (ADT) during the weekday on Oak Street, Crescent Street, and Sherwood Avenue is 3,742 vehicles per day (vpd), 1,772 vpd, and 1,294 vpd respectively. With the proposed school construction, we anticipate the daily traffic on Crescent Street to increase during peak hours, based on a new entrance to the school off of Crescent Street. There will also be a decrease in traffic on Oak Street and Sherwood Avenue during peak hours due to a shift in traffic to Crescent Street.

Seasonal Adjustments

Traffic volumes fluctuate monthly throughout the year. Based on regular traffic counts at MassHighway's permanent count stations, adjustment factors can be calculated and applied to existing traffic counts to meet average-month volumes. The data from MassHighway's count stations from 2006[2] indicate that the average volumes in August are slightly higher than the yearly average. We did not adjust the traffic counts, in order to remain conservative. Figure 5 shows the existing traffic volumes.

[2] Massachusetts Highway Department (MHD) Traffic Volume Counts, Monthly ADT Comparisons, 2006.

Figure 5 - 2009 Existing Traffic Volumes



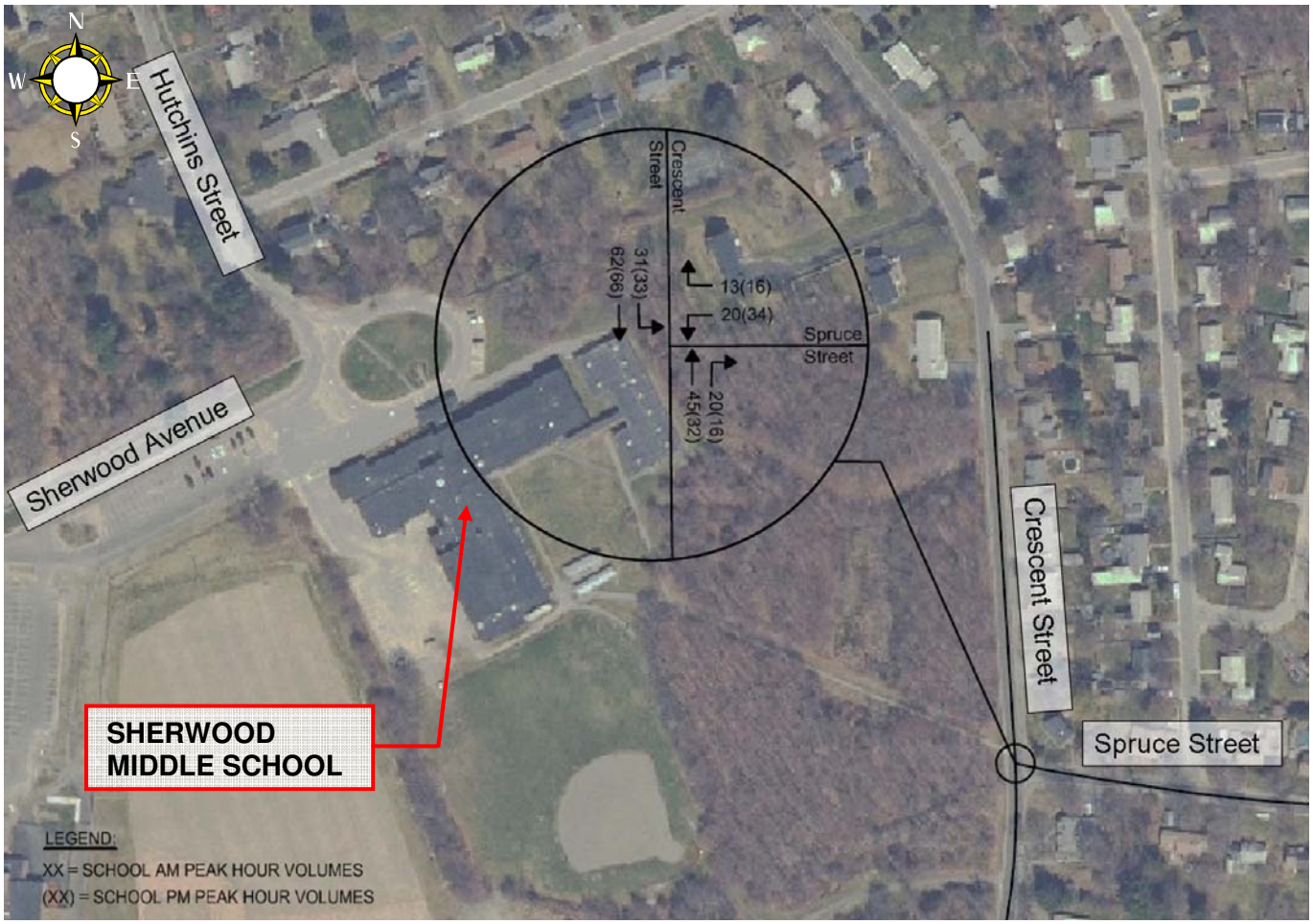
Spruce Street Redistribution

The traffic counts on Crescent Street were taken to the north of the intersection with Spruce Street. In order to analyze the intersection of Crescent Street at Spruce Street, assumptions were made about the volume of traffic on Spruce Street. Spruce Street is a local roadway connecting Crescent Street and Lake Street. Traffic travelling northbound on Crescent Street consists of residential traffic and traffic from Route 9. Traffic travelling westbound on Spruce Street consists of residential traffic, and traffic from Lake Street and Edgewood Road.

As seen in Figure 5, volumes on Crescent Street are low, particularly in the northbound direction, which is the direction that contains the traffic from Spruce Street. Low traffic volumes indicate that Crescent Street is not a preferred route for cut-through traffic. This suggests that a significant portion of the traffic travelling northbound on Crescent Street is residential in nature. Crescent Street, south of Spruce Street, is approximately twice as long, with two times as many residences as Spruce Street. Therefore, one third of the traffic on Crescent Street travelling northbound was assigned to Spruce Street, with two thirds remaining on

Crescent Street. Figure 5 also indicates that the directional split on Crescent Street favors the southbound direction, with 61% of all traffic travelling southbound during the AM peak hour and 68% travelling southbound during the PM peak hour. The same split was used for Spruce Street, to assign traffic turning left from Spruce Street westbound onto Crescent Street southbound, and traffic turning right from Crescent Street northbound onto Spruce Street eastbound. Figure 6 shows the 2009 volumes redistributed at Crescent Street and Spruce Street.

Figure 6 - 2009 Redistributed Traffic Volumes



Intersection Operations

Highway Capacity Software Methodology

We conducted a Level of Service (LOS) analysis at the study area intersections using the procedures outlined in the 2003 Highway Capacity Manual (HCM)[3]. The intersections were analyzed using SYNCHRO Version 6 computer software, which is accepted by MHD as a standard procedure. The HCM bases its LOS results solely on average vehicle delay. MassHighway considers, LOS A – D as acceptable in urban/suburban areas, and LOS E and LOS F as unacceptable.

[2] *2003 Highway Capacity Manual;* Transportation Research Board.

The intersection of Sherwood Avenue at the Site Drive is not a typical intersection. The turning movements occur at two different locations along the Site Drive. In order to analyze it in Synchro it was split into two intersections, Sherwood Avenue at Site Drive (West) and Sherwood Avenue at Site Drive (East). The western intersection was analyzed as an all-way stop. The eastern intersection was analyzed as a traditional unsignalized intersection with a free movement in the eastbound and westbound direction, and a stop control on the northbound approach.

Crescent Street and Spruce Street was analyzed as a three legged, unsignalized intersection with a stop control on the westbound approach of Spruce Street. Table 5 summarizes the 2009 existing condition traffic operations.

Table 5 - Level of Service Summary - 2009 Existing Condition

Intersection	Movement/Approach	Weekday School AM Peak Hour		Weekday School PM Peak Hour	
		LOS[1]	Delay[2] (sec)	LOS	Delay (sec)
Sherwood Avenue and Site Drive (West)	Eastbound	A	9.9	A	7.9
	Westbound	A	8.8	A	8.2
	Northbound	A	9.6	A	8.9
Sherwood Avenue and Site Drive (East)	Westbound Left	A	0.5	A	0.6
	Northbound	B	11.6	B	10.1
Crescent Street and Spruce Street	Westbound Left	A	9.4	A	9.5
	Southbound	A	2.6	A	2.6

[1] LOS = level of service
[2] Average delay in seconds per vehicle

The traffic at the intersection of Sherwood Avenue and Site Drive is not very high; therefore the LOS is adequate by Mass Highway standards. This analysis shows that the volume of traffic is not the cause of the queuing observed in the field. However, the organization of the pick-up/drop-off and the layout of the intersection are very confusing to drivers. This forces drivers to react slowly, and causes traffic to back up. Additionally, every time a bus turns right at this intersection, all traffic must stop in order for them to maneuver safely. The intersection is unsignalized, but it is controlled by school employees directing traffic. This is necessary to control the flow of traffic through the intersection and prevent collisions.

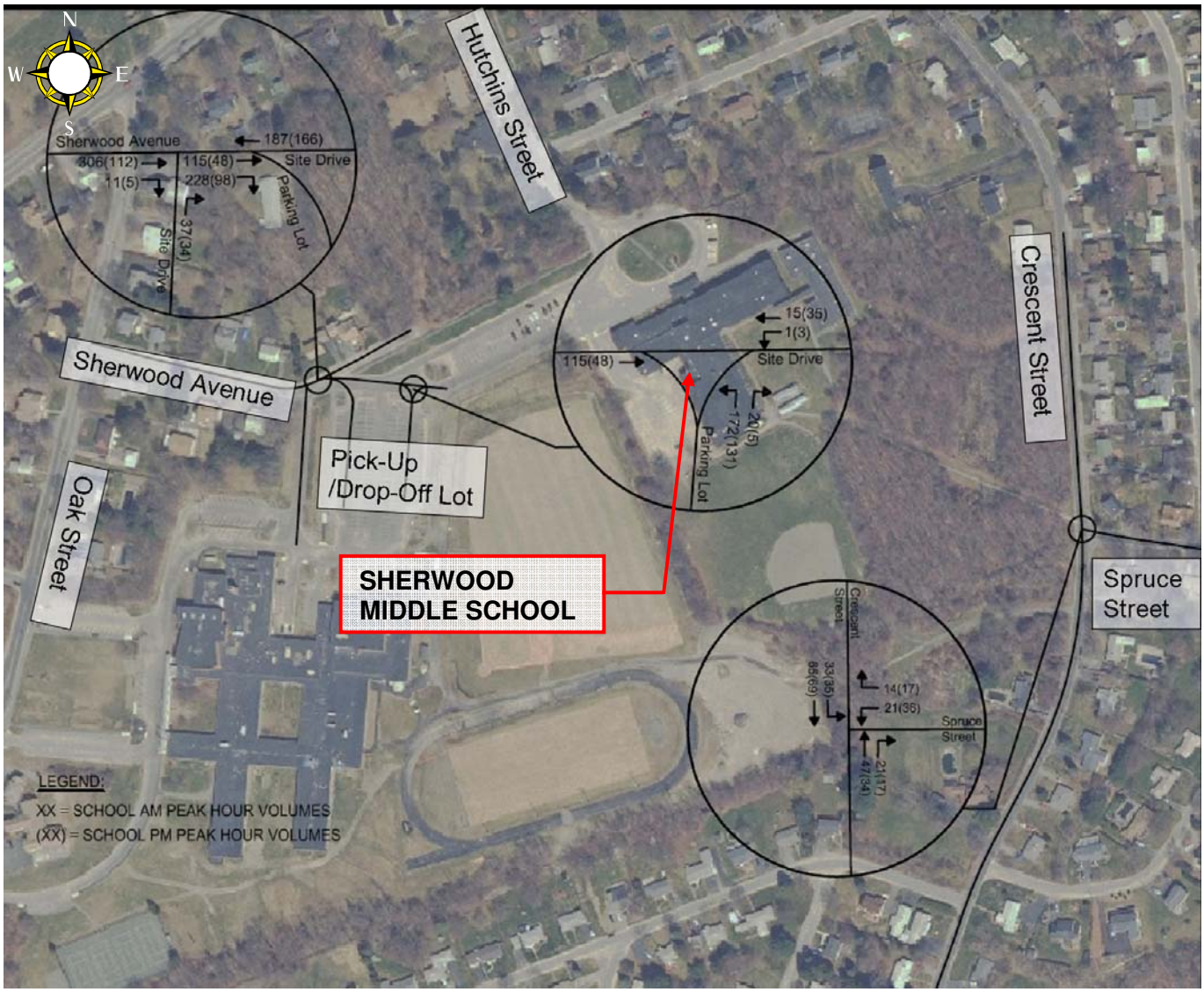
The existing LOS at Crescent Street and Spruce Street is adequate by Mass Highway standards for both the AM and PM peak periods.

2014 No-Build Traffic Volumes

Nitsch Engineering used data from MassHighway's traffic volume counts to determine the background growth in the Town of Shrewsbury[4]. Based on the Average Annual Daily Traffic (AADT) data available, the traffic volumes at count station 3125 on Oak Street, north of Route 9 saw a -2% volume change between 1999 and 2005. However, in order to remain conservative Nitsch Engineering used a background growth rate of 1%. We applied the background growth factor to the 2009 existing traffic volumes to develop the 2014 traffic volumes. The five-year time frame conforms to the Executive Office of Environmental Affairs/Executive Office of Transportation (EOEA/EOT) guidelines for traffic impact assessments.

[4] Massachusetts Highway Department, City/Town Traffic Volume Count Listing, 2007

Figure 7 - 2014 No-Build Traffic Volumes



Nitsch Engineering performed a Level of Service analysis using the 2014 No-Build volumes. Table 6 summarizes the results of the 2014 No-Build condition LOS analysis.

Table 6 - Level of Service Summary - 2014 No-Build

Intersection	Movement/Approach	Weekday School AM Peak Hour		Weekday School PM Peak Hour	
		LOS[1]	Delay[2] (sec)	LOS	Delay (sec)
Sherwood Avenue and Site Drive (West)	Eastbound	B	10.2	A	7.9
	Westbound	A	8.9	A	8.3
	Northbound	A	9.7	A	9.0
Sherwood Avenue and Site Drive (East)	Westbound Left	A	0.5	A	0.6
	Northbound	B	11.9	B	10.2
Crescent Street and Spruce Street	Westbound Left	A	9.5	A	9.6
	Southbound	A	2.6	A	2.6

[1] LOS = level of service
[2] Average delay in seconds per vehicle

The analysis indicates that there would be a minor degradation in LOS (from LOS A to LOS B) on the eastbound approach of Sherwood Avenue and Site Drive (West) in the AM peak for the No-Build conditions when compared to the Existing conditions. It is still an acceptable LOS by Mass Highway Standards.

PROPOSED SHERWOOD MIDDLE SCHOOL

The proposed Sherwood Middle School will be built to the west of the existing middle school, on the existing P7 parking lot and the fields to the east of the lot. The new building will be fully constructed before the old building is demolished. The parking lots at P7, P8, P9, and P10 will be demolished, and replaced with new lots. There will be a new access point to the site off of Crescent Street, across from Spruce Street. The access to Hutchins Street and Sherwood Avenue will be reconfigured.

Oak Middle School will remain unchanged during construction of Sherwood Middle School. The existing site access off of Sherwood Avenue will be reconfigured due to the proposed development.

Vehicle Trip Generation

A typical component of traffic impact studies is a trip generation forecast for the project. Such forecast is based on either established data compiled by the Institute of Transportation Engineers (ITE)[5] or on existing vehicle counts to determine a trip generation rate. Nitsch Engineering used ITE data for trip generation (under Land Use Code (LUC) 522 – Middle School/Junior High School) to estimate the proposed trips to the middle school. The school enrollment as of October 2008 was 917 students, with 123 staff during the 2008-2009 school year. The proposed school will accommodate 900 students.

Using the proposed student population of approximately 900 students, Table 7 below shows school-generated peak hour trips calculated using ITE trip data for middle schools. The volumes only show the traffic associated with Sherwood Middle School, and does not include the traffic for Oak Middle School. This data was used rather than the existing counts, because the existing counts only included the traffic at Sherwood Avenue and Site Drive, and did not include the traffic volumes at other site drives. The trip generation includes all pick-up/ drop-off, employee, and bus traffic.

[5] *Trip Generation, Seventh Edition*; Institute of Transportation Engineers; Washington, D.C.; 2003

Table 7 - Trip Generation - Sherwood Middle School

Time Period	ITE Volumes[3]		
	In	Out	Total
School AM Peak Hour	267	219	486
School PM Peak Hour	126	153	279

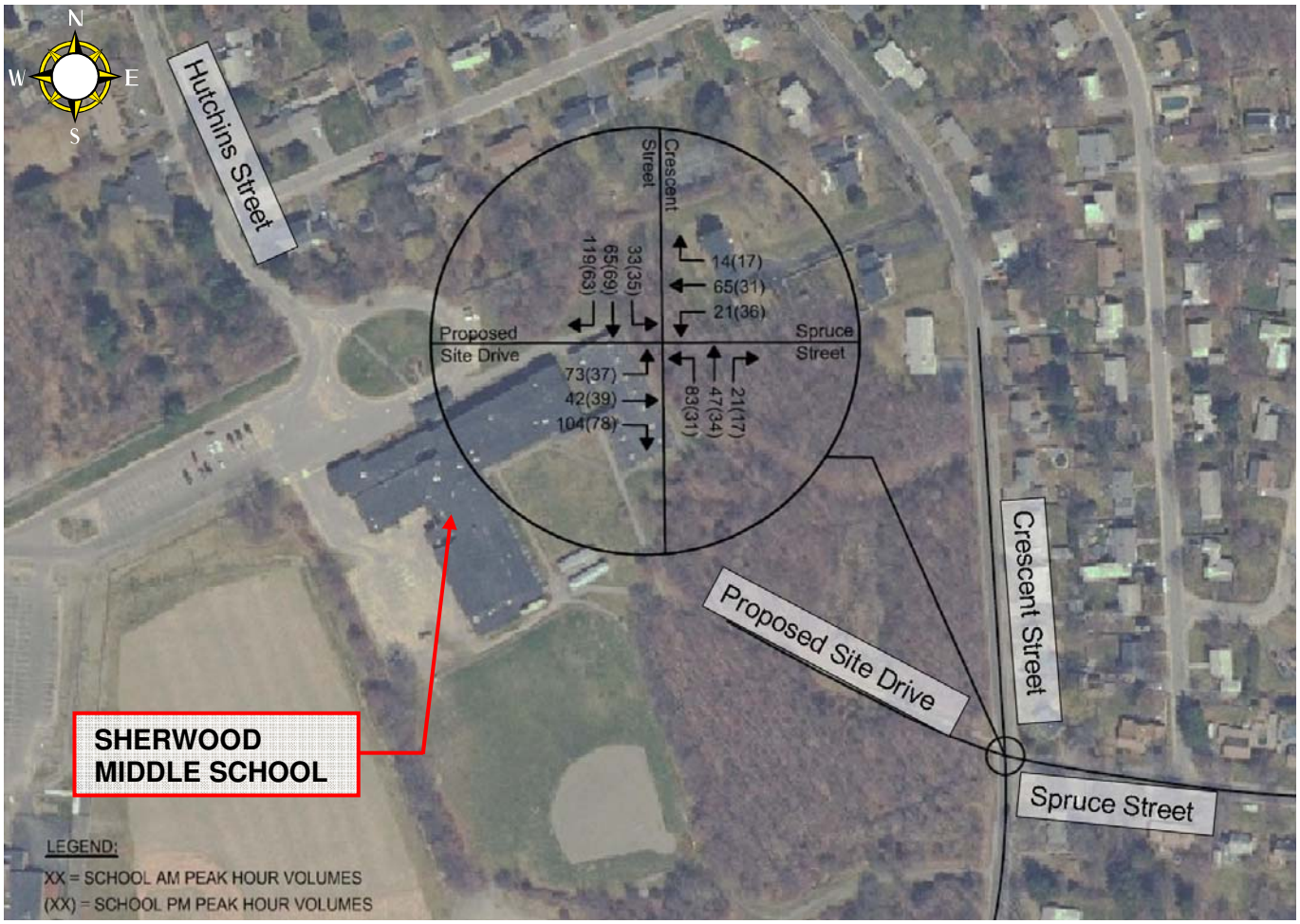
2014 Build Traffic Volumes

There are multiple site drives to the proposed Sherwood Middle School. The incoming and outgoing traffic will be split between the various site drives. For the traffic analysis, Nitsch Engineering assigned all school trips for the proposed school to the intersection of Crescent Street and the Proposed Site Drive to establish a conservative 2014 Build condition. The Proposed Site Drive intersects Crescent Street across from Spruce Street. Nitsch Engineering used trip distribution patterns from the existing (redistributed) traffic volumes to determine the trip distribution for the proposed school. The percentages are shown in Table 8. Significantly less traffic will be using the existing site entrance off of Sherwood Avenue. Since the intersection of Sherwood Avenue and Site Drive achieves an acceptable LOS under existing and no-build conditions, it was not analyzed with a reduction in traffic under build conditions. Figure 8 shows 2014 traffic volumes with the assigned school trips.

Table 8 - Trip Distribution - Sherwood Middle School

Time Period	Incoming			Outgoing		
	NB	SB	WB	NB	SB	EB
School AM Peak Hour	31%	44%	24%	34%	47%	19%
School PM Peak Hour	24%	51%	25%	24%	51%	25%

Figure 8 - 2014 Build Traffic Volumes



2014 Build Level of Service Analysis

Nitsch Engineering performed a Level of Service analysis using the 2014 Build condition traffic network. The intersection of Crescent Street, Spruce Street, and the Proposed Site Drive was analyzed as a four legged, unsignalized intersection with stop control on the eastbound (Site Drive) approach and the westbound (Spruce Street) approach and no control on Crescent Street. Table 9 summarizes the results of the 2014 Build condition LOS analysis.

Table 9 - Level of Service Summary - 2014 Build Condition

Intersection	Movement/Approach	Weekday School AM Peak Hour		Weekday School PM Peak Hour	
		LOS[1]	Delay[2] (sec)	LOS	Delay (sec)
Crescent Street and Proposed Site Drive	Eastbound	C	16.3	B	11.6
	Westbound	C	16.2	B	12.7
	Northbound	A	4.5	A	3.0
	Southbound	A	1.3	A	1.7

[1] LOS = level of service; [2] Average delay in seconds per vehicle

The proposed site drive on Crescent Street maintains an acceptable LOS by Mass Highway standards. In addition, the layout of the intersection is straightforward and does not require the presence of school employees to direct traffic flow. Buses would be prohibited at this access point. This would simplify the pick-up/drop-off and reduce congestion at the existing Site Drive on Sherwood Avenue. A signal warrant analysis at this intersection is not required because the volume of traffic is very low.

PARKING ASSESSMENT

Nitsch Engineering observed parking activities on Thursday, July 30 to determine the current number of parking spaces available. There are a number of different parking areas throughout the site that are shared with the Oak Middle School. The location of the parking lots is shown in Figure 3. Table 10 summarizes the existing parking supply at Sherwood and Oak Middle Schools.

Table 10 - Existing Parking Supply

Lot	P1	P2	P3	P4	P5	P6	P7	P8	P9	P10	**TOTAL**
Total Spaces	9	41	11	30	11	28	167	58	36	8	**399**
Handicap Spaces		3	4				2			3	**12**

During our site visit, we observed 399 general parking spaces and twelve (12) handicap accessible spaces. There are presently 399 parking spaces for approximately 1870 (920 Sherwood Middle School, 950 Oak Middle School) students, generating a parking ratio of 0.21 spaces per student.

The ITE Parking Generation Manual[6] suggests a parking ratio of 0.11 spaces per student, or 1.6 spaces per employee for a Junior/High School. Applying this parking ratio to a student population of 900, the required parking spaces for the Sherwood Middle School would be 99 spaces. Applying a parking ratio of 1.6 spaces per employee for 123 employees, the Sherwood Middle School would require 197 spaces.

Oak Middle School has approximately 950 students and 112 employees. Applying the same parking ratios listed above, the required parking spaces would be 105 based on the student population and 180 based on the number of employees. Using the most conservative estimates, the total number of required parking spaces for both schools is 377.

[6] Institute of Transportation Engineers, Parking Generation, 7th Edition, LUC 522 Middle, Junior/High School

The proposed parking supply is generally higher than the parking demand if we use the existing and ITE's parking ratio. The local zoning for the Town of Shrewsbury requires one (1) parking space for each classroom or office and one (1) parking space for each three (3) seats in an auditorium, whichever is greater. Based on the proposed school size, we anticipate that the total number of required parking spaces would not exceed 377.

CONCLUSIONS/ RECOMMENDATIONS

The existence of multiple one-way roadway sections is confusing to drivers maneuvering through the site. There are missing centerlines on many of the two-way sections, which makes it hard to differentiate between one-way and two-way roadways. The existing configuration of Sherwood Avenue and Site Drive is confusing to drivers and requires attention. School employees are being used to direct traffic flow during the morning and afternoon hours. The buses conflict with the pick-up/ drop-off and employee traffic. This causes extensive queuing on Sherwood Avenue and the Site Drive.

With the proposed school construction, we anticipate the daily traffic on Crescent Street to increase during peak hours, based on a new entrance to the school off of Crescent Street. There will also be a decrease in traffic on Oak Street and Sherwood Avenue during peak hours due to a shift in traffic to Crescent Street. The existing traffic volumes on Crescent Street are low, and should be able to accommodate a shift in traffic without compromising on safety and capacity. Crescent Street is similar in nature and function to Oak Street with access to Route 9 and Maple Street. Redistributing traffic from Oak Street to Crescent Street would not disrupt existing traffic routes for motorists.

The existing parking capacity is sufficient, and any proposals should retain the current number of parking spaces.

Nitsch Engineering makes the following recommendations to reduce delays, enhance safety, and improve efficiency of traffic operations within the Sherwood Middle School campus.

- Move the Sherwood Middle School pick-up/ drop-off to the east side of the proposed school building to reduce conflicts at the intersection of Sherwood Avenue and Site Drive.

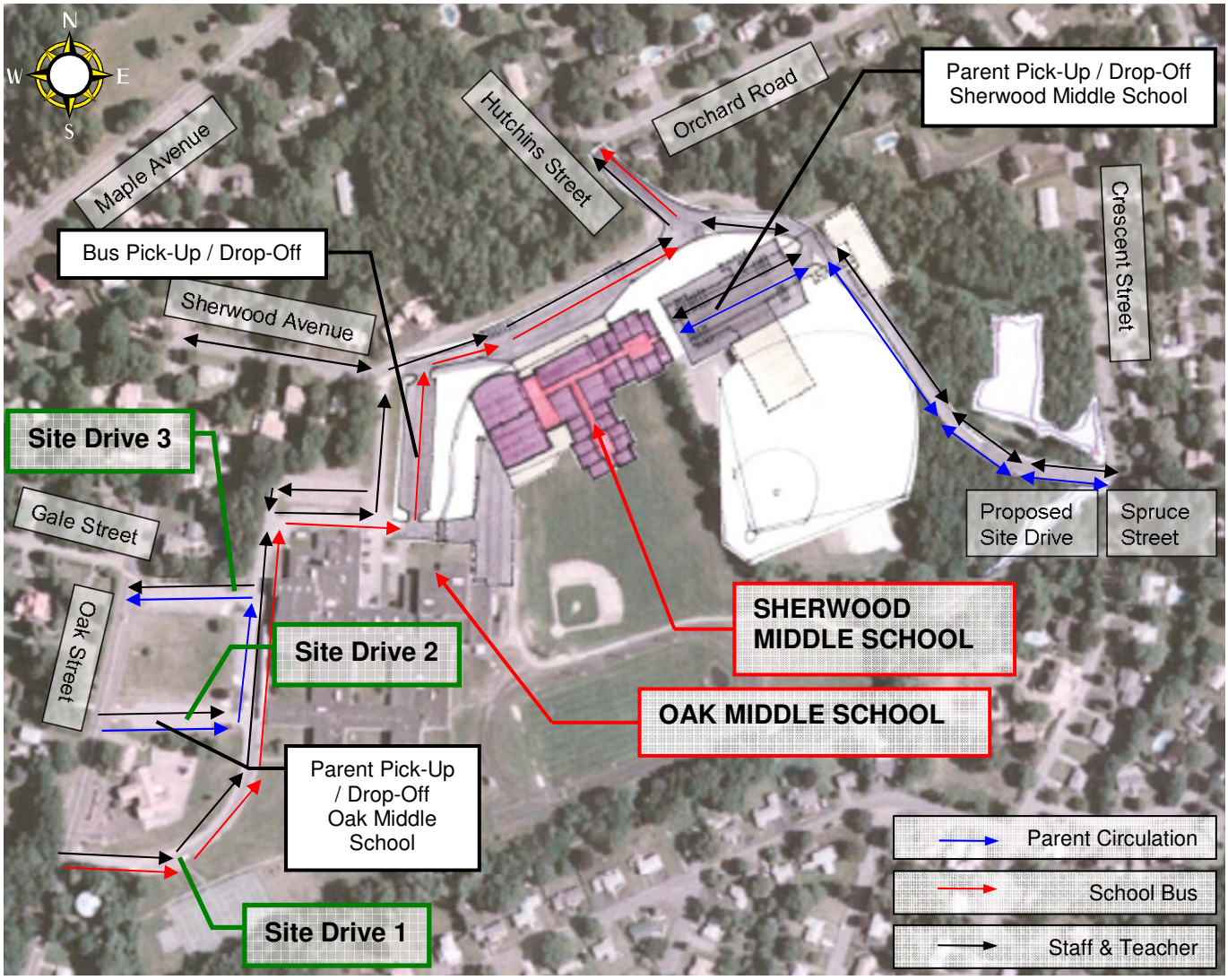
- Provide a single school bus pick-up/ drop-off area for both Oak Middle School and Sherwood Middle School to improve the efficiency of the school bus circulation. This should be located at the new parking lot that replaces P7.

- Relocate the Oak Middle School parent pick-up/ drop-off to the parking areas at Site Drive 2 and Site Drive 3 near Oak Street. This would provide an improved flow of traffic for vehicles entering and exiting the site.

- Provide signage and pavement markings to the north and south of the new access point off of Crescent Street, notifying drivers that they are in a school zone.
    - A warning sign should be introduced advising drivers to slow down for school children.
    - Pavement markings "SLOW" and "SCHOOL", similar to the existing markings on Oak Street, should be introduced on Crescent Street.

With these changes we anticipate a majority of conflicts between buses and pick-up/ drop-off traffic to be eliminated, and the pick-up/ drop-off traffic to get split between Oak Street and Crescent Street. Figure 9 shows the proposed pick-up/ drop-off locations and circulation changes.

Figure 9 - Recommendations



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MEMORANDUM

TO: Lamoureux Pagano Associates c/o Ms. Kathryn Crockett, AIA

FROM: Aaron Gallagher, P.E, LEED AP

DATE: 12/01/2009

RE: Proposed Site/Drainage Features and Permitting Issues

The following memorandum outlines some of the site/drainage features and permitting issues associated with the schematic design documents prepared by Nitsch Engineering (dated 11/17/2009) for the new Sherwood Middle School project:

SITE / DRAINAGE FEATURES

WETLAND REPLICATION AREA

The proposed Sherwood Middle School will permanently affect approximately 2,500 square feet of bordering vegetated wetlands (BVW) subject to regulation by the Shrewsbury Conservation Commission pursuant to the MA Wetlands Protection Act (WPA; MGL Chapter 131, Section 40) and associated regulations (310 CMR 10.00 et. seq.). To compensate for project-related impacts to wetlands, approximately 5,000 SF of uplands onsite will be converted to a mixture of emergent and scrub/shrub wetland communities.

Prior to construction, the boundaries of wetlands will be re-flagged, as will the limits of construction, to preclude unnecessary disturbances. To limit the amount of sediment transported off site by construction vehicles, a stabilized construction entrance/exit will be established. Soil erosion and sedimentation will be minimized by the use of hay bales and silt fences to isolate the construction zone. The installation of soil erosion and sediment controls will comply with the Massachusetts Erosion and Sediment Control Guidelines for Urban and Suburban Areas (Franklin, Hampden, Hampshire Conservation Districts; March 2003). These controls will be inspected and maintained periodically, as required, until such time that their removal is approved by the Shrewsbury Conservation Commission (SCC).

In addition to requiring that the surface area of affected BVW be replaced by a 2:1-sized compensation area, the WPA regulations at 310 CMR 10.55(4)(b) require the following:

- The ground water and surface elevation of the replacement area shall be approximately equal to that of the lost area;
- The overall horizontal configuration and location of the replacement area with respect to the bank shall be similar to that of the lost area;
- The replacement area shall have an unrestricted hydraulic connection to the same water body or waterway as the lost area; and
- At least 75% of the surface of the replacement area shall be reestablished with indigenous wetland plant species within two growing seasons, and prior to said vegetative reestablishment any exposed soil in the replacement area shall be temporarily stabilized to prevent erosion in accordance with standard U.S. Soil Conservation Service methods.

The wetland restoration plan for the site should comply with each of the construction-related requirements listed above. It also is anticipated that within two growing seasons following construction of the proposed replication areas, at least 75% of the surface of these areas will be reestablished with indigenous wetland plant species.

With respect to the implementation of wetland replication activities, it is recommended that the Contractor retain the services of a qualified Wetland Scientist to oversee and monitor replication site construction, and to adjust the replication plan depending upon site-specific conditions revealed during the construction process, as may be required.

Replication Site Preparation

Following the installation of soil erosion and sediment controls, debris and existing vegetation within the wetland replication areas will be cleared. The replication sites then will be over-excavated by a minimum of 12 inches relative to the elevations of adjacent wetlands. Excavated materials shall be removed to a location beyond the 100-foot Buffer Zone to the wetland area.

Subsequently, each replication area will be back-filled with 12 inches or more of organic-rich soils. These soils will consist of natural topsoil consisting of loam as defined by the U.S. Department of Agriculture/Natural Resources Conservation Service (NRCS) and will be placed within the over-excavated portion of the wetland replication area to attain final grades, as indicated on the grading plans. The loam to be used at the wetland replication sites will have an organic carbon content on a dry weight basis of 8% - 12% (13.76% – 20.64% organic matter.)

In lieu of natural soils, manmade soils consisting of loam with equal volumes of organic and mineral materials can be used. In this regard, clean leaf compost or other soil amendment(s) may be used to meet the requisite organic carbon/organic matter content noted above.

It is expected, however, that the General Contractor's Wetland Scientist will make adjustments to the above-referenced site preparation guidelines if determined to be warranted based upon site-specific subsurface, hydrologic and/or other relevant conditions observed during site preparation. In the event changes to the site preparation are determined to be warranted, the SCC or its agent will be notified. Any such changes only will be implemented following approval by the SCC or its agent.

Replication Site Planting

The application of the seed mix, as referenced below, will be conducted in accordance with procedures provided by the nursery supplying the seed mix. Additionally, the seed will be furnished and delivered in new, clean, sealed, and properly labeled containers. All seed will comply with State and Federal seed laws. Seed which has become wet, moldy or otherwise damaged shall not be acceptable.

Re-vegetation of the wetland replication area will include the mechanical application or application via hydro-seeding of the seed mix specified in Tables 3-I, below. New England Roadside Matrix Wet Meadow Seed Mix (or equivalent)will be applied to each wetland replication area to establish a mixture of both woody and herbaceous vegetation. If applied via hydro-seeding, the hydro-seed mixture will contain a green dye to allow for easy visual metering during application, and shall be nontoxic to plant life or animal life. The seed mix will be applied at a rate of 1 lb/1,245 square feet or as specified otherwise by the nursery supplying the seed mix.

As with the establishment of final replication site grades/elevations, it is anticipated that the planting plan will be adjusted by the Wetland Scientist if determined to be warranted based upon site-specific subsurface, hydrologic and/or other relevant conditions observed during site preparation. In the event changes to the planting plan are

determined to be warranted, the SCC or its agent will be notified. The adjusted/revised planting plan will not be implemented until approved by the SCC or its agent.

Upon completion of seed mix application, each wetland replication area will be covered with a 100% biodegradable (e.g. straw/coconut fiber) erosion control blanket with 100% biodegradable netting. The erosion control blanket will be installed in accordance with the manufacturer's/distributor's specifications. Following installation of the erosion control blanket, the wetland replication areas will be watered as directed by the Wetland Scientist, with watering to continue at the direction of the Wetland Scientist. Water to the site, including hose and all other watering equipment required for the work, is expected to be furnished by the Contractor and be suitable for irrigation and free from ingredients harmful to plant life.

All plantings will occur either following snow-melt in the spring, but no later than April 30th. It is anticipated that the Wetland Scientist will verify this planting schedule with the nursery supplying the seed mix prior to seed mix application.

New England Roadside Matrix Mix (or equivalent)

The New England Roadside Matrix Mixes are designed for use along roads and highways. These mixes are unusual in that they blend native grasses, wildflowers and shrubs together in a native matrix seed mix. In areas that receive frequent mowing, such as those closest to the roadway shoulder, the warm season grasses will dominate. In areas farther from the road that may be mown only once each year, or in hard to mow areas such as around sign posts, the wildflower component will become dominant. Along cuts and side slopes that may never be mown, the shrub component will add diversity, beauty, and wildlife habitat to the roadside plantings. These are particularly appropriate seed mixes for roadsides, industrial sites, or cut and fill slopes.

Seeding**:** These mixes may be applied by hydro seeding or by mechanical spreader. When applying on bare soil, rake the soil to create a slightly rough surface, apply seed, then gently rake over. Best results are obtained with a Spring or Summer seeding. Summer seeding will be successful with a light mulching of weed free straw to conserve moisture. These mixes are not well suited to late Fall or Winter dormant seeding.

New England Roadside Matrix Wet Meadow Seed Mix

Species: GRASSES: Switch Grass (*Panicum virgatum*), Creeping Red Fescue (*Festuca rubra*), Virginia Wild Rye (*Elymus virginicus*) WILDFLOWERS: Nodding Bur-marigold (*Bidens cernua*), Blue Vervain (*Verbena hastata*), Flat-top Aster (*Aster umbellatus*), Spotted Joe Pye Weed (*Eupatorium maculatum*) , Boneset (*Eupatorium perfoliatum*) SHRUBS: Arrowwood (*Viburnum dentatum*), Silky Dogwood (*Cornus amomum*), Nannyberry (*Viburnum lentago*)

Application Rate: 35 LBS/ACRE (1245 SQ. FT/LB.)

Source: New England Wetlands Plants, Inc. (2007)

Monitoring and Maintenance Plan

Wetland replication site monitoring will include supervision of all wetland replication activities, including but not limited to the installation of soil erosion and sedimentation controls, excavation of wetland replication areas, soils introduction and grading, and re-vegetation of the replication areas. Monitoring will be conducted by a qualified Wetland Scientist, anticipated to be retained by the Contractor.

Unless specified otherwise in the Order of Conditions, the Wetland Scientist will monitor the above-referenced activities throughout the wetland replication area construction effort. Following wetland replication area construction,

the Wetland Scientist shall monitor the replication area at least twice annually for a minimum of three (3) growing seasons (on or about June 1st and September 15th), or until a Certificate of Compliance is issued by the SCC. During this monitoring period, annual monitoring reports will be prepared and filed with the SCC, as described below.

Prior to replication area construction, photographs will be taken to document existing site conditions. Photographs also will be taken during and after each phase of site preparation and planting. Each photograph will note the date, time, weather, and other relevant observations.

As noted above, the Wetland Scientist shall monitor the replication area at least twice annually for a minimum of three (3) growing seasons (on or about June 1st and September 15th) following wetland replication area construction, or until a Certificate of Compliance is issued by the SCC. During each monitoring event, the Wetland Scientist will record baseline data within each replication area. These data will consist of plant species composition and percent cover, based upon direct observations and visual estimates. Photographs of the wetland replication area also will be taken coincident with each monitoring event. Each photograph will note the date, time, weather, and other relevant observations.

Additionally, general observations will be made during each monitoring event relative to the integrity of erosion/sedimentation controls, the establishment of vegetation, side-slope stabilization, and factors/events adversely affecting the viability of the wetland replication area. These factors/events may include herbivory or invasion by such species as common reed (*Phragmites australis*). In this regard, it is important to note that, due to the existing presence of *Phragmites* and its naturally aggressive growth habit, the elimination of this plant species from the replication areas may not be either feasible or practicable.

Regardless, in the event invasive plant species are observed in the replication area(s) and if corrective action is deemed warranted, the Wetland Scientist will coordinate with the SCC to determine the most appropriate course of action, if any, prior to implementation of any remedial actions/controls. The Wetland Scientist will take similar coordination actions in the event that indigenous wetland plant species have not become established over at least 75% of the surface of the replication area following the second growing season.

For the duration of the monitoring period, monitoring reports will be prepared annually and provided to the SCC. In addition to summaries of annual monitoring events, the monitoring reports will address the following:

- Consultations with the SCC or its agent relative to the wetland replication areas
- Remedial actions/controls conducted during the monitoring year, including those conducted to improve the success potential of the wetland replication program.
- Recommendations for future remedial activities
- Monitoring Report Appendices, including:

    - An 'as-built' grading plan showing plant existing and replicated plant communities by vegetative type
    - A list of volunteer plant species in each plant replication area by community type
    - Representative photographs of the replication areas taken from the same location for each monitoring event, and map(s) indicating the locations of photographic stations

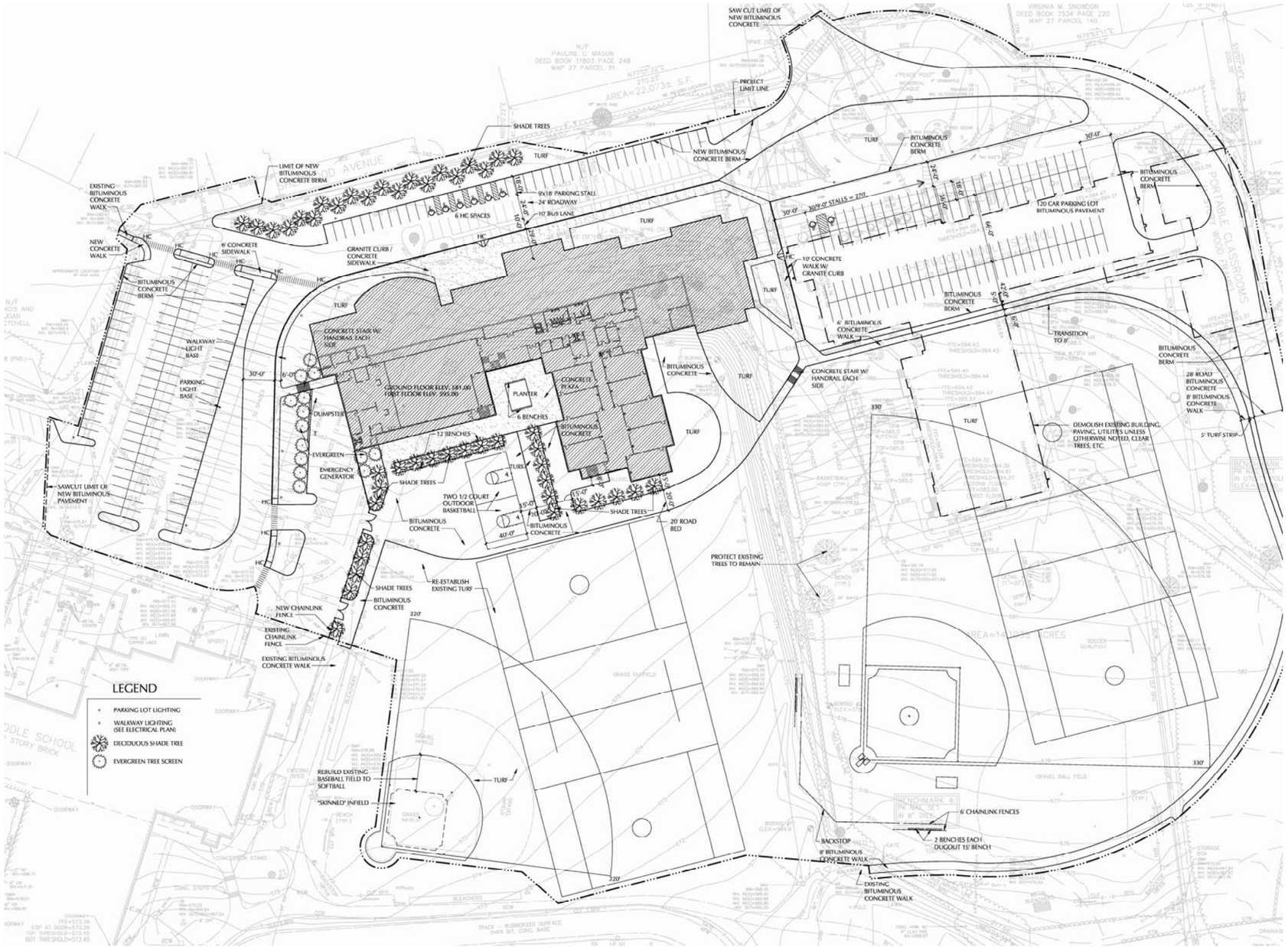
The first annual report will be prepared at the end of the first growing season following implementation of the wetland replication plan. The monitoring reports will be submitted to the SCC no later than December 15th following each growing season, and will reference the project name and location, the monitoring report number (e.g. Monitoring Report 1 of 3) and relevant permit/file number(s).

STORM DRAINAGE SYSTEM:
The storm drainage system being proposed for this project is a closed system consisting of underground plastic piping, deep sump hooded catch basins, water quality structures and an underground detention/infiltration system (large diameter perforated pipe wrapped in stone and geotextile fabric) as detailed on sheet C203 of the schematic design documents dated 11/17/09.

PERMITTING REQUIREMENTS

Since this project will disturb more than one acre of land, a National Pollutant Discharge Elimination System (NPDES) Stormwater Construction General Permit also will be required. To apply for coverage under this General Permit, a Notice of Intent will be submitted to the U.S. Environmental Protection Agency prior to the commencement of construction. This Notice of Intent requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP) for construction activities. The SWPPP is a detailed erosion and sediment control plan that indicates the structural and non-structural erosion and sediment controls that will be employed, as appropriate, to control erosion on the construction sites. These measures will include such items as temporary seeding, mulching, silt fences, check dams and storm drain inlet protection. The SWPPP also will include provisions that these erosion control measures be inspected regularly to ensure that they are functioning properly.

The project is proposing to permanently alter areas of Bordering vegetated Wetlands (BVW) and do work within the 100-foot buffer sone of the BVW located on-site. This will require the filing of a Notice of Intent (NOI) with the Shrewbury Conservation Commission and the issuance of an Order of Conditions.


SAW CUT LIMIT OF NEW BITUMINOUS CONCRETE
PROJECT LIMIT LINE
SHADE TREES
LIMIT OF NEW BITUMINOUS CONCRETE BERM
NEW BITUMINOUS CONCRETE BERM
EXISTING BITUMINOUS CONCRETE WALK
9'x18' PARKING STALL
24' ROADWAY
10' BUS LANE
6 HC SPACES
NEW CONCRETE WALK
6' CONCRETE SIDEWALK
GRANITE CURB / CONCRETE SIDEWALK
BITUMINOUS CONCRETE BERM
WALKWAY LIGHT BASE
PARKING LIGHT BASE
CONCRETE STAIR W/ HANDRAIL EACH SIDE
GROUND FLOOR ELEV. 581.00
FIRST FLOOR ELEV. 595.00
CONCRETE PLAZA
PLANTER
6 BENCHES
12' BENCHES
DUMPSTER
EVERGREEN
EMERGENCY GENERATOR
BITUMINOUS CONCRETE
TURF
SAWCUT LIMIT OF NEW BITUMINOUS PAVEMENT
TWO 1/2 COURT OUTDOOR BASKETBALL
20' ROAD BED
RE-ESTABLISH EXISTING TURF
NEW CHAINLINK FENCE
EXISTING CHAINLINK FENCE
EXISTING BITUMINOUS CONCRETE WALK
PROTECT EXISTING TREES TO REMAIN
T20 CAR PARKING LOT BITUMINOUS PAVEMENT
10' CONCRETE WALK W/ GRANITE CURB
6' BITUMINOUS CONCRETE WALK
TRANSITION TO 6'
28' ROAD BITUMINOUS CONCRETE
8' BITUMINOUS CONCRETE WALK
5' TURF STRIP
DEMOLISH EXISTING BUILDING, PAVING, UTILITIES UNLESS OTHERWISE NOTED, CLEAR TREES, ETC.
LEGEND
PARKING LOT LIGHTING
WALKWAY LIGHTING (SEE ELECTRICAL PLAN)
DECIDUOUS SHADE TREE
EVERGREEN TREE SCREEN
REBUILD EXISTING BASEBALL FIELD TO SOFTBALL
"SKINNED" INFIELD
6' CHAINLINK FENCES
2 BENCHES EACH DUGOUT 15' BENCH
BACKSTOP
8' BITUMINOUS CONCRETE WALK
EXISTING BITUMINOUS CONCRETE WALK
220'
330'

1.15 PREFERRED SCHEMATIC DESIGN

B. Environmental Assessment

- 21E Phase 1 Assessment
- ANRAD Filing

PHASE I
ENVIRONMENTAL SITE ASSESSMENT

28 Sherwood Avenue
Shrewsbury, Massachusetts

Prepared for:

Mr. Ammar Dieb
Universal Environmental Consultants, Inc.
12 Brewster Road
Framingham, MA 01702

Prepared by:

Lord Associates, Inc.
1506 Providence Highway, Suite 30
Norwood, Massachusetts 02726

Project # 1479

September 21, 2009

Lord Associates, Inc.
Environmental Consulting & Licensed Site Professional Services

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September 21, 2009

Mr. Ammar Dieb
Universal Environmental Consultants, Inc.
12 Brewster Road
Framingham, MA 01702

RE: Phase I Environmental Site Assessment
28 Sherwood Avenue
Shrewsbury, Massachusetts

Dear Mr. Dieb:

Lord Associates, Inc. has completed a Phase I Environmental Site Assessment of the referenced property ("Site"). Environmental investigations were completed with consideration to standard industry practice, the ASTM E-1527 site assessment standard entitled "Environmental Site Assessments for Commercial Real Estate", applicable regulations as defined by Chapter 21E of the Massachusetts General Laws, and the Massachusetts Contingency Plan (MCP, 310 CMR 40.0000). The purpose of this assessment was to identify "Recognized Environmental Conditions" as defined in ASTM E-1527-05, and to determine if additional investigation is warranted. A summary of conclusions and recommendations is presented below.

Through the course of this Phase I Environmental Site Assessment, no Recognized Environmental Conditions were identified at the Site. Two conditions of concern were identified. In 1993, a single 10,000-gallon underground fuel oil storage tank (UST) was removed from the west side of the building in 1993; no soil testing results were made available through records reviewed in this assessment. In order to determine whether a release has occurred in the area of this former UST, soil testing would have to be performed. Secondly, based on the age of the building, it is possible that PCBs may be present in light fixtures and caulking.

We appreciate the opportunity to have provided our professional environmental consulting and analytical services.

Sincerely,
LORD ASSOCIATES, INC.

Ralph Tella, CHMM, LSP
Vice President

Andrea J. Lang
Project Manager

Enc.: Phase I ESA

TABLE OF CONTENTS

1.0 INTRODUCTION

1.1 Purpose

Lord Associates, Inc. (LAI) has completed a Phase I Environmental Site Assessment for 28 Sherwood Avenue in Shrewsbury, Massachusetts. The purpose of this assessment was to identify "Recognized Environmental Conditions" as defined in ASTM standard E1527-05, and to determine if additional investigation is warranted.

Recognized Environmental Conditions are defined as the presence or likely presence of any hazardous substances or petroleum products on the property under conditions that indicate an existing release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property. The term Recognized Environmental Conditions is not intended to include *de minimis* conditions which generally do not present a material risk of harm to public health or the environment, and that generally would not be the subject of a notification and/or enforcement action if brought to the attention of appropriate governmental agencies.

The Phase I consisted of a Site reconnaissance, and an assessment of the Site and surrounding properties for visual and/or olfactory evidence of the use, storage, and/or release of oil and/or hazardous material. The Phase I also included a review of federal, state, and local agency files regarding the history of the Site and surrounding area relative to the use, storage and/or release of oil and/or hazardous material.

Please note that an investigation for the presence of lead based paint or asbestos is beyond the scope of work described by ASTM E1527-05, therefore LAI did not explore those conditions.

1.2 Project Scope

This assessment was performed following standard industry practice and with consideration to the ASTM E-1527 site assessment standard entitled "Environmental Site Assessments for Commercial Real Estate." Limitations to this practice are described in Lord Associates, Inc.'s proposal and **Section 6.0** of this report. The investigation included completion of the following tasks:

1. A field investigation was performed including a visual surficial inspection of the Site and abutting properties; and

2. The following agencies were contacted to inquire of past ownership, complaints, or violations concerning environmental issues at the Site and vicinity.

   - The Massachusetts Department of Environmental Protection (MADEP)
   - The Shrewsbury Tax Assessor's Office

The Site is located in an Area of Critical Environmental Concern (ACEC) defined as protected open space. Two additional ACECs are located within ½-mile of the Site, both of which are protected open spaces, located approximately 0.15 miles to the northeast and approximately 0.20 to the northwest of the Site.

2.3 Hydrogeology

According to the United States Geological Survey (USGS) Marlborough Quadrangle Topographical Map, the elevation of the Site is approximately 594 feet above mean sea level. Topography of the Site vicinity is flat with a slight slope to the south. The direction of groundwater flow in the vicinity is assumed to the south.

No water bodies are located on the Site. No local water bodies are located within a half-mile of the Site.

According to the Bureau of Waste Site Cleanup Priority Resources Maps published by the MADEP, the Site is not located within a current or potential drinking water source area.

2.4 Site Description and Usage

The Site is approximately 14.2 acres of land located on the south side of Sherwood Avenue in Shrewsbury, Massachusetts. One two-story school building occupies the northern portion of the Site. The Site building is surrounded by asphalt paved driveways and parking areas to the north. Basketball courts exist to the west, and sports fields to the south. Wooded land exists to the east. The Site is used as a middle school, grades 5 and 6. A detailed Site description is presented in **Section 3.0**.

2.5 Environmental Liens

There was no information reported over the course of this investigation by "users" with respect to environmental liens pertaining to the Site. Users are defined by ASTM as "the party seeking to use Practice E 1527 in the environmental site assessment process."

2.6 Site History

Research regarding historical land usage of the Site and surrounding properties was conducted using data obtained from parties familiar with the Site, and municipal officials. Based on information gathered through the course of this assessment, the following history of the Site has been prepared:

During an interview, Mr. Robert Cox, Superintendent of Shrewsbury Public Buildings, indicated that the school was constructed in 1964 and used as the Shrewsbury Junior High School. Reviews of 1941 and 1953 historical topographical maps of the Worcester Quadrant indicate that the Site was previously undeveloped land.

3.0 SITE INSPECTION

On September 14, 2009, LAI personnel conducted on-Site inspections, which consisted of a visual examination of the Site and portions of adjacent properties and interviews with Site personnel. Areas were examined for surficial indications of releases of OHM.

Mr. Robert Cox accompanied our personnel during the inspection. A Site Plan depicting significant features observed is included as **Figure 3** and photographs are included in **Appendix A** of this report.

3.1 Interior Inspection

One two-story school building with basement is located on the Site. It is constructed with brick, steel and concrete foundation. It is currently occupied by Sherwood Middle School, and houses the 5th and 6th grades. According to Mr. Cox, the main building was constructed in 1964 and is connected to municipal water, sewer and electric. In 1995, 11 modular classrooms were added on to the eastern side of the original building and are also connected to municipal water, sewer and electric.

The main building occupies two-stories and an area of approximately 89,957 square feet. Most of the classrooms are comprised of 12" x 12" vinyl floor tile, plaster ceiling and ceramic tiled and acoustic tiled walls. The corridors and stairwells are comprised of 12" x 12" vinyl floor tile, plaster ceilings and brick walls. The main building is heated using fuel-oil-fired forced hot air. A 9,500-gallon underground fuel storage tank (UST) is located in the western exterior portion of the Site.

A kitchen area exists on the western side of the building. Floor drains and a grease trap were observed in this area. Mr. Cox indicated that the all of the floor drains in the building are connected to the municipal sewer system. The grease trap is cleaned twice a year and is connected to the sewer system. Two sets of Boys and Girls restrooms exist off the main corridor on each floor. Floor drains were observed in the restrooms. A hydraulic elevator exists on the southern side of the building. The elevator was installed in 1993 and routine maintenance is performed on the elevator four times a year. No evidence of significant staining or a release was observed in the vicinity of the hydraulic reservoir. Three high voltage transformers are located in a first floor electrical room; LAI was not able to gain access to the room. However, Mr. Cox indicated that the old transformers were removed approximately three years ago by the electric company as part of routine upgrades to remove any PCB containing equipment.

PCBs can be found in hydraulic-oil filled electrical equipment (such as motors and pumps), capacitors or transformers, and fluorescent light ballasts manufactured prior to July 2, 1979. LAI observed fluorescent light fixtures throughout the Site. Age of the fixtures could not be determined. However, it is not likely that they are thirty years old and still working. Additionally, any light ballast manufactured after 1979 must be labeled "No PCB". Note that electric light ballasts that contained PCBs had less than 1.5 ounces of PCB. The reportable quantity requiring notification to the Massachusetts Department of Environmental Protection of a release is one pound. Therefore the risk presented by PCB-containing ballasts is relatively low.

A garage area with bay door is located on the western side of the building. The room contains yard maintenance equipment, a fire resistant cabinet containing extra gasoline, and small containers of maintenance supplies, three 5-gallon buckets of fuel additive, one 55-gallon drum without a label, and one 55-gallon drum of solvent cleaner for the boiler.

The two boilers and hot water tank is located adjacent to the garage maintenance area. The pilots for the two boilers are light by natural gas. A sump is located in the boiler room and according to Mr. Cox is connected to the sewer system. A generator was observed in one of the maintenance rooms, it is fueled with diesel oil contained in a belly aboveground storage tank (AST) with a secondary containment system. Lord Associates, Inc. personnel did not observe any evidence of on-Site releases of OHM.

The modular classrooms occupy an area of approximately 11,836 square feet, and are constructed on concrete pillars. The modular classrooms are heated using natural gas-fired forced hot air. LAI personnel did not inspect the roof.

3.2 Exterior Inspection

The Site consists of approximately 14.2 acres. Automobiles were parked on the asphalt surface located on the northern side of the Site. Basketball courts exist on the western side of the Site and sports fields to the south. Wooded land exists to the east. One 9,500-gallon underground fuel storage tank (UST) is located in the western side of the Site, under the basketball courts. An out-of-use sawdust collector was observed on the exterior portion of the western side of the building.

No evidence of a significant surface release of oil or hazardous material was observed through the course of our inspection.

3.3 Oil or Hazardous Materials

OHM observed on the Site during the inspections consisted of the following:

- Container of gasoline
- Three 5-gallon buckets of fuel additive
- One 55-gallon drum without a label
- One 55-gallon drum of solvent cleaner for the boiler
- One 250-gallon diesel AST associated with the generator

3.4 Underground Fuel Storage Tanks (USTs)

One 9,500-gallon underground fuel storage tank (UST) was installed in 1993 and is located in the western exterior portion of the Site, under the basketball courts. A Fire Department Permit for the removal of one 10,000-gallon UST was dated October 13, 1993. No records of soil testing were available in files reviewed. According to Mr. Cox the 9,500-gallon UST was installed in the tank grave of the 10,000-gallon UST.

3.5 Indications of Polychlorinated Biphenyls (PCBs)

Lighting fixtures located throughout the building may contain polychlorinated biphenyls (PCBs) in their electric ballasts. Based on the age of the building (1964), it is also possible that caulking may contain PCBs.

3.6 Solid Waste Disposal

Two solid waste dumpsters were observed at the Site. No evidence of a release of OHM was observed in the area of the dumpster.

3.7 Previous Environmental Investigations

According to Mr. Cox, previous environmental investigations have not been completed at the Site.

An asbestos abatement project began in 1989, asbestos and air quality monitoring has been completed annually since that time.

3.8 Surrounding Lot Features

Residential properties surround the Site to the north, south and east. A school is located to the west. No bulk fuel storage was observed on adjacent properties.

4.0 RECORDS REVIEWS

A review of federal, state and local regulatory agency files was conducted in accordance with ASTM E-1527-05 standards to identify the use, generation, storage, treatment, disposal and/or release of oil and/or hazardous materials that may potentially impact the Site.

4.1 Municipal Offices

4.1.1 Assessors Office

Lord Associates, Inc. visited the municipal Assessor's Office to review historical ownership information for the Site. This data was reviewed for the purposes of land use determination and should not be relied upon as a complete chain of title. The field card indicates that the Site is zoned "Res B-1, residential." **Table 3** is a summary of ownership information obtained at the assessor's office for the Site.

Table 2
Chain of Title

Grantee	Date of Acquisition	Book/Page
Town of Shrewsbury	12/13/1962	4338/283

LAI reviewed records with the Worcester County Registry of Deeds for the Site, which date back to 1978. No additional records were available for the Site.

4.1.2 Health Department

Lord Associates, Inc. made inquiries at the municipal Health Department. No records were available regarding the Site.

4.1.3 Building Department

A review of files was requested at the municipal Building Department to obtain information on historical building alterations. The following building permits were reviewed:

- Elevator Installation, dated August 18, 1993
- Addition of modular classrooms, dated July 14, 1995
- Temporary trailers, dated October 18, 2001
- Removal and replacement of siding, repair the roof of corridor connecting the modular classrooms, dated October 30, 2003
- Interior renovation, dated June 23, 2004

Flood Insurance Rate Maps (FIRM) was also available for review at the building department. According to the map on file dated June 4, 1980, the Site is located within an area designated as Zone C, indicating an area of minimal flooding.

4.1.4 Water Department

Personnel at the municipal Water Department reported that the Site was connected to the public water supply in 1964.

4.1.5 Conservation Commission

A review of files was requested at the Conservation Commission regarding environmental violations. No records were available regarding the Site.

4.1.6 Fire Prevention

Lord Associates, Inc. requested a review of information regarding the storage of hazardous materials at the Site from the municipal Fire Prevention Office. The Fire Prevention Office had a permit on file dated October13, 1993, for the removal of a 10,000-gallon heating oil UST. No records of soil testing were available in files reviewed.

4.1.7 Public Library

A request was made at the municipal Public Library for historical town directories. No historical town directories were available.

4.2 Sanborn Map Review

Sanborn Fire Insurance Maps were reviewed for the Site and vicinity. Sanborn Maps usually show property use and underground commercial fuel storage for the purposes of insurance companies. Maps were not available for the Site.

4.3 Radius Search for Properties of Environmental Concern

A radius search was conducted of federal and state-listed sites of potential environmental concern as outlined in ASTM E-1527 guidelines. The search was performed using software developed by First Search Technology Corporation. Sites identified within the designated ASTM search radii are summarized in the following table. The FirstSearch report is included in **Appendix B.**

Table 5
Properties of Potential Environmental Concern

NPL (1 mi.)	RCRIS TSDF (1 mi.)	CERCLIS (0.5 mi.)	Landfill (0.5 mi.)	STATE SITES (0.5 mi.)	SPILLS (0.25 mile)	ERNS (Site/ Abutters)	RCRIS (Site/ Abutters)	UST (Site/ Abutters)
NI	NI	NI	NI	Residence 15 Dawson Cir 2-10970/RAO 0.29-mile SE Elev. Diff = -55 Sheperd Residence 59 Janet Cir 2-16118/RAO 0.45 mile SE Elev. Diff = -19	NI	NI	NI	NI

Notes:
All above locations are in Shrewsbury, Massachusetts
N=north, S=south, W=west, E=east
Elev. Diff = Difference in elevation from Site
NPL = National Priorities List
RCRIS = Resource Conservation and Recovery Information System
TSDF = Treatment Storage & Disposal Facilities
ERNS = Environmental Response Notification System
NI = None Identified
RAO = Closed in accordance with MADEP Regulations
TierII = Listed with MADEP due to oil or hazardous material in soil/groundwater (not closed)
DPS = Downgradient Property Status (contamination is from an upgradient source)
UST = Underground Storage Tank

4.4 Massachusetts Department of Environmental Protection Review

Site-specific files were not reviewed at the Massachusetts Department of Environmental Protection (MADEP) since sites identified in the FirstSearch report have been closed out by the MADEP or the identified properties are located topographically and/or hydraulically downgradient from the Site. The identified properties, therefore, are not suspected to pose significant environmental threat to the Site.

5.0 RESTRICTIVE CONDITIONS

5.1 Limitations & Deviations

LAI did not identify any limitations or deviations during the Phase 1 Environmental Site Assessment that would affect the ability to identify conditions indicative of a release or threatened release or Recognized Environmental Conditions.

5.2 Significance of Data Gaps

LAI did not identify any data gaps during the course of the Phase 1 Environmental Site Assessment that would affect the ability to identify conditions indicative of a release or threatened release or Recognized Environmental Conditions (RECs).

6.0 SUMMARY OF FINDINGS AND CONCLUSION

Lord Associates, Inc. has completed a Phase I Environmental Site Assessment of the Site. This assessment was performed with consideration to standard industry practice and the ASTM E-1527 site assessment standard entitled "Environmental Site Assessments for Commercial Real Estate". Our findings are presented below:

1. Information provided indicates that the Site consists of a single lot totaling approximately 14.2 acres of land located south of Sherwood Avenue in Shrewsbury, Massachusetts. The Site is designated as Lot 93 on Shrewsbury Tax Assessor's Map 27. One two-story school building occupies the northern portion of the Site. The Site building is surrounded by asphalt paved driveways and parking areas to the north. Basketball courts exist to the west, and sports fields to the south. Wooded land exists to the east. The Site is used as a middle school, grades 5 and 6.

2. During an interview, Mr. Robert Cox, Superintendent of Shrewsbury Public Buildings, indicated that the school was constructed in 1964 and used as the Shrewsbury Junior High School. Reviews of 1941 and 1953 historical topographical maps of the Worcester Quadrant indicate that the Site was previously undeveloped land.

3. The Site is located in an Area of Critical Environmental Concern (ACEC) defined as protected open space. Two additional ACECs are located within ½-mile of the Site, both of which are protected open spaces, located approximately 0.15 miles to the northeast and approximately 0.20 to the northwest of the Site.

4. Lord Associates, Inc. conducted an inspection of the Site consisting of a visual examination of the Site, immediate surrounding features, and abutting properties. The building is connected to municipal water, sewer and overhead electric. Hanging fluorescent lighting fixtures were observed throughout the building. Although unlikely, given the age of the building, these fixtures may contain polychlorinated biphenyls (PCBs) in their ballasts. Similarly, given the age of the building, PCBs may be present in caulking.

5. Municipal file reviews were performed, which did not indicate that releases of oil and/or hazardous materials (OHM) have occurred at the Site. One 9,500-gallon underground fuel storage tank (UST) was installed in 1993 and is located in the western exterior portion of the Site, under the basketball courts. A Fire Department

Permit for the removal of one 10,000-gallon UST was dated October 13, 1993. No records of soil testing were available in files reviewed. According to Mr. Cox, the 9,500-gallon UST was installed in the tank grave of the 10,000-gallon UST.

6. Two state-listed properties were identified in the radius search of waste sites in the vicinity. These properties were listed as closed, or due to their location, are hydrologically down gradient from the Site. Based on the location, distance, and/or cleanup activities, it is our opinion that these properties listed in the vicinity will not adversely impact the Site.

Conclusions

This assessment has not identified any Recognized Environmental Conditions in connection with the property, 28 Sherwood Avenue in Shrewsbury, Massachusetts. Two conditions of concern were identified: a 10,000-gallon fuel oil UST was removed from the west side of the building in 1993; no soil testing was made available through records reviewed in this assessment. In order to determine whether a release has occurred in the area of this former UST, soil testing would have to be performed.

Based on the age of the building, caulking and fluorescent light fixtures may contain PCBs.

Any exceptions to, or deletions from, ASTM Practice E1527 are described in **Section 5.0** of this report. Please note that an investigation for the presence of lead based paint or asbestos is beyond the scope of work described by ASTM E1527-05, therefore LAI did not explore those conditions.

7.0 ENVIRONMENTAL PROFESSIONAL STATEMENT

LAI declares that, to the best of our professional knowledge and belief, we meet the definition of *Environmental Professional* as defined in §312.10 of 40 CFR 312. LAI has the specific qualifications based on education, training, and experience to assess a property of the nature, history, and setting of the subject property. LAI has developed and performed the all appropriate inquiries in conformance with the standards and practices set forth in 40 CFR Part 312.

8.0 LIMITATIONS

No warranty, whether expressed or implied, is given with respect to this report or any opinions expressed herein. It is expressly understood that this report and the opinions expressed herein are based upon Site conditions as they existed only at the time of assessment.

The data reported and the findings, observations, and opinions expressed in the report are limited by the Scope of Work. The Scope of Work was performed based on budgetary, time, and other constraints imposed by the Client, and the agencies and persons reviewed. In preparing this report, Lord Associates, Inc. has relied upon and presumed accurate certain information about the Site and adjacent properties provided by governmental agencies, the client and others identified in the report. Except as otherwise stated in the report, Lord Associates, Inc. has not attempted to verify the accuracy or completeness of any such information.

This report has been prepared on behalf of and for the exclusive use of Rockland Federal Credit Union and those immediate entities involved with the proximate financing of this project, solely for use in the environmental evaluation of the Site.

This report is dated this September 21, 2009 and is signed by individuals who are duly authorized to do so.

Ralph Tella, CHMM, LSP
Vice President

Andrea J. Lang
Project Manager

APPENDIX A

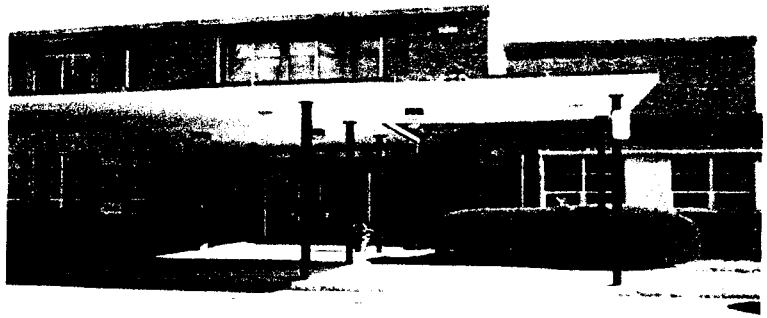


Photo #1	View of front of building, facing south.

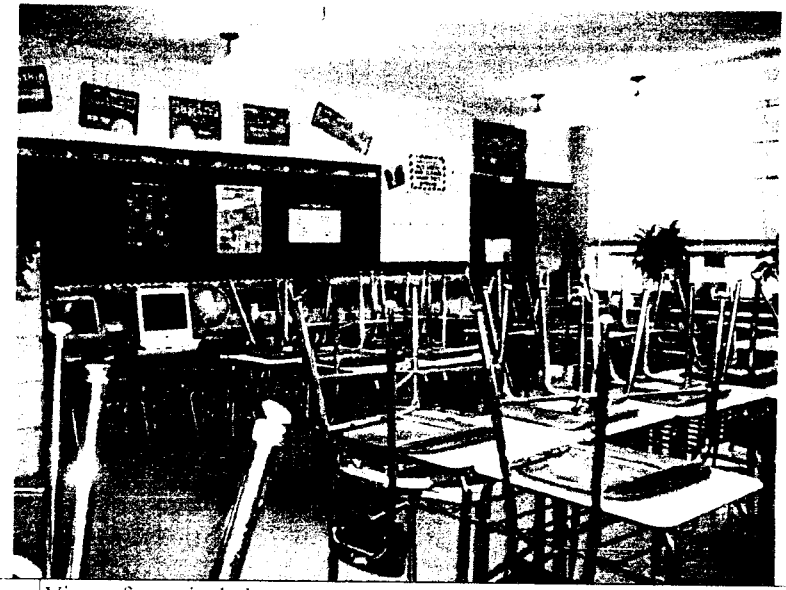


Photo #2	View of a typical classroom.

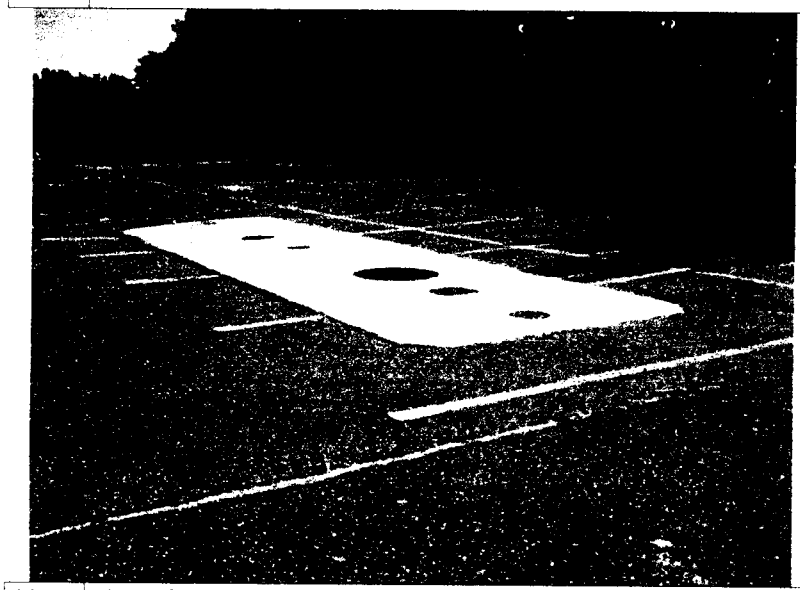


Photo #3	View of UST pad, facing southwest.

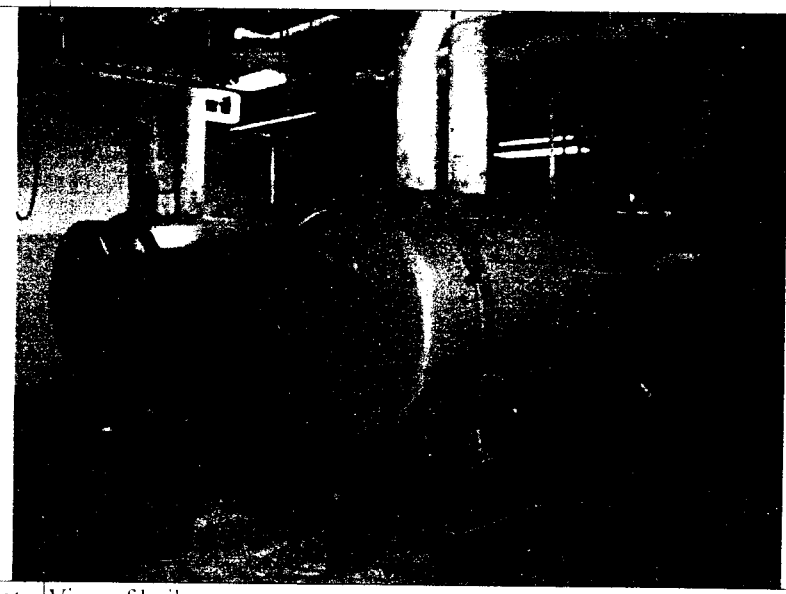


Photo #4	View of boilers.

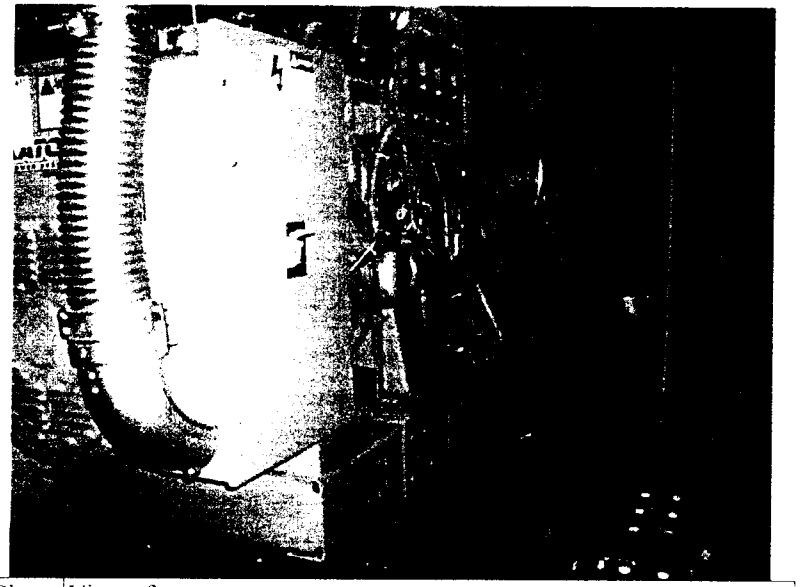


Photo #5	View of generator

Photo #6	View of fuel additive containers in garage area.

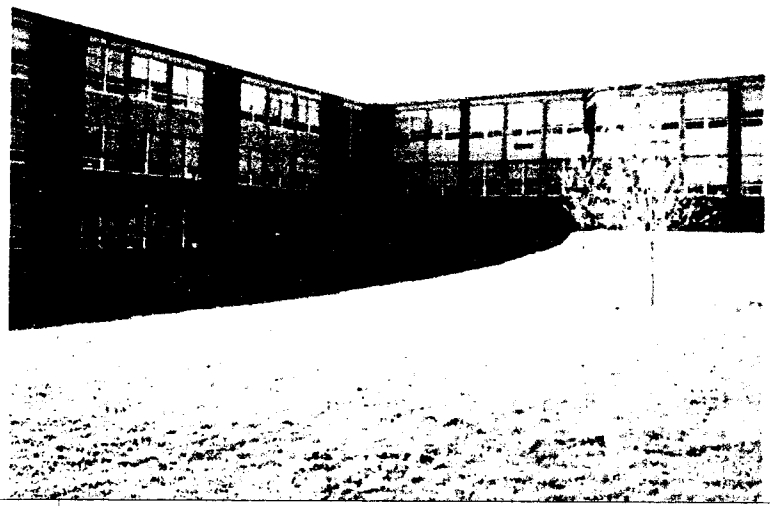


Photo #7	Views of back of school building.

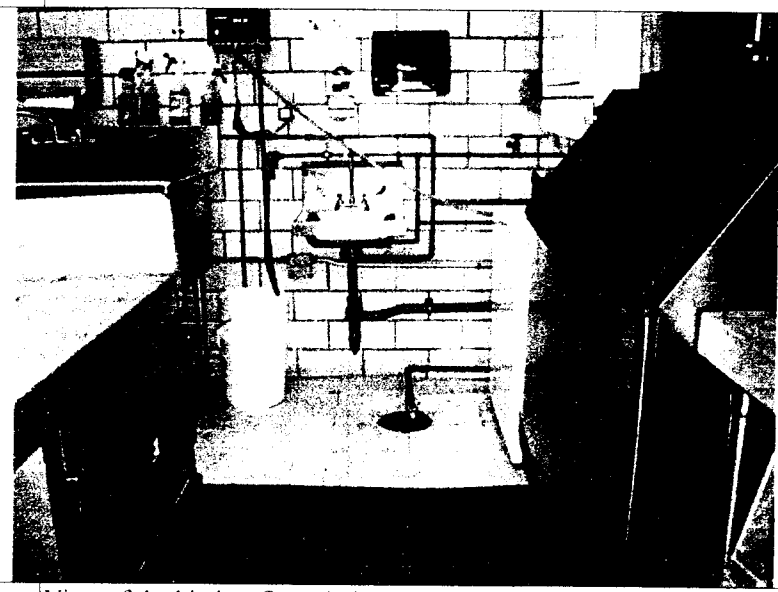


Photo #8	View of the kitchen floor drain.

APPENDIX B

FirstSearch Technology Corporation

Environmental FirstSearch [TM] Report

Target Property:

30 SHERWOOD AVE

SHREWSBURY MA 01545

Job Number: 1479

PREPARED FOR:

FirstSearch Technology.Com

09-10-09

Tel: (781) 551-0470 *Fax: (781) 551-0471*

Environmental FirstSearch
Search Summary Report

Target Site: 30 SHERWOOD AVE
SHREWSBURY MA 01545

FirstSearch Summary

Database	Sel	Updated	Radius	Site	1/8	1/4	1/2	1/2>	ZIP	TOTALS
NPL	Y	06-12-09	1.00	0	0	0	0	0	0	0
NPL Delisted	Y	06-12-09	0.50	0	0	0	0	-	0	0
CERCLIS	Y	05-27-09	0.50	0	0	0	0	-	0	0
NFRAP	Y	05-27-09	0.50	0	0	0	0	-	0	0
RCRA COR ACT	Y	07-14-09	1.00	0	0	0	0	0	0	0
RCRA TSD	Y	07-14-09	0.50	0	0	0	0	-	0	0
RCRA GEN	Y	07-14-09	0.25	0	0	2	-	-	0	2
Federal Brownfield	Y	08-06-09	0.25	0	0	0	-	-	0	0
ERNS	Y	06-16-09	0.12	0	0	-	-	-	0	0
Tribal Lands	Y	12-01-05	1.00	0	0	0	0	0	1	1
State/Tribal Sites	Y	07-14-09	1.00	0	0	0	2	15	1	18
State Spills 90	Y	07-14-09	0.12	0	0	-	-	-	1	1
State/Tribal SWL	Y	04-01-09	0.50	0	0	0	0	-	0	0
State/Tribal LUST	Y	07-14-09	0.50	0	0	0	7	-	0	7
State/Tribal UST/AST	Y	06-18-09	0.50	0	0	0	0	-	0	0
State/Tribal EC	Y	NA	0.50	0	0	0	0	-	0	0
State/Tribal IC	Y	11-03-08	0.25	0	0	0	-	-	0	0
State/Tribal VCP	Y	NA	0.50	0	0	0	0	-	0	0
State/Tribal Brownfields	Y	NA	0.50	0	0	0	0	-	0	0
State Other	Y	01-01-07	0.25	0	0	0	-	-	0	0
- TOTALS -				0	0	2	9	15	3	29

Notice of Disclaimer

Due to the limitations, constraints, inaccuracies and incompleteness of government information and computer mapping data currently available to FirstSearch Technology Corp., certain conventions have been utilized in preparing the locations of all federal, state and local agency sites residing in FirstSearch Technology Corp.'s databases. All EPA NPL and state landfill sites are depicted by a rectangle approximating their location and size. The boundaries of the rectangles represent the eastern and western most longitudes, the northern and southern most latitudes. As such, the mapped areas may exceed the actual areas and do not represent the actual boundaries of these properties. All other sites are depicted by a point representing their approximate address location and make no attempt to represent the actual areas of the associated property. Actual boundaries and locations of individual properties can be found in the files residing at the agency responsible for such information.

Waiver of Liability

Although FirstSearch Technology Corp. uses its best efforts to research the actual location of each site, FirstSearch Technology Corp. does not and can not warrant the accuracy of these sites with regard to exact location and size. All authorized users of FirstSearch Technology Corp.'s services proceeding are signifying an understanding of FirstSearch Technology Corp.'s searching and mapping conventions, and agree to waive any and all liability claims associated with search and map results showing incomplete and or inaccurate site locations.

Environmental FirstSearch
Site Information Report

Request Date: 09-10-09
Requestor Name: ANDREA J. LANG
Standard: AAI

Search Type: COORD
Job Number: 1479
Elevated Report

Target Site: 30 SHERWOOD AVE
SHREWSBURY MA 01545

Demographics

Sites: 29 **Non-Geocoded:** 3 **Population:** 5449
Radon: 0.8 - 31.3 PCI/L

Site Location

	Degrees (Decimal)	Degrees (Min/Sec)		UTMs
Longitude:	-71.725882	-71 43 33	**Easting:**	275241.734
Latitude:	42.284173	42 17 3	**Northing:**	4684713.041
Elevation:	594		**Zone:**	19

Comment

Comment:

Additional Requests Services

Adjacent ZIP Codes: 0 Mile(s)

ZIP Code	City Name	ST	Dist/Dir	Sel

Services:

	Requested?	Date
Fire Insurance Maps	Yes	09-10-09
Aerial Photographs	No	
Historical Topos	No	
City Directories	No	
Title Search/Env Liens	No	
Municipal Reports	No	
Online Topos	No	

Environmental FirstSearch
Sites Summary Report

Target Property: 30 SHERWOOD AVE; SHREWSBURY MA 01545 **JOB:** 1479

TOTAL: 29 **GEOCODED:** 26 **NON GEOCODED:** 3 **SELECTED:** 0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	Elev Diff	Page No.
1	RCRAGN	UMASS MED SCHOOL SHREWSBURY CAMPUS	222 MAPLE AVE	0.21 NW	- 9	5
		MAD005957352/SGN	SHREWSBURY MA 01545			
1	RCRAGN	GE SYNTHESIS INC	222 MAPLE AVE	0.21 NW	- 9	6
		MAR000010181/SGN	SHREWSBURY MA 01545			
2	LUST	CRESCENT ST	54 SHADY LN	0.26 NE	- 11	46
		2-0010030/RAO	SHREWSBURY MA 01545			
3	LUST	RESIDENCE	43 SHADYLANE AVE	0.27 NE	- 6	43
		2-0011026/RAO	SHREWSBURY MA 01545			
4	LUST	RESIDENCE	6 BELLRIDGE DR	0.28 SE	- 11	40
		2-0012315/RAO	SHREWSBURY MA 01545			
5	LUST	RESIDENCE	38 SHADYLANE AVE	0.28 NE	- 4	38
		2-0011266/RAO	SHREWSBURY MA 01545			
6	STATE	RESIDENCE	15 DAWSON CIR	0.29 SE	- 55	7
		2-0010970/RAO	SHREWSBURY MA 01545			
7	STATE	SHEPARD RESIDENTIAL RELEASE	59 JANET CIR	0.45 SE	- 19	32
		2-0010611/TIER II	SHREWSBURY MA 01545			
7	LUST	SHEPARD RESIDENTIAL REL	59 JANET CIR	0.45 SE	- 19	29
		2-0010564/RAO/NR	SHREWSBURY MA 01545			
8	LUST	RESIDENT	17 JANET CIR	0.47 SE	- 32	47
		2-0010295/RAO	SHREWSBURY MA 01545			
9	LUST	RESIDENCE	5 ELAINE ST	0.49 SE	- 26	45
		2-0010002/RAO	SHREWSBURY MA 01545			
10	STATE	MECHELT RESIDENCE	21 ESTER BROOK RD	0.63 NE	- 6	23
		2-0013867/RAO	SHREWSBURY MA 01545			
11	STATE	GAS STATION	522 BOSTON TPKE	0.69 SE	- 46	17
		2-0000876/RAO	SHREWSBURY MA 01545			
12	STATE	PHALO CORP	530 BOSTON TPKE	0.72 SE	- 47	4
		2-0000122/DEP/SFA	SHREWSBURY MA 01545			
12	STATE	S OF HOME DEPOT BLDG	530 BOSTON TPKE	0.72 SE	- 37	1
		2-0010099/RAO	SHREWSBURY MA 01545			
13	STATE	RESIDENCE	203 GRAFTON ST	0.72 SE	- 38	26
		2-0013902/RAO	SHREWSBURY MA 01545			
14	STATE	TRANSFORMER AREA	MUNICIPAL DR	0.77 NE	- 7	35
		2-0013366/TIER TIER 1B	SHREWSBURY MA 01545			
15	STATE	BUDDENHAGEN REALTY	32 MAPLE AVE	0.79 NE	- 49	9
		2-0001001/REM/OPS	SHREWSBURY MA 01545			
16	STATE	FAIRLAWNS PLAZA	380 MAPLE AVE	0.79 SW	- 103	15
		2-0016080/TIER II	SHREWSBURY MA 01545			
17	STATE	SHREWSBURY MUNICIPAL LIGHT AND POW	11 MUNICIPAL RD	0.81 NE	- 9	22
		2-0013806/RAO/NR	SHREWSBURY MA 01545			
17	STATE	JOHNSON SUBSTA	11 MUNICIPAL DR	0.81 NE	- 9	19
		2-0013784/TIER II	SHREWSBURY MA 01545			

Environmental FirstSearch
Sites Summary Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

TOTAL: 29 **GEOCODED:** 26 **NON GEOCODED:** 3 **SELECTED:** 0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	Elev Diff	Page No.
18	STATE	SHELL GAS STATION 2-0017160 TIER II	29 MAPLE AVE SHREWSBURY MA 01545	0.01 NE	- 51	27
19	STATE	CONCORD OIL CO 2-0012229 RAO	23 MAPLE ST SHREWSBURY MA 01545	0.05 NE	- 56	11
20	STATE	MOBIL STATION 01-EAR 2-0000800 RAO	22 MAPLE ST SHREWSBURY MA 01545	0.07 NE	- 61	24
21	STATE	EMPIRE CLEANERS 2-0000967 TIER II	15 MAPLE AVE SHREWSBURY MA 01545	0.08 NE	- 60	13
22	STATE	SUNOCO STATION 2-0000872 RAO	275 BOSTON PIKE SHREWSBURY MA 01545	0.09 SW	- 100	34

Environmental FirstSearch
Sites Summary Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

TOTAL: 29 **GEOCODED:** 26 **NON GEOCODED:** 3 **SELECTED:** 0

Map ID	DB Type	Site Name/ID/Status	Address	Dist/Dir	Elev Diff	Page No.
	TRIBAL LAND	BUREAU OF INDIAN AFFAIRS CONTACT I BIA-01545	UNKNOWN MA 01545	NON GEO	N/A	N/A
	STATE	SHREWSBURY SUBSTATION 2-0015213 RAO	WORTHINGTON AVE SHREWSBURY MA 01545	NON GEO	N/A	N/A
	SPILLS	RESIDENCE 2-0017579 SUCCESS	14 ORCHARD RD SHREWSBURY MA 01545	NON GEO	N/A	N/A

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

RCRAGN

SEARCH ID: 2 **DIST/DIR:** 0.21 NW **ELEVATION:** 585 **MAP ID:** 1

NAME: UMASS/MED SCHOOL SHREWSBURY CAMPUS
ADDRESS: 222 MAPLE AVE
SHREWSBURY MA 01545

CONTACT:
SOURCE: EPA

REV: 7/14/09
ID1: MAD065957352
ID2:
STATUS: SGN
PHONE:

CT MANIFEST INFORMATION

MANIFEST ID	SHIPPED	TSD ID	TRANS ID	QTY	MATERIAL
MAG2680136	12/17/1992	CTD000604488	MAD039322250	0001 G	WASTE FLAMMABLE LIQUID NOS
MAH1907211	11/09/1993	CTD000604488	MAD039322250	0001 G	WASTE FLAMMABLE LIQUID
MAH1907411	11/09/1993	CTD000604488	MAD039322250	0001 P	WASTE FLAMMABLE LIQUID
MAH1715982	07/18/1994	CTD000604488	MAD039322250	0001 G	WASTE HYDRAZINE, ANHYDROUS

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

RCRAGN

SEARCH ID: 1 **DIST/DIR:** 0.21 NW **ELEVATION:** 585 **MAP ID:** 1

NAME: GL SYNTHESIS INC
ADDRESS: 222 MAPLE AVE
SHREWSBURY MA 01545
WORCESTER

CONTACT:
SOURCE: EPA

REV: 7/14/09
ID1: MAR000010843
ID2:
STATUS: SGN
PHONE:

SITE INFORMATION

CONTACT INFORMATION: GEORGE WRIGHT
222 MAPLE AVE
SHREWSBURY MA 01545

PHONE: 5088459484

UNIVERSE INFORMATION:

NAIC INFORMATION

54171 - RESEARCH AND DEVELOPMENT IN THE PHYSICAL, ENGINEERING, AND LIFE SCIENCES

ENFORCEMENT INFORMATION:

VIOLATION INFORMATION:

HAZARDOUS WASTE INFORMATION:

Acetonitrile (I,T)
Chloroform
The following spent non-halogenated solvents: toluene, methyl ethyl ketone, carbon disulfide, isobutanol, pyridine, benzene, 2-ethoxyethanol, and 2-nitropropane; all spent solvent mixtures/blends containing, before use, a total of ten percent or more (by
The following spent non-halogenated solvents: Xylene, acetone, ethyl acetate, ethyl benzene, ethyl ether, methyl isobutyl ketone, n-butyl alcohol, cyclohexanone, and methanol; all spent solvent mixtures/blends containing, before use, only the above spent
Ignitable waste
The following spent halogenated solvents: Tetrachloroethylene, methylene chloride, trichloroethylene, 1,1,1-trichloroethane, chlorobenzene, 1,1,2-trichloro-1,2,2-trifluoroethane, ortho-dichlorobenzene, trichlorofluoromethane, and 1,1,2-trichloroethane a
Acetic acid ethyl ester (I) (OR) Ethyl acetate (I)
Chloroform (OR) Methane, trichloro-

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 20 **DIST/DIR:** 0.26 NE **ELEVATION:** 605 **MAP ID:** 2

NAME: CRESCENT ST
ADDRESS: 54 SHADY LN
SHREWSBURY MA 01545

CONTACT:
SOURCE: MA DEP

REV: 7/14/09
IDI: 2-0010038
IDI2:
STATUS: RAO
PHONE:

SITE INFORMATION

STATUS: RAO - (Response Action Outcome): a site release where an RAO statement was submitted. An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated.

STATUS: RAO - (Response Action Outcome): a site release where an RAO statement was submitted. An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated.

LTR:
DELETED:

CONFIRMED
REMOVED:

LOCATION TYPE: RESIDENTIAL
SOURCE: FUEL TANK, UST
SITE DESCRIPTION:

CHEMICALS

2 FUEL OIL 6(#)/GAL
2 FUEL OIL

SITE ACTIONS

LSP INVOLVED: ROBERT BERGER

ACT DATE: 9/15/1993
ACT USE LIMITATION:
ACT STATUS: ISSUED
ACT TYPE: NOTICE OF RESPONSIBILITY
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS BEEN REDUCED TO BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 9/30/1993
ACT USE LIMITATION:
ACT STATUS: ISSUED
ACT TYPE: NOTICE OF RESPONSIBILITY
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS BEEN REDUCED TO BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 10/1/1993
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE DISPOSITION
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS BEEN REDUCED TO BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 10/1/1993
ACT USE LIMITATION:
ACT STATUS: ORAL APPROVAL OF PLAN
ACT TYPE: IMMEDIATE RESPONSE ACTION

- Continued on next page -

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 20 **DIST/DIR:** 0.26 NE **ELEVATION:** 605 **MAP ID:** 2

NAME: CRESCENT ST
ADDRESS: 54 SHADY LN
SHREWSBURY MA 01545

CONTACT:
SOURCE: MA DEP

REV: 7/14/09
IDI: 2-0010038
IDI2:
STATUS: RAO
PHONE:

RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS BEEN REDUCED TO BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 12/1/1993
ACT USE LIMITATION:
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS BEEN REDUCED TO BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 1/11/1994
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE NOTIFICATION
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS BEEN REDUCED TO BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 2/8/1994
ACT USE LIMITATION:
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS BEEN REDUCED TO BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 2/8/1994
ACT USE LIMITATION:
ACT STATUS: WRITTEN PLAN RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS BEEN REDUCED TO BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 2/8/1994
ACT USE LIMITATION:
ACT STATUS: RAO STATEMENT RECEIVED
ACT TYPE: RESPONSE ACTION OUTCOME - RAO
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS BEEN REDUCED TO BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 21 **DIST/DIR:** 0.27 NE **ELEVATION:** 600 **MAP ID:** 3

NAME: RESIDENCE
ADDRESS: 43 SHADY LANE AVE
SHREWSBURY MA 01545

CONTACT:
SOURCE: MA DEP

REV: 7/14/09
IDI: 2-0011026
IDI2:
STATUS: RAO
PHONE:

SITE INFORMATION

STATUS: RAO - (Response Action Outcome): a site release where an RAO statement was submitted. An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated.

STATUS: RAO - (Response Action Outcome): a site release where an RAO statement was submitted. An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated.

LTR:
DELETED:

CONFIRMED
REMOVED:

LOCATION TYPE: RESIDENTIAL
SOURCE: UST
SITE DESCRIPTION:

CHEMICALS

2 FUEL OIL 145 PPM/V

SITE ACTIONS

LSP INVOLVED: ROBERT BERGER

LSP INVOLVED: KENNETH ESNOW

LSP INVOLVED: N/A

ACT DATE: 12/5/1995
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE DISPOSITION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO BACKROUND

ACT DATE: 12/5/1995
ACT USE LIMITATION:
ACT STATUS: ORAL APPROVAL OF PLAN
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO BACKROUND

ACT DATE: 12/11/1995
ACT USE LIMITATION:
ACT STATUS: ISSUED
ACT TYPE: NOTICE OF RESPONSIBILITY
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO BACKROUND

ACT DATE: 1/9/1996

- Continued on next page -

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 21 **DIST/DIR:** 0.27 NE **ELEVATION:** 600 **MAP ID:** 3

NAME: RESIDENCE
ADDRESS: 43 SHADY LANE AVE
SHREWSBURY MA 01545

CONTACT
SOURCE: MA DEP

REV: 7/14/09
IDI: 2-0011026
IDI2:
STATUS: RAO
PHONE:

ACT USE LIMITATION:
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO BACKROUND

ACT DATE: 8/21/1996
ACT USE LIMITATION:
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO BACKROUND

ACT DATE: 4/2/1997
ACT USE LIMITATION:
ACT STATUS: RAO STATEMENT RECEIVED
ACT TYPE: RESPONSE ACTION OUTCOME - RAO
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO BACKROUND

ACT DATE: 4/2/1997
ACT USE LIMITATION:
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO BACKROUND

ACT DATE: 4/2/1997
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE NOTIFICATION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO BACKROUND

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 22 **DIST/DIR:** 0.28 NE **ELEVATION:** 583 **MAP ID:** 4

NAME: RESIDENCE
ADDRESS: 6 BELLRIDGE DR
SHREWSBURY MA
CONTACT:
SOURCE: MA DEP

REV: 7/1/99
ID1: 2-0012435
ID2:
STATUS: RAO
PHONE:

SITE INFORMATION

STATUS: RAO - (Response Action Outcome) a site release where an RAO statement was submitted. An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated

STATUS: RAO - (Response Action Outcome) a site release where an RAO statement was submitted. An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated

LTBL:
DELETED:

CONFIRMED:
REMOVED:

LOCATION TYPE: RESIDENTIAL
SOURCE: UST
SITE DESCRIPTION:

CHEMICALS

2 FUEL OIL #4/#6 PMN

SITE ACTIONS

LSP INVOLVED: BRIAN MORGAN

LSP INVOLVED: RALPH PLENNEY

ACT DATE: 7/24/1998
ACT USE LIMITATION:
ACT STATUS: BCA ASSESSMENT COMPLY
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 7/24/1998
ACT USE LIMITATION
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE DISPOSITION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 7/24/1998
ACT USE LIMITATION
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 7/27/1998
ACT USE LIMITATION
ACT STATUS: FOLLOW UP OFFICE RESPONSE

- Continued on next page -

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 22 **DIST/DIR:** 0.28 NE **ELEVATION:** 583 **MAP ID:** 4

NAME: RESIDENCE
ADDRESS: 6 BELLRIDGE DR
SHREWSBURY MA
CONTACT:
SOURCE: MA DEP

REV: 7/1/99
ID1: 2-0012435
ID2:
STATUS: RAO
PHONE:

ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 7/29/1998
ACT USE LIMITATION:
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 7/31/1998
ACT USE LIMITATION:
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 8/3/1998
ACT USE LIMITATION:
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 8/3/1998
ACT USE LIMITATION:
ACT STATUS: ELDRUN
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 8/4/1998
ACT USE LIMITATION:
ACT STATUS: ORAL APPROVAL OF PLAN
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 8/4/1998
ACT USE LIMITATION:
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 8/19/1998
ACT USE LIMITATION:
ACT STATUS: ISSUED
ACT TYPE: NOTICE OF RESPONSIBILITY
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

- Continued on next page -

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 22 **DIST/DIR:** 0.28 NE **ELEVATION:** 583 **MAP ID:** 4

NAME: RESIDENCE
ADDRESS: 6 BELLRIDGE DR
SHREWSBURY MA
CONTACT:
SOURCE: MA DEP

REV: 7/1/99
ID1: 2-0012435
ID2:
STATUS: RAO
PHONE:

ACT DATE: 9/1/1998
ACT USE LIMITATION
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 9/29/1998
ACT USE LIMITATION:
ACT STATUS: WRITTEN PLAN RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 9/29/1998
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE NOTIFICATION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 10/6/1998
ACT USE LIMITATION:
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 12/9/1998
ACT USE LIMITATION:
ACT STATUS: STATUS REPORT RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 4/28/1999
ACT USE LIMITATION
ACT STATUS: RAO STATEMENT RECEIVED
ACT TYPE: RESPONSE ACTION OUTCOME - RAO
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 4/29/1999
ACT USE LIMITATION
ACT STATUS: FEE RECEIVED-ENFORCE USE ONLY
ACT TYPE: RESPONSE ACTION OUTCOME - RAO
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 5/27/1999
ACT USE LIMITATION:
ACT STATUS: NOA
ACT TYPE: AGENT COMMUNICATION AND CORRESPONDENCE

- More Details Exist For This Site; Max Page Limit Reached -

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 23 **DIST/DIR:** 0.28 NE **ELEVATION:** 598 **MAP ID:** 5

NAME: RESIDENCE
ADDRESS: 68 SHADYLANE AVE
SHREWSBURY MA 01545
CONTACT:
SOURCE: MA DEP

REV: 7/1/99
ID1: 2-0013266
ID2:
STATUS: RAO
PHONE:

SITE INFORMATION

STATUS: RAO - (Response Action Outcome) a site release where an RAO statement was submitted. An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated

STATUS: RAO - (Response Action Outcome) a site release where an RAO statement was submitted. An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated

LTBL:
DELETED:

CONFIRMED:
REMOVED:

LOCATION TYPE: RESIDENTIAL
SOURCE: UST
SITE DESCRIPTION:

CHEMICALS

2 FUEL OIL #2/#4 PMN

SITE ACTIONS

LSP INVOLVED: ROBERT BERGER

ACT DATE: 6/7/1996
ACT USE LIMITATION
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS BEEN REDUCED TO
BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 6/7/1996
ACT USE LIMITATION
ACT STATUS: ORAL APPROVAL OF PLAN
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS BEEN REDUCED TO
BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 6/7/1996
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE DISPOSITION
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS BEEN REDUCED TO
BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 6/10/1996
ACT USE LIMITATION:
ACT STATUS: ISSUED
ACT TYPE: NOTICE OF RESPONSIBILITY
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS BEEN REDUCED TO

- Continued on next page -

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 23 **DIST/DIR:** 0.28 NE **ELEVATION:** 598 **MAP ID:** 5

NAME: RESIDENCE
ADDRESS: 30 SHADYLANE AVE
SHREWSBURY MA 01545
CONTACT:
SOURCE: MADEP

REV: 7 14 99
IDI: 2400U296
ID2:
STATUS: RAO
PHONE:

BACKGROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 6 11 1996
ACT USE LIMITATION:
ACT STATUS: FOLLOW UP OTHER RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED CONTAMINATION HAS BEEN REDUCED TO
BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 6 18 1996
ACT USE LIMITATION:
ACT STATUS: RAO STATEMENT RECEIVED
ACT TYPE: RESPONSE ACTION OBTAIN - RAO
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED CONTAMINATION HAS BEEN REDUCED TO
BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 6 18 1996
ACT USE LIMITATION:
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED CONTAMINATION HAS BEEN REDUCED TO
BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

ACT DATE: 6 18 1996
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE NOTIFICATION
RAO CLASS: A1 - A PERMANENT SOLUTION HAS BEEN ACHIEVED CONTAMINATION HAS BEEN REDUCED TO
BACKROUND OR A THREAT OF A RELEASE HAS BEEN ELIMINATED

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 12 **DIST/DIR:** 0.29 SE **ELEVATION:** 539 **MAP ID:** 6

NAME: RESIDENCE
ADDRESS: 15 DAWSON CIR
SHREWSBURY MA 01545
WORCESTER
CONTACT:
SOURCE: MADEP

REV: 1 29 01
IDI: 2400U970
ID2:
STATUS: RAO
PHONE:

SITE INFORMATION

LTID:
DELETED:

CONFIRMED:
REMOVED:

CATEGORY: 1 DAWSON CIR
DATE: 10 23 95
PHASE: PHASE II

21E STATUS: RAO
21E DATE: 10 30 98
HAZMAT TYPE: OIL

RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

LOCATION TYPE: RESIDENTIAL
SOURCE: PIPE
SITE DESCRIPTION: CONTAINED IN: HOSE OR PIPE; GROUNDWATER RELEASE; RELEASE TO SOIL; RESIDENTIAL
SITE:

OTHER CONTAMINATION:
OTHER RELEASES: 2 FUEL OIL
OTHER PROBLEMS:
OTHER TYPE OF SITE:

SITE ACTIONS

TS DATE: 19961029 00:00:00
ACL RESTRICTION:
LSP: RICHARD WOZMIAK
RA STATUS: TRANSMITTAL RECEIVED
RAS TYPE: 1CLASS - TIER CLASSIFICATION
RAO CLASS:

TS DATE: 19970402 00:00:00
ACL RESTRICTION:
LSP:
RA STATUS: RELATED TO A TRANSITION SITE (NOT TIER CLASSIFIED)
RAS TYPE: 9 END
RAO CLASS:

ACT DATE: 10 29 1996
ACT USE LIMITATION:
LSP: RICHARD WOZMIAK
ACT STATUS: TIER 2 CLASSIFICATION
ACT TYPE: 1CLASS - TIER CLASSIFICATION
RAO TYPE:

ACT DATE: 10 29 1996

- Continued on next page -

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 12 **DIST/DIR:** 0.29 SE **ELEVATION:** 539 **MAP ID:** 6

NAME: RESIDENCE
ADDRESS: 15 DAWSON CIR
SHREWSBURY MA 01545
WORCESTER
CONTACT:
SOURCE: MADEP

REV: 1 29 01
IDI: 2400U970
IDE:
STATUS: RAO
PHONE:

ACT USE LIMITATION:
LSP: RICHARD WOZMIAK
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: PHASE I, PHASE I
RAO TYPE:

ACT DATE: 10 30 1998
ACT USE LIMITATION:
LSP: RICHARD WOZMIAK
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: IRA - IMMEDIATE RESPONSE ACTION
RAO TYPE:

ACT DATE: 10 30 1998
ACT USE LIMITATION:
LSP: RICHARD WOZMIAK
ACT STATUS: RAO STATEMENT RECEIVED
ACT TYPE: RAO RESPONSE ACTION ACTS COMP
RAO TYPE: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 16 **DIST/DIR:** 0.45 SE **ELEVATION:** 575 **MAP ID:** 7

NAME: SHEPERD RESIDENTIAL RELEASE
ADDRESS: 59 JANET CIR
SHREWSBURY MA 01545
CONTACT:
SOURCE: MADEP

REV: 1 28 99
IDI: 2400U218
ID2:
STATUS: ID RH
PHONE:

SITE INFORMATION

LOCATION TYPE:
SOURCE:
SITE DESCRIPTION:

CHEMICALS

SITE ACTIONS

LSP INVOLVED: WILLIAM FABBRI

ACT DATE: 2 14 2006
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE DISPOSITION
RAO CLASS:

ACT DATE: 2 14 2006
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE NOTIFICATION
RAO CLASS:

ACT DATE: 9 20 2006
ACT USE LIMITATION:
ACT STATUS: ISSUED
ACT TYPE: NOR
RAO CLASS:

ACT DATE: 1 2 2007
ACT USE LIMITATION:
ACT STATUS: ATSENT
ACT TYPE: NOR
RAO CLASS:

ACT DATE: 2 16 2007
ACT USE LIMITATION:
ACT STATUS: TRANSMITTAL RECEIVED
ACT TYPE: TIER CLASSIFICATION
RAO CLASS:

ACT DATE: 2 16 2007
ACT USE LIMITATION:
ACT STATUS: TIER 2 CLASSIFICATION
ACT TYPE: TIER CLASSIFICATION
RAO CLASS:

ACT DATE: 2 16 2007

- Continued on next page -

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 16 **DIST/DIR:** 0.45 SE **ELEVATION:** 575 **MAP ID:** 7

NAME: SHEPARD RESIDENTIAL RELEASE
ADDRESS: 59 JANET CIR
SHREWSBURY MA 01545

CONTACT:
SOURCE: MA DEP

REV: 1-28-09
IDI: 2-0016318
ID2:
STATUS: TIER II
PHONE:

ACT USE LIMITATION:
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: PHASE I
RAO CLASS:

ACT DATE: 2-28-2007
ACT USE LIMITATION:
ACT STATUS: TECHNICAL SCREEN AUDIT
ACT TYPE: PHASE I
RAO CLASS:

ACT DATE: 4-2-2007
ACT USE LIMITATION:
ACT STATUS: NAE/NVD
ACT TYPE: AUDIT/MA
RAO CLASS:

ACT DATE: 4-2-2007
ACT USE LIMITATION:
ACT STATUS: AUDIT INSPECTION
ACT TYPE: PHASE I
RAO CLASS:

ACT DATE: 12-18-2007
ACT USE LIMITATION:
ACT STATUS: RTN LINKED TO TCLASS VIA TIER CLASSIFICATION SUBMITTAL
ACT TYPE: TIER CLASSIFICATION
RAO CLASS:

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 26 **DIST/DIR:** 0.45 SE **ELEVATION:** 575 **MAP ID:** 7

NAME: SHEPARD RESIDENTIAL REL
ADDRESS: 59 JANET CIR
SHREWSBURY MA 01545

CONTACT:
SOURCE: MA DEP

REV: 7-14-09
IDI: 2-0016364
ID2:
STATUS: RAO/NR
PHONE:

SITE INFORMATION

STATUS: RAO/NR - Response action outcome not required

STATUS: RAO/NR - Response action outcome not required

LOCATION TYPE: RESIDENTIAL
SOURCE: UST
SITE DESCRIPTION:

CHEMICALS

FUEL OIL 2 36 INCH

SITE ACTIONS

LSP INVOLVED: WILLIAM V MORET

LSP INVOLVED: STEVEN SHOPE

ACT DATE: 12-18-2007
ACT USE LIMITATION:
LSP:
ACT STATUS: LINKED TO A TIER CLASSIFIED SITE
LINKED SITE ID: 2-0016318
ACT TYPE: RAO NOT REQUIRED
RAO CLASS:

ACT DATE: 1-29-2007
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE DISPOSITION
RAO CLASS:

ACT DATE: 1-29-2007
ACT USE LIMITATION:
ACT STATUS: ORAL APPROVAL OF PLAN
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS:

ACT DATE: 2-12-2007
ACT USE LIMITATION:
ACT STATUS: ISSUED
ACT TYPE: NOTICE OF RESPONSIBILITY
RAO CLASS:

ACT DATE: 2-16-2007
ACT USE LIMITATION:
ACT STATUS: TIER 2 CLASSIFICATION

- Continued on next page -

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 26 **DIST/DIR:** 0.45 SE **ELEVATION:** 575 **MAP ID:** 7

NAME: SHEPARD RESIDENTIAL REL
ADDRESS: 59 JANET CIR
SHREWSBURY MA 01545

CONTACT:
SOURCE: MA DEP

REV: 7-14-09
IDI: 2-0016364
ID2:
STATUS: RAO/NR
PHONE:

ACT TYPE: TIER CLASSIFICATION
RAO CLASS:

ACT DATE: 2-16-2007
ACT USE LIMITATION:
ACT STATUS: TRANSMITTAL RECEIVED
ACT TYPE: TIER CLASSIFICATION
RAO CLASS:

ACT DATE: 3-30-2007
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE NOTIFICATION
RAO CLASS:

ACT DATE: 3-30-2007
ACT USE LIMITATION:
ACT STATUS: WRITTEN PLAN RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS:

ACT DATE: 4-2-2007
ACT USE LIMITATION:
ACT STATUS: NAE/NVD
ACT TYPE: AUDIT COMMUNICATION AND CORRESPONDENCE
RAO CLASS:

ACT DATE: 4-2-2007
ACT USE LIMITATION:
ACT STATUS: AUDIT INSPECTION
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS:

ACT DATE: 5-25-2007
ACT USE LIMITATION:
ACT STATUS: MODIFIED REVISED OR UPDATED PLAN RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS:

ACT DATE: 5-25-2007
ACT USE LIMITATION:
ACT STATUS: STATUS REPORT RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS:

ACT DATE: 6-18-2007
ACT USE LIMITATION:
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS:

ACT DATE: 6-18-2007
ACT USE LIMITATION:

- Continued on next page -

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 26 **DIST/DIR:** 0.45 SE **ELEVATION:** 575 **MAP ID:** 7

NAME: SHEPARD RESIDENTIAL REL
ADDRESS: 59 JANET CIR
SHREWSBURY MA 01545

CONTACT
SOURCE: MA DEP

REV: 7-14-09
IDI: 2-0016364
ID2:
STATUS: RAO/NR
PHONE:

ACT STATUS: TECHNICAL SCREEN AUDIT
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS:

ACT DATE: 6-22-2007
ACT USE LIMITATION:
ACT STATUS: TECHNICAL SCREEN AUDIT
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS:

ACT DATE: 11-27-2007
ACT USE LIMITATION:
ACT STATUS: ALSENT
ACT TYPE: NOTICE OF RESPONSIBILITY
RAO CLASS:

ACT DATE: 11-30-2007
ACT USE LIMITATION:
ACT STATUS: STATUS REPORT RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS:

ACT DATE: 11-30-2007
ACT USE LIMITATION:
ACT STATUS: MODIFIED REVISED OR UPDATED PLAN RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS:

ACT DATE: 12-18-2007
ACT USE LIMITATION:
ACT STATUS: RTN LINKED TO TCLASS VIA TIER CLASSIFICATION SUBMITTAL
ACT TYPE: TIER CLASSIFICATION
RAO CLASS:

ACT DATE: 12-18-2007
ACT USE LIMITATION:
ACT STATUS: LINKED TO A TIER CLASSIFIED SITE
ACT TYPE: RAO NOT REQUIRED
RAO CLASS:

ACT DATE: 1-11-2008
ACT USE LIMITATION:
ACT STATUS: AUDIT INSPECTION
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS:

ACT DATE: 1-11-2008
ACT USE LIMITATION:
ACT STATUS: NAE/NVD
ACT TYPE: AUDIT COMMUNICATION AND CORRESPONDENCE
RAO CLASS:

ACT DATE: 5-22-2008

- More Details Exist For This Site; Max Page Limit Reached -

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 25 **DIST/DIR:** 0.47 SE **ELEVATION:** 562 **MAP ID:** 8

NAME: RESIDENCE
ADDRESS: 17 JANET CIR
SHREWSBURY MA

CONTACT:
SOURCE: MADEP

REV: 7/14/99
IDE: 2400100795
IDE2:
STATUS: RAO
PHONE:

SITE INFORMATION

STATUS: RAO - (Response Action Outcome): a site release where an RAO statement was submitted. An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated.

STATUS: RAO - (Response Action Outcome): a site release where an RAO statement was submitted. An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated.

LTDL:
DELETED:

CONFIRMED:
REMOVED:

LOCATION TYPE: RESIDNTIAL
SOURCE: UST
SITE DESCRIPTION:

CHEMICALS

2 FUEL OIL 560 PPMV
2 FUEL OIL

SITE ACTIONS

LSP INVOLVED: N/A

ACT DATE: 8/4/1994
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE DISPOSITION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 8/4/1994
ACT USE LIMITATION:
ACT STATUS: ORAL APPROVAL OF PLAN
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 9/6/1994
ACT USE LIMITATION:
ACT STATUS: ISSUED
ACT TYPE: NOTICE OF RESPONSIBILITY
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND

ACT DATE: 7/12/1994
ACT USE LIMITATION:
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION

- Continued on next page -

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 25 **DIST/DIR:** 0.47 SE **ELEVATION:** 562 **MAP ID:** 8

NAME: RESIDENCE
ADDRESS: 17 JANET CIR
SHREWSBURY MA

CONTACT:
SOURCE: MADEP

REV: 7/14/99
IDE: 2400100795
IDE2:
STATUS: RAO
PHONE:

RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

ACT DATE: 7/12/1994
ACT USE LIMITATION:
ACT STATUS: RAO STATEMENT RECEIVED
ACT TYPE: RESPONSE ACTION OUTCOME - RAO
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

ACT DATE: 7/12/1994
ACT USE LIMITATION:
ACT STATUS: WRITTEN PLAN RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

ACT DATE: 7/29/1994
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE NOTIFICATION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 24 **DIST/DIR:** 0.49 SE **ELEVATION:** 568 **MAP ID:** 9

NAME: RESIDENCE
ADDRESS: 5 ELAINE ST
SHREWSBURY MA

CONTACT:
SOURCE: MADEP

REV: 7/14/99
IDE: 2400100012
IDE2:
STATUS: RAO
PHONE:

SITE INFORMATION

STATUS: RAO - (Response Action Outcome): a site release where an RAO statement was submitted. An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated.

STATUS: RAO - (Response Action Outcome): a site release where an RAO statement was submitted. An RAO Statement asserts that response actions were sufficient to achieve a level of no significant risk or at least ensure that all substantial hazards were eliminated.

LTDL:
DELETED:

CONFIRMED:
REMOVED:

LOCATION TYPE: RESIDNTIAL
SOURCE: UST
SITE DESCRIPTION:

CHEMICALS

2 FUEL OIL

SITE ACTIONS

LSP INVOLVED: N/A

ACT DATE: 6/1/1995
ACT USE LIMITATION:
ACT STATUS: ORAL APPROVAL OF PLAN
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

ACT DATE: 6/1/1995
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE DISPOSITION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

ACT DATE: 6/2/1995
ACT USE LIMITATION:
ACT STATUS: ISSUED
ACT TYPE: NOTICE OF RESPONSIBILITY
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

ACT DATE: 2/6/1996
ACT USE LIMITATION:
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO

- Continued on next page -

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

LUST

SEARCH ID: 24 **DIST/DIR:** 0.49 SE **ELEVATION:** 568 **MAP ID:** 9

NAME: RESIDENCE
ADDRESS: 5 ELAINE ST
SHREWSBURY MA

CONTACT:
SOURCE: MADEP

REV: 7/14/99
IDE: 2400100012
IDE2:
STATUS: RAO
PHONE:

BACKROUND:

ACT DATE: 6/25/1997
ACT USE LIMITATION:
ACT STATUS: FOLLOW UP OFFICE RESPONSE
ACT TYPE: SITE VISIT OR COMPLIANCE INSPECTION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

ACT DATE: 2/9/1998
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE NOTIFICATION
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

ACT DATE: 4/13/1998
ACT USE LIMITATION:
ACT STATUS: RAO STATEMENT RECEIVED
ACT TYPE: RESPONSE ACTION OUTCOME - RAO
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

Environmental FirstSearch
Site Detail Report

Target Property: 40 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 9 **DIST/DIR:** 0.63 NE **ELEVATION:** 600 **MAP ID:** 10

NAME: MITCHELL RESIDENCE
ADDRESS: 24 WINTER BROOK RD
SHREWSBURY MA 01545
WORCESTER
CONTACT:
SOURCE: MA DEP

REV: 1.29.01
IDI: 2-0001067
ID2:
STATUS: RAO
PHONE:

SITE INFORMATION

CATEGORY: 2 TIER
DATE: 6.29.01
PHASE: NO PHASE

2 TIER STATUS: PRE CLASSIFIED
2 TIER DATE: 6.30.01
HAZMAT TYPE: OIL

RAO CLASS:

LOCATION TYPE: RESIDENTIAL
SOURCE: UST
SITE DESCRIPTION:

CHEMICALS

FUEL OIL 2 1 2 PPM MX

SITE ACTIONS

ACT DATE: 06/29/2001
ACT USE LIMITATION:
LSP: THOMAS WILLIAMSON
ACT STATUS: ORAL APPROVAL OF PLAN
ACT TYPE: RAM IMMEDIATE RESPONSE ACTION
RAO TYPE:

Environmental FirstSearch
Site Detail Report

Target Property: 40 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 7 **DIST/DIR:** 0.69 SE **ELEVATION:** 558 **MAP ID:** 11

NAME: GAS STATION
ADDRESS: 522 BOSTON TPKE
SHREWSBURY MA 01545
WORCESTER
CONTACT:
SOURCE: MA DEP

REV: 1.29.01
IDI: 2-0000676
ID2:
STATUS: RAO
PHONE:

SITE INFORMATION

LTR#: 4.15.92
DELETED:

CONFIRMED: 7.15.93
REMOVED:

CATEGORY:
DATE: 4.23.92
PHASE: PHASE II

2 TIER STATUS: RAO
2 TIER DATE: 8.02.93
HAZMAT TYPE: OIL

RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED - CONTAMINATION HAS NOT BEEN REDUCED TO
BACKGROUND

LOCATION TYPE:
SOURCE:
SITE DESCRIPTION: 1-4000 GW WATER RELEASE - CONTAINED IN A LUST - GAS STATION - GASOLINE PRESENT
RELEASE TO SOIL

OTHER CONTAMINATION:
OTHER RELEASES:
OTHER PROBLEMS:
OTHER TYPE OF SITE:

SITE ACTIONS

TS DATE: 19961016 00:00:00
ACL RESTRICTION:
LSP:
RA STATUS: WRITTEN APPROVAL OF PLAN
RAS TYPE: RAM RELEASE ABATEMENT MEASURE
RAO CLASS:

TS DATE: 19960723 00:00:00
ACL RESTRICTION:
LSP:
RA STATUS: FEE RECEIVED
RAS TYPE: RAM RELEASE ABATEMENT MEASURE
RAO CLASS:

TS DATE: 19961010 00:00:00
ACL RESTRICTION:
LSP: THOMAS WILLIAMSON
RA STATUS: TRANSMITTAL RECEIVED
RAS TYPE: LSP-PA
RAO CLASS:

TS DATE: 19961010 00:00:00

- Continued on next page -

Environmental FirstSearch
Site Detail Report

Target Property: 40 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 7 **DIST/DIR:** 0.69 SE **ELEVATION:** 558 **MAP ID:** 11

NAME: GAS STATION
ADDRESS: 522 BOSTON TPKE
SHREWSBURY MA 01545
WORCESTER
CONTACT:
SOURCE: MA DEP

REV: 1.29.01
IDI: 2-0000676
ID2:
STATUS: RAO
PHONE:

ACL RESTRICTION:
LSP: THOMAS WILLIAMSON
RA STATUS: WRITTEN PLAN RECEIVED
RAS TYPE: RAM RELEASE ABATEMENT MEASURE
RAO CLASS:

TS DATE: 19961101 00:00:00
ACL RESTRICTION:
LSP: THOMAS WILLIAMSON
RA STATUS: WRITTEN PLAN RECEIVED
RAS TYPE: RAM RELEASE ABATEMENT MEASURE
RAO CLASS:

TS DATE: 19970122 00:00:00
ACL RESTRICTION:
LSP: COLIN COOL
RA STATUS: STATUS REPORT RECEIVED
RAS TYPE: RAM RELEASE ABATEMENT MEASURE
RAO CLASS:

TS DATE: 19970411 00:00:00
ACL RESTRICTION: NON
LSP: THOMAS WILLIAMSON
RA STATUS:
RAS TYPE: RAO RESPONSE ACTION OUTCOME
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED - CONTAMINATION HAS NOT BEEN REDUCED TO
BACKGROUND

TS DATE: 19970711 00:00:00
ACL RESTRICTION:
LSP: THOMAS WILLIAMSON
RA STATUS: COMPLETION STATEMENT RECEIVED
RAS TYPE: PHASE I PHASE I
RAO CLASS:

TS DATE: 19960809 00:00:00
ACL RESTRICTION:
LSP:
RA STATUS: WRITTEN DENIAL OF PLAN
RAS TYPE: RAM RELEASE ABATEMENT MEASURE
RAO CLASS:

Environmental FirstSearch
Site Detail Report

Target Property: 40 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 12 **DIST/DIR:** 0.72 SE **ELEVATION:** 557 **MAP ID:** 12

NAME: PHAETAS 480
ADDRESS: 530 BOSTON TPKE
SHREWSBURY MA 01545
WORCESTER
CONTACT:
SOURCE: MA DEP

REV: 1.29.01
IDI: 2-0000122
ID2:
STATUS: IMPORTA
PHONE:

SITE INFORMATION

LTR#:
DELETED:

CONFIRMED:
REMOVED: 1.15.87

CATEGORY:
DATE:
PHASE: NO PHASE

2 TIER STATUS: NFA
2 TIER DATE: 7.23.93
HAZMAT TYPE: OIL AND HAZARDOUS MATERIAL

RAO CLASS:

LOCATION TYPE:
SOURCE:
SITE DESCRIPTION: LANDFILL - CONTAINED IN LAGOON OR PIT - INDUSTRIAL SITE - GROUNDWATER RELEASE
MANUFACTURING FACILITY - CONTAINED IN A LUST - METALS PRESENT - PCBS PRESENT - CONTAINED IN DRUMS - FORMER
CHLORINATED SOLVENTS PRESENT - RELEASE TO SOIL - PETROLEUM PRESENT - VOCS PRESENT - WETLANDS RELEASE -
THREAT - UNKNOWN AS TO WHAT IS CONTAINED IN -

OTHER CONTAMINATION:
OTHER RELEASES:
OTHER PROBLEMS:
OTHER TYPE OF SITE:

SITE ACTIONS

TS DATE: 19970625 00:00:00
ACL RESTRICTION:
LSP: JOHN DROBINSKI
RA STATUS: RAO STATEMENT RECEIVED
RAS TYPE: RAO-P PARTIAL RESPONSE ACTION OUTCOME
RAO CLASS:

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE:

SEARCH ID: 14 **DIST/DIR:** 0.72 SE **ELEVATION:** 557 **MAP ID:** 12

NAME: S O E HOME DEPOT BLDG
ADDRESS: 530 BOSTON TPKE
SHREWSBURY MA 01545
WORCESTER
CONTACT:
SOURCE: MA DEP

REV: 10/23/02
IDI: 2-0010098
ID2:
STATUS: RAO
PHONE:

SITE INFORMATION

STATUS: IDI & 2 - A site releases receiving a total NRS score less than 150, unless the site meets any of the Tier 1 Inclusionary Criteria (CMR 40.0502(4)(a)). Permits are not required at Tier 2 sites releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites

LTDL:
DELETED:

CONFIRMED:
REMOVED:

CATEGORY: 2 HR
DATE: 10/27/1993
PHASE:

2IE STATUS: IDI & 2
2IE DATE: 10/27/1994
HAZMAT TYPE: OIL AND HAZARDOUS MATERIAL

RAO CLASS:

LOCATION TYPE: INDUSTRIAL
SOURCE: UNKNOWN - DRUMS
SITE DESCRIPTION: RELEASE TO SOIL - VOCS PRESENT - INDUSTRIAL SITE - CONTAINED IN DRUMS.
GROUNDWATER RELEASE:

OTHER CONTAMINATION
OTHER RELEASES
OTHER PROBLEMS
OTHER TYPE OF SITE

CHEMICALS

UNKNOWN CHEMICAL OF TYPE - OIL
BENZENE, ALL ISOMERS - 42000 PPB
UNKNOWN CHEMICAL OF TYPE - OIL
2-PROPANONE, 74000 PPB
BENZENE, ALL ISOMERS - 42 UG/G
2-PROPANONE, 74 UG/G
2-PROPANONE, 74000 PPB
BENZENE, ALL ISOMERS - 42 UG/G
2-PROPANONE, 74 UG/G
BENZENE, ALL ISOMERS - 42000 PPB

SITE ACTIONS

TS DATE: 10/27/1994
ACT. RESTRICTION:
LSP: JOHN DROBINSKI
RAS STATUS: TRANSMITTAL RECEIVED
RAS TYPE: IIER CLASSIFICATION
RAO CLASS:

- Continued on next page -

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE:

SEARCH ID: 14 **DIST/DIR:** 0.72 SE **ELEVATION:** 557 **MAP ID:** 12

NAME: S O E HOME DEPOT BLDG
ADDRESS: 530 BOSTON TPKE
SHREWSBURY MA 01545
WORCESTER
CONTACT:
SOURCE: MA DEP

REV: 10/23/02
IDI: 2-0010098
ID2:
STATUS: RAO
PHONE:

TS DATE: 12/1/1996
ACT. RESTRICTION:
LSP:
RAS STATUS: LINKED TO A TRANSITION SITE - OBSOLETE STATUS
RAS TYPE: FEND
RAO CLASS:

ACT DATE: 09/15/1995
ACT USE LIMITATION:
LSP: JOHN DROBINSKI
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO TYPE:

ACT DATE: 10/27/1994
ACT USE LIMITATION:
LSP: JOHN DROBINSKI
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: PHASE I
RAO TYPE:

ACT DATE: 01/25/1994
ACT USE LIMITATION:
LSP:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE NOTIFICATION
RAO TYPE:

ACT DATE: 11/22/2003
ACT USE LIMITATION:
LSP: JOHN DROBINSKI
ACT STATUS: IIER 2 EXTENSION
ACT TYPE: IIER CLASSIFICATION
RAO TYPE:

ACT DATE: 08/22/1997
ACT USE LIMITATION:
LSP: JOHN DROBINSKI
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: PHASE V
RAO TYPE:

ACT DATE: 06/23/1997
ACT USE LIMITATION: NONE
LSP: JOHN DROBINSKI
ACT STATUS: RAO STATEMENT RECEIVED
ACT TYPE: PARTIAL RAO FOR THIS RTN

- Continued on next page -

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE:

SEARCH ID: 14 **DIST/DIR:** 0.72 SE **ELEVATION:** 557 **MAP ID:** 12

NAME: S O E HOME DEPOT BLDG
ADDRESS: 530 BOSTON TPKE
SHREWSBURY MA 01545
WORCESTER
CONTACT:
SOURCE: MA DEP

REV: 10/23/02
IDI: 2-0010098
ID2:
STATUS: RAO
PHONE:

RAO TYPE: V2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKGROUND

ACT DATE: 10/27/1994
ACT USE LIMITATION:
LSP:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE DISPOSITION
RAO TYPE:

ACT DATE: 10/20/1997
ACT USE LIMITATION:
LSP: JOHN DROBINSKI
ACT STATUS: SCOPE OF WORK RECEIVED
ACT TYPE: PHASE 2
RAO TYPE:

ACT DATE: 01/26/2001
ACT USE LIMITATION:
LSP: JOHN DROBINSKI
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: RELEASE ABATEMENT MEASURE
RAO TYPE:

ACT DATE: 04/04/2001
ACT USE LIMITATION:
LSP: JOHN DROBINSKI
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: PHASE 4
RAO TYPE:

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE:

SEARCH ID: 13 **DIST/DIR:** 0.72 SE **ELEVATION:** 556 **MAP ID:** 13

NAME: RESIDENCE
ADDRESS: 203 GRAFTON ST
SHREWSBURY MA 01545
CONTACT:
SOURCE: MA DEP

REV: IC1 01
IDI: 2-0013962
ID2:
STATUS: RAO
PHONE:

SITE INFORMATION

CATEGORY: TWO HR
DATE: 7/11/01
PHASE: NO PHASE

2IE STATUS: PREL ASSESSED
2IE DATE: 7/11/01
HAZMAT TYPE: OIL

RAO CLASS:

LOCATION TYPE: RESIDENTIAL
SOURCE: AST
SITE DESCRIPTION:

CHEMICALS

FUEL OIL, 2 20 GAL

SITE ACTIONS

ACT DATE: 07/16/2003
ACT USE LIMITATION:
LSP: STEVEN SHOPL
ACT STATUS: ORAL APPROVAL OF A MODIFIED PLAN
ACT TYPE: IRA IMMEDIATE RESPONSE ACTION
RAO TYPE:

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 19 **DIST/DIR:** 0.77 NE **ELEVATION:** 603 **MAP ID:** 14

NAME: TRANSFORMER AREA
ADDRESS: MUNICIPAL DC
SHREWSBURY MA 01545

CONTACT:
SOURCE: MA DEP

REV: 8/1/01
HD1: 2-0001468
HD2:
STATUS: DEP TIER 1D
PHONE:

SITE INFORMATION

CATEGORY: TWO DIR
DATE: 7/12/00
PHASE: NO PHASE

2DR STATUS:
2DR DATE:
HAZ/MAT TYPE:

DEP TIER 1D
7/19/01
HAZARDOUS MATERIAL

RAO CLASS:

LOCATION TYPE: MUNICIPAL
SOURCE: TRANSFORM
SITE DESCRIPTION:

CHEMICALS

1,1-DICHLOROETHYLENE (1,1-DICHLOROETHENE; VINYLIDENE CHLORIDE)

SITE ACTIONS

ACT DATE: 07/12/2000
ACT USE LIMITATION:
LSP: JAMES D'ORRIEN
ACT STATUS: ORAL APPROVAL OF PLAN
ACT TYPE: IRA IMMEDIATE RESPONSE ACTION
RAO TYPE:

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 3 **DIST/DIR:** 0.79 NE **ELEVATION:** 643 **MAP ID:** 15

NAME: BUDDENHAGEN REALTY
ADDRESS: 32 MAPLE AVE
SHREWSBURY MA 01545

CONTACT:
SOURCE: MA DEP

REV: 8/14/04
HD1: 2-0001004
HD2:
STATUS: REMOVED
PHONE:

SITE INFORMATION

STATUS: TIER 2 - A site/release receiving a total NRS score less than 450, unless the site meets any of the Tier 1 Discretionary Criteria (310 CMR 40.0520(2)(a)). Permits are not required at Tier 2 sites/releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites.

LTDL: 7/15/1993
DELETED:

CONFIRMED: 7/15/1993
REMOVED:

LOCATION TYPE: COMMERCIAL
SOURCE: UST
SITE DESCRIPTION: RELEASE TO SOIL - COMMERCIAL SITE; GROUNDWATER RELEASE - CLASS GE PRESENT
CONTAINED IN: UNKNOWN

OTHER CONTAMINATION:
OTHER RELEASES:
OTHER PROBLEMS:
OTHER TYPE OF SITE:

CHEMICALS

UNKNOWN CHEMICAL OF UNKNOWN TYPE

SITE ACTIONS

TN DATE: 8/11/1997
ACUL RESTRICTION:
LSP: ROEL LOITHERSTEIN
RA STATUS:
RAS TYPE: TIER CLASSIFICATION
RAO CLASS:

TN DATE: 8/11/1997
ACUL RESTRICTION:
LSP: ROEL LOITHERSTEIN
RA STATUS: COMPLETION STATEMENT RECEIVED
RAS TYPE: PHASE 3
RAO CLASS:

ACT DATE: 6/29/2004
ACT USE LIMITATION:
LSP:
ACT STATUS: TIER 2 EXTENSION
ACT TYPE: TIER CLASSIFICATION
RAO CLASS:

- *Continued on next page* -

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 3 **DIST/DIR:** 0.79 NE **ELEVATION:** 643 **MAP ID:** 15

NAME: BUDDENHAGEN REALTY
ADDRESS: 32 MAPLE AVE
SHREWSBURY MA 01545

CONTACT:
SOURCE: MA DEP

REV: 8/14/04
HD1: 2-0001004
HD2:
STATUS: REMOVED
PHONE:

ACT DATE: 2/10/2003
ACT USE LIMITATION:
LSP: ROEL LOITHER
ACT STATUS: NOTICE OF DELAY IN MEETING RAO DEADLINE RECEIVED
ACT TYPE: PHASE 2
RAO CLASS:

ACT DATE: 2/10/2003
ACT USE LIMITATION:
LSP: ROEL LOITHER
ACT STATUS: NOTICE OF DELAY IN MEETING RAO DEADLINE RECEIVED
ACT TYPE: PHASE 3
RAO CLASS:

ACT DATE: 8/11/1997
ACT USE LIMITATION:
LSP:
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: PHASE 1
RAO CLASS:

ACT DATE: 10/8/2003
ACT USE LIMITATION:
LSP: ROEL LOITHER
ACT STATUS: WRITTEN PLAN RECEIVED
ACT TYPE: PHASE 4
RAO CLASS:

ACT DATE: 7/15/1993
ACT USE LIMITATION:
LSP:
ACT STATUS: VALID TRANSMISSION SENT
ACT TYPE: RELEASE DISPOSITION
RAO CLASS:

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 6 **DIST/DIR:** 0.79 SW **ELEVATION:** 413 **MAP ID:** 16

NAME: FAIRLAWN PLAZA
ADDRESS: 180 MAPLE AVE
SHREWSBURY MA 01545
WORCESTER

CONTACT:
SOURCE: MA DEP

REV: 7/14/09
HD1: 2-0017680
HD2:
STATUS: TIER 1D
PHONE:

SITE INFORMATION

STATUS: TIER 2 - A site/release receiving a total NRS score less than 450, unless the site meets any of the Tier 1 Discretionary Criteria (310 CMR 40.0520(2)(a)). Permits are not required at Tier 2 sites/releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites.

STATUS: TIER 2 - A site/release receiving a total NRS score less than 450, unless the site meets any of the Tier 1 Discretionary Criteria (310 CMR 40.0520(2)(a)). Permits are not required at Tier 2 sites/releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites.

LOCATION TYPE:
SOURCE:
SITE DESCRIPTION:

CHEMICALS

VINYL CHLORIDE (CHLOROETHENE)

SITE ACTIONS

LSP INVOLVED: 4969

ACT DATE: 1/29/2006
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE DISPOSITION
RAO CLASS:

ACT DATE: 1/29/2006
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE NOTIFICATION
RAO CLASS:

ACT DATE: 2/15/2006
ACT USE LIMITATION:
ACT STATUS: ISSUED
ACT TYPE: NOTICE OF RESPONSIBILITY
RAO CLASS:

ACT DATE: 11/14/2006
ACT USE LIMITATION:
ACT STATUS: ALSENT
ACT TYPE: NOTICE OF RESPONSIBILITY
RAO CLASS:

ACT DATE: 1/22/2007
ACT USE LIMITATION:
ACT STATUS: TIER 2 CLASSIFICATION
ACT TYPE: TIER CLASSIFICATION

- *Continued on next page* -

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 6 **DIST/DIR:** 0.79 SW **ELEVATION:** 413 **MAP ID:** 16

NAME: FAIRLAWN PLAZA
ADDRESS: 180 MAPLE AVE
SHREWSBURY MA 01545
WORCESTER
CONTACT
SOURCE: MADEP

REV: 7/14/99
HD1: 2400143080
HD2:
STATUS: HERB
PHONE:

RAO CLASS:

ACT DATE: 1/22/2007
ACT USE LIMITATION:
ACT STATUS: TRANSMITTAL RECEIVED
ACT TYPE: HER CLASSIFICATION
RAO CLASS:

ACT DATE: 1/22/2007
ACT USE LIMITATION:
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: PHASE I
RAO CLASS:

ACT DATE: 1/22/2007
ACT USE LIMITATION:
ACT STATUS: SCOPE OF WORK RECEIVED
ACT TYPE: PHASE 2
RAO CLASS:

ACT DATE: 2/14/2007
ACT USE LIMITATION:
ACT STATUS: TECHNICAL SCREEN AT DEP
ACT TYPE: PHASE I
RAO CLASS:

ACT DATE: 1/22/2009
ACT USE LIMITATION:
ACT STATUS: NOTICE OF DELAY IN MEETING/RAO DEADLINE RECEIVED
ACT TYPE: PHASE 2
RAO CLASS:

ACT DATE: 1/22/2009
ACT USE LIMITATION
ACT STATUS: NOTICE OF DELAY IN MEETING/RAO DEADLINE RECEIVED
ACT TYPE: PHASE I
RAO CLASS:

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 17 **DIST/DIR:** 0.81 NE **ELEVATION:** 603 **MAP ID:** 17

NAME: SHREWSBURY MUNICIPAL LIGHT AND POWER
ADDRESS: 12 MUNICIPAL RD
SHREWSBURY MA 01545
WORCESTER
CONTACT
SOURCE: MADEP

REV: 8/25/01
HD1: 2400143044
HD2:
STATUS: HERB
PHONE:

SITE INFORMATION

CATEGORY: 72 HR
DATE: 9/8/01
PHASE: NO PHASE

ZIP STATUS: PRECLASSIFIED
ZIP DATE: 5/8/03
HAZMAT TYPE: OIL

RAO CLASS:

LOCATION TYPE: COMMERCIAL
SOURCE:
SITE DESCRIPTION:

CHEMICALS

OIL 2.5 INCH

SITE ACTIONS

ACT DATE: 05/08/2001
ACT USE LIMITATION:
USP: GLENN GORAL
ACT STATUS: ORAL APPROVAL OF PLAN
ACT TYPE: IRA IMMEDIATE RESPONSE ACTION
RAO TYPE:

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 8 **DIST/DIR:** 0.81 NE **ELEVATION:** 603 **MAP ID:** 17

NAME: JOHNSON SUBSTA
ADDRESS: 12 MUNICIPAL DR
SHREWSBURY MA
CONTACT
SOURCE: MADEP

REV: 8/25/01
HD1: 2400143044
HD2:
STATUS: HERB
PHONE:

SITE INFORMATION

STATUS: HER 2 - A site release receiving a total SRN score less than 150, unless the site meets any of the Tier 1A Inclusionary Criteria (CMR 40.0520(2)(a)). Permits are not required at Tier 2 sites releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transmission sites that have accepted sites are categorically Tier 2 sites.

LTBL:
DELETED:

CONFIRMED:
REMOVED:

LOCATION TYPE: MUNICIPAL
SOURCE: TRANSFORM
SITE DESCRIPTION:

CHEMICALS

UNKNOWN CHEMICAL OF TYPE: OIL 150.0 GAL

SITE ACTIONS

LSP INVOLVED: JAMES STOUDER IV

LSP INVOLVED: N/A

ACT DATE: 4/20/2001
ACT USE LIMITATION:
ACT STATUS: ISSUED
ACT TYPE: RLFA
RAO CLASS:

ACT DATE: 4/20/2001
ACT USE LIMITATION:
ACT STATUS: 1-4 YRS
ACT TYPE: RULA
RAO CLASS:

ACT DATE: 4/20/2001
ACT USE LIMITATION:
ACT STATUS: ORAL APPROVAL OF PLAN
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS:

ACT DATE: 4/20/2001
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE CUSTOMAGE 2H
ACT TYPE: RELEASE DISPOSITION
RAO CLASS:

- Continued on next page -

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 8 **DIST/DIR:** 0.81 NE **ELEVATION:** 603 **MAP ID:** 17

NAME: JOHNSON SUBSTA
ADDRESS: 12 MUNICIPAL DR
SHREWSBURY MA
CONTACT
SOURCE: MADEP

REV: 8/25/01
HD1: 2400143044
HD2:
STATUS: HERB
PHONE:

ACT DATE: 8/25/2001
ACT USE LIMITATION:
ACT STATUS: ISSUED
ACT TYPE: NOR
RAO CLASS:

ACT DATE: 6/20/2001
ACT USE LIMITATION:
ACT STATUS: WRITTEN PLAN RECEIVED
ACT TYPE: RELEASE ABATEMENT MEASURE
RAO CLASS:

ACT DATE: 6/20/2001
ACT USE LIMITATION
ACT STATUS: REPORTABLE RELEASE CUSTOMAGE 2H
ACT TYPE: RELEASE NOTIFICATION
RAO CLASS:

ACT DATE: 6/20/2001
ACT USE LIMITATION
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO CLASS:

ACT DATE: 6/26/2002
ACT USE LIMITATION:
ACT STATUS: FEE RECEIVED-EMERA USE ONLY
ACT TYPE: RELEASE ABATEMENT MEASURE
RAO CLASS:

ACT DATE: 7/5/2002
ACT USE LIMITATION
ACT STATUS: AUSENT
ACT TYPE: NOR
RAO CLASS:

ACT DATE: 4/30/2002
ACT USE LIMITATION
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: PHASE I
RAO CLASS:

ACT DATE: 4/30/2002
ACT USE LIMITATION

- Continued on next page -

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: X **DIST/DIR:** 0.81 NE **ELEVATION:** 603 **MAP ID:** 17

NAME: JOHNSON SUBSTA
ADDRESS: 11 MUNICIPAL DR
SHREWSBURY MA

CONTACT
SOURCE: MA DEP

REV: 8.25.98
IDI: 2-0011784
IDI2:
STATUS: HERB
PHONE

ACT STATUS: RAO LINKED TO RTN SAYBTER CLASSIFICATION SUBMITTAL
ACT TYPE: HER CLASSIFICATION
RAO CLASS:

ACT DATE: 4/10/2002
ACT USE LIMITATION:
ACT STATUS: TIER 2 CLASSIFICATION
ACT TYPE: HER CLASSIFICATION
RAO CLASS:

ACT DATE: 4/10/2002
ACT USE LIMITATION:
ACT STATUS: TRANSMITTAL RECEIVED
ACT TYPE: HER CLASSIFICATION
RAO CLASS:

ACT DATE: 5/16/2002
ACT USE LIMITATION:
ACT STATUS: TECHNICAL SCREEN AUDIT
ACT TYPE: PHASE I
RAO CLASS:

ACT DATE: 5/16/2002
ACT USE LIMITATION:
ACT STATUS: TECHNICAL SCREEN AUDIT
ACT TYPE: HER CLASSIFICATION
RAO CLASS:

ACT DATE: 7/17/2007
ACT USE LIMITATION:
ACT STATUS: NOIR
ACT TYPE: Closure
RAO CLASS:

ACT DATE: 9/28/2007
ACT USE LIMITATION:
ACT STATUS: MODIFIED/REVISED OR UPDATED PLAN RECEIVED
ACT TYPE: RELEASE ABATEMENT MEASURE
RAO CLASS:

ACT DATE: 9/28/2007
ACT USE LIMITATION:
ACT STATUS: STATUS REPORT RECEIVED
ACT TYPE: RELEASE ABATEMENT MEASURE
RAO CLASS:

ACT DATE: 9/28/2007
ACT USE LIMITATION:

- More Details Exist For This Site; Max Page Limit Reached -

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 15 **DIST/DIR:** 0.81 NE **ELEVATION:** 645 **MAP ID:** 18

NAME: SHELL GAS STATION
ADDRESS: 29 MAPLE AVE
SHREWSBURY MA 01545
WORCESTER

CONTACT
SOURCE: MA DEP

REV: 7.14.99
IDI: 2-0017160
IDI2:
STATUS: HERB
PHONE:

ACT DATE: 7/8/2009
ACT USE LIMITATION:
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: PHASE I
RAO CLASS:

ACT DATE: 7/8/2009
ACT USE LIMITATION:
ACT STATUS: TRANSMITTAL RECEIVED
ACT TYPE: HER CLASSIFICATION
RAO CLASS:

ACT DATE: 7/8/2009
ACT USE LIMITATION:
ACT STATUS: TIER 2 CLASSIFICATION
ACT TYPE: HER CLASSIFICATION
RAO CLASS:

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 15 **DIST/DIR:** 0.81 NE **ELEVATION:** 645 **MAP ID:** 18

NAME: SHELL GAS STATION
ADDRESS: 29 MAPLE AVE
SHREWSBURY MA 01545
WORCESTER

CONTACT
SOURCE: MA DEP

REV: 7.14.99
IDI: 2-0017160
IDI2:
STATUS: HERB
PHONE:

SITE INFORMATION

STATUS: TIER 2 - A site release receiving a total NRS score less than 150, unless the site meets any of the Tier 1 Disclosure Criteria (310 CMR 40.0520(2)(a)1). Permits are not required at Tier 2 site releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites

STATUS: TIER 2 - A site release receiving a total NRS score less than 150, unless the site meets any of the Tier 1 Disclosure Criteria (310 CMR 40.0520(2)(a)1). Permits are not required at Tier 2 site releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites

LOCATION TYPE: COMMERCIAL
SOURCE:
SITE DESCRIPTION:

CHEMICALS

GASOLINE, ALIPHATIC HYDROCARBONS 5470-7 C.T.
CAS NO: 21.6 MG/KG

SITE ACTIONS

ACT DATE: 7/8/2008
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE DISPOSITION
RAO CLASS:

ACT DATE: 7/8/2008
ACT USE LIMITATION:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE NOTIFICATION
RAO CLASS:

ACT DATE: 7/21/2008
ACT USE LIMITATION:
ACT STATUS: ISSUED
ACT TYPE: NOTICE OF RESPONSIBILITY
RAO CLASS:

ACT DATE: 5/7/2009
ACT USE LIMITATION:
ACT STATUS: ALSENT
ACT TYPE: NOTICE OF RESPONSIBILITY
RAO CLASS:

ACT DATE: 7/8/2009
ACT USE LIMITATION:
ACT STATUS: SCOPE OF WORK RECEIVED
ACT TYPE: PHASE 2
RAO CLASS:

- Continued on next page -

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 4 **DIST/DIR:** 0.85 NE **ELEVATION:** 650 **MAP ID:** 19

NAME: CONCORD OIL CO
ADDRESS: 23 MAPLE ST
SHREWSBURY MA 01545

CONTACT
SOURCE: MA DEP

REV: 10.23.02
IDI: 2-0015225
IDI2:
STATUS: ACT
PHONE:

SITE INFORMATION

STATUS: TIER 2 - A site release receiving a total NRS score less than 150, unless the site meets any of the Tier 1 Disclosure Criteria (310 CMR 40.0520(2)(a)1). Permits are not required at Tier 2 site releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites

CATEGORY: 2
DATE: 5/21/1998
PHASE: PHASE III
2DE STATUS: TIER 2
2DE DATE: 5/27/1999
HAZMAT TYPE: OIL

RAO CLASS:

LOCATION TYPE: COMMERCIAL
SOURCE: UST
SITE DESCRIPTION:

CHEMICALS

GASOLINE, 1155 PPMV
GASOLINE, 1155 PPMV

SITE ACTIONS

ACT DATE: 07/22/2002
ACT USE LIMITATION:
LSP: ANTHONY ANDRONICO
ACT STATUS: WRITTEN PLAN RECEIVED
ACT TYPE: RELEASE ABATEMENT MEASURE
RAO TYPE:

ACT DATE: 05/21/1998
ACT USE LIMITATION:
LSP:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE DISPOSITION
RAO TYPE:

ACT DATE: 10/21/1999
ACT USE LIMITATION:
LSP: ANTHONY ANDRONICO
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: IMMEDIATE RESPONSE ACTION
RAO TYPE:

ACT DATE: 05/27/1999
ACT USE LIMITATION:

- Continued on next page -

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 4 **DIST/DIR:** 0.85 NE **ELEVATION:** 650 **MAP ID:** 19

NAME: [illegible]
ADDRESS: 23 MAPLE ST
SHREWSBURY MA 01545
CONTACT
SOURCE: MADEP

REV: 10/23/02
IDI: 2-0012225
IH2:
STATUS: RAO
PHONE:

LSP: ANTHONY ANDRONICO
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: PHASE I
RAO TYPE:

ACT DATE: 05/28/2001
ACT USE LIMITATION:
LSP: ANTHONY ANDRONICO
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: RELEASE ABATEMENT MEASURE
RAO TYPE:

ACT DATE: 01/12/2000
ACT USE LIMITATION:
LSP: ANTHONY ANDRONICO
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: RELEASE ABATEMENT MEASURE
RAO TYPE:

ACT DATE: 08/23/2000
ACT USE LIMITATION:
LSP: ANTHONY ANDRONICO
ACT STATUS: REVISED STATEMENT OR TRANSMITTAL RECEIVED
ACT TYPE: TIER CLASSIFICATION
RAO TYPE:

ACT DATE: 12/21/2001
ACT USE LIMITATION:
LSP: ANTHONY ANDRONICO
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: PHASE 2
RAO TYPE:

ACT DATE: 07/21/1998
ACT USE LIMITATION:
LSP:
ACT STATUS: REPORTABLE RELEASE UNDER MGL 21E
ACT TYPE: RELEASE NOTIFICATION
RAO TYPE:

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 10 **DIST/DIR:** 0.87 NE **ELEVATION:** 655 **MAP ID:** 20

NAME: MOBIL STATION 01-ELR
ADDRESS: 22 MAPLE ST
SHREWSBURY MA 01545
WORCESTER
CONTACT
SOURCE: MADEP

REV: 1/29/91
IDI: 2-0006806
IH2:
STATUS: RAO
PHONE:

SITE INFORMATION

LTID: 4/15/91 CONFIRMED: 4/15/91
DELETED: REMOVED:

CATEGORY:
DATE: 4/15/91 21E STATUS: RAO
PHASE: PHASE III 21E DATE: 6/16/98
HAZMAT TYPE: OIL
RAO CLASS:

LOCATION TYPE:
SOURCE:
SITE DESCRIPTION: GROUNDWATER RELEASE, CONTAINED IN A CUSL, GAS STATION, PETROLEUM PRESENT
RELEASE TO SOIL:

OTHER CONTAMINATION:
OTHER RELEASES:
OTHER PROBLEMS:
OTHER TYPE OF SITE:

SITE ACTIONS

TS DATE: 19970114 00:00:00
ACL RESTRICTION:
LSP: KENNETH SMITH
RA STATUS: TRANSMITTAL RECEIVED
RAS TYPE: TIER2EXT
RAO CLASS:

TS DATE: 19980604 00:00:00
ACL RESTRICTION:
LSP: JAMES YOUNG
RA STATUS: RAO STATEMENT RECEIVED
RAS TYPE: RAO RESPONSE ACTION OUTCOME
RAO CLASS:

TS DATE: 19980402 00:00:00
ACL RESTRICTION:
LSP: JAMES YOUNG
RA STATUS: SCOPE OF WORK RECEIVED
RAS TYPE: PHASEII
RAO CLASS:

TS DATE: 19980616 00:00:00
ACL RESTRICTION:

- Continued on next page -

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 10 **DIST/DIR:** 0.87 NE **ELEVATION:** 655 **MAP ID:** 20

NAME: MOBIL STATION 01-ELR
ADDRESS: 22 MAPLE ST
SHREWSBURY MA 01545
WORCESTER
CONTACT
SOURCE: MADEP

REV: 1/29/91
IDI: 2-0006806
IH2:
STATUS: RAO
PHONE:

LSP: JAMES YOUNG
RA STATUS: FILE RECEIVED
RAS TYPE: RAO RESPONSE ACTION OUTCOME
RAO CLASS:

TS DATE: 19980604 00:00:00
ACL RESTRICTION:
LSP: JAMES YOUNG
RA STATUS: COMPLETION STATEMENT RECEIVED
RAS TYPE: PHASEII
RAO CLASS:

TS DATE: 19970220 00:00:00
ACL RESTRICTION:
LSP: WILLIAM ABBOTT
RA STATUS:
RAS TYPE: TIER2EXT
RAO CLASS:

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 5 **DIST/DIR:** 0.88 NE **ELEVATION:** 654 **MAP ID:** 21

NAME: EMPIRE CLEANERS
ADDRESS: 15 MAPLE AVE
SHREWSBURY MA 01545
CONTACT
SOURCE: MADEP

REV: 11/1/07
IDI: 2-0000766
IH2:
STATUS: TIER 2
PHONE:

SITE INFORMATION

STATUS: TIER 2 - A site release requiring a total NRS score less than 150, unless the site meets one of the Tier I Deficiencies Criteria in MR 40.0520(2)(a)1. Permits are not required at Tier 2 site releases and response actions may be performed under the supervision of an LSP without prior DEP approval. All pre-1993 transition sites that have accepted waivers are categorically Tier 2 sites

LTID: 7/15/1993 CONFIRMED: 7/15/1993
DELETED: REMOVED:

LTID: CONFIRMED:
DELETED: REMOVED:

LTID: CONFIRMED:
DELETED: REMOVED:

LOCATION TYPE: FORMER GAS STATION
SOURCE: UST
SITE DESCRIPTION: RELEASE TO SOIL, GAS STATION, FORMER, PETROLEUM PRESENT, GROUNDWATER RELEASE, CONTAINED IN A CUSL
RELEASE TO SOIL:

OTHER CONTAMINATION:
OTHER RELEASES:
OTHER PROBLEMS:
OTHER TYPE OF SITE:

CHEMICALS

PETROLEUM BASED OIL

SITE ACTIONS

ACT DATE: 8/1/2005
ACT USE LIMITATION:
LSP: 0722
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: PHASE I
RAO CLASS:

ACT DATE: 7/15/1993
ACT USE LIMITATION:
LSP:
ACT STATUS: VALID TRANSITION SITE
ACT TYPE: RELEASE DISPOSITION
RAO CLASS:

- Continued on next page -

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 5 **DIST/DIR:** 0.88 NE **ELEVATION:** 654 **MAP ID** 21

NAME: EMPIRE CLEANERS
ADDRESS: 134 MAPLE AVE
SHREWSBURY MA 01545

CONTACT
SOURCE: MADEP

REV: C1107
EDI: 2000000627
ID2:
STATUS: HERE
PHONE:

ACT DATE: 12 2 2002
ACT USE LIMITATION:
LSP: MICHAEL PENZ
ACT STATUS: TECHNICAL SCREEN AUDIT
ACT TYPE: PHASE I
RAO CLASS:

ACT DATE: 3 1 2003
ACT USE LIMITATION:
LSP: 4722
ACT STATUS: RAN LINKED TO RTN CLASSIFICATION SUBMITTAL
ACT TYPE: TIER CLASSIFICATION
RAO CLASS:

ACT DATE: 6 1 2005
ACT USE LIMITATION:
LSP: 4722
ACT STATUS: COMPLETION STATEMENT RECEIVED
ACT TYPE: PHASE 2
RAO CLASS:

ACT DATE: 1 5 2007
ACT USE LIMITATION:
LSP: 4722
ACT STATUS: STATE SUPPORT RECEIVED
ACT TYPE: PHASE 4
RAO CLASS:

Environmental FirstSearch
Site Detail Report

Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

STATE

SEARCH ID: 18 **DIST/DIR:** 0.90 SW **ELEVATION:** 414 **MAP ID** 22

NAME: SUNOCO STATION
ADDRESS: 275 BOSTON TPKE
SHREWSBURY MA 01545

CONTACT
SOURCE: MADEP

REV: 1 25 01
EDI: 2000000732
ID2:
STATUS: HERE
PHONE:

SITE INFORMATION

LHB: 7 15 92
DELETED:

CONFIRMED: 7 15 92
BOARDED:

CATEGORY:
DATE: 7 15 92
PHASE: PHASE II

2HS STATUS: HERE
2HS DATE: 2 1 95
HAZMAT TYPE: OIL

RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

LOCATION TYPE:
SOURCE:
SITE DESCRIPTION: GROUNDWATER RELEASE - CONTAMINATION AT UST - GAS STATION - GASOLINE PRESENT
RELEASE TO SOIL - PETROLEUM PRESENT, VOCS PRESENT

OTHER CONTAMINATION:
OTHER RELEASES:
OTHER PROBLEMS:
OTHER TYPE OF SITE:

SITE ACTIONS

IN DATE: 10/29/1992 12:00:00 AM
ACT RESTRICTION: NON
LSP: MICHAEL BINGHAM
RA STATUS:
RAN TYPE: RAO RESPONSE ACTION OUTCOME
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

FS DATE: 10/29/1992 12:00:00 AM
ACT RESTRICTION: NON
LSP: MICHAEL BINGHAM
RA STATUS: RAO STATEMENT RECEIVED
RAN TYPE: RAO RESPONSE ACTION OUTCOME
RAO CLASS: A2 - A PERMANENT SOLUTION HAS BEEN ACHIEVED. CONTAMINATION HAS NOT BEEN REDUCED TO
BACKROUND:

Environmental FirstSearch
Street Name Report for Streets within .25 Mile(s) of Target Property

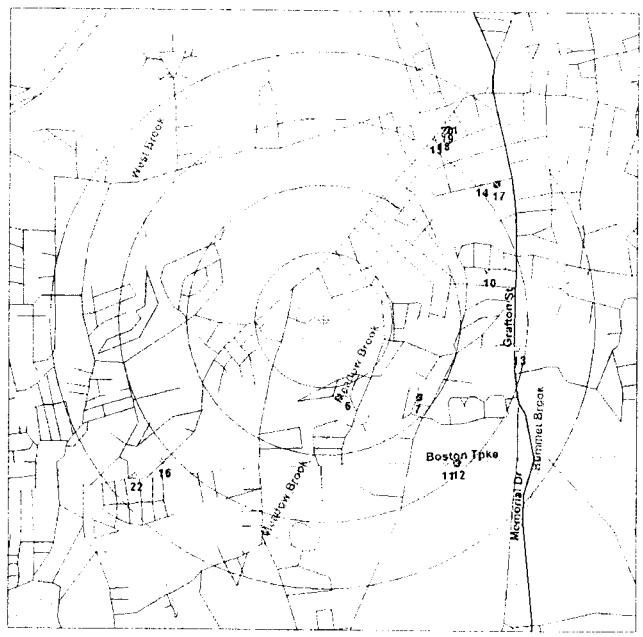
Target Property: 30 SHERWOOD AVE
SHREWSBURY MA 01545

JOB: 1479

Street Name	Dist/Dir	Street Name	Dist/Dir
Broadway	0.24 SW		
Crescent Pl	0.25 NE		
Crescent St	0.23 NE		
Dawson Cir	0.25 SE		
Fiske St	0.21 NE		
Gale Ave	0.15 SW		
Harriet Ave	0.23 SE		
Hutchins St	0.10 NE		
Kneeland St	0.23 SW		
Maple Ave	0.15 NW		
Newton St	0.19 SW		
Oak St	0.11 NW		
Old Mill Rd	0.25 SW		
Orchard Rd	0.11 NE		
Shady Lane Ave	0.24 NE		
Sherwood Ave	0.03 NW		

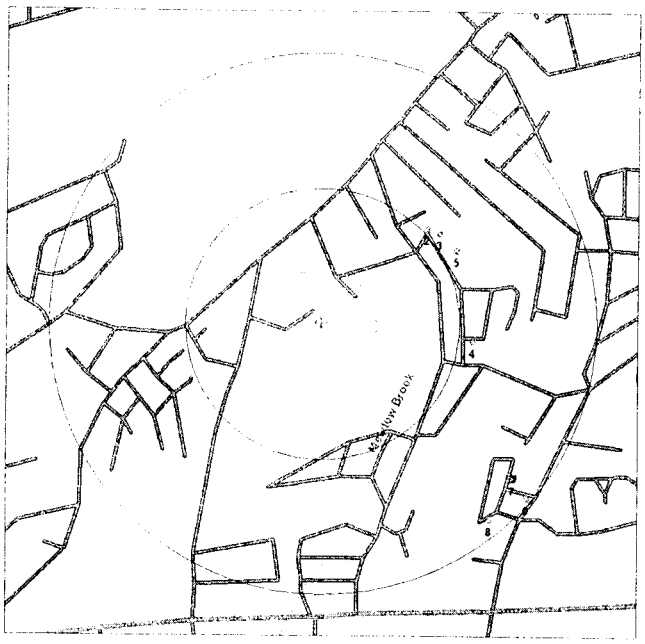
Environmental FirstSearch
1 Mile Radius
ASTM Map NPL RCRACOR STATE Sites

30 SHERWOOD AVE SHREWSBURY MA 01545



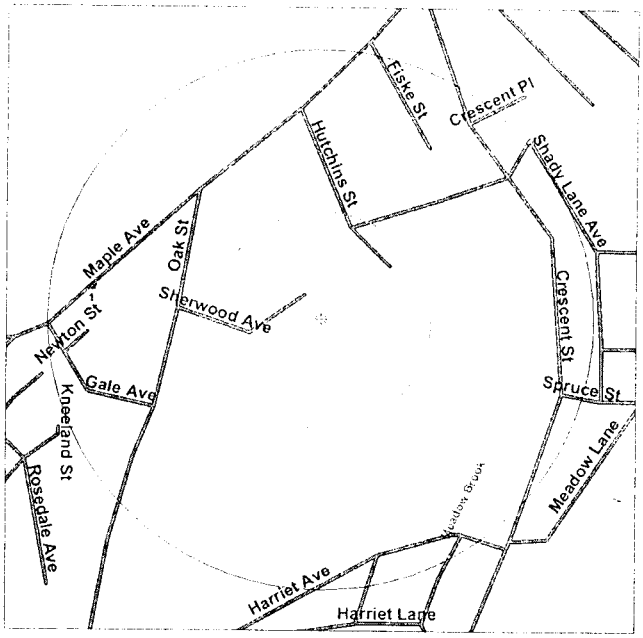
Environmental FirstSearch
5 Mile Radius
ASTM Map CERCLIS RCRATSD LUST SWL

FIRSTSEARCH



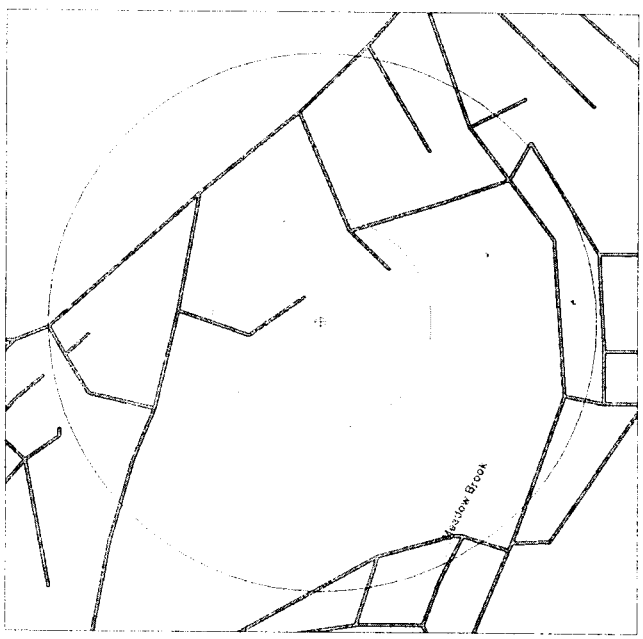
Environmental FirstSearch
25 Mile Radius
ASTM Map RCRAGEN ERNS UST FEDIC/EC METHLABS

FIRSTSEARCH



Environmental FirstSearch
25 Mile Radius
Non-ASTM Map No Sites Found

FIRSTSEARCH



HISTORICAL FIRE INSURANCE MAPS

NO MAPS AVAILABLE

9/11/2009

1479

30 SHERWOOD AVE
SHREWSBURY, MA 01545

A search of FirstSearch Technology Corporation's proprietary database of historical fire insurance map availability confirmed that there are NO MAPS AVAILABLE for the Subject Location as shown above

FirstSearch Technology Corporation's proprietary database of historical fire insurance map availability represents abstracted information from the Sanborn® Map Company LLC obtained through online access to the Library of Congress as well as the result of a review of the other fire insurance map microfilm collections available via various local libraries.

APPENDIX C

27 Plate | 093000 Plot | Condo | 1 of 1 CARD | COMM/IND | TOTAL ASSESSED: 10,369,700 !5086!

Town of Shrewsbur

Patriot Properties Inc.

PROPERTY LOCATION

No	Alt No	Direction/Street/City
28		SHERWOOD AVE, SHREWSB

OWNERSHIP

Owner	SHREWSBURY TOWN OF
Owner	
Owner	
Street	100 MAPLE AVE
Street	
Twn/Cit	SHREWSBURY
St/Prov	MA Cntr Own O N
Postal:	01545 Typ

PREVIOUS OWNER

Owner	
Owner	
Street	
Twn/Cit	
St/Prov	Cntr
Postal:	

NARRATIVE DESCRIPTION

This Parcel contains 14.2 ACRES of land mainly classified as MUNICPL with a(n) School Building Built about 1960, Having Primarily BRICK Exterior and MEMBRANE Roof Cover, with 1 Units, 0 Baths, 34 HalfBaths, 0 3/4 Baths, 0 Rooms, and 0

OTHER ASSESSMENTS

Code	Descrip/No	Amount	Com. Int

IN PROCESS APPRAISAL SUMMARY

Use Code	Building Value	Yard Items	Land Size	Land Value	Total Value
903	9,524,500		14.200	845,200	10,369,700
Total Card	9,524,500		14.200	845,200	10,369,700
Total Parcel	9,524,500		14.200	845,200	10,369,700

Source: Market Adj Co | Total Value per SQ unit /Car 126.87 /Parc 126.

Legal Description

Entered Lot Size | Total Land: | Land Unit Type

User Acct 2.72939e+00 | **GIS Ref** | **GIS Ref** | **Insp Date**

PREVIOUS ASSESSMENT

Parcel ID 27 093000

Tax Yr	Use	Cat	Bldg Value	Yrd Item	Land Size	Land Valu	Total Valu	Asses'd Valu	Notes	Date
2008	903	FV	9,524,500	0	14.2	845,200	10,369,700	10,369,700		1/4/2008
2007	903	FV	11,184,300	0	14.2	845,200	12,029,500	12,029,500	Year End	1/2/2007
2007	903	PA	9,306,700	0	14.2	845,200	10,151,900	10,151,900	SUBSEQ TO REVAL	6/15/2006
2007	903	PC	13,710,400	0	14.2	718,200	14,428,600	14,428,600	PRIOR TO 2007 CAI	6/7/2006
2006	903	FV	13,710,400	0	14.2	718,200	14,428,600	14,428,600		1/3/2006
2005	903	CNVS	10,819,900	0	14.2	642,100	11,462,000	11,462,000	upgrade to 44	12/13/2004
2005	903	FV	6,924,700	0	14.2	642,100	7,566,800	7,566,800		1/4/2005
2004	903	FV	10,819,900	0	14.2	642,100	11,462,000	11,462,000	year end role	1/5/2004

SALES INFORMATION

TAX DISTRIC | PAT ACCT. 5086

Grantor	Legal Ref	Typ	Date	Sale Code	Sale Price	V	Tst	Verif Assoc PCL Value	Notes
	4338-283		12/13/19	OTHER	0	No	No		

PRINT

Date	Time
09/14/0	15:04:

LAST R

Date	Time
09/18/0	16:24:
sdagle	

USER DEFINED

Prior Id #	
Prior Id #	
Prior Id #	
Prior Id #	
Prior Id #	
Prior Id #	
Prior Id #	
Prior Id #	1963-464
Prior Id #	
ASR Ma	
Fact Dist:	
Reval Dis	
Year:	
LandReas	
BldReaso	

BUILDING PERMITS

Date	Number	Descrip	Amount	C/O	Last Visit	Fed Cod	F. Descrip	Comment
6/23/2004	04-441	RENOVAT	30,000	C	9/20/2004			INTERIOR RENOVA
10/30/20(	03-816	MANUAL		C	9/20/2004			REPLACE SIDING & R
10/18/20(	01-612	MANUAL		C	9/12/2002			TEMPORARY TRAILERS

ACTIVITY INFORMATION

Date	Result	By	Name
10/2/1994	REVIEW	RJE	RJE

PROPERTY FACTORS

Ite	Code	Descip	%	Item	Cod	Descrip
Z	D	Res B-1	100	U	2	SEWER
o				t	3	WATER
n				l		
Census:						
Flood Haz:				xmpt		
D				Topo		
s				Stree		
t				Traffi		

Sig | VERIFICATION OF VISIT NOT O ___/___/

LAND SECTION (First 7 lines only)

Use Code	Description	LUC Fact	No of Units	Depth / PriceUnit	Unit Type	Land Type	LT Facto	Base Value	Unit Price	Adj	Neigh	Neigh Influ	eigh	Infl 1	%	Infl 2	%	Infl 3	%	Appraised Value	Alt Class	%	Spec Land	J Code	Fact	Use Value	Notes
903	MUNICPL		43560		SQ FT	SITE		190,250	8.06	0.249	1									277,610						277,600	
903	MUNICPL		13.2		ACRES	EXCESS		0	43,000.	1.000	1									567,600						567,600	

Total AC/H	14.20000	Total SF/S	618552.00	Parcel LU	903	MUNICPL	Prime NB D	Excellent

Total: 845,211 | Spl Cre | Total: 845,200

Disclaimer: This Information is believed to be correct but is subject to change and is not warranteed Database: FY2009

apro

2009

EXTERIOR INFORMATION

Type:	675 - School		
Sty Ht:	2 - 2 Story		
(Liv) Units	1	Total:	1
Foundati	1 - CONCRETE		
Frame:	7 - MASONRY		
Prime W	7 - BRICK		
Sec Wall:			%
Roof Stru	4 - FLAT		
Roof Cov	11 - MEMBRANE		
Color:			
View / De	A - AVERAGE		

GENERAL INFORMATION

Grade:	A+ - EXCELLENT		
Year Blt	1960	Eff Yr Blt:	2005
Alt LUC		Alt %:	
Jurisdic		Fact:	
Const Mod:			
Lump Sum Ad			

INTERIOR INFORMATION

Avg Ht/F	10		
Prim Int	1 - DRYWALL		
Sec Int W			%
Partition:	T - TYPICAL		
Prim Floo	5 - LINO/VINYL		
Sec Floor			%
Bsmnt Flr	12 - CONCRETE		
Bsmnt G			
Electric:	400 - 400 Amps		
Insulation	T - TYPICAL		
Int vs Ext:	S		
Heat Fuel	2 - GAS		
Heat Typ	1 - FORCED H/A		
# Heat Sy	1		
% Heated	100	% AC:	
Solar HW	N	Central V	N
% Com		% Sprinkl	

BATH FEATURES

Full Ba		Ratin	
A Bath		Ratin	
3/4 Bat		Ratin	
A 3QB		Ratin	
1/2 Bat	34	Ratin	Average
A HBt		Ratin	
OthrFi		Ratin	

OTHER FEATURES

Kits:	1	Ratin	Good
A Kits:		Ratin	
Frpl:		Ratin	
WSFlu		Ratin	

CONDO INFORMATION

Location:	
Total Unit	
Floor:	
% Own:	
Name:	

DEPRECIATION

Phys Con	AV - Average	1.0	%
Functiona			%
Economi			%
Special:			%
Override:			%
	Total:	1	%

CALC SUMMARY

Basic $ / SQ:	85.00
Size Adj.:	0.812234
Const Adj.:	1.053998
Adj $ / SQ:	72.768
Other Features	51590
Grade Factor:	1.85
Neighborhood I	0.839999
LUC Factor:	1.00
Adj Total:	9620700
Depreciation:	96207
Depreciated To	9524493

COMMENTS

RESIDENTIAL GRID

1st Res G		Des								# Uni				
Leve	FY	LR	DR	D	K	FR	RR	BR	FB	HB	L	O		
Othe														
Upp														
Lvl 2														
Lvl 1														
Low														

Total	RMs:	BR	Bath	H	3

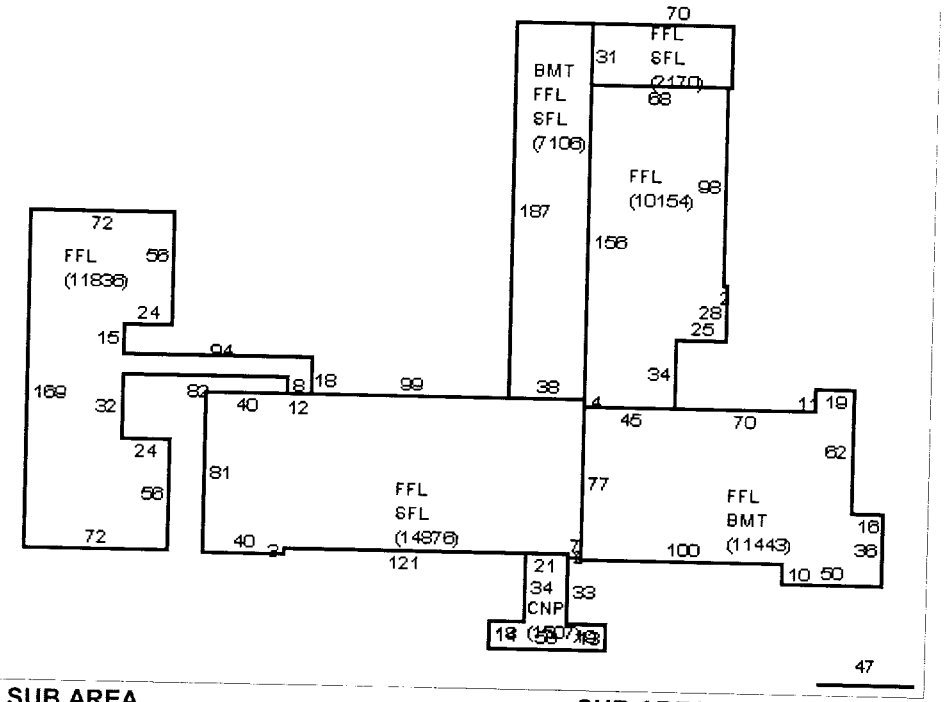
REMODELING

Exterior	
Interior:	
Additio	
Kitchen	
Baths:	
Plumbi	
Electric:	
Heating	
Genera	

RES BREAKDOWN

No Un	RMS	BRS	FL
Totals			

SKETCH



SUB AREA

Code	Description	Area - SQ	Rate - AV	Undepr Valu
FFL	FIRST FLOOR	57,585	72.770	4,190,345
SFL	SECOND FLOOI	24,152	72.770	1,757,493
BMT	BASEMENT	18,549	8.730	161,973
CNP	CANOPY	1,507	19.590	29,526

SUB AREA DETAIL

Sub Area	% Usb	Descrip	% Type	Qu	# Ten

COMPARABLE SALES

Rate	Parcel ID	Typ	Date	Sale Price

WtAv$/S		AvRat		Ind.V	
Juris. Factor:			Val/Su Fi	116.53	
Special Featu	0		Val/Su Ne	93.57	
Final Total:	9524500		Val/Su Sz	116.53	

Net Sketched Area:	101,793	Total:	6,139,337
Size	81737	Gross Ar	101793	FinAr	81737
---	---	---	---	---	---

IMAGE

SPEC FEATURES/YARD ITEMS

Code	Description	A	Y/	Qty	Size/Dim	Qual	Con Year	Unit Price	D/	Dep	LUC	Fact	NB	F	Appr Value	JCo	JFa	Juris. Value

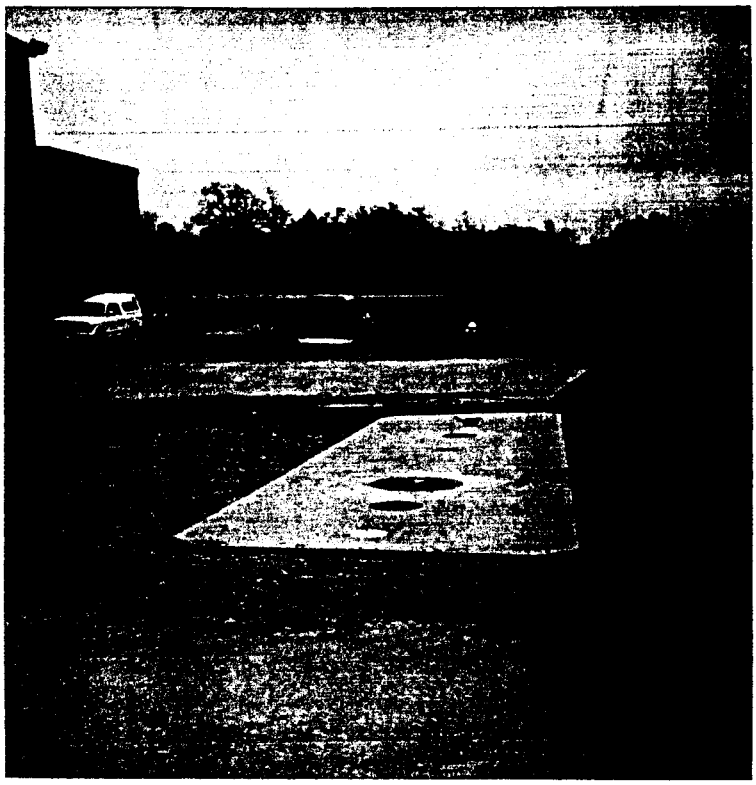
PARCEL ID

27 093000

More	N	Total Yard Ite		Total Special Featu		Total:	

AssessPro Patriot Properties, Inc

Post-it® Fax Note 7671	Date 7/2	# of pages ▶ 1
To Stuart Glass	From Robert Cox	
Co./Dept.	Co. Town of Shrews.	
Phone #	Phone # (508) 841-8390	
Fax # (781) 237-4350	Fax # (508) 841-8497	



Middle School Tank

Town of Shrewsbury
Middle School
Oil Tank

DIMENSIONS

	Width (feet)		Length (feet)	
Tank 1	96"	X	26'10"	(10,000 gal)
Tank 2	-----	X	-----	
Tank 3	-----	X	-----	
Tank 4	-----	X	-----	
Tank 5	-----	X	-----	

Tank Removed From

Middle School - Town of Shrewsbury
(no. street)

Shrewsbury
(city or town)

Fire Department Permit # None-Listed
(if applicable)

III. TYPE OF OWNER	IV. INDIAN LANDS	
☐ Federal Government ☐ Commercial ☐ State Government ☐ Private ☒ Local Government	Tanks are located on land within an Indian Reservation or on other trust lands. ☐ Tanks are owned by native American nation, tribe, or individual. ☐	Tribe or Nation: _____

V. TYPE OF FACILITY

Select the Appropriate Facility Description

____ Gas Station	____ Railroad	____ Trucking/Transport
____ Petroleum Distributor	____ Federal - Non-Military	____ Utilities
____ Air Taxi (Airline)	____ Federal - Military	____ Residential
____ Aircraft Owner	____ Industrial	____ Farm
____ Auto Dealership	____ Contractor	X Other (Explain) School

VI. CONTACT PERSON IN CHARGE OF TANKS

Name	Job Title	Address	Phone Number (Include Area Code)

VII. FINANCIAL RESPONSIBILITY

I have met the financial responsibility requirements in accordance with 40 CFR Subpart H ☐

Check All that Apply

☐ Self Insurance	☐ Guarantee	☐ State Funds
☐ Commercial Insurance	☐ Surety Bond	☐ Trust Fund
☐ Risk Retention Group	☐ Letter of Credit	☐ Other Method Allowed Specify _____

VIII. CERTIFICATION (Read and sign after completing all sections)

I certify under penalty of law that I have personally examined and am familiar with the information submitted in this and all attached documents, and that based on my inquiry of those individuals immediately responsible for obtaining the information, I believe that the submitted information is true,accurate, and complete.

Name and official title of owner or owner's authorized representative (Print)	Signature	Date Signed
Robert A. Cox	Robert A. Cox	12/1/93

EPA estimates public reporting burden for this form to average 30 minutes per response including time for reviewing instructions, gathering and maintaining the data needed and completing and reviewing the form. Send comments regarding this burden estimate to Chief, Information Policy Branch PM-223, U.S. Environmental Protection Agency, 401 M Street, Washington D.C. 20460, marked "Attention Desk Officer for EPA." This form amends the previous notification form as printed in 40 CFR Part 280, Appendix I.

IX. DESCRIPTION OF UNDERGROUND STORAGE TANKS (Complete for each tank at this location.)

Tank Identification Number	Tank No. 1	Tank No. ____	Tank No. ____	Tank No. ____	Tank No. ____
1. Status of Tank (mark only one) — Currently in Use	X				
Temporarily Out of Use (Remember to fill out section IX.)					
Permanently Out of Use (Remember to fill out section IX.)					
Amendment of Information					
2. Date of Installation (mo./year)	10-93				
3. Estimated Total Capacity (gallons)	10,000				
4. Material of Construction (Mark all that apply)					
Asphalt Coated or Bare Steel					
Cathodically Protected Steel					
Epoxy Coated Steel					
Composite (Steel with Fiberglass)	X				
Fiberglass Reinforced Plastic					
Lined Interior					
Double Walled	X				
Polyethylene Tank Jacket					
Concrete					
Excavation Liner					
Unknown					
Other, Please specify					
Has tank been repaired?					
5. Piping (Material) (Mark all that apply) — Bare Steel					
Galvanized Steel					
Fiberglass Reinforced Plastic	X				
Copper					
Cathodically Protected					
Double Walled	X				
Secondary Containment					
Unknown					
Other, Please specify					
6. Piping (Type) (Mark all that apply)					
Suction: no valve at tank					
Suction: valve at tank	X				
Pressure					
Gravity Feed					
Has piping been repaired?					

IX. DESCRIPTION OF UNDERGROUND STORAGE TANKS (Complete for each tank at this location.)

Tank Identification Number	Tank No. 1	Tank No. ____	Tank No. ____	Tank No. ____	Tank No. ____
1. Status of Tank (mark only one) — Currently in Use	X				
Temporarily Out of Use (Remember to fill out section IX.)					
Permanently Out of Use (Remember to fill out section IX.)					
Amendment of Information					
2. Date of Installation (mo./year)	10-93				
3. Estimated Total Capacity (gallons)	10,000				
4. Material of Construction (Mark all that apply)					
Asphalt Coated or Bare Steel					
Cathodically Protected Steel					
Epoxy Coated Steel					
Composite (Steel with Fiberglass)	X				
Fiberglass Reinforced Plastic					
Lined Interior					
Double Walled	X				
Polyethylene Tank Jacket					
Concrete					
Excavation Liner					
Unknown					
Other, Please specify					
Has tank been repaired?					
5. Piping (Material) (Mark all that apply) — Bare Steel					
Galvanized Steel					
Fiberglass Reinforced Plastic	X				
Copper					
Cathodically Protected					
Double Walled	X				
Secondary Containment					
Unknown					
Other, Please specify					
6. Piping (Type) (Mark all that apply)					
Suction: no valve at tank					
Suction: valve at tank	X				
Pressure					
Gravity Feed					
Has piping been repaired?					

XI. CERTIFICATION OF COMPLIANCE (COMPLETE FOR ALL NEW AND UPGRADED TANKS AT THIS LOCATION)

Tank Identification Number	Tank No. 1	Tank No. ____	Tank No. ____	Tank No. ____	Tank No. ____
1. Installation					
A. Installer certified by tank and piping manufacturers	X				
B. Installer certified or licensed by the implementing agency					
C. Installation inspected by a registered engineer					
D. Installation inspected and approved by implementing agency					
E. Manufacturer's installation check-lists have been completed					
F. Another method allowed by State agency. Please specify.					

2. Release Detection (Mark all that apply)	TANK	PIPING	TANK	PIPING	TANK	PIPING	TANK	PIPING	TANK	PIPING
A. Manual tank gauging										
B. Tank tightness testing	X									
C. Inventory controls										
D. Automatic tank gauging	X									
E. Vapor monitoring										
F. Groundwater monitoring										
G. Interstitial monitoring double walled tank/piping	X									
H. Interstitial monitoring/secondary containment	X									
I. Automatic line leak detectors										
J. Line tightness testing		X								
K. Other method allowed by Implementing Agency. Please specify.										

3. Spill and Overfill Protection					
A. Overfill device installed	X				
B. Spill device installed	X				

OATH: I certify the information concerning installation that is provided in section XI is true to the best of my belief and knowledge.

Installer: SCOTT DESROSIERS (Name) — [signature] (Signature) — 11-24-93 (Date)

PRESIDENT (Position) — DESROSIERS + SON CONST (Company)

11/1/93

TRANSMITTAL

ENGINEERED CONSTRUCTION COMPANY, INC.
270 COMMUNICATION WAY - 1B
HYANNIS, MA 02601
(508) 771-1174 FAX (508) 771-1886

TO: SHREWSBURY FIRE DEPT
PO BOX 275
SHREWSBURY MA. 01545
842-6640

DATE: 10/29/93 JOB NO: 85
ATTENTION: CHIEF
RE: SHREWSBURY MIDDLE SCHOOL
TANK DISPOSAL RECEIPT

WE ARE SENDING YOU THE ATTACHED:

( ) LETTER ( ) PLANS ( ) SUBMITTALS ( ) SAMPLES
( ) CHANGE ORDER ( ) SPECIFICATIONS ( ) SHOP DRAWINGS ( ) OTHER

COPIES	DATE	DESCRIPTION
1	10-22-93	Tank Receipt / TOM BARELLO & SONS

THESE ARE TRANSMITTED AS CHECKED BELOW:

( ) FOR APPROVAL ( ) FOR YOUR USE ( ) AS REQUESTED ( ) FOR REVIEW

( ) APPROVED AS SUBMITTED ( ) APPROVED AS NOTED ( ) RETURNED FOR CORRECTIONS

( ) FOR BIDS DUE ( ) RETURNED AS NOTED OR REQUESTED

REMARKS:

COPY TO:
BOB COX TOWN OF SHREWSBURY

SIGNED
David A. Parrella
President

VHW-001 (REV. 9/86)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Form Approved. OMB No. 2050-0039. Expires 9-30-91

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. | Manifest Document No.: MAP000560091 | 01173

2. Page 1 of 1 | Information in the shaded areas is not required by Federal law.

A. State Manifest Document Number: **NJA 0975354**

3. Generator's Name and Mailing Address
Shrewsbury School Department
Dutchins Street
Shrewsbury, MA 01545

4. Generator's Phone (508) 845-3521

5. Transporter 1 Company Name: Zecco, Inc.

6. US EPA ID Number: NJD052922995

B. State Generator's ID: [redacted]

C. State Trans. ID: [redacted]

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone ([redacted]) 913-2597

E. State Trans. ID

9. Designated Facility Name and Site Address
Cycle Chem Inc.
217 So. First Street
Elizabeth, NJ 07206

10. US EPA ID Number: NJD002080046

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (201) 355-8800

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Waste Combustible Liquid n.o.s. Combustible Liquid NA1993	001	DM	00055	G	X722
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a. L.,82 Fuel Oil 10%, Oily Sludge 80%, Sediment and Inert Debris 10%
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. 591
b.
c.
d.

15. Special Handling Instructions and Additional Information
Product Code: LM24-6

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; **OR**, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

GENERATOR — Printed/Typed Name: [illegible] | Signature: [signature] | Month Day Year: 11/16/16

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: DAVID TATRO | Signature: David Tatro | Month Day Year: 11/16/16

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Month Day Year

FACILITY

19. Discrepancy Indication Space
[illegible]

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Month Day Year

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection. (609) 292-5560 (Day) (609) 292-7172 (Night).

EPA Form 8700-22 (Rev. 3/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

VHW-001 (REV. 9/86)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. [illegible] Manifest Document No.

2. Page 1 of

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Secretary School Department
Hutchins Street
Secretary, MA 01545

4. Generator's Phone (508 [illegible]

A. State Manifest Document Number **NJA 0975354**

B. State Generator's ID [illegible]

5. Transporter 1 Company Name
Tesco, Inc.

6. US EPA ID Number [illegible]

C. State Trans. ID [illegible]

7. Transporter 2 Company Name

8. US EPA ID Number

D. Transporter's Phone (508 [illegible]

E. State Trans. ID

9. Designated Facility Name and Site Address
Cycle Chem Inc.
217 So. First Street
Elizabeth, NJ 07206

10. US EPA ID Number [illegible]

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (201) 355-5000

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Waste Combustible Liquid n.o.s. Combustible Liquid NA1993	[illegible]	DM	[illegible]	G	[illegible]
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a. L.,82 Fuel Oil 15%, Oily Sludge 80%, Sorbent and Inert Debris 3%
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. c.
b. d.

15. Special Handling Instructions and Additional Information
Product Code: LH24-6

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; **OR,** if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name	Signature	Month Day Year
[illegible]		

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year
[illegible]	[illegible]	

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name	Signature	Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name	Signature	Month Day Year

GENERATOR

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection, (609) 292-5560 (Day) (609) 292-7172 (Night)

EPA Form 8700-22 (Rev. 9/83) Previous editions are obsolete.

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

GENERATOR COPY

VHW-001 (REV. 9/86)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-91

In case of an emergency or spill immediately call the state the emergency occurred in and the N.J. Dept. of Environmental Protection. (609) 292-5568 (Day) (609) 292-7172 (Night)

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. N J P 0 0 0 8 5 7 1 4 9 — Manifest Document No. 9 1 6 0 9 — 2. Page 1 of 1 — Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Shrewsbury Middle School
Hutches Street
Shrewsbury, NJ 07702

A. State Manifest Document Number: NJA 0875474

4. Generator's Phone (908) 842-3621

B. State Generator's ID: [redacted]

5. Transporter 1 Company Name: Zecco, Inc. — 6. US EPA ID Number: N J D 0 5 2 9 2 4 4 9 5

C. State Trans. ID: [redacted]

7. Transporter 2 Company Name — 8. US EPA ID Number

D. Transporter's Phone ([redacted])

E. State Trans. ID: [redacted] 908) 370-2037

9. Designated Facility Name and Site Address
Cycle Chem Inc.
217 So. First Street
Elizabeth, NJ 07206 — 10. US EPA ID Number: N J D 0 2 2 6 0 0 4 6

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (201) 355-1300

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Waste Petroleum Mixture, Solid, n.o.s. Non RCRA Waste Material	001	DM	00310	P	X765
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a. Sand, Dirt and Speedi-dri, Absorbent Pads 75%, Oil 25%
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a. SD
b.
c.
d.

15. Special Handling Instructions and Additional Information
Product Code: 88-6

Emergency Contact: Zecco, Inc. (800) 442-5336

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; **OR,** if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

GENERATOR — Printed/Typed Name: Richard Lavalle — Signature: Richard Lavalle — Month Day Year: 01 11 19 91

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: DAVID TATRO — Signature: David Tatro — Month Day Year: 01 11 19 91

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

FACILITY

19. Discrepancy Indication Space
1 Pail 10 of 60 DT

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year: 01 11 91

NJA 0875474

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

COMMONWEALTH OF MASSACHUSETTS
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF HAZARDOUS WASTE
One Winter Street
Boston, Massachusetts 02108

Please print or type. (Form designed for use on elite (12-pitch) typewriter.)

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator US EPA ID No. | Manifest Document No. | 2. Page 1 of | Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Mr. Robert Cox
Hutchins Street
Shrewsbury, MA 0155

4. Generator's Phone (508) 845-3521

5. Transporter 1 Company Name
Jasco, Inc.

6. US EPA ID Number
MAD052924495

7. Transporter 2 Company Name

8. US EPA ID Number

9. Designated Facility Name and Site Address
345 West Main Street
Northboro, MA 01532

10. US EPA ID Number
MAD052924495

A. State Manifest Document Number: MA 025580
B. State Generator's ID
C. State Trans. ID 1MS1B109
D. Transporter's Phone ( )
E. State Trans. ID
F. Transporter's Phone ( )
G. State Facility's ID Not Required
H. Facility's Phone ( )

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number)	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Waste Combustible Liquid n.o.s. Combustible Liquid NA1993	001	TT	010242	G	
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above (Include physical state and hazard code.)
a.
b.

K. Handling Codes for Wastes Listed Above
a.
b.

15. Special Handling Instructions and Additional Information

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: R. Scott A. Cox | Signature | Date: Month 1/1 Day 1/3 Year 9-

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: E. JOHN STINK | Signature | Date: Month 1/1 Day 1/2 Year 9-

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name | Signature | Date: Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name | Signature | Date: Month Day Year

GENERATOR

In case of emergency or spill, immediately call the National Response Center (800) 424-8802.

MA 025580 COPY>8: GENERATOR RETAINS

Form Approved OMB No. 2050-0039. Expires 9-30-91
EPA Form 8700-22 (Rev. 9-88) Previous editions are obsolete.

COPY>8: GENERATOR RETAINS

VHW-001 (REV. 9/88)

State of New Jersey
Department of Environmental Protection
Division of Hazardous Waste Management
Manifest Section
CN 028, Trenton, NJ 08625

Please type or print in block letters. (Form designed for use on elite (12-pitch) typewriter.)

Form Approved. OMB No. 2050-0039. Expires 9-30-91

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. NJ0000571199 — Manifest Document No.

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

A. State Manifest Document Number: **NJA 0975474**

3. Generator's Name and Mailing Address: Secretary Middle School, Butler Street, Secretary, MD 01545

B. State Generator's ID

4. Generator's Phone (508 865-3521)

5. Transporter 1 Company Name: Zeeco, Inc.

6. US EPA ID Number: NJA000212195

C. State Trans. ID 1860

D. Transporter's Phone (508 399-2537)

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Trans. ID

9. Designated Facility Name and Site Address: Cycle Chem Inc., 217 So. First Street, Elizabeth, NJ 07206

10. US EPA ID Number: NJD002200004

F. Transporter's Phone ( )

G. State Facility's ID

H. Facility's Phone (201) 355-5800

11. US DOT Description (Including Proper Shipping Name, Hazard Class, and ID Number) HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a. Waste Petroleum Mixture, Solid, n.o.s. Non DOT Non RCRA Waste Material	001	DM	00110	P	X725
b.					
c.					
d.					

J. Additional Descriptions for Materials Listed Above
a. S., Sand, Dirt and Speedi-dri, Absorbent Pads/Pkg, Oil Sk
b.
c.
d.

K. Handling Codes for Wastes Listed Above
a.
b.
c.
d.

15. Special Handling Instructions and Additional Information
Product Code: M-6
Emergency Contact: Zeeco, Inc. (800) 442-9336

16. **GENERATOR'S CERTIFICATION:** I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; **OR**, if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name — Signature — Month Day Year

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: DAVID TATRO — Signature — Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Month Day Year

In case of an emergency or spill immediately call the state hotline (609) 292-7172

NJA0975474

EPA Form 8700-22 (Rev. 9/88) Previous editions are obsolete.

SIGNATURE AND INFORMATION *MUST* BE LEGIBLE ON ALL COPIES

WATERMAN DESIGN ASSOCIATES, INC.

31 East Main Street, Westborough, MA 01581
508.366.6552 Fax 508.366.6506
watermandesign.com

DEP # 285-1512 (No comments)

October 1, 2009

Mr. John J. Ostrosky, Chairman
Shrewsbury Conservation Commission
Town Hall, 100 Maple Avenue
Shrewsbury, Massachusetts 01545

Via: Hand Delivery

Reference: Abbreviated Notice of Resource Area Delineation
Sherwood Middle School
Shrewsbury, Massachusetts
WDA JN-135.05

Dear Mr. Ostrosky and Members of the Commission:

On behalf of The Town of Shrewsbury (Applicant), we are submitting herewith an Abbreviated Notice of Resource Area Delineation (ANRAD) for the confirmation of the resource areas only, namely areas of bordering vegetated wetlands. The resource areas to be reviewed are located generally on the south/southeast portion of the Sherwood Middle School property. No work is being proposed at this time. This filing has been prepared in accordance with the Massachusetts Wetlands Protection Act (Act) and the Town of Shrewsbury Wetlands Policy. As the Town is the Applicant, this filing qualifies as fee exempt.

We have enclosed the following for your reference:

1. WPA Form 4A, Abbreviated Notice of Resource Area Delineation for Resource Area Delineation Only
2. USGS Locus Map
3. Certified List of Abutters within 100 feet
4. Notification of Abutters
5. FEMA Flood Map (Community Panel # 250332 0003 B)
6. Existing Conditions Plans, prepared by WDA, Inc., dated July 21, 2009.

The 14± acre locus property (Property) has a total of approximately 446 feet of frontage along Crescent Street, although access to the school and Property is via a driveway off of Sherwood Avenue/Oak Street. The Property is located entirely within the Residential B Zoning District and the Property is bounded by the Oak Middle School to the west and by residential parcels to the north, east and south. No portion of the Property contains an area of Zone A, 100-year flood zone, as shown on the Flood Insurance Rate Map for the Town of Shrewsbury (Community Panel # 250332 0003 B, effective date June 4, 1980). The Property does not contain a designated area of priority habitat of rare species, wildlife or vernal pools, according to the Natural Heritage Atlas, valid from October 1, 2008.

An area of bordering vegetated wetland is located at the south/southeastern side of the Property, associated with several intermittent streams and drainage channels, as well as the area of the

former ice rink. The wetland areas were delineated by WDA July 16, 2009 with numbered blue flagging and have been survey located by WDA. The boundaries were determined upon review of the existing vegetation, soils and hydrologic conditions, as well as the topography and other visual indicators. Soils were reviewed utilizing a hand auger and Munsell color chart. In general, the wetland areas follow a fairly distinct boundary at the toe of slope or along the streams and channels, although they are separated by paved walkways, upland breaks and drainage infrastructure. Most areas may be classified as wooded/shrub swamps, consisting of red maple, elm, winterberry, spicebush, highbush blueberry, speckled alder, silky dogwood, soft rush, skunk cabbage, cinnamon fern, sensitive fern, sphagnum and jewelweed. The marsh area (former ice rink) is predominately cattail, tussock sedge, bluejoint, soft rush, wool grass, buttonbush, skunk cabbage, sensitive fern with a fringe of red maple, winterberry, arrowwood, and speckled alder. Generally the upland areas consist of oak, pine, black birch, witch hazel, poplar, blackberry, rose, black cherry, American hazelnut, Pennsylvania sedge, Canada mayflower and bittersweet.

The larger wetland area is delineated by flag series WF-1 through WF-14 and WF-40 through WF-58, and the second largest area, just to the south, is delineated by flag series WF-15 through WF-37. These two wetland series are located toward Crescent Street in the southeast portion of the property. A headwall/culvert discharges flows from Crescent Street into a manmade channel, which discharges into the former ice rink area (generally WF-3 to WF-12 and WF-50 to WF-54). Seasonal flows from this area then enter a channel adjacent to the walkway and flow southeasterly into a 12" culvert under the walkway, flowing to the south. Two other culverts from Crescent Street enter into this wetland and form into a single channel, which flows to the southwest, eventually entering a drain inlet at the end of the channel/wetland. From there flows remain within a closed drainage system and leave the Property. The wetlands within this system are delineated by flag series WF-15 to WF-37.

The final wetland area is a small pocket located approximately 210' east of the end of the track and field area. This wetland area is associated with drainage from the baseball field to the north and water that seeps and flows from the slope below the field, which flows to a low area before entering into a headwall/culvert and discharging near the southern Property boundary. This wetland area is delineated by flag serried WF-100 to WF-104.

To summarize, we are requesting confirmation of the delineated wetland boundaries. No work is proposed at this time, and this process is to confirm the resource areas only, to serve future planning and design purposes. We thank you in advance for your attention to the information provided and look forward to meeting with the Commission to discuss the enclosed ANRAD at the next available hearing.

Very truly yours,

WATERMAN DESIGN ASSOCIATES, INC.

Brian P. Waterman
Wetland Specialist

cc: DEP Central Regional Office, 1 copy (via certified mail)
Ms. Katie Crockett, AIA, Lamoureux Pagano Associates

G:\common\0135A\admin\135.05ANRAD\0670ANRADlt Shrewsbury.doc

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 4A – Abbreviated Notice of Resource Area Delineation

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

Provided by MassDEP:

MassDEP File Number

Document Transaction Number

Shrewsbury
City/Town

A. General Information

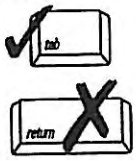
1. Project Location (**Note:** electronic filers will click on button for GIS locator):

28 Sherwood Ave (Sherwood Middle School) — a. Street Address
Shrewsbury — b. City/Town
01545 — c. Zip Code

Latitude and Longitude:
042-17-02 N — d. Latitude
071-43-22 W — e. Longitude

27 — f. Assessors Map/Plat Number
93 — g. Parcel /Lot Number

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



2. Applicant:

Daniel — a. First Name
Morgado — b. Last Name
Town of Shrewsbury — c. Organization
100 Maple Avenue — d. Mailing Address
Shrewsbury — e. City/Town
MA — f. State
01545 — g. Zip Code
508-841-8508 — h. Phone Number
508-841-0587 — i. Fax Number
dmorgado@th.ci.shrewsbury.ma.us — j. Email Address

3. Property owner (if different from applicant): ☐ Check if more than one owner (attach additional sheet with names and contact information)

a. First Name
b. Last Name
c. Organization
d. Mailing Address
e. City/Town
f. State
g. Zip Code
h. Phone Number
i. Fax Number
j. Email Address

Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

4. Representative (if any):

Brian — a. Contact Person First Name
Waterman — b. Contact Person Last Name
Waterman Design Associates, Inc. — c. Organization
31 East Main Street — d. Mailing Address
Westborough — e. City/Town
MA — f. State
01581 — g. Zip Code
508-366-6552 — h. Phone Number
508-366-6506 — i. Fax Number
bpw@wdassoc.com — j. Email Address

Fees will be calculated for online users.

5. Total WPA Fee Paid (from attached ANRAD Wetland Fee Transmittal Form):

N/A — a. Total Fee Paid
b. State Fee Paid
c. City/Town Fee Paid

B. Area(s) Delineated

1. Bordering Vegetated Wetland (BVW) — 2,050 +/- (Linear Feet of Boundary Delineated)
2. Check all methods used to delineate the Bordering Vegetated Wetland (BVW) boundary:
   a. ☐ MassDEP BVW Field Data Form (attached)
   b. ☒ Other Methods for Determining the BVW boundary (attach documentation):
      1. ☒ 50% or more wetland indicator plants
      2. ☒ Saturated/inundated conditions exist
      3. ☒ Groundwater indicators
      4. ☒ Direct observation
      5. ☒ Hydric soil indicators
      6. ☐ Credible evidence of conditions prior to disturbance
3. Indicate any other resource area boundaries that are delineated:

a. Resource Area	b. Linear Feet Delineated
c. Resource Area	d. Linear Feet Delineated

C. Additional Information

Applicants must include the following plans with this Abbreviated Notice of Resource Area Delineation. See instructions for details. **Online Users:** Attach the Document Transaction Number (provided on your receipt page) for any of the following information you submit to the Department.

1. ☒ ANRAD (Delineation Plans only)
2. ☒ USGS or other map of the area (along with a narrative description, if necessary) containing sufficient information for the Conservation Commission and the Department to locate the site. (Electronic filers may omit this item.)
3. ☒ Plans identifying the boundaries of the Bordering Vegetated Wetlands (BVW) (and/or other resource areas, if applicable).
4. ☒ List the titles and final revision dates for all plans and other materials submitted with this Abbreviated Notice of Resource Area Delineation.

D. Fees

The fees for work proposed under each Abbreviated Notice of Resource Area Delineation must be calculated and submitted to the Conservation Commission and the Department (see Instructions and Wetland Fee Transmittal Form).

1. ☒ Fee Exempt: No filing fee shall be assessed for projects of any city, town, county, or district of the Commonwealth, federally recognized Indian tribe housing authority, municipal housing authority, or the Massachusetts Bay Transportation Authority.

Applicants must submit the following information (in addition to the attached Wetland Fee Transmittal Form) to confirm fee payment:

2. Municipal Check Number

3. Check date

4. State Check Number

5. Check date

6. Payor name on check: First Name

7. Payor name on check: Last Name

E. Signatures

I certify under the penalties of perjury that the foregoing Abbreviated Notice of Resource Area Delineation and accompanying plans, documents, and supporting data are true and complete to the best of my knowledge. I understand that the Conservation Commission will place notification of this Notice in a local newspaper at the expense of the applicant in accordance with the wetlands regulations, 310 CMR 10.05(5)(a).

I further certify under penalties of perjury that all abutters were notified of this application, pursuant to the requirements of M.G.L. c. 131, § 40. Notice must be made in writing by hand delivery or certified mail (return receipt requested) to all abutters within 100 feet of the property line of the project location.

I hereby grant permission, to the Agent or member of the Conservation Commission and the Department of Environmental Protection, to enter and inspect the area subject to this Notice at reasonable hours to evaluate the wetland resource boundaries subject to this Notice, and to require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

I acknowledge that failure to comply with these certification requirements is grounds for the Conservation Commission or the Department to take enforcement action.

1. Signature of Applicant

2. Date: 9/29/2009

3. Signature of Property Owner (if different)

4. Date

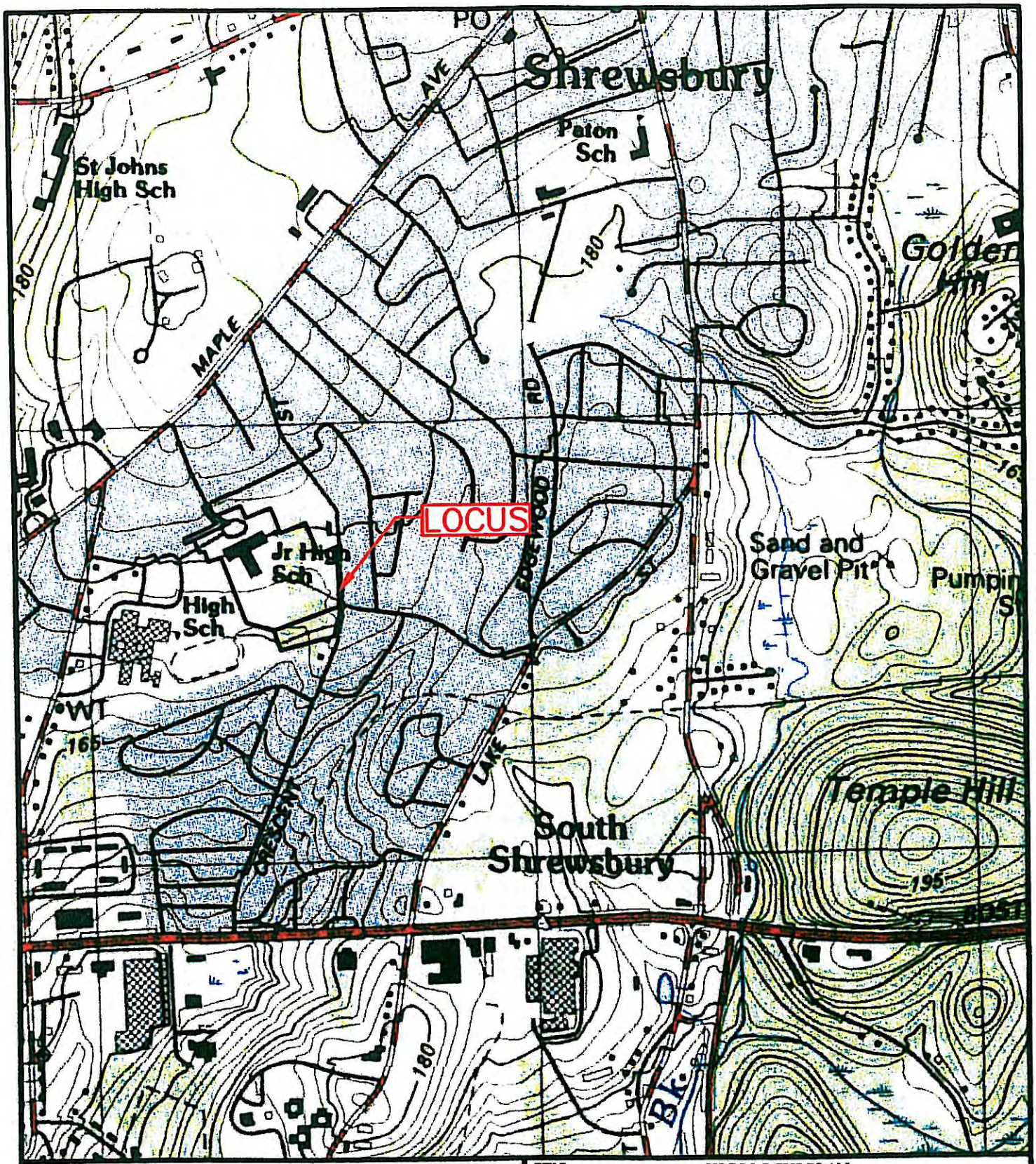
5. Signature of Representative (if any)

6. Date: 9/29/09

For Conservation Commission:
Two copies of the completed Abbreviated Notice of Resource Area Delineation (Form 4A), including supporting plans and documents; two copies of the ANRAD Wetland Fee Transmittal Form; and the city/town fee payment must be sent to the Conservation Commission by certified mail or hand delivery.

For MassDEP:
One copy of the completed Abbreviated Notice of Resource Area Delineation (Form 4A), including supporting plans and documents; one copy of the ANRAD Wetland Fee Transmittal Form; and a copy of the state fee payment must be sent to the MassDEP Regional Office (see Instructions) by certified mail or hand delivery. (E-filers may submit these electronically.)

The original and copies must be sent simultaneously. Failure by the applicant to send copies in a timely manner may result in dismissal of the Notice of Intent.



PREPARED BY:

WATERMAN DESIGN ASSOCIATES, INC.

31 East Main Street
Westborough, MA 01581

508.366.6552
(fax) 508.366.6506
watermandesign.com wda@wdassoc.com

TITLE:	USGS LOCUS PLAN 28 SHERWOOD AVENUE Shrewsbury, MA
CLIENT:	TOWN OF SHREWSBURY 100 MAPLE AVENUE
SOURCE:	USGS Topographic Map Shrewsbury, MA Quadrangle

DATE:	09/29/09	*FILE NO.:*	0480001	*SCALE:*	1" = 1000'
JOB NO.:	135.05	*DWG NO.:*	048003A	*DRAWN BY:*	BPW
		REV. NO.:		*REV DATE:*	

Abutters List

ParcelID	Location	Owner	Co-Owner	Mailing Address	City	State	Zip
27 082000	17 -19 SHERWOOD AVE	SHREWSBURY TOWN OF ~~SCHOOL~~		100 MAPLE AVE	SHREWSBURY	MA	01545-5338
27 085000	45 OAK ST	SHREWSBURY TOWN OF		100 MAPLE AVE	SHREWSBURY	MA	01545
27 138000	9 ORCHARD RD	ALBERTSON MICHAEL	ALBERTSON JAMIE L	9 ORCHARD RD	SHREWSBURY	MA	01545
27 139000	15 ORCHARD RD	WEIGOLD KEVIN W JR	WEIGOLD CHRISTY G	15 ORCHARD RD	SHREWSBURY	MA	01545
27 140000	17 ORCHARD RD	SNOWDON DAVID C JR		17 ORCHARD RD	SHREWSBURY	MA	01545
27 142000	25 ORCHARD RD	BODDEN PATRICK	BODDEN ERICA	25 ORCHARD RD	SHREWSBURY	MA	01545
27 147001	54 CRESCENT ST	MAYER JAMES F	MAYER SANDRA B	54 CRESCENT ST	SHREWSBURY	MA	01545
27 148000	62 CRESCENT ST	VOLKERT JAMES F	VOLKERT JEANNINE R	62 CRESCENT ST	SHREWSBURY	MA	01545-2810
27 148001	64 CRESCENT ST	VOLKERT JAMES F	VOLKERT JEANNINE R	62 CRESCENT ST	SHREWSBURY	MA	01545-2810
27 167000	110 CRESCENT ST	AMBACH JOHN W	AMBACH MAUREEN	PO BOX 165	SHREWSBURY	MA	01545
27 168000	129 MAPLE AVE	LEE GREGORY M		129 MAPLE AVE	SHREWSBURY	MA	01545-2852
27 211000	63 CRESCENT ST	HUNT JEAN G		63 CRESCENT ST	SHREWSBURY	MA	01545-2809
27 212000	65 CRESCENT ST	SNAY GERALD L JR		65 CRESCENT ST	SHREWSBURY	MA	01545-2809
27 213000	67 CRESCENT ST	THE FLYNN TRUST	FLYNN GERALDINE TRUSTE	67 CRESCENT ST	SHREWSBURY	MA	01545-2809
27 214000	69 CRESCENT ST	WENTZELL DAVID H	WENTZELL LEAH M	69 CRESCENT ST	SHREWSBURY	MA	01545-2809
27 215000	71 CRESCENT ST	BRADLEY MEAGHAN G	AVELLANEDA NICOLAS	71 CRESCENT ST	SHREWSBURY	MA	01545-2809
27 216000	83 CRESCENT ST	PUTNAM DANA S	PUTNAM CLAUDIA C	83 CRESCENT ST	SHREWSBURY	MA	01545
27 273000	85 CRESCENT ST	DEERING GEORGE E JR	BALLIN REBECCA J	85 CRESCENT ST	SHREWSBURY	MA	01545-2827
27 274000	93 CRESCENT ST	SURABIAN STEPHEN	SURABIAN CAROL A	93 CRESCENT ST	SHREWSBURY	MA	01545-2827
27 275000	97 CRESCENT ST	FUGERE DONNA M		2205 FRANCIS LEWIS CT	ORANGE PARK	FL	32073
27 276000	101 CRESCENT ST	RACINE RICHARD P	RACINE GALE M	101 CRESCENT ST	SHREWSBURY	MA	01545-2827
27 379000	56 CRESCENT ST	PERIS DEBORAH		56 CRESCENT ST	SHREWSBURY	MA	01545
33 094000	12 HARRIET AVE	MURPHY EDWARD P	MURPHY JOY A	12 HARRIET AVE	SHREWSBURY	MA	01545
33 095000	14 HARRIET AVE	CAPPOLI SALVATORE D	CAPPOLI VIRGINIA C	14 HARRIET AVE	SHREWSBURY	MA	01545-2741
33 096000	18 HARRIET AVE	SIMONE STEVEN P	SIMONE DANA M	18 HARRIET AVE	SHREWSBURY	MA	01545-2741
33 097000	22 HARRIET AVE	BUCKLEY RICHARD J	BUCKLEY ALMA M	22 HARRIET AVE	SHREWSBURY	MA	01545-2741
33 098000	24 HARRIET AVE	BUNTON DAVID E	BUNTON KAREN M	24 HARRIET AVE	SHREWSBURY	MA	01545-2741
33 099000	26 HARRIET AVE	BELBIN EDWARD L JR	BELBIN JULIE A	26 HARRIET AVE	SHREWSBURY	MA	01545-2741
33 100000	32 HARRIET AVE	DEGABRIELE FRANCES M	~~LINDBERG DENISE DEGABF~~	32 HARRIET AVE	SHREWSBURY	MA	01545-2726
33 101000	36 HARRIET AVE	SIMULAVICH LINDA C		36 HARRIET AVE	SHREWSBURY	MA	01545-2726
33 102000	38 HARRIET AVE	COSTELLO MICHAEL P		38 HARRIET AVE	SHREWSBURY	MA	01545-2726

End of Report

The above list is certified as correct according to the Assessors' records for the current tax year.

Christopher R. Reidy, Principal Assessor

Notification to Abutters Under the
Massachusetts Wetlands Protection Act

In accordance with the second paragraph of Massachusetts General Laws Chapter 131 Section 40, you are hereby notified of the following.

A. The name of the applicant is: **Town of Shrewsbury.**

B. The applicant has filed a Abbreviated Notice of Resource Area Delineation (ANRAD) with the Conservation Commission for the municipality of **Shrewsbury** seeking confirmation of wetland resource boundaries only, located on the Sherwood Middle School property located off of Sherwood Avenue and Crescent Street, per the requirements of the Wetlands Protection Act (General laws Chapter 131, Section 40).

c. The address of the lot where the activity is proposed is:
28 Sherwood Avenue (assessors map 27/lot 93)

D. Copies of the ANRAD may be examined at the **Shrewsbury Conservation Commission** between the hours of **8:00 AM - 4:00 PM** on the following days of the week: **Monday - Friday**

For more information, call: **(508) 841-8502**
Check One: This is the applicant ___, representative ___, or other
_X_ (specify): Conservation Commission.

E. Copies of the ANRAD may be obtained from either (check one) the applicant ___, or the applicant's representative _X_, by calling this telephone number (508)366-6552 between the hours of 7:30 AM and 5:00 PM on the following days of the week: Monday through Friday.

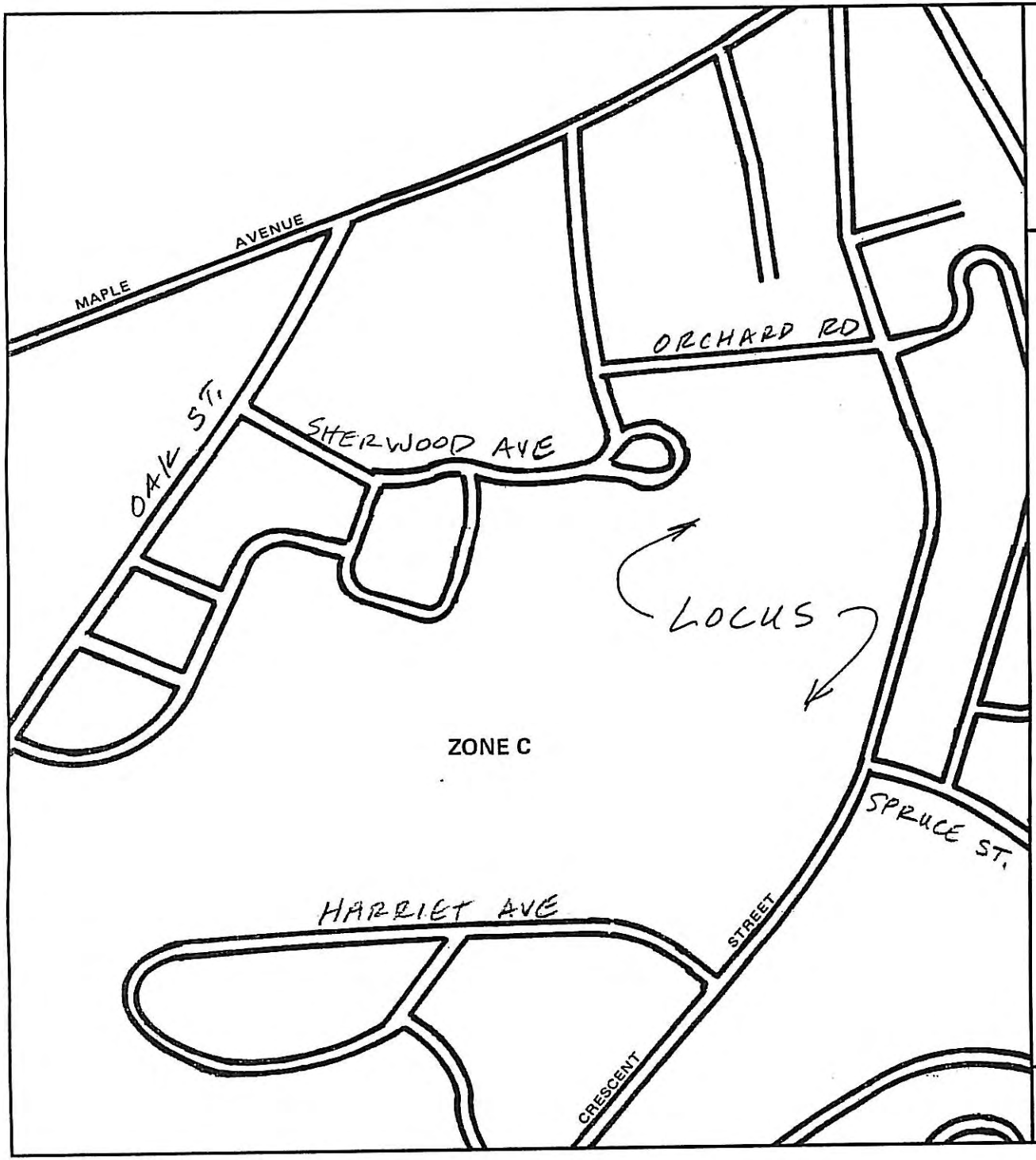
F. Information regarding the date, time and place of the public hearing may be obtained from the **Shrewsbury Conservation Commission** by calling this telephone number **(508)841-8502.**

Note: Notice of the public hearing, including its date, time, and place, will be published at least five (5) days in advance in the **Worcester Telegram & Gazette.**

Note: Notice of the public hearing, including its date, time, and place, will be posted in the City of Town hall not less than forty-eight (48) hours in advance.

Note: You also may contact your local Conservation Commission or the nearest Department of Environmental Protection Regional Office for more information about this application or the Wetlands Protection Act. To contact DEP, call:

Central Region: 508-792-7650 ~~Northeast Region: 978-661-7600~~
~~Southeast Region: 508-946-2800~~ ~~Western Region: 413-784-1100~~



APPROXIMATE SCALE

400 0 400 FEET

NATIONAL FLOOD INSURANCE PROGRAM

FIRM

FLOOD INSURANCE RATE MAP

TOWN OF
SHREWSBURY, MASSACHUSETTS
WORCESTER COUNTY

PANEL 3 OF 6
(SEE MAP INDEX FOR PANELS NOT PRINTED)

COMMUNITY-PANEL NUMBER
250332 0003 B

EFFECTIVE DATE:
JUNE 4, 1980

U.S. DEPARTMENT OF HOUSING
AND URBAN DEVELOPMENT
FEDERAL INSURANCE ADMINISTRATION

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

RECEIVED
TOWN OF SHREWSBURY
09 NOV 27 AM 10: 19
TOWN MANAGER'S OFFICE

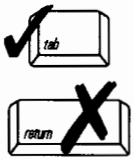
DEP File Number:
285-1512
Provided by DEP

WPA Form 4B – Order of Resource Area Delineation

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. General Information

Important: When filling out forms on the computer, use only the tab key to move your cursor - do not use the return key.



Note: Before completing this form consult your local Conservation Commission regarding any municipal bylaw or ordinance.

From: Shrewsbury Conservation Commission
1. Conservation Commission

2. This Issuance is for (check one):

a. ☒ Order of Resource Area Delineation Only

b. ☐ Order of Resource Area Delineation Subject to Simplified Review

1. ☐ Not Subject to Stormwater Policy

2. ☐ Subject to Stormwater Policy

c. ☐ Amended Order of Resource Area Delineation

3. To: Applicant:

Daniel	Morgado	Town of Shrewsbury
a. First Name	b. Last Name	c. Company

100 Maple Avenue
d. Mailing Address

Shrewsbury	MA	01545
e. City/Town	f. State	g. Zip Code

4. Property Owner (if different from applicant):

a. First Name	b. Last Name	c. Company

d. Mailing Address

e. City/Town	f. State	g. Zip Code

5. Project Location:

28 Sherwood Avenue	Shrewsbury
a. Street Address	b. City/Town
Plate 27	Plot 93
c. Assessors Map/Plat Number	d. Parcel/Lot Number

Latitude and Longitude **(note:** electronic filers will click for GIS locator):

e. Latitude	f. Longitude

6. Dates:

October 1, 2009	October 20, 2009	November 27, 2009
a. Date Notice of Intent filed	b. Date Public Hearing Closed	c. Date of Issuance

7. Title and Date (or Revised Date if applicable) of Final Plans and Other Documents:

Existing Conditions Plan, Sheets C0.03 & C0.04	7/21/09
a. Title	b. Date
c. Title	d. Date

B. Order of Delineation

1. The Conservation Commission has determined the following (check whichever is applicable):

   a. ☒ **Accurate**: The boundaries described on the referenced plan(s) above and in the Abbreviated Notice of Resource Area Delineation are accurately drawn for the following resource area(s):

      1. ☒ Bordering Vegetated Wetlands
      2. ☐ Other Resource Area(s), specifically:

   b. ☐ **Modified**: The boundaries described on the plan(s) referenced above, as modified by the Conservation Commission from the plans contained in the Abbreviated Notice of Resource Area Delineation, are accurately drawn from the following resource area(s):

      1. ☐ Bordering Vegetated Wetlands
      2. ☐ Other Resource Area(s), specifically:

   c. ☐ **Inaccurate**: The boundaries described on the referenced plan(s) and in the Abbreviated Notice of Resource Area Delineation were found to be inaccurate and cannot be confirmed for the following resource area(s):

      1. ☐ Bordering Vegetated Wetlands
      2. ☐ Other Resource Area(s), specifically:

      3. The boundaries were determined to be inaccurate because:

C. Simplified Buffer Zone Review

Work within the Buffer Zone pursuant to the Simplified Review (310 CMR 10.02) requires that you must comply with the following conditions. If your project does not meet these requirements, you are required to either file a Determination of Applicability or Notice of Intent or take other corrective measures as directed by the Conservation Commission.

Simplified Review Conditions:

Work conducted under Simplified Review requires the following:

1. No work of any kind shall occur within any wetland resource areas including Riverfront Area and Bordering Land Subject to Flooding.
2. The inner 0-to-50-foot wide area from the delineated wetland boundary that has a Buffer Zone shall not be disturbed by any work associated with this project, including placement of any stormwater management components.
3. No work shall occur in the Buffer Zone bordering an Outstanding Resource Water (e.g., certified vernal pool, public water supply reservoir or tributary), as defined in 314 CMR 4.00 or border coastal resource areas at 310 CMR 10.25-10.35.
4. No work shall occur in the Buffer Zone adjacent to wetland resources with estimated wildlife habitat (which is identified on the most recent Estimated Habitat Map of State-listed Rare Wetlands Wildlife).
5. Erosion and Sedimentation controls shall be installed and maintained at the 50-foot Buffer Zone line or limit of work (whichever is a greater distance from the resource area) to protect resource areas during construction.
6. If the project is subject to the Massachusetts Stormwater Policy, all work shall be conducted in conformance with an approved Stormwater Management Plan.
7. The Buffer Zone does not contain a slope greater than an average of 15% at its steepest gradient across the 100-foot Buffer Zone.
8. The amount of new impervious surface, in combination with existing impervious surfaces, shall not exceed 40% of the Buffer Zone between 50 and 100 feet.
9. No work is allowed, and no additional NOI or RDA shall be filed, for any work within the 0-to-50-foot Buffer Zone during the three-year term of an Order associated with this application.
10. Prior to any work being undertaken pursuant to this Order, the wetland resource boundary shall be flagged; all boundary delineation flagging should be maintained for the term of the Order.
11. If stormwater management structures are proposed in the Buffer Zone, the stormwater management structures shall be maintained as required in the Stormwater Plan. Such maintenance constitutes an ongoing condition and is not subject to further permitting requirements.
12. If this ORAD involves work as part of a Simplified Review, the ORAD shall be recorded at the Registry of Deeds prior to the commencement of work per the requirements of Section F.
13. Prior to proceeding with any work under Simplified Review, applicants are required to provide written notice to the Commission one week prior to commencing any work.
14. If work authorized under Simplified Review is commenced, no work is allowed, and no additional NOI or RDA may be filed, for any work within the 0-to-50-foot buffer zone during the term of an ORAD associated with this application. If work authorized under Simplified Review is **not** commenced, then future NOIs or RDAs may be filed for work within the 0-to-50-foot portion of the buffer zone.

--End of Conditions--

C. Simplified Buffer Zone Review (cont.)

Stormwater Applicability

1. ☐ The project is not subject to the Stormwater Policy.
2. ☐ The project is subject to the Stormwater Policy and the Stormwater Plan included for the project complies with all stormwater standards.

Ineligibility Determinations

Site Conditions: The applicant is not eligible for Simplified Buffer Zone review and must file a Request for Determination of Applicability or Notice of Intent prior to any work because:

3. ☐ Work is within the Buffer Zone of a Coastal Resource Area as defined at 310 CMR 10.25-10.35.
4. ☐ The Buffer Zone contains existing slopes greater than an average of 15%.
5. ☐ Buffer Zone contains estimated rare wildlife habitat.[1]
6. ☐ The site borders an Outstanding Resource Water.[2]

Stormwater

7. ☐ The project is subject to the Stormwater Policy and the applicant has not submitted sufficient information to demonstrate compliance with the Stormwater Management Policy. Prior to any work, the applicant must submit plans showing compliance with the standards in the Stormwater Policy, the location of the work, the amount of impervious surface, and the location of erosion controls, to the Commission for its concurrence. (See instructions to ANRAD Form 4A.) The following necessary stormwater information was not submitted by the applicant:

   a. _____

8. ☐ The project is subject to the Stormwater Policy but the project does not comply with one or more of the stormwater standards (specify which standard(s) not met).
   a. Standard # : _____
   b. Standard # : _____
9. ☐ Impervious surface exceeds 40% of the area of the Buffer Zone between 50 and 100 feet from the resource area.
10. ☐ The applicant did not submit plans depicting adequate erosion and sedimentation controls located at the limit of work or at least 50 feet from any resource areas, whichever will be greater.
11. ☐ Work is proposed within 50 feet of a resource area.

Notice to Commission

Any applicant proposing to proceed under Simplified Buffer Zone Review, as specified in 310 CMR 10.02, must provide written notice to the Commission one week prior to any work.

---

[1] *Identified on the most recent Estimated Habitat Map of State-listed Rare Wetlands Wildlife of the Natural Heritage and Endangered Species Program.*
[2] *Certified Vernal Pools, public water supplies, or inland ACECs as identified in 314 CMR 4.00.*

D. Findings

This Order of Resource Area Delineation determines that the Stormwater Plan, if applicable, and the boundaries of those resource areas noted above, have been delineated and approved by the Commission and are binding as to all decisions rendered pursuant to the Massachusetts Wetlands Protection Act (M.G.L. c.131, § 40) and its regulations (310 CMR 10.00). This Order does not, however, determine the boundaries of any resource area or Buffer Zone to any resource area not specifically noted above, regardless of whether such boundaries are contained on the plans attached to this Order or to the Abbreviated Notice of Resource Area Delineation.

The Agent or members of the Conservation Commission and the Department of Environmental Protection shall have the right to enter and inspect the area subject to this Order at reasonable hours to evaluate compliance with the conditions stated in this Order, and may require the submittal of any data deemed necessary by the Conservation Commission or Department for that evaluation.

If the Abbreviated Notice of Resource Area Delineation was filed as Simplified Review for a Buffer Zone project, the applicant has certified that any work associated with the proposed project meets all eligibility requirements for Simplified Review listed in Section C of this Order. Any work that does not comply with the Simplified Review requirements will require a Notice of Intent or Request for Determination of Applicability.

The applicant is responsible for promptly requesting a Certificate of Compliance following completion of any work allowed pursuant to a Simplified Review or no later than three years from the date of the Order of Resource Area Delineation unless the Order is extended.

Failure to comply with the conditions of this Order is grounds for the Conservation Commission or the Department to take enforcement action.

This Order must be signed by a majority of the Conservation Commission. The Order must be sent by certified mail (return receipt requested) or hand delivered to the applicant. A copy also must be mailed or hand delivered at the same time to the appropriate DEP Regional Office (see http://www.mass.gov/dep/about/region/findyour.htm).

E. Appeals

The applicant, the owner, any person aggrieved by this Order, any owner of land abutting the land subject to this Order, or any ten residents of the city or town in which such land is located, are hereby notified of their right to request the appropriate DEP Regional Office to issue a Superseding Order of Resource Area Delineation. When requested to issue a Superseding Order of Resource Area Delineation, the Department's review is limited to the objections to the resource area delineation(s) stated in the appeal request. The request must be made by certified mail or hand delivery to the Department, with the appropriate filing fee and a completed Request for Departmental Action Fee Transmittal Form, as provided in 310 CMR 10.03(7) within ten business days from the date of issuance of this Order. A copy of the request shall at the same time be sent by certified mail or hand delivery to the Conservation Commission and to the applicant, if he/she is not the appellant. Any appellants seeking to appeal the Department's Superseding Order associated with this appeal will be required to demonstrate prior participation in the review of this project. Previous participation in the permit proceeding means the submission of written information to the Conservation Commission prior to the close of the public hearing, requesting a Superseding Order or Determination, or providing written information to the Department prior to issuance of a Superseding Order or Determination.

The request shall state clearly and concisely the objections to the Order which is being appealed and how the Order does not contribute to the protection of the interests identified in the Massachusetts Wetlands Protection Act, (M.G.L. c. 131, § 40) and is inconsistent with the wetlands regulations (310 CMR 10.00). To the extent that the Order is based on a municipal bylaw or ordinance, and not on the Massachusetts Wetlands Protection Act or regulations, the Department of Environmental Protection has no appellate jurisdiction.

Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

DEP File Number:

WPA Form 4B – Order of Resource Area Delineation

285-1512
Provided by DEP

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

F. Signatures and Notary Acknowledgement

Please indicate the number of members who will sign this form: FIVE
1. Number of Signers

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

Signature of Conservation Commission Member

This Order is valid for three years from the date of issuance.

This Order is issued to the applicant and the property owner (if different) as follows:

☒ by hand delivery on NOVEMBER 27, 2009
Date

☐ by certified mail, return receipt requested on
Date

Notary Acknowledgement

Commonwealth of Massachusetts County of

On this 20th (Day) of October (Month) 2009 (Year)

Before me, the undersigned Notary Public, personally appeared John Ostrosky
Name of Document Signer

proved to me through satisfactory evidence of identification, which was/were personal recognition
Description of evidence of identification

to be the person whose name is signed on the preceding or attached document, and acknowledged to me that he/she signed it voluntarily for its stated purpose.

As member of SHREWSBURY (City/Town) Conservation Commission

SANDRA E. WRIGHT
Notary Public
Commonwealth of Massachusetts
My Commission Expires
June 6, 2014

Sandra E. Wright
Signature of Notary Public

SANDRA E. WRIGHT
Printed Name of Notary Public

Place notary seal and/or any stamp above

JUNE 6, 2014
My Commission Expires (Date)

G. Recording Information

If this Order is issued for purposes of Resource Area Delineation only, this Order should NOT be recorded.

If this Order of Resource Area Delineation is issued as part of a Simplified Review, this Order must be recorded in the Registry of Deeds or the Land Court for the district in which the land is located, within the chain of title of the affected property. In the case of recorded land, the Final Order shall also be noted in the Registry's Grantor Index under the name of the owner of the land subject to the Order. In the case of registered land, this Order shall also be noted on the Land Court Certificate of Title of the owner of the land subject to the Order of Conditions. The recording information on Page 6 of this form shall be submitted to the Conservation Commission listed below.

N/A
Conservation Commission

Detach on dotted line, have stamped by the Registry of Deeds and submit to the Conservation Commission.

To:

Conservation Commission

Please be advised that the Order of Conditions for the Project at:

Project Location | DEP File Number

Has been recorded at the Registry of Deeds of:

County | Book | Page

for:

Property Owner

and has been noted in the chain of title of the affected property in:

Book | Page

In accordance with the Order of Conditions issued on:

Date

If recorded land, the instrument number identifying this transaction is:

Instrument Number

If registered land, the document number identifying this transaction is:

Document Number

Signature of Applicant

PLAN NOTES:

1. REFER TO SHEET C0.01 FOR NOTES AND LEGEND.

THIS DOCUMENT, AS AN INSTRUMENT OF SERVICE, IS THE SOLE PROPERTY OF WATERMAN DESIGN ASSOCIATES, INC. ITS USE BY THE OWNER FOR OTHER PROJECTS OR FOR COMPLETION OF THIS PROJECT BY OTHERS IS STRICTLY FORBIDDEN. DISTRIBUTION IN CONNECTION WITH THIS PROJECT SHALL NOT BE CONSTRUED AS PUBLICATION IN DEROGATION OF THE ENGINEERS RIGHTS.

REV.	DATE	DESCRIPTION	INIT.
A	☒	INITIAL ISSUE	

STEPHEN P. CONVERSE No. 33585

7/21/09

PREPARED BY:

WATERMAN DESIGN ASSOCIATES, INC.
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508.366.6552
508.366.6506 (fax)
watermandesign.com wda@wdassoc.com

OWNER:

TOWN OF SHREWSBURY
100 Maple Avenue
Shrewsbury, MA

APPLICANT:

TOWN OF SHREWSBURY
100 Maple Avenue
Shrewsbury, MA

TITLE:

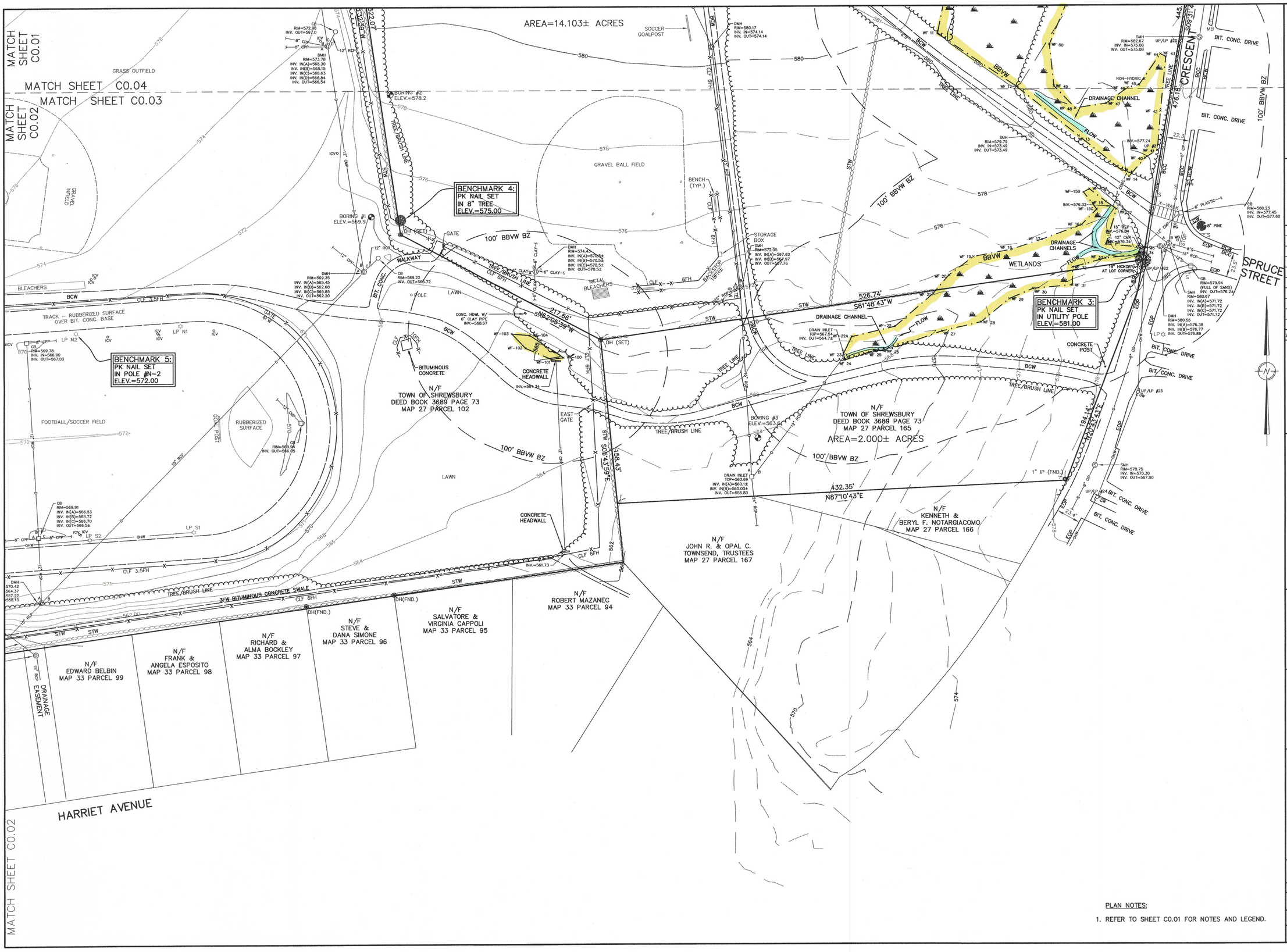
EXISTING CONDITIONS PLAN

OAK & SHERWOOD MIDDLE SCHOOLS

Shrewsbury, MA
(Worcester County)

0 40 80 120

DATE:	7/21/09	*SCALE:*	1" = 40'
JOB NO.:	JN-135.05	*DWN. BY:*	JRZ & MJS
FILE NO.:	0135480	*CHK'D. BY:*	SPC
DRAWING NO.:	0135483A	*SHEET:*	C0.03



PLAN NOTES:

1. REFER TO SHEET C0.01 FOR NOTES AND LEGEND.

REV.	DATE	DESCRIPTION	INIT.
A		INITIAL ISSUE	

COMMONWEALTH OF MASSACHUSETTS
STEPHEN CONVERSE No. 33585 PROFESSIONAL LAND SURVEYOR
7/21/09

PREPARED BY:

WATERMAN DESIGN ASSOCIATES, INC.
31 East Main Street
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OWNER:
TOWN OF SHREWSBURY
100 Maple Avenue
Shrewsbury, MA

APPLICANT:
TOWN OF SHREWSBURY
100 Maple Avenue
Shrewsbury, MA

TITLE:
EXISTING CONDITIONS PLAN
OAK & SHERWOOD MIDDLE SCHOOLS
Shrewsbury, MA
(Worcester County)

0 40 80 120

DATE: 7/21/09	SCALE: 1" = 40'
JOB NO.: JN-135.05	DWN. BY: IRZ & MIS
	CHK'D. BY: SPC
FILE NO.: 0135480	SHEET: C0.04
DRAWING NO.: 0135484A	

1.15 PREFERRED SCHEMATIC DESIGN

C. Geotechnical Analysis

YANKEE ENGINEERING & TESTING, INC.

November 27, 2009

Mr. Mike Pagano
Lamoureux Pagano Associates, Inc.
10 East Worcester Street
Worcester, MA 01604

RE: Geotechnical Investigation Summary
Sherwood Middle School
Sherwood, Massachusetts **Project # 29071**

Dear Mr. Pagano:

Per our agreement, Yankee Engineering has completed the geotechnical investigation for the above site. Two (2) copies of the report, including the specific subsurface data and professional engineering conclusions and recommendations, are enclosed.

In general, the soils across the area of the proposed building area (B-1 to B-10) consisted of 1'-2' of surficial topsoil or fill overlying a brown silty sands (slightly plastic/clayey) with little gravel, which were judged to be undisturbed soil, that extended to the refusal depths. The 10'± depths at B-1 to B-4 (located near the top of the slope) were believed to be bedrock (corresponding to elevation 576' to 584'). The 9'± depths for B-5 to B-8 (located near the toe of the slope) showed bedrock (elev. 570' to 574'). Borings B-9 and B-10, situated 75' west of the existing school, found bedrock at depth of 17.5' and 8', respectively, correlating to elevations 570' and 582'. Boring B-11 to B-13, in the playfields to the south of the school, went at least 15' deep (8'$^{+}$ below the water table) indicating that shallow bedrock was not a concern.

The blow counts indicated the native silty sand to be at least medium dense and suitable for typical foundation support. However, the soil has high fines (%<#200 sieve) content and should be considered extremely susceptible to moisture/vibration. As such, it must be protected during construction and would not be suitable for reuse as structural backfill.

Based on the recovered soil(s) and measured penetration resistance(s), the proposed areas appeared suitable for typical spread and/or continuous footing type foundations, bearing on the native silty sands using a bearing capacity of not more than 2 TSF (4000 psf).

We appreciate this opportunity to be of service to you. Should you have any questions relative to this report, or require additional services, please do not hesitate to contact me at our Worcester office.

Very truly yours

Whitney J. Parker, P.E.
Director of Engineering Services
enc.
s/works/project/29071/geotech/intro 11279

10 Mason Street, Worcester, Massachusetts 01609
TEL (508) 831-7404 FAX (508) 831-7388
CONSTRUCTION INSPECTION & MATERIALS TESTING
www.yankeeengineering.com

YANKEE ENGINEERING & TESTING, INC.

GEOTECHNICAL INVESTIGATION
REPORT

FOR

SHERWOOD MIDDLE SCHOOL
SHREWSBURY MASSACHUSETTS

PREPARED
FOR:

TOWN OF SHREWSBURY
C/O
LAMOUREUX PAGANO ASSOC., INC.
WORCESTER, MA

PREPARED
BY:

YANKEE ENGINEERING & TESTING, INC.
WORCESTER, MASSACHUSETTS

PROJECT # 29071

NOVEMBER 27, 2009

10 Mason Street, Worcester, Massachusetts 01609
TEL (508) 831-7404 FAX (508) 831-7388
CONSTRUCTION INSPECTION & MATERIALS TESTING
www.yankeeengineering.com

RE: Geotechnical Investigation (2)
Sherwood Middle School
Shrewsbury, Massachusetts **Project # 29071**

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation for the proposed Sherwood Middle School addition in Shrewsbury Massachusetts. The purpose of the review was to obtain information regarding subsurface conditions and soil properties, for use in developing the geotechnical engineering recommendations for the structure, slabs, and paved areas.

2.0 SITE LOCATION & DESCRIPTION

The site, as stated above, consists of a 14± acre property located along the southern side of Sherwood Avenue, in the City of Shrewsbury, as shown in Figure 1, and has 300'± of frontage. An existing three (3) story brick framed structure occupies the northeastern site quadrant. The new 3 story building (footprint of 45,000± s.f.) will likely be situated to just west of the existing structure, although several borings (B-11 to B-13) were requested for the southeastern quadrant.

The rear half of the property is primarily playfields, and slopes from an elevation of 582'± along the rear of the building, to 574'± near the southern limits of the site, based on a supplied site topographical plan.

3.0 INVESTIGATIONS

3.1 FIELD SERVICES

A series of thirteen (13) soil borings (B-1 to B-13) was performed by Soil Exploration Services on November 19th and 20th 2009, under direction of Mr. Rick McCarthy, a Yankee geotechnical engineer. The borings were advanced using 6 inch o.d. hollow stem augers, driven by a truck mounted mobile boring rig. The boring locations, shown in Figure 2 (Boring Location Plan) were determined in the field by taping from identified landmarks, while the boring ground elevations were interpolated from contours shown on the site plan. Thus, the boring locations should be considered accurate only to the degree implied by the applied methodology.

Standard penetration resistance, generally at 5' increments was measured using an 24" long 2" o.d., split spoon sampler driven by a 140 lb. weight falling 30 inches. The recorded values, commonly referred to as blow counts, are listed on the individual soil boring logs, shown in Appendix A. The recovered samples, visually classified in the field, were recorded and stored in the event that further review is warranted.

Borings B-1 through B-10 were believed to encompass the general area of the proposed addition footprint and intended to sample soils near the expected footing elevation. It was assumed that purpose of borings B-11 to B-13 (to the south of the school) was for use in evaluating a possible alternate location.

3.2 LABORATORY SERVICES

As a majority of the recovered soil samples were visually quite similar, this office elected to perform gradation analyses according to ASTM D-422 washed sieve test methods, on three (3) recovered samples. These samples, from a depth of 5 to 7' from boring B-1, B-3 and B-6, showed a soil classification of SM: brown (slightly plastic/clayey) silty sand with little gravel. The laboratory gradation results, presented in Appendix B, showed 40%$^{+}$ silt/clay (%<#200 sieve) contents indicating the subsurface silty till to have a very high "fines" content, which is addressed in detail later in this report.

4.0 OBSERVED CONDITIONS

4.1 SUBSURFACE SOILS

In general, the subsurface soil across top of the slope, near the north side of the proposed addition (B-1 to B-4), consisted of 2' of surficial pavement/gravel fill overlying the brown medium dense silty till (native silty sands with little gravel, described above). This silty till extended down to suspected weathered bedrock at boring depths of 10' to 13' (correlating to elevations 576' to 581') at B-1 and B-3, respectively.

B-5 to B-8 along the south side of the addition footprint (located near the toe of the slope) showed 1'± of surficial topsoil/subsoil overlying the undisturbed medium dense brown silty till. The 9'± drilling depths, also believed to be bedrock, correlated to elev. 570' and 574', at B-5 and B-8, respectively.

Borings B-9 and B-10, situated 75' west of the existing school, encountered similar medium dense silty till with bedrock at 17.5' and 8' respectively, correlating to elevations 570' and 582'. B-11 to B-13, in the playfield areas to the south of the school, went at least 15' deep (which was 8'$^{+}$ below the water table) indicating that shallow bedrock was not a concern. It should be noted that none of the borings found evidence of foundations, loose soil, or "variable fill soil(s)".

4.2 GROUNDWATER OBSERVATIONS

In the northern addition area, groundwater was encountered within the silty till at depths of 9' at B-1 (elev. 577') and 4' at borings B-4 (elev. 580'). However, in the southern part of the property, borings B-11 to B-13 found wet soil at about elevation 570'. As such, it appears the general groundwater table follows the surface contours, from north to south, but also appears to be perched (trapped) at variable elevations within the native silty till. We do not believe that it will impact the expected shallow foundation construction operations, however deeper excavations, for utilities etc., may approach the groundwater table. Further, it should be noted that fluctuations of the ground water table will occur due to precipitation and seasonal changes. As such, readings taken under different conditions may vary somewhat from those presented in this report.

5.0 GEOTECHNICAL EVALUATION

5.1 FOUNDATIONS

Judging from the blow counts and soil type(s), it is our professional opinion that, in accordance with Section 1804.3 of the Massachusetts State Building Code, the maximum allowable net soil bearing capacity of the medium dense, silty sands with little gravel (Class #8), near the expected footing elevation is 2 TSF (4000 PSF). Further, as the area is underlain by soil consisting of medium dense Class #8 soil, according to State Code Table 1612.4.1, the site is a soil profile type S_2, having a site seismic coefficient of 1.2. The subsurface soil conditions were not considered to be susceptible to liquefaction, according to CMR 1805.3, due to their fine grained composition and high relative density.

According to the State Code 7th edition, section 9.4.1.2.1, the boring data/blow counts and soil gradation results dictate that the site be given a Class "D" classification.

Footings should be designed in accordance with Section 1806 of the State Code. For footings smaller than 3 feet in least lateral dimension, the allowable bearing pressure should be reduced to one-third of the above value multiplied by the least lateral footing dimension in feet. We recommend that continuous wall footings be a minimum of 18" wide and isolated footings at least 24" wide. All exterior and interior footings in unheated areas should bear a minimum of 4' below finish grade to provide protection from frost penetration. We suggest that interior footings, in heated areas, should bear at least 18" below the underside of the floor slab.

The static lateral earth pressure for any unrestrained foundation walls, which will effectively serve as retaining walls with greater than 4' exposed, should be calculated using an equivalent fluid pressure of 60 pcf (pounds per cubic foot). This value is based on the interior backfill consisting of granular soils, having less than 10% silt (%< #200 sieve), being compacted to greater than 95%. Additional pressure exerted from interior slab surcharge loads (acting within 1.5 times the exposed wall height) should be considered as a uniform pressure equal to $0.5q$, where q (psf) is the surcharge load.

5.2 SLABS ON GRADE

The existing native silty tills when compacted and stable are suitable to remain as subgrade (up to 12" below slab grade) material beneath the floor slab(s) on grade. We recommend a minimum 12" thick slab base course layer, meeting the Base Gravel specifications as presented hereinafter. The slab gravel will have to be imported as the onsite soils will not meet the Base Course requirements. Further, it must be noted that the existing subgrade soils are moisture sensitive and may destabilize if exposed to excessive moisture and/or equipment traffic. Thus, the building area and subgrade soils will require some weather protection, during construction, to maintain their suitable density and stability.

5.3 PAVEMENTS

The existing undisturbed silty till appears suitable in its nature state, to remain as subgrade material beneath paved areas. However, as mentioned above, they are moisture susceptible and will require protection depending on the construction season. Based on the fine grained subgrade soil and expected light vehicle traffic, we recommend a 12" thick sub-base layer of Base Gravel, topped by 4 inches of Dense Graded crushed gravel. The dense mix is warranted as the silty subgrade soils are relatively weak due to their elevated fines content. The increasing strength of the proposed pavement base layers should provide adequate support for the bituminous asphalt.

6.0 RECOMMENDATIONS

6.1 GENERAL SITE PREPARATION

The building area could be stripped down to the underlying natural silty sands prior to commencing construction, in order to salvage/segregate the existing pavement "base gravel" for re-use. Care must be taken to avoid degrading the soil quality by mixing it with the underlying silty till or bituminous asphalt. We recommend that the contractor proof roll the exposed soil subgrade in open areas, with at least ten (10) passes of a vibratory drum roller, having a minimum static weight of 10,000 pounds. Over-excavate any weak or soft spots, identified during proof rolling, and replace them with compacted granular fill, where necessary.

In more confined areas, such as footing trenches, we suggest that a vibratory compactor be applied until passing field compaction results are obtained. Again, any weak or soft areas should be excavated and replaced with compacted granular fill material.

The following material soil gradations specifications are recommended for Granular Fill, Gravel Base, and Dense Mix, respectively:

Sieve Size	Granular Fill	Gravel Base	Dense Mix
6 inch	100	100	100
3 inch	95 - 100	100	100
1/2 inch	60 - 95	50 - 85	50 - 80
No. 4	50 - 80	40 - 75	30 - 55
No. 10	30 - 70	30 - 60	n/a
No. 40	10 - 70	10 - 35	10 - 25
No. 100	0 - 25	5 - 20	n/a
No. 200	0 - 10	0 - 8	3 – 10

All backfill materials shall be free from ice, snow, roots, and/or other deleterious matter.

Place and compact granular fill up to the required subgrade elevation(s). The recommended minimum compaction, expressed as a percentage of the maximum dry density, when tested in accordance with ASTM D-1557, is specified below:

General Fill Location/Type	Percent Compaction (D-1557)
Beneath All Footings & Slabs	95%
Pavement Base Course Material	95%
Beneath Pavement Base Course	92%
Beneath Landscape Areas	90%

6.2 FOUNDATIONS

The bearing soils, at the bottom of any foundation trenches, should be re-compacted (i.e. proof rolled) using vibratory equipment of sufficient weight to obtain the specified 95% minimum compaction. Should the soil(s) become destabilized (weaving/pumping) the contractor may be required to over-excavate the footing trenches and prepare a 1'± thick lift of crushed stone (1-1/2" max. or similar) to stabilize the subgrade and provide temporary drainage during construction. The contractor may also be required to construct stone "sump points" to collect/remove water from open excavation(s)

Backfilling of foundation walls should be performed on both sides to avoid unbalanced fill loading. In general, lift thickness during backfill should not exceed 6" when utilizing hand-operated, vibratory plate compactors, and 10 -12" when using walk-behind, dual drum, or vibratory rollers, unless sufficient means of compaction otherwise can be demonstrated to the satisfaction of the architect and/or engineer.

6.3 SLABS ON GRADE

As mentioned previously, the existing undisturbed silty till should be suitable to remain as slab subgrade provided it does not become destabilized during construction. We also recommend a minimum 12" thick lift of compacted Base Gravel for directly beneath the slab, in order to create a suitably strong, non-yielding bearing surface for slab. Again, it must be noted that it is critical that the contractor protect the native silty sand subgrade and avoid the repeated vibration/loading associated with "traffic routes".

6.4 PAVEMENTS

As previously mentioned, the existing native silty till, is suitable to remain as pavement subgrade provided they do not become destabilized during construction. Also, 12" of compacted Base Gravel sub-base and a minimum 4" of Dense Grade (intended to produce a gradable hard surface) is recommended for directly beneath bituminous pavement. Given the expected light traffic conditions, consisting primarily of personal vehicles, we typically suggest a pavement cross-section consisting of 2" of bituminous binder with 1-1/2" of top mix. All materials and placement procedures should be in accordance with the State Highway & Bridge specifications and standards.

7.0 CONSTRUCTION MONITORING

We recommend that Yankee Engineering & Testing, Inc. be retained to monitor aspects of the foundation and pavement construction operations which are listed below:

- Monitor the removal of unsuitable materials from the footing and floor slab areas, and to confirm that the type of material encountered at subgrade level is adequate.
- Review the proposed bearing surfaces to confirm that they have been properly prepared, and that they are satisfactory for the recommended bearing pressures.
- Observe the placement and compaction of controlled fills within the building footprint and proposed pavement areas.
- Check the suitability, via project specifications, of soils proposed for use as backfill.

By monitoring these aspects of the construction, we will be able to observe compliance with the design concepts, assumptions, and specifications, and to facilitate the design changes in the event that subsurface conditions differ from those anticipated prior to the start of construction. In addition, *Yankee* would be pleased to provide the full range of future testing/inspection services, as required by the State Building Code.

We believe that your will find the information and engineering opinions expressed herein to be clear and concise. However, should you have any questions or require additional geotechnical services, please do not hesitate to contact me at our Worcester office. We appreciate this opportunity to be of service to your firm.

Prepared By:

Whitney J. Parker, P.E.
Director of Engineering Services
WJP:rap

enc.

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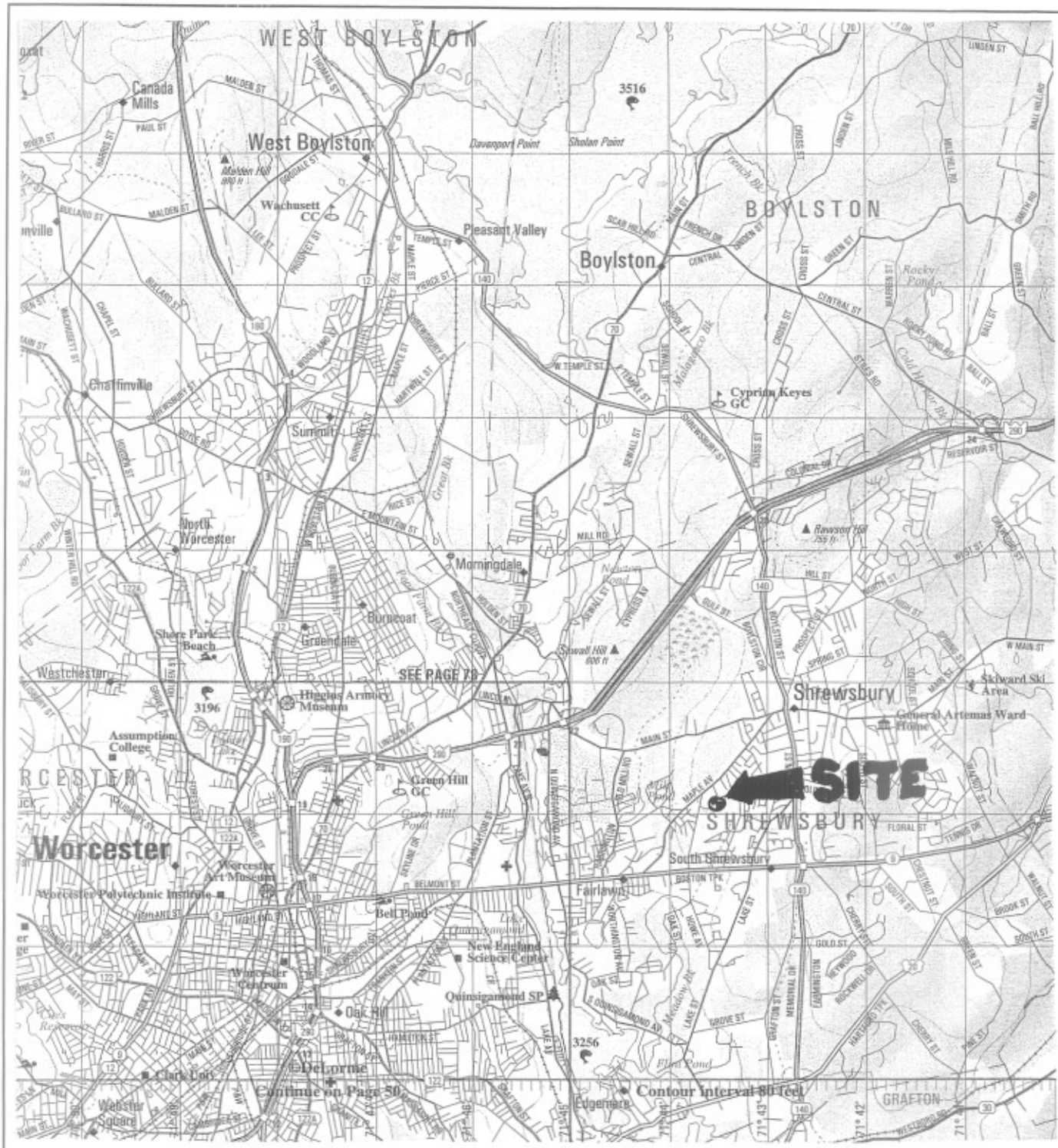
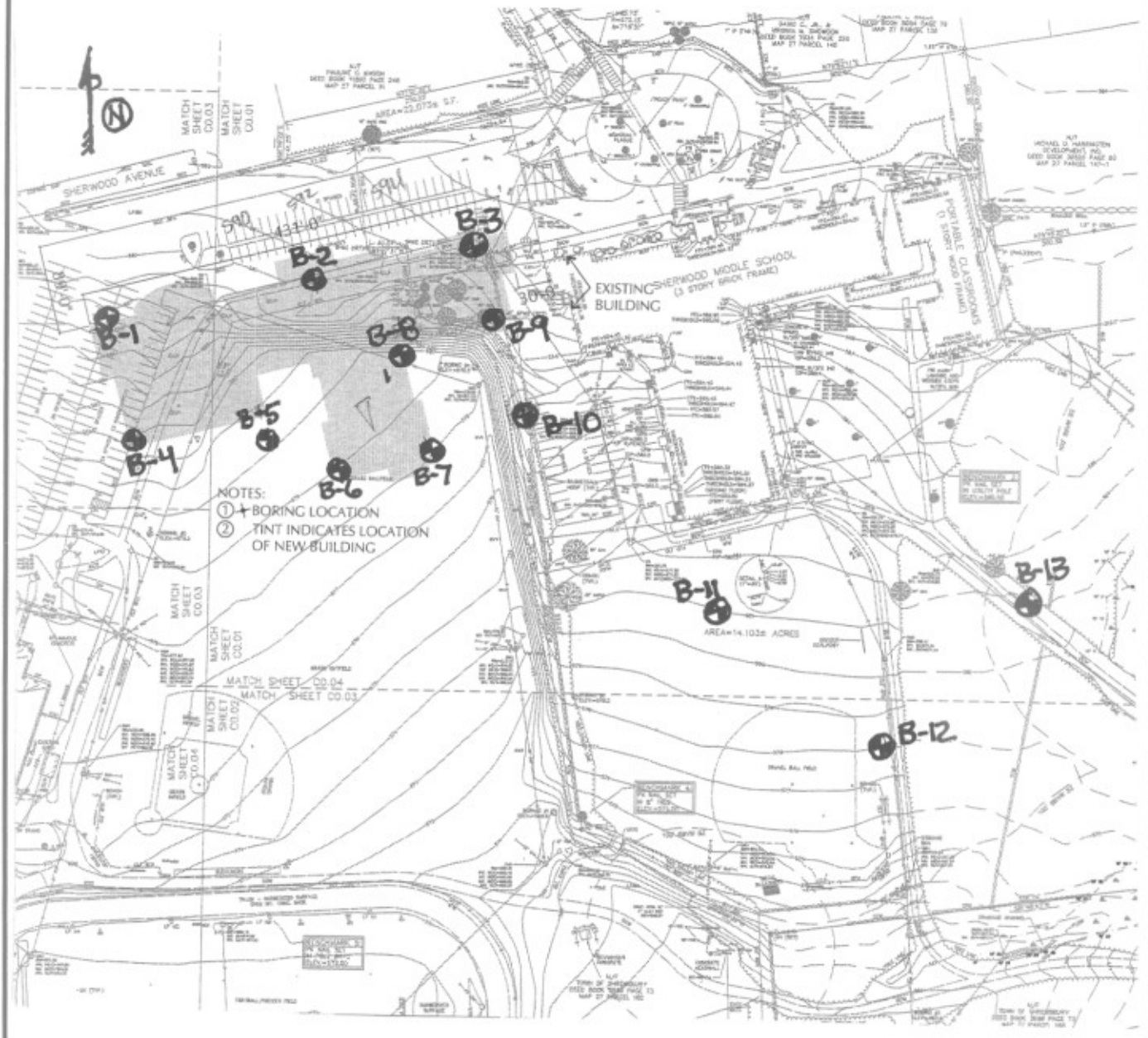


Yankee Engineering & Testing, Inc. 10 Mason Street Worcester, MA 10609 Phone: (508) 831-7404 • Fax: (508) 831-7388	**Project:**	Sherwood Middle School
	Location:	Shrewsbury Massachusetts
	Project #:	29071
	Date:	November 27, 2009
	Client:	Town c/o Lamoureux Pagano

FROM: USGS Quad. Map	**SITE LOCUS PLAN** **FIGURE 1**	**Approx. Scale** 1" = 7000'



● = BORING LOCATIONS

Yankee Engineering & Testing, Inc. 10 Mason Street Worcester, MA 01609 Phone: (508) 831-7404 Fax: (508) 831-7388	**Project:** Sherwood Middle School **Location:** Shrewsbury Massachusetts **Project #:** 29071 **Date:** November 27, 2009 **Client:** Town c/o Lamoureux Pagano	
FROM: Schematic Site Plan	**BORING LOCATION PLAN** **FIGURE 2**	**Approx. Scale:** 1"=160'

Yankee Engineering & Testing, Inc.
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Worcester Ma 01609
Phone: (508) 831-7404
Fax: (508) 831-7388

SOIL TEST BORING LOG

Project:	Sherwood Middle School	Boring #	B - 1
Location:	Shrewsbury, MA	Sheet #	1 of 1
Job No:	29071	Location:	NW Corner
Date Start:	November 20, 2009		See Boring Plan
Date End:	November 20, 2009	Elevation*:	586'

Drilling	Core	Casing	Sampler
Type	n/a	n/a	Split Spoon
Size	n/a	n/a	2" I.D.
Hammer	n/a	n/a	140 #
Fall	n/a	n/a	30"

Groundwater Observations

Date	Depth	Casing At	Stabilization Period
11/20/09	9'±	n/a	Upon Completion of Boring

Depth (ft.)	BORING SAMPLING DATA No.	Depth	Pen.	Rec.	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
						0.4'	Bituminous Pavement	Asphalt
	S - 1	1' - 3'	24"	12"	4 - 4	1.5'	S-1: Brown, damp, medium dense, fine sand/gravel	dense grade
					8 - 12			
	S -2	3' - 5'	24"	20"	8 - 10		S-2: Brown, damp, dense silty sand little gravel	
5'					18 - 17			
	S - 3	5' - 7'	24"	8"	10 - 10		S-3: Same as S-2 but medium dense	Native Soil
					8 - 9			
						H2O at 9'		
10'								
	S - 4	10'-10.2'	2"	2"	60/2"	10.2'	S-4: Same as S-2 but moist/wet	
		10'-12.5'	n/a	n/a	n/a	12.5'	Drill rig augered through weathered rock from 10'-12.5'	Rock
15'							Boring terminated at depth of 12.5' on suspected bedrock at about elevation 574'.	
20'								

Drilling Co.	Soil Exploration Services
Rig Type:	Truck Mounted Acker 82
Driller:	Mr. Dennis Leger
Helper:	Mr. Darwin Newton
Inspector:	Mr. Rick McCarthy
Client Rep.:	n/a

Soil Composition Proportions	
Trace:	0%-10%
Little:	10%-20%
Some:	20%-35%
And:	35%-50%

Cohesive (blows/ft)	Cohesionless (blows/ft)
0 - 2 = Very Soft	0 - 3 = Very Loose
2 - 4 = Soft	4 - 9 = Loose
5 - 8 = Med. Stiff	10 - 29 = Med. Dense
9 - 15 = Stiff	30 - 49 = Dense
16 - 30 = Hard	50+/ft. = Very Dense

DRILLING NOTES & REMARKS	Refer to geotechnical report dated November 27, 2009 for additional information.
	* - Ground elevation based on the provided site plan dated October 30, 2009.

Yankee Engineering & Testing, Inc.
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SOIL TEST BORING LOG

Project:	Sherwood Middle School	Boring #	B - 2
Location:	Shrewsbury, MA	Sheet #	1 of 1
Job No:	29071	Location:	North side
Date Start:	November 20, 2009		See Boring Plan
Date End:	November 20, 2009	Elevation*:	590'

Drilling	Core	Casing	Sampler
Type	n/a	n/a	Split Spoon
Size	n/a	n/a	2" I.D.
Hammer	n/a	n/a	140 #
Fall	n/a	n/a	30"

Groundwater Observations

Date	Depth	Casing At		Stabilization Period
11/20/09	no GW	n/a	Upon Completion of Boring	

Depth (ft.)	BORING SAMPLING DATA No.	Depth	Pen.	Rec.	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
	S - 1	0' - 2'	24"	14"	6 - 10	0.5'	Topsoil/subsoil	
					16 - 16	2'	S-1: Brown, crushed sand/gravel	fill
	S - 2	2' - 4'	24"	14"	10 - 6		S-2: Lt. brown, damp, medium dense silty sand little gravel	
					8 - 10			Native
5'						4'		
	S - 3	5' - 7'	24"	18"	8 - 16		S-3: Brown, damp, medium dense silty sand little gravel	
					10 - 10			
								Native
10'								
	S - 4	10'-10.1'	1"	1"	40/1"	10.2'	S-4: Rock fragments (no soil)	
							Drill rig augered through weathered bedrock from 10'-14.5'	Rock
						14.5'		
15'							Boring terminated at depth of 14.5' on suspected bedrock at about elevation 576'.	
20'								

Drilling Co.	Soil Exploration Services
Rig Type:	Truck Mounted Acker 82
Driller:	Mr. Dennis Leger
Helper:	Mr. Darwin Newton
Inspector:	Mr. Rick McCarthy
Client Rep.:	n/a

Soil Composition Proportions	
Trace:	0%-10%
Little:	10%-20%
Some:	20%-35%
And:	35%-50%

Cohesive (blows/ft)	Cohesionless (blows/ft)
0 - 2 = Very Soft	0 - 3 = Very Loose
2 - 4 = Soft	4 - 9 = Loose
5 - 8 = Med. Stiff	10 - 29 = Med. Dense
9 - 15 = Stiff	30 - 49 = Dense
16 - 30 = Hard	50+/ft. = Very Dense

DRILLING NOTES & REMARKS	Refer to geotechnical report dated November 27, 2009 for additional information.
	* - Ground elevation based on the provided site plan dated October 30, 2009.

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SOIL TEST BORING LOG

Project:	Sherwood Middle School	Boring #	B - 3
Location:	Shrewsbury, MA	Sheet #	1 of 1
Job No:	29071	Location:	NE Side
Date Start:	November 20, 2009		See Boring Plan
Date End:	November 20, 2009	Elevation*:	594'

Drilling	Core	Casing	Sampler
Type	n/a	n/a	Split Spoon
Size	n/a	n/a	2" I.D.
Hammer	n/a	n/a	140 #
Fall	n/a	n/a	30"

Groundwater Observations

Date	Depth	Casing At	Stabilization Period
11/20/09	no GW	n/a	Upon Completion of Boring

Depth (ft.)	BORING SAMPLING DATA No.	Depth	Pen.	Rec.	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
	S - 1	0' - 2'	24"	16"	8 - 6		S-1: Brown, damp, medium dense	Fill
					6 - 6	2'	silty sand some gravel	
	S - 2	2' - 4'	24"	20"	10 - 8		S-2: Brown, damp, dense	
					18 - 24		silty sand little gravel	Native
5'								Soil
	S - 3	5' - 7'	24"	18"	12 - 10		S-3: Same as S-2	
					26 - 20			
10'								Native
	S - 4	10' - 12'	24"	16"	6 - 18		S-4: Same as S-2	Soil
					20 - 28			
						13'	weathered rock at 13'	
						14.5'	augered through rock from 13' to 14.5'	Rock
15'								
							Boring terminated at depth of 14.5' on suspected bedrock at about elevation 580'.	
20'								

Drilling Co.	Soil Exploration Services
Rig Type:	Truck Mounted Acker 82
Driller:	Mr. Dennis Leger
Helper:	Mr. Darwin Newton
Inspector:	Mr. Rick McCarthy
Client Rep.:	n/a

Soil Composition Proportions	
Trace:	0%-10%
Little:	10%-20%
Some:	20%-35%
And:	35%-50%

Cohesive (blows/ft)	Cohesionless (blows/ft)
0 - 2 = Very Soft	0 - 3 = Very Loose
2 - 4 = Soft	4 - 9 = Loose
5 - 8 = Med. Stiff	10 - 29 = Med. Dense
9 - 15 = Stiff	30 - 49 = Dense
16 - 30 = Hard	50+/ft. = Very Dense

DRILLING NOTES & REMARKS

Refer to geotechnical report dated November 27, 2009 for additional information.

* - Ground elevation based on the provided site plan dated October 30, 2009.

Yankee Engineering & Testing, Inc.

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Worcester Ma 01609
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SOIL TEST BORING LOG

Project:	Sherwood Middle School	Boring #	B - 4
Location:	Shrewsbury, MA	Sheet #	1 of 1
Job No:	29071	Location:	SW side
Date Start:	November 20, 2009	See Boring Plan	
Date End:	November 20, 2009	Elevation*:	584'

Drilling	Core	Casing	Sampler
Type	n/a	n/a	Split Spoon
Size	n/a	n/a	2" I.D.
Hammer	n/a	n/a	140 #
Fall	n/a	n/a	30"

Groundwater Observations

Date	Depth	Casing At		Stabilization Period
11/20/09	4'	n/a	Upon Completion of Boring	

Depth (ft.)	BORING SAMPLING DATA No.	Depth	Pen.	Rec.	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
	S - 1	0' - 2'	24"	16"	12 - 12	0.5'	Topsoil/subsoil	
					15 - 10		S-1: Brown damp silty sand/gravel	
	S - 2	2' - 4'	24"	20"	14 - 10		S-2: Same as S-1 but med. dense	Native Soil
					12 - 16	H2O at 4'		
5'								
	S - 3	5' - 7'	24"	16"	26 - 38		S-3: Same as S-1 but dense	
					20 - 28			
						8'		
						9'	Augered thru rock 9' to 10'	Rock
10'							Boring terminated at depth of 9' on suspected bedrock at about elevcation 574'.	
15'								
20'								

Drilling Co.	Soil Exploration Services
Rig Type:	Truck Mounted Acker 82
Driller:	Mr. Dennis Leger
Helper:	Mr. Darwin Newton
Inspector:	Mr. Rick McCarthy
Client Rep.:	n/a

Soil Composition Proportions	
Trace:	0%-10%
Little:	10%-20%
Some:	20%-35%
And:	35%-50%

Cohesive (blows/ft)	Cohesionless (blows/ft)
0 - 2 = Very Soft	0 - 3 = Very Loose
2 - 4 = Soft	4 - 9 = Loose
5 - 8 = Med. Stiff	10 - 29 = Med. Dense
9 - 15 = Stiff	30 - 49 = Dense
16 - 30 = Hard	50+/ft. = Very Dense

DRILLING NOTES & REMARKS

Refer to geotechnical report dated November 27, 2009 for additional information.

* - Ground elevation based on the provided site plan dated October 30, 2009.

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SOIL TEST BORING LOG

Project:	Sherwood Middle School	Boring #	B - 5
Location:	Shrewsbury, MA	Sheet #	1 of 1
Job No:	29071	Location:	south side
Date Start:	November 19, 2009		See Boring Plan
Date End:	November 19, 2009	Elevation*:	580'

Drilling	Core	Casing	Sampler
Type	n/a	n/a	Split Spoon
Size	n/a	n/a	2" I.D.
Hammer	n/a	n/a	140 #
Fall	n/a	n/a	30"

Groundwater Observations

Date	Depth	Casing At		Stabilization Period
11/19/09	8'±	n/a	Upon Completion of Boring	

Depth (ft.)	BORING SAMPLING DATA No.	Depth	Pen.	Rec.	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
	S - 1	.5' - 2.5'	24"	20"	6 - 6	0.5'	Topsoil/subsoil	
					18 - 15		S-1: Brown damp dense silty sand/gravel	
	S - 2	2.5'-4.5'	24"	18"	12 - 55		S-2: Same as S-1	Native Soil
					24 - 18			
5'	S - 3	4.5'-6.5'	24"	22"	10 - 24		S-3: Same as S-1	
			24"	22"	26 - 26			cobble
						H2O at 8'		
10'						10.2'		
	S - 4	10'-10.2'	3"	2"	50/3"		S-4: Brown, wet, silty sand/gravel	
						11'	Augered through rock 10' to 11'	Rock
15'							Boring terminated at depth of 10' on suspected bedrock at about elevation 570'.	
20'								
25'								

Drilling Co.	Soil Exploration Services
Rig Type:	Truck Mounted Acker 82
Driller:	Mr. Dennis Leger
Helper:	Mr. Darwin Newton
Inspector:	Mr. Rick McCarthy
Client Rep.:	n/a

Soil Composition Proportions	
Trace:	0%-10%
Little:	10%-20%
Some:	20%-35%
And:	35%-50%

Cohesive (blows/ft)	Cohesionless (blows/ft)
0 - 2 = Very Soft	0 - 3 = Very Loose
2 - 4 = Soft	4 - 9 = Loose
5 - 8 = Med. Stiff	10 - 29 = Med. Dense
9 - 15 = Stiff	30 - 49 = Dense
16 - 30 = Hard	50+/ft. = Very Dense

DRILLING NOTES & REMARKS

Refer to geotechnical report dated November 27, 2009 for additional information.

* - Ground elevation based on the provided site plan dated October 30, 2009.

Yankee Engineering & Testing, Inc.
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SOIL TEST BORING LOG

Project:	Sherwood Middle School	Boring #	B - 6
Location:	Shrewsbury, MA	Sheet #	1 of 1
Job No:	29071	Location:	south side
Date Start:	November 19, 2009	See Boring Plan	
Date End:	November 19, 2009	Elevation*:	580'

Drilling	Core	Casing	Sampler
Type	n/a	n/a	Split Spoon
Size	n/a	n/a	2" I.D.
Hammer	n/a	n/a	140 #
Fall	n/a	n/a	30"

Groundwater Observations

Date	Depth	Casing At	Stabilization Period
11/19/09	6'±	n/a	Upon Completion of Boring

Depth (ft.)	BORING SAMPLING DATA No.	Depth	Pen.	Rec.	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
	S - 1	0' - 2'	24"	18"	4 - 4	0.5'	Topsoil/subsoil	
					4 - 20		S-1: Brown damp silty sand little gravel	
	S - 2	2' - 4'	24"	22"	14 - 10		S-2: Same as S-1,	Native Soil
					14 - 12			
5'								
	S - 3	5' - 7'	24"	22"	6 - 10	H2O at 6'	S-3: Same as S-1 but moist	Native Soil
					12 - 14			
						9'		
10'						9.7'	Augered through rock 9'to 9.7'.	Rock
							Boring terminated at depth of 9.7' on suspected bedrock at about elevation 570'.	
15'								
20'								

Drilling Co.	Soil Exploration Services
Rig Type:	Truck Mounted Acker 82
Driller:	Mr. Dennis Leger
Helper:	Mr. Darwin Newton
Inspector:	Mr. Rick McCarthy
Client Rep.:	n/a

Soil Composition Proportions	
Trace:	0%-10%
Little:	10%-20%
Some:	20%-35%
And:	35%-50%

Cohesive (blows/ft)	Cohesionless (blows/ft)
0 - 2 = Very Soft	0 - 3 = Very Loose
2 - 4 = Soft	4 - 9 = Loose
5 - 8 = Med. Stiff	10 - 29 = Med. Dense
9 - 15 = Stiff	30 - 49 = Dense
16 - 30 = Hard	50+/ft. = Very Dense

DRILLING NOTES & REMARKS

Refer to geotechnical report dated November 27, 2009 for additional information.

* - Ground elevation based on the provided site plan dated October 30, 2009.

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SOIL TEST BORING LOG

Project:	Sherwood Middle School	Boring #	B - 7
Location:	Shrewsbury, MA	Sheet #	1 of 1
Job No:	29071	Location:	south side
Date Start:	November 19, 2009	See Boring Plan	
Date End:	November 19, 2009	Elevation*:	581'

Drilling	Core	Casing	Sampler
Type	n/a	n/a	Split Spoon
Size	n/a	n/a	2" I.D.
Hammer	n/a	n/a	140 #
Fall	n/a	n/a	30"

Groundwater Observations

Date	Depth	Casing At		Stabilization Period
11/19/09	7'±	n/a	Upon Completion of Boring	

Depth (ft.)	BORING SAMPLING DATA No.	Depth	Pen.	Rec.	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
	S - 1	0' - 2'	24"	20"	3 - 6	1'	Topsoil/subsoil	
					12 - 24	2'	S-1: Lt. brn damp fine sand little gravel	Fill
	S - 2	2' - 4'	24"	22"	26 - 18		S-2: Brown, damp, dense	
					14 - 24		silty sand little gravel	Native
5'							S-3: Same as S-2	Soil
	S - 3	5' - 7'	24"	20"	8 - 20			
					16 - 20	H2O at 7'		
								Native
								Soil
10'								
	S - 4	10'-11.7'	21"	16"	48 - 44		S-4: Same as S-2 but very dense	
					34 - 50/3"	11.7'	sampler refusal at 11.7'	569'
						13'	Augered through rock from 11.7' to 13'	Rock
							Boring terminated at depth of 13'	
15'							on suspected bedrock at about	
							elevation 568'.	
20'								

Drilling Co.	Soil Exploration Services
Rig Type:	Truck Mounted Acker 82
Driller:	Mr. Dennis Leger
Helper:	Mr. Darwin Newton
Inspector:	Mr. Rick McCarthy
Client Rep.:	n/a

Soil Composition Proportions	
Trace:	0%-10%
Little:	10%-20%
Some:	20%-35%
And:	35%-50%

Cohesive (blows/ft)	Cohesionless (blows/ft)
0 - 2 = Very Soft	0 - 3 = Very Loose
2 - 4 = Soft	4 - 9 = Loose
5 - 8 = Med. Stiff	10 - 29 = Med. Dense
9 - 15 = Stiff	30 - 49 = Dense
16 - 30 = Hard	50+/ft. = Very Dense

DRILLING NOTES & REMARKS

Refer to geotechnical report dated November 27, 2009 for additional information.

* - Ground elevation based on the provided site plan dated October 30, 2009.

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Worcester Ma 01609
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SOIL TEST BORING LOG

Project:	Sherwood Middle School	Boring #	B - 8
Location:	Shrewsbury, MA	Sheet #	1 of 1
Job No:	29071	Location:	east side
Date Start:	November 19, 2009	See Boring Plan	
Date End:	November 19, 2009	Elevation*:	580'

Drilling	Core	Casing	Sampler
Type	n/a	n/a	Split Spoon
Size	n/a	n/a	2" I.D.
Hammer	n/a	n/a	140 #
Fall	n/a	n/a	30"

Groundwater Observations

Date	Depth	Casing At		Stabilization Period	
11/19/09	4'±	n/a	Upon Completion of Boring		

Depth (ft.)	BORING SAMPLING DATA No.	Depth	Pen.	Rec.	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
	S - 1	0' - 2'	24"	22"	4 - 4	1'	Topsoil/subsoil	
					9 - 16		S-1: Brown silty sand little gravel	
	S - 2	2' - 4'	24"	20"	14 - 12		S-2: Same as S-1 but moist	Native Soil
					12 - 24	H2O at 4'		
5'								
	S - 3	5' - 5.7'	8"	8"	24 - 50/2"	5.7'	S-3: Brown/orange, moist, very dense silty sand some gravel	
						8'	Augered through rock 5.7' to 8'	Rock
							Boring terminated at depth of 8' on suspected bedrock at about elevation 572'.	
10'								
15'								
20'								

Drilling Co.	Soil Exploration Services
Rig Type:	Truck Mounted Acker 82
Driller:	Mr. Dennis Leger
Helper:	Mr. Darwin Newton
Inspector:	Mr. Rick McCarthy
Client Rep.:	n/a

Soil Composition Proportions	
Trace:	0%-10%
Little:	10%-20%
Some:	20%-35%
And:	35%-50%

Cohesive (blows/ft)	Cohesionless (blows/ft)
0 - 2 = Very Soft	0 - 3 = Very Loose
2 - 4 = Soft	4 - 9 = Loose
5 - 8 = Med. Stiff	10 - 29 = Med. Dense
9 - 15 = Stiff	30 - 49 = Dense
16 - 30 = Hard	50+/ft. = Very Dense

DRILLING NOTES & REMARKS

Refer to geotechnical report dated November 27, 2009 for additional information.

* - Ground elevation based on the provided site plan dated October 30, 2009.

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SOIL TEST BORING LOG

Project:	Sherwood Middle School	Boring #	B - 9
Location:	Shrewsbury, MA	Sheet #	1 of 1
Job No:	29071	Location:	east side
Date Start:	November 20, 2009	See Boring Plan	
Date End:	November 20, 2009	Elevation*:	588'

Drilling	Core	Casing	Sampler
Type	n/a	n/a	Split Spoon
Size	n/a	n/a	2" I.D.
Hammer	n/a	n/a	140 #
Fall	n/a	n/a	30"

Groundwater Observations

Date	Depth	Casing At	Stabilization Period
11/20/09	no GW	n/a	Upon Completion of Boring

Depth (ft.)	BORING SAMPLING DATA No.	Depth	Pen.	Rec.	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
	S - 1	0' - 2'	24"	6"	12 - 8	1'	4" asphalt and 8" crushed gravel	Fill
					6 - 6		S-1: Brown damp silty sand little gravel	
	S - 2	2.5'-4.5'	24"	10"	10 - 6		S-2: Same as S-1	Native Soil
					10 - 10			
5'								
	S - 3	5.5'-7.5'	24"	24"	14 - 18		S-3: Same as S-1 but very dense	
					30 - 22			
10'								
	S - 4	10.5'-12.5'	24"	18"	12 - 26		S-4: Same as S-1 but slightly gray	Native Soil
					28 - 24			
15'								
	S - 5	15.5'-17.5'	24"	16"	28 - 20		S-5: Same as S-1	
					44 - 30	17.5'	sampler refusal at 17.5')	
							Boring terminated at depth of 17' \on suspected bedrock at about elevation 570'.	
20'								
25'								

Drilling Co.	Soil Exploration Services
Rig Type:	Truck Mounted Acker 82
Driller:	Mr. Dennis Leger
Helper:	Mr. Darwin Newton
Inspector:	Mr. Rick McCarthy
Client Rep.:	n/a

Soil Composition Proportions	
Trace:	0%-10%
Little:	10%-20%
Some:	20%-35%
And:	35%-50%

Cohesive (blows/ft)	Cohesionless (blows/ft)
0 - 2 = Very Soft	0 - 3 = Very Loose
2 - 4 = Soft	4 - 9 = Loose
5 - 8 = Med. Stiff	10 - 29 = Med. Dense
9 - 15 = Stiff	30 - 49 = Dense
16 - 30 = Hard	50+/ft. = Very Dense

DRILLING NOTES & REMARKS

Refer to geotechnical report dated November 27, 2009 for additional information.

* - Ground elevation based on the provided site plan dated October 30, 2009.

Yankee Engineering & Testing, Inc.
10 Mason Street
Worcester Ma 01609
Phone: (508) 831-7404
Fax: (508) 831-7388

SOIL TEST BORING LOG

Project:	Sherwood Middle School	Boring #	B - 10
Location:	Shrewsbury, MA	Sheet #	1 of 1
Job No:	29071	Location:	top of slope
Date Start:	November 20, 2009		See Boring Plan
Date End:	November 20, 2009	Elevation*:	590'

Drilling	Core	Casing	Sampler
Type	n/a	n/a	Split Spoon
Size	n/a	n/a	2" I.D.
Hammer	n/a	n/a	140 #
Fall	n/a	n/a	30"

Groundwater Observations

Date	Depth	Casing At		Stabilization Period	
11/20/09	noGW	n/a	Upon Completion of Boring		

Depth (ft.)	BORING SAMPLING DATA No.	Depth	Pen.	Rec.	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
	S - 1	0' - 2'	24"	16"	3 - 3		S-1: Dk. brown, damp, medium dense	Fill
					3 - 8	2'	silty sand little gravel some organics	
	S - 2	2' - 4'	24"	20"	16 - 28		S-2: Brown/gray, damp, very dense	
					36 - 40	4'	silty sand little gravel	Fill?
5'								
	S - 3	5' - 7'	24"	18"	24 - 28		S-3: Lt. brown, damp, very dense	Native
					30 - 40		silty sand little gravel	Soil
						8'		
							Boring termintaed due to auger refusal	
10'							on suspected bedrock at 8' depth or	
							about elevation 582'.	
15'								
20'								

Drilling Co.	Soil Exploration Services
Rig Type:	Truck Mounted Acker 82
Driller:	Mr. Dennis Leger
Helper:	Mr. Darwin Newton
Inspector:	Mr. Rick McCarthy
Client Rep.:	n/a

Soil Composition Proportions	
Trace:	0%-10%
Little:	10%-20%
Some:	20%-35%
And:	35%-50%

Cohesive (blows/ft)	Cohesionless (blows/ft)
0 - 2 = Very Soft	0 - 3 = Very Loose
2 - 4 = Soft	4 - 9 = Loose
5 - 8 = Med. Stiff	10 - 29 = Med. Dense
9 - 15 = Stiff	30 - 49 = Dense
16 - 30 = Hard	50+/ft. = Very Dense

DRILLING NOTES & REMARKS

Refer to geotechnical report dated November 27, 2009 for additional information.

* - Ground elevation based on the provided site plan dated October 30, 2009.

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SOIL TEST BORING LOG

Project:	Sherwood Middle School	Boring #	**B - 11**
Location:	Shrewsbury, MA	Sheet #	**1 of 1**
Job No:	29071	Location:	rear middle
Date Start:	November 19, 2009	See Boring Plan	
Date End:	November 19, 2009	Elevation*:	581'

Drilling	Core	Casing	Sampler
Type	n/a	n/a	Split Spoon
Size	n/a	n/a	2" I.D.
Hammer	n/a	n/a	140 #
Fall	n/a	n/a	30"

Groundwater Observations

Date	Depth	Casing At		Stabilization Period	
11/19/09	6'±	n/a	Upon Completion of Boring		

Depth (ft.)	BORING SAMPLING DATA No.	Depth	Pen.	Rec.	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
	S - 1	0' - 2'	24"	20"	4 - 6	1'	Topsoil/subsoil	
					8 - 18		S-1: Dk brown damp silty sand/gravel	Fill
	S - 2	2' - 4'	24"	18"	14 - 16		S-2: Brown, damp, dense silty sand little gravel	Native Soil
					24 - 20			
5'								
	S - 3	5' - 7'	24"	22"	6 - 10	H2O at 6'	S-3: Brown/gray, moist, medium dense silty sand little gravel	
					8 - 8			
								cobble at 7' to 8'
10'								
	S - 4	10' - 12'	24"	16"	32 - 16		S-4: Same as S-2	
					16 - 30			
								cobble at 13' to 14'
						14'		
15'								
	S - 5	15' - 17'	24"	16"	28 - 40		S-5: Lt. brown, damp, very dense silty sand little gravel	Native Soil
					38 - 32			
						18'		
						19'	Auger refusal at 19'	boulder?
20'							Boring terminated at 19' on suspected boulder (elevation about 562').	

Drilling Co.	Soil Exploration Services
Rig Type:	Truck Mounted Acker 82
Driller:	Mr. Dennis Leger
Helper:	Mr. Darwin Newton
Inspector:	Mr. Rick McCarthy
Client Rep.:	n/a

Soil Composition Proportions	
Trace:	0%-10%
Little:	10%-20%
Some:	20%-35%
And:	35%-50%

Cohesive (blows/ft)	Cohesionless (blows/ft)
0 - 2 = Very Soft	0 - 3 = Very Loose
2 - 4 = Soft	4 - 9 = Loose
5 - 8 = Med. Stiff	10 - 29 = Med. Dense
9 - 15 = Stiff	30 - 49 = Dense
16 - 30 = Hard	50+/ft. = Very Dense

DRILLING NOTES & REMARKS

Refer to geotechnical report dated November 27, 2009 for additional information.

* - Ground elevation based on the provided site plan dated October 30, 2009.

Yankee Engineering & Testing, Inc.
10 Mason Street
Worcester Ma 01609
Phone: (508) 831-7404
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SOIL TEST BORING LOG

Project:	Sherwood Middle School	Boring #	B - 12
Location:	Shrewsbury, MA	Sheet #	1 of 1
Job No:	29071	Location:	rear middle
Date Start:	November 19, 2009		See Boring Plan
Date End:	November 19, 2009	Elevation*:	577'

Drilling	Core	Casing	Sampler
Type	n/a	n/a	Split Spoon
Size	n/a	n/a	2" I.D.
Hammer	n/a	n/a	140 #
Fall	n/a	n/a	30"

Groundwater Observations

Date	Depth	Casing At	Stabilization Period
11/19/09	8'	n/a	Upon Completion of Boring

Depth (ft.)	BORING SAMPLING DATA No.	Depth	Pen.	Rec.	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
	S - 1	0' - 2'	24"	14"	7 - 12	1'	Topsoil/subsoil	
					26 - 10		S-1: Brown damp silty sand little gravel	
	S - 2	2' - 4'	24"	24"	14 - 18		S-2: Same as S-1 but slightly siltier	
					12 - 16			
5'								
	S - 3	5' - 7'	24"	6"	10 - 8		S-3: Same as S-1	
					8 - 8			
						H2O at 8'		
10'								
	S - 4	10' - 12'	24"	20"	6 - 16		S-4: Same as S-1 but very dense,	
					16 - 32			
								boulder at 14'-15'
15'								
	S - 5	15'-15.3'	4"	0	60/4"	15.3'	S-5: no recovery	
							Boring terminated at depth of 15.3' on boulder/bedrock (elev. 562').	
20'								

Drilling Co.	Soil Exploration Services
Rig Type:	Truck Mounted Acker 82
Driller:	Mr. Dennis Leger
Helper:	Mr. Darwin Newton
Inspector:	Mr. Rick McCarthy
Client Rep.:	n/a

Soil Composition Proportions	
Trace:	0%-10%
Little:	10%-20%
Some:	20%-35%
And:	35%-50%

Cohesive (blows/ft)	Cohesionless (blows/ft)
0 - 2 = Very Soft	0 - 3 = Very Loose
2 - 4 = Soft	4 - 9 = Loose
5 - 8 = Med. Stiff	10 - 29 = Med. Dense
9 - 15 = Stiff	30 - 49 = Dense
16 - 30 = Hard	50+/ft. = Very Dense

DRILLING NOTES & REMARKS

Refer to geotechnical report dated November 27, 2009 for additional information.

* - Ground elevation based on the provided site plan dated October 30, 2009.

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Worcester Ma 01609
Phone: (508) 831-7404
Fax: (508) 831-7388

SOIL TEST BORING LOG

Project:	Sherwood Middle School	Boring #	B - 13
Location:	Shrewsbury, MA	Sheet #	1 of 1
Job No:	29071	Location:	rear east
Date Start:	November 19, 2009		See Boring Plan
Date End:	November 19, 2009	Elevation*:	581'

Drilling	Core	Casing	Sampler
Type	n/a	n/a	Split Spoon
Size	n/a	n/a	2" I.D.
Hammer	n/a	n/a	140 #
Fall	n/a	n/a	30"

Groundwater Observations

Date	Depth	Casing At	Stabilization Period
11/19/09	10'	n/a	Upon Completion of Boring

Depth (ft.)	BORING SAMPLING DATA No.	Depth	Pen.	Rec.	Blows/6"	Strata Change	Sample Descriptions & Geotechnical Observations	Remarks
	S - 1	0' - 2'	24"	20"	3 - 3	1.5'	Forest debris/leaves/subsoil	
					4 - 2		S-1: Brown damp silty sand trace gravel	
	S - 2	2' - 4'	24"	20"	10 - 16		S-2: Same as S-1	Native Soil
					12 - 16			
5'								
	S - 3	5' - 7'	24"	20"	10 - 8		S-3: Same as S-1	
					8 - 16			
10'						H2O at 10'		
	S - 4	10' - 12'	24"	20"	8 - 12		S-4: Same as S-1	Native Soil
					24 - 26			
15'								
	S - 5	15'-17'	24"	14"	16 - 30		S-5: Same as S-1 but very dense	
					36 - 30			
						18'		
							Boring terminated at 18' (elev 563') in very dense silty sand/gravel.	
20'								

Drilling Co.	Soil Exploration Services
Rig Type:	Truck Mounted Acker 82
Driller:	Mr. Dennis Leger
Helper:	Mr. Darwin Newton
Inspector:	Mr. Rick McCarthy
Client Rep.:	n/a

Soil Composition Proportions	
Trace:	0%-10%
Little:	10%-20%
Some:	20%-35%
And:	35%-50%

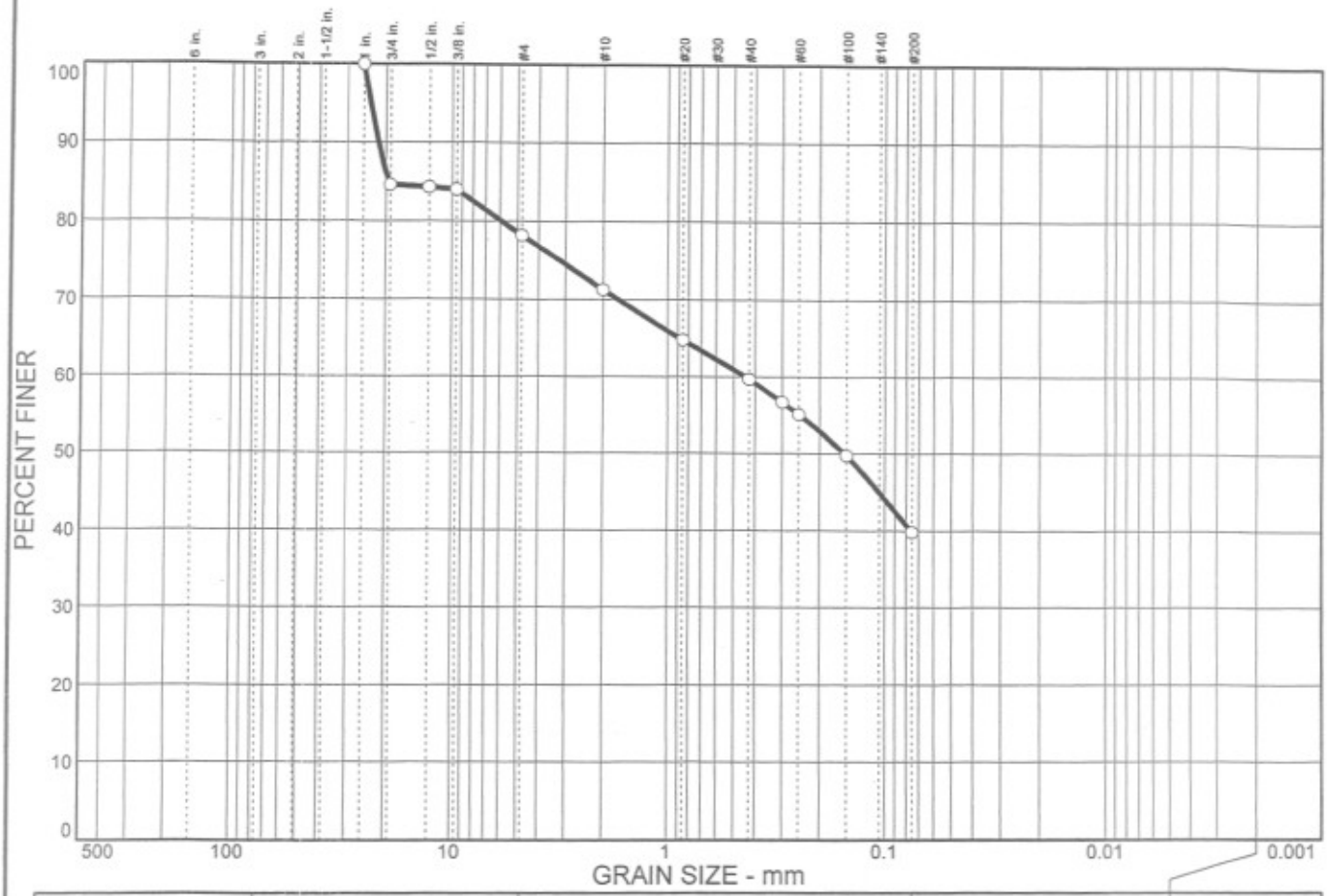
Cohesive (blows/ft)	Cohesionless (blows/ft)
0 - 2 = Very Soft	0 - 3 = Very Loose
2 - 4 = Soft	4 - 9 = Loose
5 - 8 = Med. Stiff	10 - 29 = Med. Dense
9 - 15 = Stiff	30 - 49 = Dense
16 - 30 = Hard	50+/ft. = Very Dense

DRILLING NOTES & REMARKS

Refer to geotechnical report dated November 27, 2009 for additional information.

* - Ground elevation based on the provided site plan dated October 30, 2009.

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	21.8	38.4	39.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	84.6		
1/2 in.	84.3		
3/8 in.	84.0		
#4	78.2		
#10	71.3		
#20	64.8		
#40	59.7		
#50	56.7		
#60	55.1		
#100	49.7		
#200	39.8		

* (no specification provided)

Soil Description

Brown silty/clayey sand little gravel
Silty sand with gravel (fines slightly plastic)

Atterberg Limits

PL= untested LL= untested PI= untested

Coefficients

D_{85}= 19.3 D_{60}= 0.441 D_{50}= 0.154
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

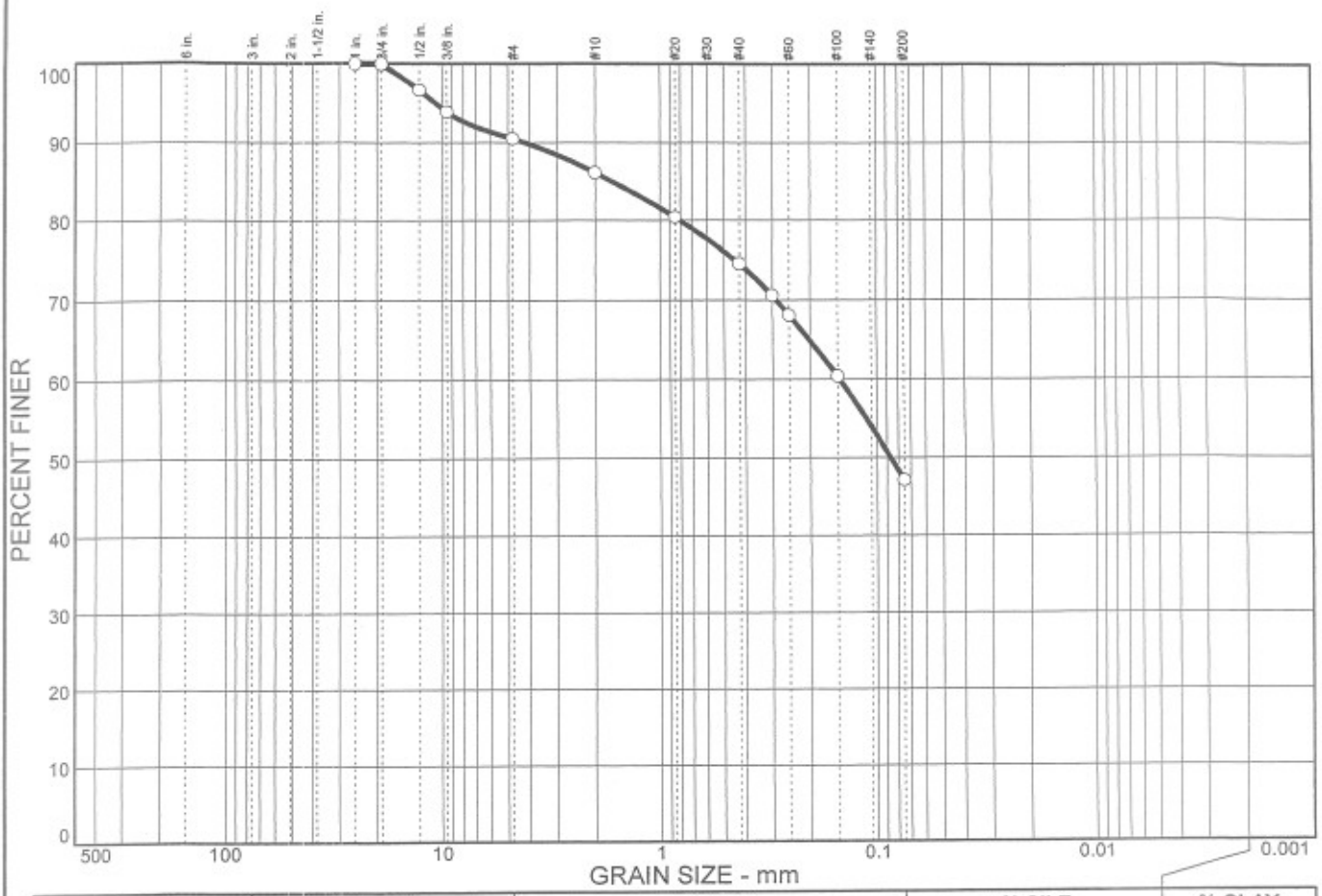
Boring sample by Rick McCarthy (Yankee) 11/19/09
see 11/27/09 geotech summary for additional information

Sample No.: S-3 **Source of Sample:** Soil Borings **Date:** 11/30/09
Location: B-1 (NW Corner) **Elev./Depth:** 5-7' BEG

YANKEE ENGINEERING & TESTING, INC.

Client: Town c/o Lamoreux Pagano Assoc.
Project: Sherwood Middle School
Shrewsbury Massachusetts
Project No: 29071

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	9.5	43.4	47.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	100.0		
1/2 in.	96.8		
3/8 in.	94.0		
#4	90.5		
#10	86.1		
#20	80.4		
#40	74.5		
#50	70.6		
#60	68.1		
#100	60.4		
#200	47.1		

* (no specification provided)

Soil Description

Brown silty/clayey sand little gravel
Silty sand (fines slightly plastic)

Atterberg Limits

PL= untested LL= untested PI= untested

Coefficients

D_{85}= 1.67 D_{60}= 0.147 D_{50}= 0.0865
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

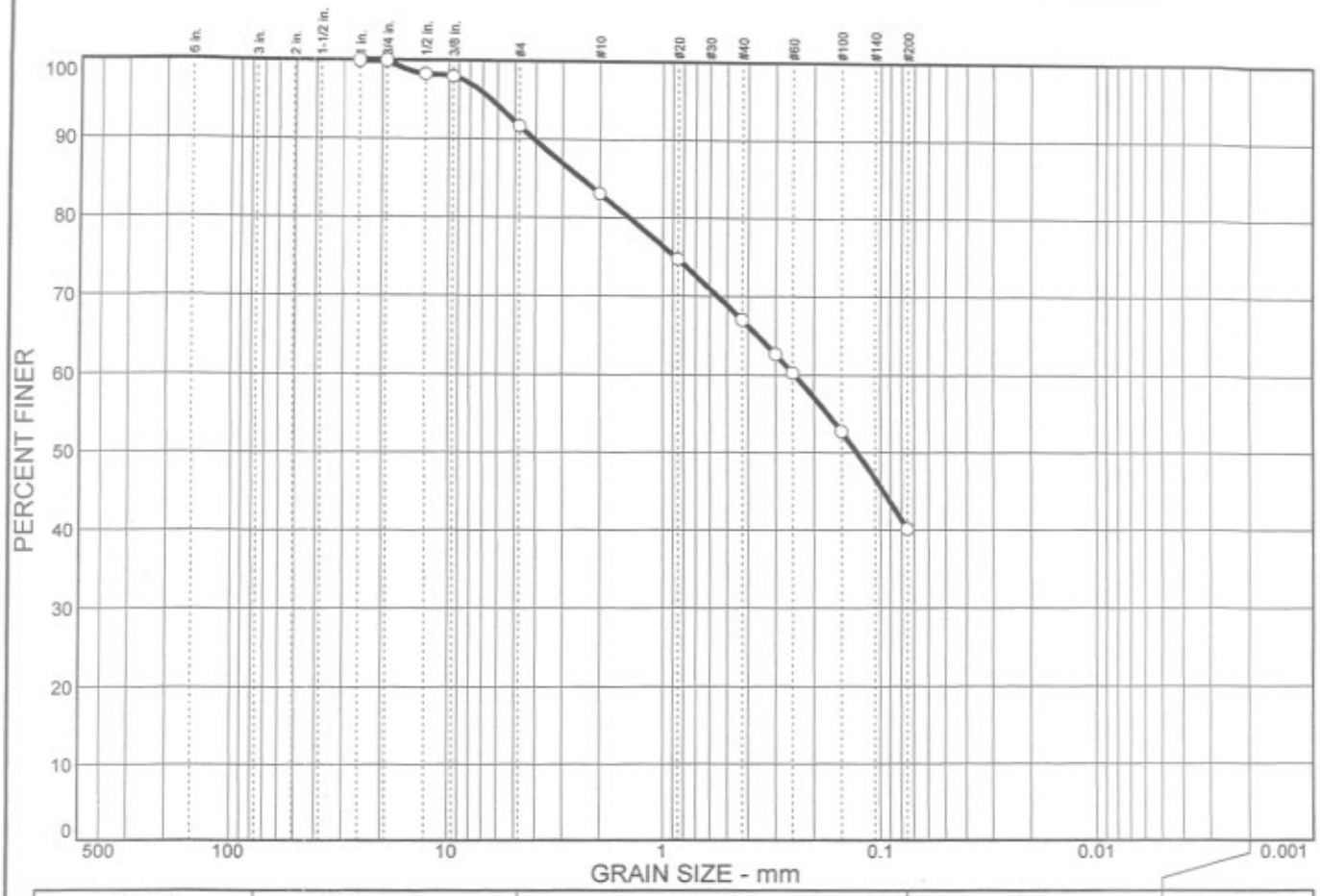
Boring sample by Rick McCarthy (Yankee) 11/19/09
see 11/27/09 geotech report for additional information

Sample No.: S-3 **Source of Sample:** Soil Borings **Date:** 11/30/09
Location: B-3 (NE Corner) **Elev./Depth:** 5-7' BEG

YANKEE ENGINEERING & TESTING, INC.

Client: Town c/o Lamoreux Pagano Assoc.
Project: Sherwood Middle School
Shrewsbury Massachusetts
Project No: 29071

PARTICLE SIZE DISTRIBUTION TEST REPORT



% + 3"	% GRAVEL	% SAND	% SILT	% CLAY
0.0	8.3	51.6	40.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1 in.	100.0		
3/4 in.	100.0		
1/2 in.	98.4		
3/8 in.	98.1		
#4	91.7		
#10	83.1		
#20	74.7		
#40	67.0		
#50	62.7		
#60	60.3		
#100	52.7		
#200	40.1		

* (no specification provided)

Soil Description

Brown silty/clayey sand little gravel
Silty sand (fine slightly plastic)

Atterberg Limits

PL= untested LL= untested PI= untested

Coefficients

D_{85}= 2.45 D_{60}= 0.245 D_{50}= 0.128
D_{30}= D_{15}= D_{10}=
C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

Boring sample by Rick McCarthy (Yankee) 11/19/09
see 11/27/09 geotech report for aditional information

Sample No.: S-3 **Source of Sample:** Soil Borings **Date:** 11/27/09
Location: B-6 (South Side) **Elev./Depth:** 5-7' BEG

YANKEE ENGINEERING & TESTING, INC.

Client: Town c/o Lamoreux Pagano Assoc.
Project: Sherwood Middle School
Shrewsbury Massachusetts
Project No: 29071

LIMITATIONS

- The analyses and recommendations submitted in this report are based upon the data obtained from the subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it may be necessary to reevaluate the geotechnical engineering recommendations contained in this report.

- The generalized soil profile(s) is intended to show trends in the subsurface soil conditions. The boundaries between strata are approximated and have been developed by interpretation of the widely spaced explorations and samples. The actual soil transitions are probably more erratic.

- Water level readings have been made in the explorations at the times, and under the conditions, stated on the boring logs. However, it must be noted that fluctuations in the level of the groundwater will occur due to variations in rainfall, season, temperature and other factors.

- In the event that changes in the nature, design, or location of the proposed buildings are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by the preparer.

- It is recommended that this firm be provided the opportunity for a review of the final construction design and specifications, in order to confirm that the earthwork and foundation recommendations are properly implemented.

- It is recommended that this firm be retained to provide the geotechnical engineering services during construction of the excavation and foundation phases of the work. This is to observe compliance with the design concepts, material specifications and engineering recommendations, and to allow for changes in the event that conditions differ from those anticipated.

- This report has been prepared for the exclusive use of Lamoureux Pagano Associates for specific applications to the Sherwood Middle School site, located in Shrewsbury, Massachusetts, in accordance with accepted foundation engineering practices. No other warranty, expressed or implied, is made.

- This report should be considered for foundation design purposes only, and is not sufficient to prepare an accurate or complete bid. Contractors wishing a copy of the report may secure it with the understanding that the reports scope is limited to general design considerations only.

YANKEE ENGINEERING & TESTING, INC.

1.15 PREFERRED SCHEMATIC DESIGN

D. Utility Analysis

The design team reviewed the available utilities and determined that the projected needs can be accommodated by the on site capacity. In particular, the following was reviewed more closely:

GAS: NStar representatives indicated that approximately 6000cfh of gas is available for the site currently. Consultants anticipate a need for 5530cfh for boilers, water heaters, and kitchen loads. NStar reserved the option to reconsider the capacity closer to construction time depending on any unanticipated natural gas demands that may occur in the interim period.

FIRE PROTECTION: On site hydrant flow tests conducted in July, 2009 showed adequate flow and pressure to support the fire protection system for the Sherwood project. At the hydrant on side playground/parking area, the static pressure was 85 lbs. And the pressure was 42 lbs. At the hydrant in front of the school, the flow was 840gpmand the pressure was 25 lbs.

ELECTRIC/CABLE/TELECOMMUNICATIONS: are all provided by Shrewsbury Electric Light Company (SELCO). On October 28, 2009, proposed plans were reviewed and approved by SELCO representatives and a primary electric route was designated for the new school that will allow the existing school to operate uninterrupted during construction.

SANITARY: A new connection to a Crescent Street sanitary structure was developed that will not require an ejector pump.

E. Code Outline

This narrative is intended to outline the basic code parameters as required by the 7th Edition of the Massachusetts State Building Code, 780 CMR.

The narrative addresses the pertinent construction and life safety issues of the code in sequential order of the code's chapters that affect the design of the proposed school.

- **Chapter 3 "Use and Occupancy Classifications"**

  Use Group E – Educational

  Assembly areas (gym, cafeteria, library): Accessory assembly uses, not required to be a separated use group. Administrative offices constitute less than 10% of the floor area and therefore considered accessory use and not required to be a separated use group. Incidental use areas to be separated by automatic fire extinguishing system.

- **Chapter 4 "Special Detailed Requirements on Use and Occupancy"**

  The gymnasium includes and platform for school presentations. The platform framing will be constructed of non-combustible materials. There is no requirement for a fire curtain, rated enclosure, roof vents or standpipe system.

- **Chapter 5 "General Building Heights and Areas"**

  Per Table 503 "Allowable Height and Building Areas"

  For Use Group E, Type 2B construction (non-combustible) the allowable floor area is 14,500 sq. ft. per floor and maximum two (2) stories in height.

  Allowable number of stories increases by one (1) story with automatic sprinkler system.

  Increase in area due to area modification factors for frontage increase for accessibility to building perimeter and automatic sprinkler increase as follows:

  The perimeter is 100% accessible by public way or open space 20 feet wide or greater, therefore a 75% increase in floor area would be allowed per code for additional frontage.

  The building will have an automatic sprinkler system which allows for a 200% increase in floor area per code.

  Based on the modification factors the allowable maximum single floor area for the school is 54,375 square feet.

The actual area (area as defined by the code) is 55,902 square feet on the main level which exceeds the maximum allowable of 54,375 square feet, ground and second floor are each less than the allowable. The building will employ the use of a fire wall, separating the school into two buildings of 45,330 and 10,572 square feet, each area within the allowable maximum area. It should be noted that the fire wall is located within the building, to simultaneously act as the code required seismic/expansion joint.

- **Chapter 6 "Types of Construction"**

  School to be 2B Construction – Non-Combustible with full automatic sprinkler system. Fire-resistance rating of structural frame, interior walls and partitions (except as noted below), floor and roof construction to be 0 Hours.

  Elevator Machine Room and shaft, Emergency Electric Room to be of 2 hour construction.

  Exit stair enclosures to be of 1 hour construction. Two story open stair in main lobby allowed with automatic sprinkler system.

- **Chapter 7 "Fire Resistance-Rated Construction"**

  Fire wall to be 2 hour construction, all penetrations to be 1-1/2 hr. labeled fire protective.

  Exterior wall construction to have 0 fire rating due to fire separation distances in excess of 30 feet to property line of buildings, other than adjacent building separated by fire wall.

  Shaft enclosures for ductwork to be 1 hour rated. Ductwork shall be constructed to provide fire resistance rating of 1 hour and not require fire dampers.

  Duct penetrations of assemblies greater than 1 hour construction to have fire dampers. Fire blocking not required in non-combustible construction. Draftstopping required at rated wood gym floor system.

- **Chapter 8 "Interior Finishes"**

  Wall and ceiling finishes to be Class C or better. Floor finishes to be minimum of Class II materials. Wood flooring permitted at platform.

  Furnishings not required to comply with Cal 133 Fire Code Standard due to use of quick response sprinkler heads.

- **Chapter 9 "Fire Protection and Live Safety Systems"**

  School to have automatic sprinkler system, detection and emergency alarm systems, and portable fire extinguishers located per NFPA 10.

- **Chapter 10 "Means of Egress"**

  Corridors, stairs and doors sized to exceed minimum unit width per occupant.

  All rooms exceeding 50 occupants to have 2 exits adequately separated. Gymnasium to have 500 occupants and 3 exits. Cafeteria to have 300 occupants and 2 exits.

- **Chapter 11 "Accessibility"**

  School compliant with Architectural Access Board Regulations, 521 CMR.

- **Chapter 12 "Interior Environment"**

  Refer to Mechanical and Electrical Narratives

- **Chapter 13 "Energy Efficiency"**

  Refer to Mechanical and Electrical Narratives

- **Chapter 16 "Structural Design"**

  Refer to Structural Narrative

1.15 PREFERRED SCHEMATIC DESIGN

F. Massing Study

Existing Conditions

During Construction

Proposed Construction

View of North Entry

View of South Elevation

G. Schematic Design Drawing List

SITE SURVEY:

C0.01	EXISTING CONDITIONS PLAN
C0.02	EXISTING CONDITIONS PLAN
C0.03	EXISTING CONDITIONS PLAN
C0.04	EXISTING CONDITIONS PLAN

SITE LANDSCAPE:

L-1	OVERALL SITE PLAN
L-2	SITE LAYOUT PLAN
L-3	SITE GRADING PLAN
L-4	CRESCENT STREET ACCESS LAYOUT/GRADING PLAN & DETAILS

SITE CIVIL:

C100	CIVIL UTILITY DRAWING 1
C101	CIVIL UTILITY DRAWING 2
C200	GENERAL NOTES & SITE DETAILS
C201	WATER DETAILS
C202	SEWER DETAILS
C203	DRAIN DETAILS
C204	EROSION CONTROL DETAILS

ARCHITECTURALS:

A-1	GROUND FLOOR PLAN & ROOM FINISH SCHEDULE
A-2	FIRST FLOOR PLAN
A-3	SECOND FLOOR PLAN
A-4	ROOF PLAN
A-5	GROUND FLOOR REFLECTED CEILING PLAN
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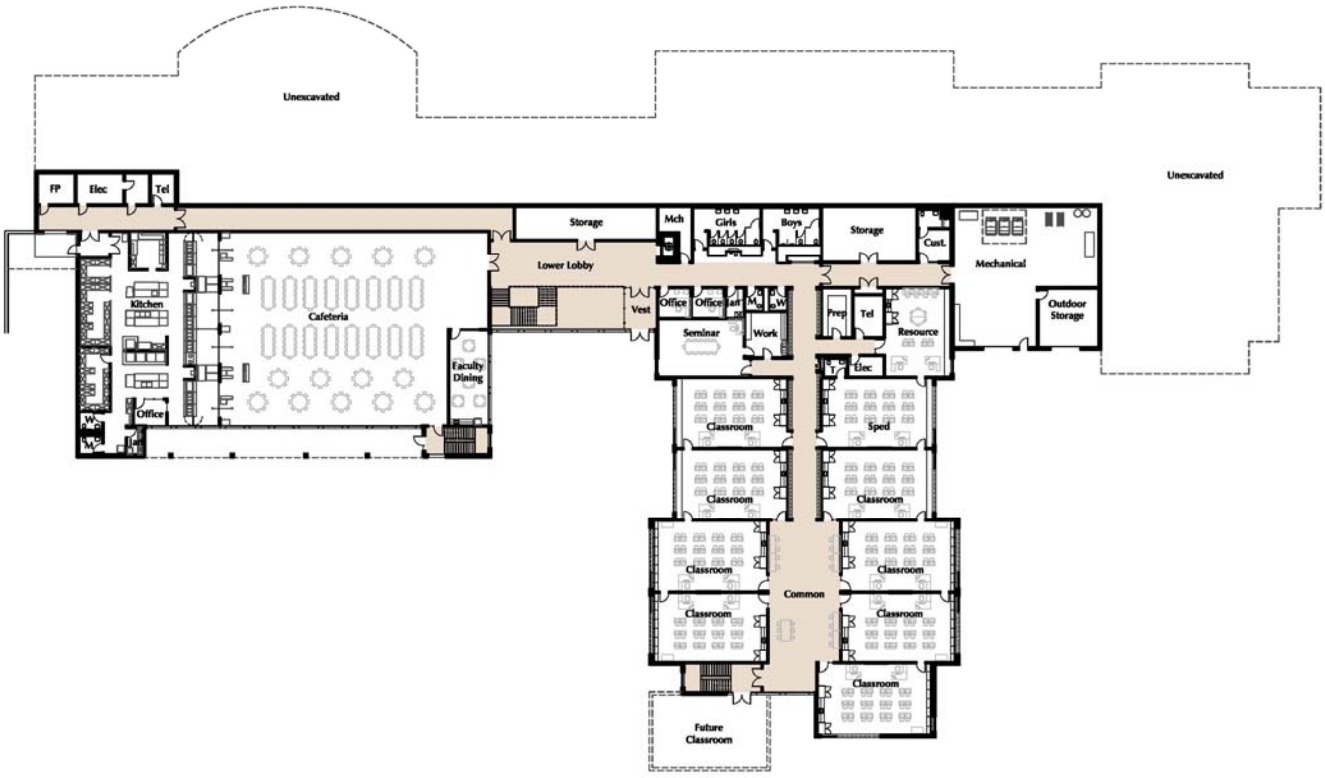
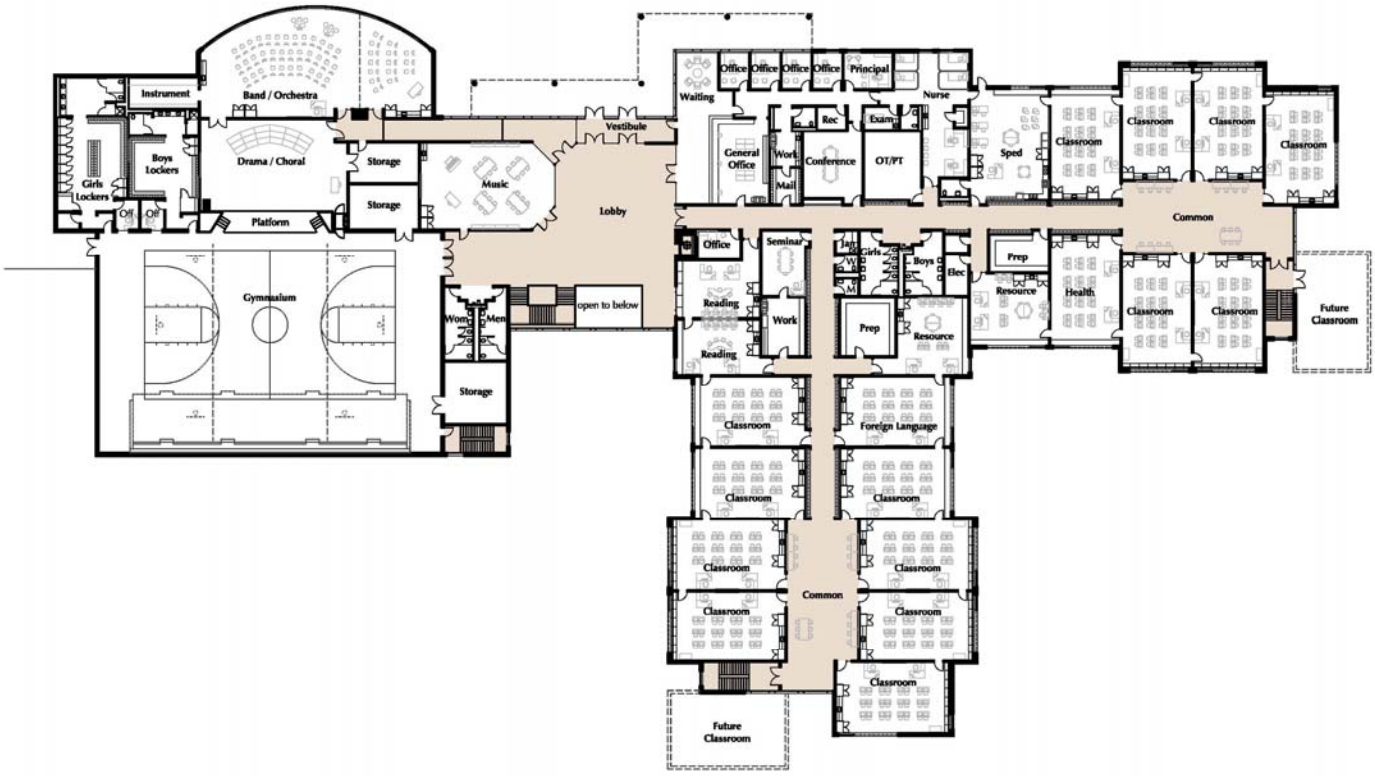


Proposed Ground Floor Plan



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Proposed Second Floor Plan

1.15 PREFERRED SCHEMATIC DESIGN

I. Schematic Exterior Elevations


North Elevation
SCALE: 1/16" = 1'-0"
1 A8
SEGMENTED WALL SURFACE
South Elevation
SCALE: 1/16" = 1'-0"
2 A8
East Elevation
SCALE: 1/16" = 1'-0"
3 A8
SEGMENTED WALL SURFACE
East Elevation
SCALE: 1/16" = 1'-0"
4 A8
West Elevation
SCALE: 1/16" = 1'-0"
5 A8
SEGMENTED WALL SURFACE
West Elevation
SCALE: 1/16" = 1'-0"
6 A8
T.O.S.
2ND FLR
609.00
1ST FLR
595.00
GRND FLR
581.00
ELEVATION LEGEND

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- Plumbing
- Fire Protection
- HVAC
- Electrical/Information Technology

BDI BOLTON & DiMARTINO, INC.
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100 Grove Street Worcester, MA 01605
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December 4, 2009

Mr. Michael Pagano
Lamoureux Pagano and Associates, Architects
14 East Worcester Street
Worcester, MA 01604

Re: Sherwood Middle School Structural Narrative

Dear Mr. Pagano,

The Sherwood Middle School consists of about 130,000 sq. ft. of one-, two-, and three-story buildings. The project conforms to Type 2B Construction.

It is assumed that the foundations will be spread footings supported on natural glacial till or compacted structural fill with a bearing capacity of 4 ksf. The perimeter concrete foundation walls have a width sufficient to eliminate the need for forming wall pilasters. Our assumptions are based on Yankee Engineering & Testing, Inc.'s "Geotechnical Investigation Report," dated November 27, 2009. The foundation also includes a fourteen-foot high, cantilevered retaining wall between the basement and first floor level within the footprint of the building.

The first floor will be a 5" thick concrete slab-on-grade reinforced with welded-wire fabric (6x6-W2.9 W2.9). Rigid insulation under the slab provides the necessary properties to satisfy the new Massachusetts Energy Code. Control joints, consisting of sawn cuts and construction joints, will be shown on the plans, and will be located at about 20 feet on center to minimize shrinkage cracks in the slab.

The second floor, and any other framed slabs, will be a 5½" thick concrete composite slab supported on steel beams. 3"-18 Gauge composite metal deck will be specified and the slab will be reinforced with welded wire fabric (6x6-W2.9 W2.9). The composite concrete slab is made composite with the steel beams by using shear studs, and "partial composite design" is used for the economy of installing fewer shear studs. ASTM A992, with yield strength of 50 ksi, will be specified for the structural steel. However, the beams will be selected on serviceability requirements to reduce the problems of vibrations and deflections, so they will not necessarily be fully stressed.

The roof framing will incorporate both steel beam and open web steel joists. In areas with many HVAC roof units only steel beams will be used to support the equipment and the associated snowdrift loads. The roof steel pitches to the roof drains to reduce the amount of tapered insulation. The roof metal deck will be 1-1/2"-20 Gauge, Type B. Over the Gymnasium, the roof deck will be Cellular Acoustic.

Wherever possible, hollow structural shapes will be selected for the columns. HSS6x6 tubes are easily concealed in the wall and partition framing eliminating the need for pilasters in the concrete foundation walls or interior partitions. Columns that are part of the lateral force resisting moment frames, or columns required to resist lateral wind pressures will typically be wide flange shapes.

The lateral stability of the buildings will be achieved with ordinary steel moment frames, concentrically braced frames, concrete shear walls, concrete floor diaphragms, and metal deck roof diaphragms. The Classroom Building will be structurally isolated from the Gymnasium Building with an expansion joint. The main lateral force resisting system of the Classroom Building will be ordinary steel moment frames. The main lateral force resisting system of the Gymnasium Building will be mainly concentrically braced frames. Typically, the concentrically braced frame members will be HSS shapes and will resist the lateral loads in both tension and compression.

Please call this office if you wish to discuss these items or any other aspect of the project.

Bolton & DiMartino, Inc.

Christopher Tutlis, P.E.
Associate

PLUMBING AND FIRE PROTECTION SYSTEMS NARRATIVE

1. PLUMBING SYSTEMS:

Criteria Listing

Massachusetts State Building Code, Seventh Edition, 780CMR
Commonwealth of Massachusetts "Fuel Gas and Plumbing Code", 248CMR
National Fuel Gas Code NFPA 54-1992

Permitting Requirements

Permitting and filing phase will be in accordance to Section 1.12K.

Fixtures and Fixture Count

Number of plumbing fixtures will be added in the facility to accommodate population of 450 male students and 450 female students and shall be in accordance with 248 CMR Paragraph 10.10, Table 1. .

Plumbing fixtures will be equipped with the following water conserving features (for 30% indoor water use reduction-MA-CHPS WC 1.1)

Water Closet	*Urinals*	*Lavatory*
Dual Flush Valve (Sloan WES-111, 1.6 gpf up and 1.1 gpf down) *Or* *Electronic sensor 1.28 gpf flush valve (Sloan 8111-1.28)*	*Electronic sensor ultra low flow flush valve type-0.25gpf (Sloan WEUS 1002)* *Or Waterfree Urinals (Sloan WES-1000)*	*Sloan Optima EAF-275-ISM "Solis" solar powered, sensor activated, hand washing faucet with integral spout temperature mixer, 0.5 gpm flow restricting aerator spray head and field adjustable run time limit setting.*

Water closets and urinals will be commercial vitreous china, wall hung (ADA compliant). Lavs will be self-rimming counter mounted china. Each floor includes a janitor's closet with a corner mop service basin. Toilet cores on each floor will include alcove-recessed electric water cooler, in a high-low handicapped accessible configuration. Toilet and mechanical room will have a floor drain with trap primer.
All classrooms will have self-rimming stainless steel sink with gooseneck type faucets (Chicago#786-GN). Plumbing connecting and faucets will provided to each kitchen

appliances requiring plumbing work. Exterior non-freeze wall hydrants will be provided on all side of the school building.

Roof Storm Drainage

Roof Drain system will carry rain water away from the flat roof of the new building with conventional primary roof drains.. The surface of the roof deck will be drained with dual level promenade drains (a minimum of two) with the lower drain bodies flashed into the waterproofing membrane. RW piping and the system will be sized to handle a rainfall rate of 4 inches per hour, with a total runoff from the main roof and the roof deck of just under 1 cubic foot per second. The storm system will be installed in cast iron piping with all horizontal piping insulated to prevent condensation. The storm system will exit along the side of the building and connect to the site storm water collection system.

Sanitary

The 6" sanitary waste system will drain by gravity and will run to exit the building and connect to the new sewer system at the site
A dedicated 4" grease waste line will be installed to collect grease laden waste water from the new Kitchen appliances and fixtures. The grease line will exit the building adjacent to the Sanitary Sewer and will be connected to an exterior grease trap outside the building. For culinary sink or prep sinks grease tarp will be provided at the source. Above ground sanitary drainage and will be piped in cast iron with "no-hub" joints.(3" or larger) . Piping smaller than 3 inch will be piped in copper. Piping below floor shall be weight cast iron hub and spigot

Domestic Cold Water Service

New main 4" domestic water supply in the mechanical room will enter from Sherwood Avenue. Reduced Pressure Backflow Preventer will be provided to the main domestic water supply to protect the service (per the DEP regulation 310 CMR 22). Boiler water feed and make-up, and any other mechanical take-Offs will branch off through a reduced pressure-principle backflow preventer.

The domestic cold water piping inside the building will be distributed in "L" type copper tube with wrought or cast copper fittings. The piping will be insulated to prevent condensation.

Domestic Hot Water Service

Two high efficiency gas fired water heaters.(100 gallon, 270 GPH water heaters similar to A.O Smith BTH-250) will be manifold together to supply hot water distribution to classroom fixtures. One high efficiency gas fired water heater will be dedicated for the kitchen appliance hot water requirement. The domestic hot water distribution system will

be in re-circulating system to the fixtures, with no dead leg more than 12" in length. There will be 2 different hot water supply / recirculation systems in the building. One system will operate at 140°F and will serve the kitchen dishwasher and 3 compartment sink. The other system will operate at 120°F and will serve the other kitchen sinks and appliances, as well as the custodian room sinks, lavatories and classroom sinks. At the lavatories, the faucets will reduce the temperature to 110°F at the lavatories, and 105°F in the Pre-K toilet rooms and class rooms sinks.

Domestic hot water will be distributed in "L" type copper tube with wrought or cast copper fittings. The hot water (HW),and re-circulating (HWC) piping will be insulated for energy savings. No HW or HWC piping will be concealed beneath the slab.

Natural Gas

New gas service sized for 5,000 cfh building load will enter the boiler room and will be regulated to low pressure (11" W.C) inside the building. The exterior pressure regulators and gas meter will be mounted on the outdoor steel rack. The gas meter and regulator will be by the gas utility company. The new 6" gas supply inside the building will be piped to the heating boilers, gas-fired water heaters and food service equipment in the kitchen area. The gas piping will be distributed in ASTM A53 schedule 40 black steel pipe, and will be limited in the boiler room and kitchen work area. Thermally actuated shut-off valve will be used wherever the gas line penetrates through the exterior wall.

Sustainable Design Features:

All plumbing fixtures will be equipped with ultra low flow water conserving faucets in order to achieve 30% water reduction of water usage from the base design.

To receive maximum MA-CHPS credits, following plumbing measures will be considered for further evaluation during design development phase.

- *Reduce potable water use for sewage conveyance by storm water harvesting.*
- *Solar thermal water heater.*

FIRE PROTECTION SYSTEMS:

Criteria Listing

Massachusetts State Building Code, Seventh Edition, 780CMR
National Fire Protection Association (NFPA) Codes
Permitting and filing phase will be in accordance to section 1.12K

Sprinklers

Building will be served from the new 8" fire service line to the building from the Sherwood Avenue. Cross connection control shall be provided by use a supervised double check valve assembly backflow preventer on the water service as it enters the building in the Boiler Room.
The entire building shall be protected throughout with a wet automatic fire suppression system. A fire department Storz connection will be provided toward the parking lot. The FDC will either be wall-mount or free-standing, depending on the final details and the preference of the responding Fire Department AHJ. This system shall be designed in accordance with NFPA Standard 13, 2007, the Massachusetts State Building Code, 7th Edition and the Shrewsbury Fire Department requirements.

Sprinklers shall be supplied from the standpipes. Floor control valve stations, consisting of a monitored shut-off valve, flow switch and an Inspector's test valve and sight glass, shall be provided at each floor take-off from the standpipe system. This shall report sprinkler flow to the fire alarm system on a floor-by-floor basis.

Sprinkler heads in electrical and mechanical rooms shall be standard response, 212 degree temperature listing. Sprinklers in all other areas shall be quick response heads.

Standpipes: Standpipes shall be supplied in all required egress stairs. Standpipes would be designed in accordance with NFPA Standard 14, 2007, and Shrewsbury Fire Department requirements. Standpipes shall be located in each required egress stairway, and adjacent to the Stage. Additionally, standpipes shall be located so that no part of the building is more than 200 feet from a standpipe valve. Each standpipe shall be equipped with a 2 1/2" fire department hose valve with 1 ½" reducer at the stair floor landing. At the Stage, fire department valves shall be provided on each side of the stage. These shall be in recessed cabinets.
Because the building is not a high rise, there is no minimum pressure requirement for the standpipes.

Fire Protection Systems: Standpipes & sprinklers shall be supplied from a dedicated water service, entering the building in the Boiler Room. The building service shall be equipped with a wet main alarm riser check valve, located at the service entrance. From

there, this line would run to each stairways, and then up through the stairways as standpipes.
Fire protection piping shall be schedule 40 piping with threaded fittings for any piping sized 2" and less. For sizes over 2", schedule 10 piping with roll grooved fittings and couplings shall be used.

All valves controlling the flow of water shall be equipped with supervisory devices that report to the Fire Alarm system. Kitchen hood will be protected with a dry agent "Ansul R-102" packaged hood suppression system

Following hydrant flow test information was obtained from the Shrewsbury town:

Static Pressure: 85 psi, Residual Pressure 43 psi, Flow 840 GPM

Based on the above hydrant flow data, we feel fire pump is not required. However hydraulic calculation will be required during design phase to determine the viability of such requirements.

SEAMAN ENGINEERING CORPORATION
30 Faith Ave. Auburn, MA 01501 508-832-3535 fx 508-832-3393

HVAC SCHEMATIC

NARRATIVE & LIFE CYCLE REPORT

FOR THE

SHERWOOD MIDDLE SCHOOL

IN

SHREWSBURY, MA

December 7, 2009

Prepared by:

SEAMAN ENGINEERING CORPORATION
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Auburn, MA 01501
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Fax (508) 832-3393

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I. EXECUTIVE SUMMARY

This report defines the Heating, Ventilating and Air Conditioning (HVAC) systems being proposed for the new Sherwood Middle School. In addition, it evaluates a base case system which meets the minimum state mandated energy performance requirements against various energy saving and high performance system options. The elected system option #2 and alternate #1, currently implemented into the design are shown on the submitted schematic drawings referenced in Appendix A.

The following briefly describes the major differences between the base case and options:

Base Case – Classroom Unit Ventilators:
Incorporates a standard efficiency 82% gas-fired boiler plant coupled to classroom unit ventilator systems and air handler coils supporting the heating and ventilation needs of the building. Unit ventilators support classroom areas whereas air handling systems support the administration, gym, café and lobby areas. Air cooled AC is provided on systems serving administrative office spaces and computer labs.

Advantages:
- Lower initial cost
- High operating cost

Disadvantages:
- Elevated noise levels in classroom
- High maintenance cost

Option #1 – Classroom Radiation & ERU's:
Incorporates a high efficiency 93%+ efficiency gas-fired boiler plant coupled to fin-tube radiation and air handler coils supporting the heating and ventilation needs of the building. Fin-tube radiation support classroom areas whereas air handling systems support the administration, gym, café and lobby areas. The ventilation needs of all the classroom areas are supported by total energy recovery units distributing reclaimed and tempered outdoor air to each classroom via a VAV terminal box which maintains constant airflow during all room occupied periods. Air handling systems support the administration, gym, café and lobby areas. The café system incorporates total energy recovery technology. Air cooled AC is provided on systems serving administrative office spaces and computer labs.

Advantages:
- Low initial cost
- Low operating cost
- Low noise in classroom

Disadvantages:
- No dehum. control in humid months

Option #2 (in lieu of Option #1) – Classroom Radiation & ERU w/ Dehum.:
Incorporates a high efficiency 93%+ efficiency gas-fired boiler plant coupled to fin-tube radiation and air handler coils supporting the heating and ventilation needs of the building. Fin-tube radiation support classroom areas whereas air handling systems support the administration, gym, café and lobby areas. The ventilation needs of all the classroom areas are supported by total energy recovery units distributing reclaimed and tempered outdoor air to each classroom via a VAV terminal box which maintains constant airflow during all room occupied periods. In addition, the classroom units have refrigerant based dehumidification cycles which use hot gas from the refrigeration cycle for reheating. Air handling systems

support the administration, gym, café and lobby areas. The café system incorporates total energy recovery technology. Air cooled AC is provided on systems serving administrative office spaces and computer labs.

Advantages:
- Low noise in classroom
- Improved comfort due to dehum. Control
- Tempered cooling from the dehum. process

Disadvantages:
- Slightly higher operation cost over Op.#1

Alternate #1 (in addition to Base Case or either Option #1 or #2) – Solar Wall.:

Advantages:
- Passive heating device
- Improved heating energy efficiency

Disadvantages:
- Added installed cost

The following table defines the economic differences between the respective options. Although Option #1 yields the best payback we have recommended **Option #2** being that it incorporates a space humidity control and inherent air tempering feature for the classroom areas during the more humid and warmer weather thereby providing improved comfort year-round over Option #1. All life cycles were run on an average life cycle of 20 years however life of equipment will vary such as boilers at 30 years and RTU's at 15+ years. Values below are in current dollars, simple payback method with no discount factor applied nor an escalation rate for energy or maintenance costs.

ECONOMIC COMPARISON SUMMARY

System	Installed Cost	Annual Energy Cost	Annual Maint.	20 year Life Cycle Cost	Annual Savings E & M	Simple Payback
Base Case	$3,335,100	$69,160	$29,900	5,316,300	---------	----------
Option #1	$3,386,000	$60,706	$16,900	4,938,120	$21,454	2.4 years
Option #2	**$3,452,000**	**$61,205**	**$17,900**	**5,034,100**	**$19,955**	**5.9 years**
Alt. #1 w/ Base	**$52,850**	**-$8,687* (-)savings**	**$800**	**-$104,890 (-)savings**	**$7,687***	**6.1 years***

**Information on alternate #1 provided by Solar Wall manufacturer. It is anticipated that the savings, when combined with either Option #1 or Option #2, will be less and the payback period will double to approximately 12+ years due to implementation of varying outdoor air flow routines included in both these options.*

II. HVAC NARRATIVE

A. DESIGN INTENT

The heating medium for the building shall be hot water generated by high efficiency condensing gas fired hot water boilers located in a ground floor boiler room. These boilers support the heating requirements of all areas of the building. The heating water is distributed to fin-tube radiation, VAV terminal units, air handler units, cabinet and unit heaters and fan coil units.

DX based air cooled space cooling equipment has been limited to support of the following areas: 1) Office /Administration, 2) Media Center, 3) Computer Labs, 4) Tel/Data MDF room. DX based dehumidification outdoor air pretreating systems are also provided for most all classroom spaces.

The air distribution systems consist of the following:

a. Treated outdoor air (VAV) terminals in the classrooms.

b. VAV terminals with reheat in administration areas.

c. Classroom ventilation is supported with central packaged VAV air handlers on the roof complete with total energy recovery wheels, hot water coils and dehumidification cycles utilizing DX based system with hot gas reheat cycle.

d. Central packaged VAV air handlers on the roof complete with total energy recovery wheels, hot water coils and DX cooling provide conditioned air to the spaces designate previously as being cooled. VAV terminals in these spaces control individual space temperature control.

e. Central packaged VAV air handlers on the roof and/or in an upper level mechanical room with hot water coils provide conditioned air to the gymnasium, cafeteria and lobby areas. These systems have the ability to pretreat the incoming outdoor air by directing the incoming outdoor air thru a solar wall system located on the South wall of the gymnasium.

f. Exhaust fans will vent specific areas such as bathrooms, storage areas and the kitchen.

The school is designed with a direct digital control (DDC) energy management system (EMS) that monitors and controls the HVAC equipment for efficient use. The system is designed on PC based architecture and adjustments are made on a graphics based presentation of building systems. The system also supports maintenance and record keeping needs of the facility. Occupancy of the school is based on the standard school year with occupied/unoccupied conditions based on current school day practice. This is an adjustable feature that can be made to reflect additional operating needs and use of the school building by staff or others.

The adjustable operating schedule, in general, is from 7:30 a.m. to 5:00 p.m., five days per week. It is expected that the building or certain areas within the building will also be used several evenings a week and occasionally on weekends.

The Designer of Record will certify that the HVAC systems have been installed in accordance with the approved construction documents, in conformance with Commonwealth of Massachusetts State Building Code 780 CMR Chapter 13.

B. BASIS OF DESIGN

The HVAC systems and components are designed in accordance with the requirements of the Commonwealth of Massachusetts State Building Code - 7th Edition, 780 CMR, and conform to the energy conservation requirements of Chapter 13 of that code.

The Sherwood Middle School is located in Shrewsbury, MA and complies with the criteria for Climate Zone 14a in Worcester County. The design criteria used for the development and sizing of the HVAC systems and components are:

Heating Degrees Winter:	-1ºF
Cooling Degrees (db) Summer:	86ºF
Cooling Degrees (wb) Summer:	73ºF
Heating degree Days (base 65):	6894
Cooling Degree Days (base 65):	507

Interior design temperature set points are 72°F for heating and 75°F for cooling (for spaces with cooling cycles) during occupied conditions however setpoints in operation shall include a minimum 5 degree deadband between cooling and heating such as 70°F heating and 75°F cooling. Space conditions are allowed to drop to 62°F during the heating season and rise to 88°F during the cooling season when spaces are in the unoccupied condition. Morning warm-up or cool-down period is optimized to achieve design space conditions at the commencement of occupied periods.

Design occupant levels by space are contained within the architectural documents included as part of the approved schematic documents.

C. HVAC SYSTEM CONTROLS

Heating and cooling systems of the Sherwood Middle School shall be monitored and controlled by an Energy Management System (EMS) using Direct Digital Control (DDC) technology. Each system is monitored for conformance to spatial design conditions and design point settings are adjustable through the DDC system. The DDC system is based on PC architecture with the central monitoring and control station located adjacent to the boiler room. System shall be web based and accessible via password protection through internet browser software.

The HVAC systems are generally operated on a school day basis coinciding with the occupied/unoccupied schedule of the standard 180-day school year. Adjustments can be made through the DDC system to allow for usage during periods other than the usual school operating periods.

Space temperature is monitored by individual space sensors that transmit data to the central monitoring and control station. Space conditions are adjustable through DDC system and can be modified to meet individual needs. Local control of space conditions is limited to predefined adjustments in space temperature and to facilitate a 3-hour occupied override feature.

Several systems shall also include carbon dioxide (CO2) indoor air quality (IAQ) sensors which optimize the fresh outdoor air ventilation levels in response to variations in space occupancies.

The building shall be connected to an emergency power source for operation of heating boilers and pumps during emergency conditions.

D. SYSTEMS AND EQUIPMENT CAPABILITIES

The heating needs of the school shall be provided for by three (3) high efficiency condensing gas-fired hot water boilers with a combined gross input capacity of 4,500,000 BTUH and an average combustion efficiency of 93%.

High efficiency packaged roof-top units provide treated outdoor air to each classroom space utilizing total energy recovery energy exchange and hot water heating coils. In addition each system incorporates a dehumidification cycle utilizing refrigeration cycle based dehumidification with hot gas coil reheating to minimize classroom high limit humidity levels.

Systems and there capacities are as follows:

Abbreviations:
H&V – Heating & Ventilation; HVAC – Heating, ventilation and air conditioning; ERV – Energy Recovery Ventilation; VAV- Variable Air Volume

- AHU-1: Kitchen Make-up Air, 6,000 CFM
- AHU-2: Café, 6,000 CFM, H&V with ERU & CO2 control
- AHU-3: Gymnasium, 12,000 CFM, H&V with CO2 control
- AHU-4: Lobbies, 8,000 CFM, H&V
- RTU-1 Art Rooms, 1,900 CFM VAV, H&V with ERV and Dehum. Control
- RTU-2 Media & Tech., 8,000 CFM VAV, HVAC with ERV
- RTU-3 Office, 8,000 CFM VAV, HVAC with ERV
- RTU-4 Classrooms, 4,100 CFM VAV, H&V with ERV and Dehum. Control
- RTU-5 Classrooms, 3,000 CFM VAV, H&V with ERV and Dehum. Control

- RTU-6 Classrooms, 6,300 CFM VAV, H&V with ERV and Dehum. Control
- RTU-7 Classrooms, 5,400 CFM VAV, H&V with ERV and Dehum. Control
- RTU-8 Band, 810 CFM, H&V with ERV and Dehum. Control
- RTU-9 Music/Drama, 945 CFM VAV, H&V with ERV and Dehum. Control
- RTU-10 Locker Room 2,400 CFM, H&V with ERV
- RTU-11 Core Restrooms, 2,700 CFM, H&V with ERV

Supplemental cabinet and unit heaters are located at building entrances and other areas to mitigate drafts from entering internal building spaces.

E. TESTING

The HVAC equipment and systems are required to be tested and reports submitted for review and record as part of the construction document requirements. In addition, systems shall be properly commissioned by an independent 3rd party. Systems and equipment requiring testing and report submittal are:

a. Heating system includes all boilers, pumps, and heating coils of connected equipment.

b. Cooling system including DX split systems and packaged rooftop units.

c. All piped distribution systems are required to pass a hydrostatic test using water ad the pressure medium at a test pressure of 150 percent of operation pressure. All hydronic heating and cooling systems will be tested and balanced. A testing, adjusting, and balancing (TAB) report will be prepared for each system and submitted for review and record to the architect and engineer. TAB shall be done by an independent testing and balancing contractor

d. All airside components of the HVAC systems shall operate as designed and conform to the specifications for airflow as defined in the contract documents. A testing, adjusting, and balancing (TAB) report will be prepared for each system and submitted for review and record to the architect and engineer. TAB shall be done by an independent testing and balancing contractor.

e. Ductwork shall be tested for leak integrity and performed in accordance with SMACNA standards.

f. Systems or equivalent components not meeting the design criteria of the contract documents shall be corrected and re-tested for conformance to contract documents at no additional cost to the owner.

g. Visual inspection of all equipment installations for conformance to contract documents with respect to sound, vibration and installation integrity. Manufacturers' recommendations for equipment installation will be followed. All HVAC systems will operate in accordance with the sequence of operation defined for that system.

III. DESIGN PARAMETERS & LOADS

DESIGN CRITERIA

The design criteria used for the development and sizing of the HVAC systems and components was as defined in the Commonwealth of Massachusetts State Building Code 780 CMR and applicably referenced ICC International Mechanical Code 2006. Outdoor design conditions utilize were:

Heating Degrees Winter:	-1ºF
Cooling Degrees (db) Summer:	86ºF
Cooling Degrees (wb) Summer:	73ºF

Interior design temperature set points are 72°F for heating and 75°F for cooling (for spaces with cooling) during occupied conditions. Indoor dehumidification setpoint for classroom spaces was set at 55%.

Outside air ventilation requirements were based on the ICC International Mechanical Code 2006 as referenced by the building code as well as cross references to ASHRAE Ventilation Standard 62.1-2007. In general design outdoor air levels of 20 cfm per person for office type occupancy and 15 CFM per person in classroom spaces was utilized.

COOLING & HEATING LOADS

Cooling and heating load calculations were performed utilizing the design data referenced above. Climate data for Worcester, MA was selected for load and energy calculations in that it offers the most applicable environmental conditions to Shrewsbury, MA in addition to the fact that Worcester was the closest city in which pertinent hourly weather data was available for the computer simulation. Summary output data can be found in Appendix C.

The building heating and cooling load requirements under peak design load conditions as indicated above are estimated as follows (cooling loads only for Offices and Media):

	Heating Load	Cooling Load	Tons
Building Loads	3,132,000 BTUH	470,300 BTUH	39.2

The estimates do not include localized cooling loads for tel/data rooms as well as additional heating loads for some area such as vestibules, boiler room, mechanical room and small ancillary spaces.

IV. ENERGY SIMULATIONS

Multiple energy simulations were run for each of the proposed options. The final recommended Option #2 outputs can be found in Appendix D. Data on the passive solar wall system was supplied by the manufacturer and can also be found in Appendix D.

There are various limitations to energy simulation programs especially in a building such as this where occupant loads can vary greatly day to day and space to space. We have listed some of our assumptions below, some of which may have been forced by program modeling limitations.

Assumptions:

- Occupancy times are from 7:00 AM to 4:00 PM Monday thru Friday with varying loading.
- Partial occupancy was assumed for most time periods in the gymnasium space
- Indoor space temperature setpoints are 75°F/88°F occ/unocc cooling (in areas where cooling is supplied and 72°/60° occ/unocc heating.
- Indoor space humidity dehumidification setpoint for classroom spaces is 55% RH.
- Natural gas cost @ $1.50 per therm
- Electric rate cost @ $0.14 per kW

V. COST ESTIMATES

Order of magnitude cost estimates for the selected schematic Option #2 were assembled utilizing the schematic estimates from A.M. Fogarty & Associates, Inc. amended as required based on know equipment prices from vendors. In addition, we projected estimates for the base case and Option #1 utilizing RS Means Cost Data and current knowledge of system pricing. Estimate for the passive Solar Wall was provided by the Solar Wall manufacturer. Refer to Solar wall data in Appendix D.

A summary of the installed cost estimates are as follows:

- **Base Case – Classroom Unit Ventilators:** ➔ **$3,335,100**
- **Option #1 – Classroom Radiation & ERU's:** ➔ **$3,386,000**
- **Option #2 – Classroom Radiation & ERU w/ Dehum.:** ➔ **$3,452,000**
- **Alternate #1 – Solar Wall.:** ➔ **$52,850**

Appendix A

Schematic Drawings

(refer to schematic drawing set submission)

Appendix B

Proposed Equipment Data

AAON

RN Series

PACKAGED ROOFTOP UNITS, HEAT PUMPS & OUTDOOR AIR HANDLERS

Features:

- Air-cooled or water-cooled condenser, with unit capacities from 6-70 Tons
- Available as a chilled water or non-compressorized DX air handler, from 1,400-28,500 CFM
- Air-source and water-source heat pump options
- R-410A scroll compressors, one, two or four stage cooling
- 10-100% variable capacity scroll compressors are available for load matching cooling and increased part load efficiency
- Electric, gas, steam, or hot water heating
- Direct drive backward curved plenum supply fans
- Power exhaust and power return options
- Factory installed AAONAIRE® total and sensible energy recovery wheels
- Double wall rigid polyurethane foam panel construction with a minimum R-value of 13
- Service access doors with full length stainless steel piano hinges and zinc cast lockable handles
- Sloped stainless steel drain pans

Application Flexibility
Minimizes Installation Time and Reduces Cost

- *Make-up Air Applications Up to 100% Outside Air*
- *Dehumidification and Filtration Capabilities*
- *Large Tonnage Rooftops with Small Footprints*
- *Factory Installed or Customer Specific Controls Options*

RN Series
Rooftop/Air Handler

The AAON RN Series continues to lead the industry in packaged rooftop equipment performance and serviceability. Double wall foam insulated cabinet construction and direct drive backward curved plenum fans allow the units to have quiet, energy efficient airflow with high static pressure capabilities. RN Series units also feature lockable hinged doors which provide service access to all sections of the unit.

Superior Features

- R-410A environmentally friendly refrigerant.
- Cabinet construction consists of rigid polyurethane foam panels with G90 galvanized steel on both sides and a closed cell polyurethane foam interior core. The inner wall protects the insulation from moisture damage, prevents microbial growth, and is easy to clean.
- 2 inch rigid polyurethane foam insulated panels have at least a thermal resistance R-value of 13, which exceeds the R-value of a cabinet with 4 inch thick fiberglass construction. They also make the cabinet more rigid and resistant to damage and provide increased sound dampening.
- Access doors with full length stainless steel piano hinges and quarter turn, zinc cast, lockable handles provide improved reliability over single point hinges and plastic or sheet metal handles, and make the unit easily serviceable.
- Corrosion resistant polyurethane paint exceeds a 2,500 hour salt spray test - over 5 times the industry standard of 500 hours.
- Compressors and unit controls are contained within a compartment isolated from the air stream for ease of service and increased sound dampening.
- Direct drive backward curved plenum fans with rubber isolation mounts provide improved energy efficiency and reduced maintenance versus belt driven fans.
- Sloped stainless steel drain pans eliminate standing water which can support microbial growth and stainless steel construction prevents corrosion that could lead to water leaks and contaminants in the air stream.
- Run test report, wiring diagram, and Installation, Operation, and Maintenance manual with startup form provided in control access compartment of every unit.
- 5 year non-prorated compressor warranty, 15 year non-prorated aluminized steel gas heat exchanger warranty, and 25 year non-prorated stainless steel gas heat exchanger warranty.

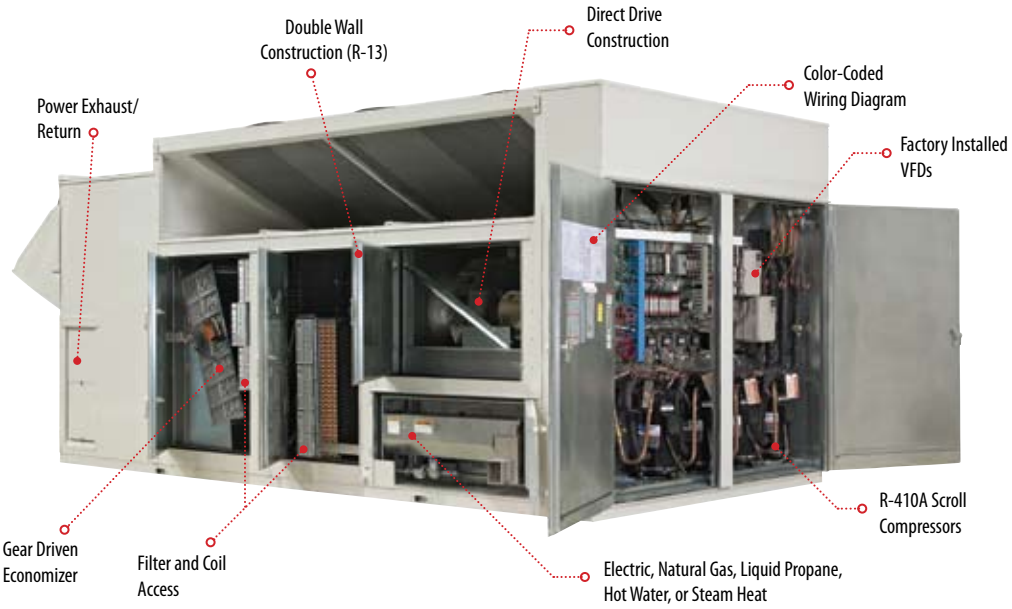
Premier Options

- 10-100% variable capacity scroll compressors are available for load matching cooling and increased part load efficiency.
- Refrigerant-to-water heat exchanger for improved unit efficiency.
- Air-source and water-source heat pump options for energy efficient heating.
- Factory installed total or sensible AAONAIRE® energy recovery wheels.
- Humidity control options including: High Capacity Coils, Modulating Humidity Control, Return Air Bypass, and Mixed Air Bypass.
- Chilled water cooling coils allow unit to tie into existing chilled water system.
- Hot water or steam heating coils allow unit to tie into existing boiler system.
- Polymer e-coated coils, copper finned coils, and stainless steel coil casings are available to extend the life of the coils and protect them in corrosive environments.
- Power exhaust and power return fans with economizer for application flexibility.
- VFD controlled supply, exhaust, and return fans for precise airflow control, building pressure control, and reduced power consumption.
- Modulating gas heat with stainless steel heat exchanger provides greater fuel efficiency, longer heater life, and improved occupancy comfort.
- SCR (Silicon Controlled Rectifier) electric heat control for reduced power consumption, longer heater life, and improved occupant comfort.
- Multiple high efficiency air filtration options.
- Unit controls options including factory installed controls by others.

B Cabinet

Air-Cooled or Water-Cooled Condensers

D Cabinet



RN Model	Cabinet	Air-Cooled EER	Water-Cooled EER	Nominal CFM	Width	Length*	Height*
006	A	Up to 14.0	Up to 18.4	2,400	79	82	44
007				2,600			
008				3,400			
010				3,600			
009	B	Up to 13.9	Up to 19.4	3,400	96	88	50
011				3,600			
013				3,800			
015				4,200			
016	C	Up to 12.7	Up to 16.9	6,400	101	110	59
018				6,800			
020				7,000			
025				9,000			
030				10,500			
026	D	Up to 12.2	Up to 16.5	10,000	100	155	97
031				12,400			
040				16,000			
050				20,000			
060				23,000			
070				25,000			

*Length and height may vary depending on options selected
All dimensions are in inches

R-13 Double Wall Rigid Polyurethane Foam Panel Construction

AAON is setting a new standard for performance with double wall construction using closed cell polyurethane foam insulation. Not only does it have more than twice the insulating R-value, it creates a far more rigid and stronger assembly with less air leakage than fiberglass insulated panels.

Dehumidification

AAON offers many humidity control options. High capacity cooling coils are available which allow for more dehumidification versus standard cooling coils. Return air bypass and mixed air bypass are available on RN Series units for single coil humidity control. Modulating humidity control is available to provide energy efficient dehumidification, even with low sensible heat loads, without the temperature swings common with on/off reheat systems.

Make Up Air Capability

AAON RN Series units have make up air capability and can be specified with up to 100% outside air. AAONAIRE® energy recovery wheels are available on make up air units to increase the unit's energy efficiency. High capacity cooling coils are available to handle the higher latent load of outside air. Modulating gas heat and SCR electric heat are available to provide energy efficient, consistent supply air temperature heating. Modulating humidity control is available to provide dehumidification without overcooling when the outside air humidity is above setpoint. Variable capacity scroll compressors are available to provide energy efficient consistent supply air temperature cooling.

Air Handler Option

AAON RN Series outdoor air handlers provide a hydronic cooling and heating option in the RN Series unit size. Gas, electric, steam, and hot water heating are available on an RN Series outdoor air handler. Cabinet construction is similar to the RN Series packaged rooftop units with easily accessible coil connections.

AAON Environmentally Friendly HVAC Product Family

Customer Commitment – AAON encourages environmentally responsible design by incorporating many energy saving features into our superior heating and cooling products. In addition to energy efficiency, AAON also offers environmentally friendly R-410A refrigerant capability in all our cooling and heat pump equipment. As countries throughout the world phase out CFC and HCFC refrigerants, R-410A is becoming the global standard and AAON is leading the way!

Rooftop Units


2 - 5 Tons


2 - 30 Tons


26 - 70 Tons


45 - 230 Tons

Condensing Units


2 - 5 Tons
(Horizontal)


2 - 5 Tons


6 - 60 Tons


45 - 230 Tons

Air-Cooled or Evaporative-Cooled Chiller


35 - 365 Tons


35 - 365 Tons


5 - 54 Tons

Self Contained


23 - 70 Tons

Boiler


500 - 6,000 MBH

Indoor Air Handling Units


1,000 - 16,000 CFM


16,000 - 51,500 CFM


800 - 10,000 CFM


800 - 2,000 CFM

Outdoor Air Handling Units


800 - 2,000 CFM


800 - 12,000 CFM


10,400 - 28,000 CFM


18,000 - 68,000 CFM

Custom Indoor or Outdoor Air Handling Units

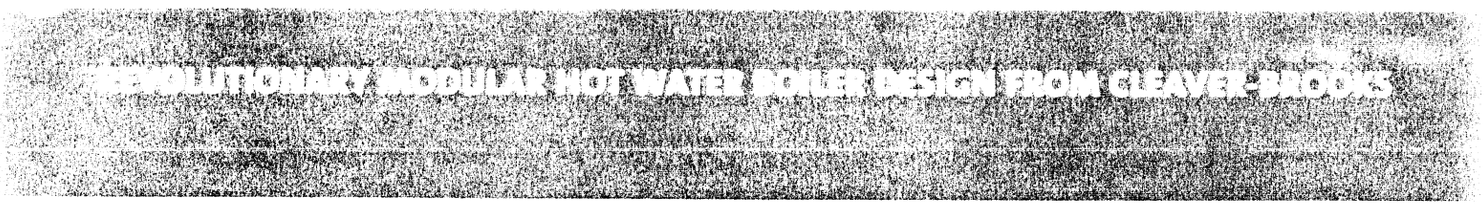

Direct Fired
1,500 - 100,000+ CFM

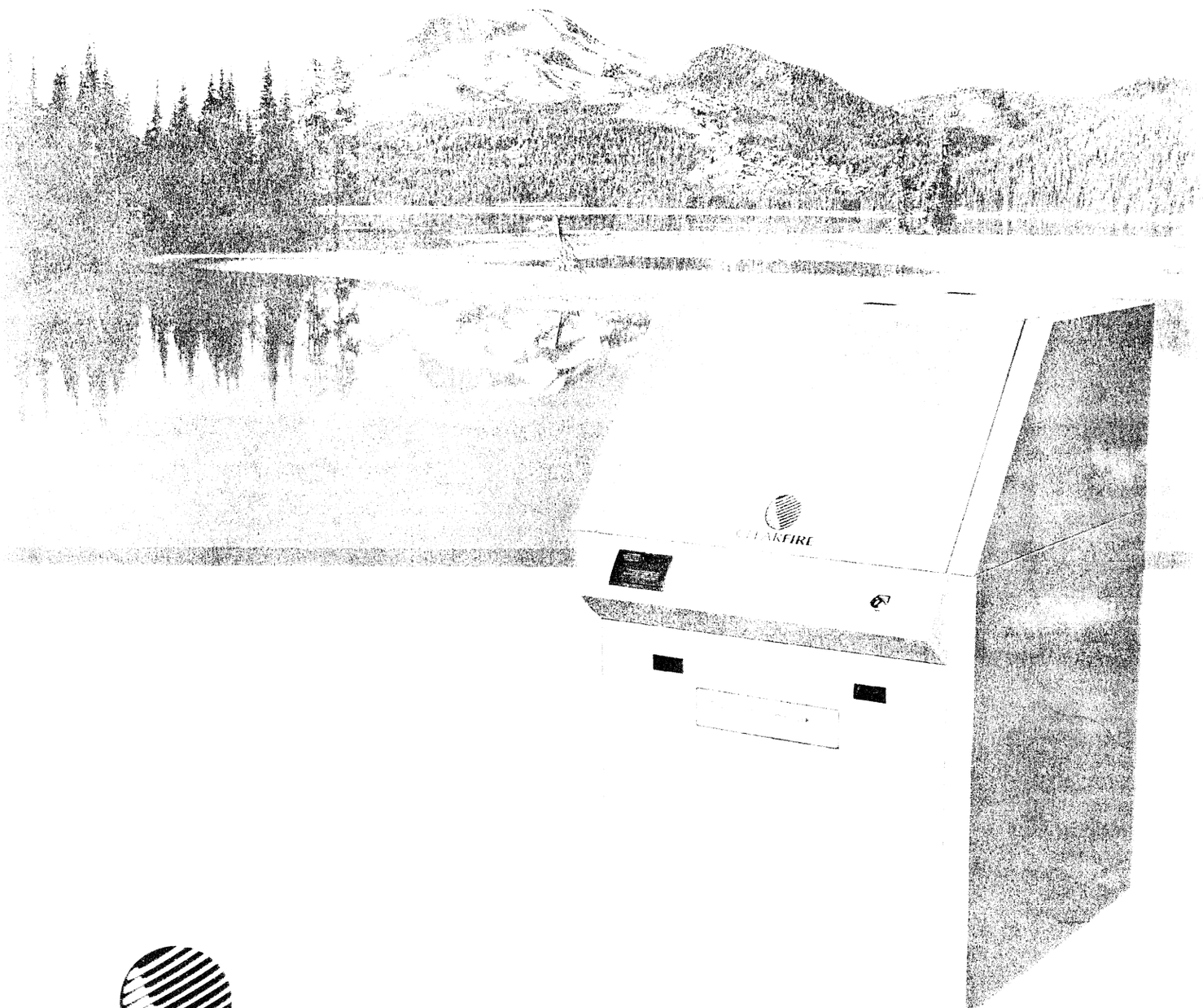

1,500 - 218,000 CFM
Indirect Fired


1,500 - 120,000+ CFM

AAON
Defining Quality. Building Comfort.

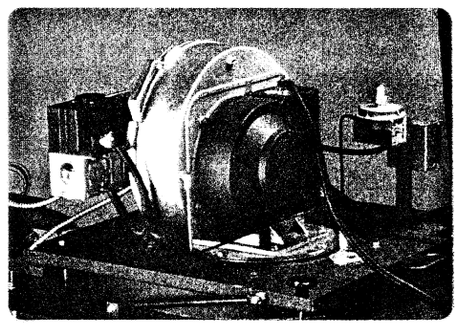
Cleaver Brooks



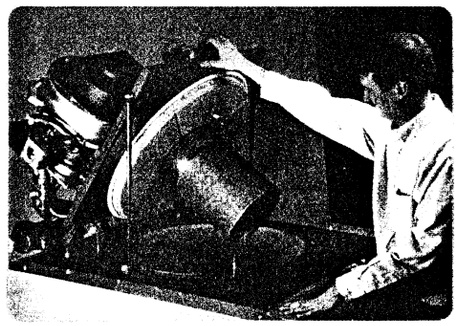


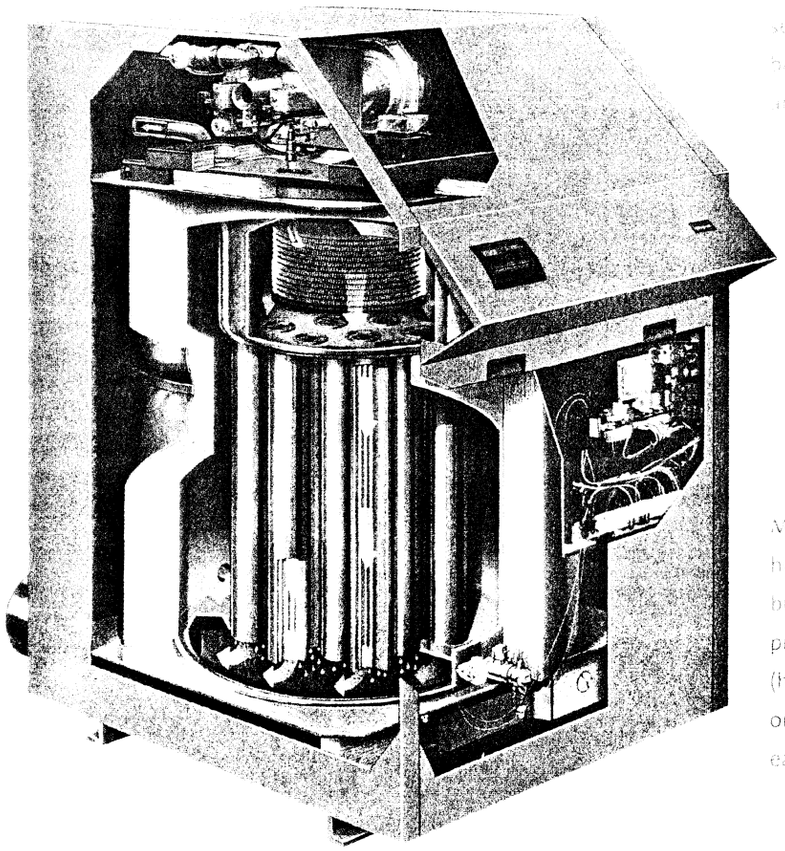
CLEARFIRE

The burner o[illegible] to deliver the high[illegible] while maintaining a "[illegible] full output. The secret [illegible] and precise machining [illegible] its speed based on [illegible] feature allows the [illegible] to 20%, therefore [illegible] cycling losses caus[illegible]



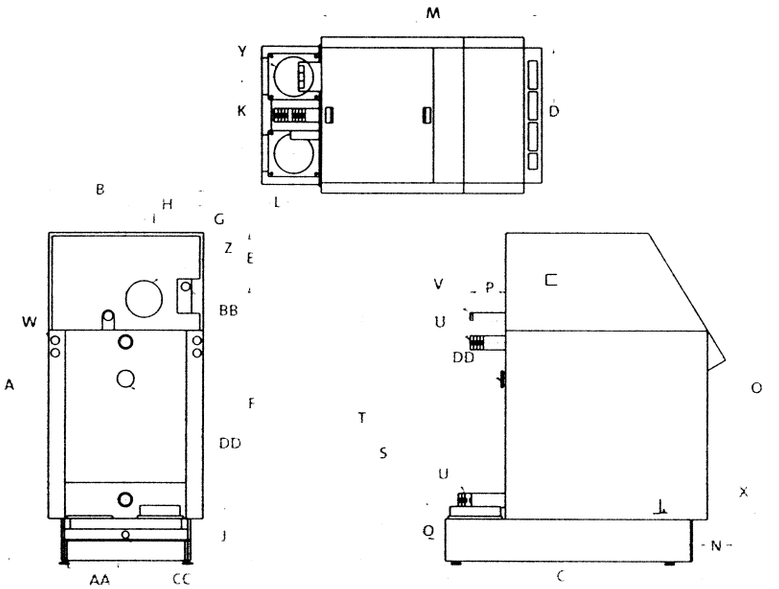
The controll[illegible] system including [illegible] a spark ig[illegible] annunciato[illegible] a sequence[illegible] larger dens[illegible] separate pa[illegible] based g[illegible] and operat[illegible]



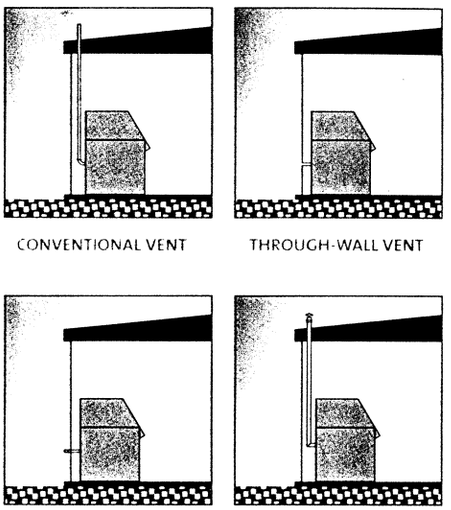


Mainten[illegible] assembly hinged to [illegible] burner com[illegible] proper. The [illegible] platform (hinged and [illegible] operator or service te[illegible] to most easily work.

DIMENSIONS AND RATINGS



VENTING OPTIONS



CONVENTIONAL VENT

THROUGH-WALL VENT

DIRECT VENT/
SEALED COMBUSTION

VERTICAL VENT/
SEALED COMBUSTION

LABEL	DESCRIPTION	750	1,000	1,500	1,800
	BTU INPUT	750,000	1,000,000	1,500,000	1,800,000
	BTU OUTPUT	675,000	900,000	1,350,000	1,620,000
	SHIPPING WEIGHT	1,477	1,554	1,940	2,061
A	OVERALL HEIGHT	76.2"	76.2"	82.4"	82.4"
B	OVERALL WIDTH	36.6"	36.6"	43.7"	43.7"
C	OVERALL DEPTH	62.7"	62.7"	66.6"	66.6"
D	WIDTH LESS SIDE CASING	31.1"	31.1"	38.1"	38.1"
E	GAS CONNECTION TO TOP OF CASING	8.8'	8.8'	10.0"	10.0"
F	GAS CONNECTION TO FLOOR	67.3"	67.3"	72.4"	72.4"
G	SIDE OF CASING TO GAS CONNECTION	5.6"	5.6"	5.6"	5.6"
H	CASING TO CENTER LINE OF BOILER	22.2"	22.2"	25.8"	25.8"
I	BOILER CENTERLINE TO CENTERLINE OF AIR INTAKE	4.0"	4.0"	7.0"	7.0"
J	FLOOR TO TOP OF STACK STUB	18.9"	18.9"	20.0"	20.0"
K	SPACING BETWEEN LEFT AND RIGHT STACK STUBS	17.0"	17.0"	21.0"	21.0"
L	REAR OF BOILER TO CENTERLINE OF STACK STUB	7.5"	7.5"	8.2"	8.2"
M	FRONT OF BOILER TO REAR OF CASING	50.0"	50.0"	50.0"	50.0"
N	CONTROL PANEL PROJECTION	4.1"	4.1"	4.2"	4.2"
O	CASING HEIGHT	60.0"	60.0"	65.3"	65.3"
P	VENT PROJECTION FROM REAR OF CASING	7.3'	7.3'	8.0"	8.0"
Q	FLOOR TO CENTERLINE OF RETURN	20.0"	20.0"	21.4"	21.4"
S	FLOOR TO CENTERLINE OF OUTLET	56.7"	56.7"	58.5"	58.5"
T	FLOOR TO CENTERLINE OF VENT	63.4"	63.4"	64.4"	64.4"
U	CONNECTION (SUPPLY AND RETURN)	2.5"	2.5"	3.0"	3.0"
V	VENT	1.0"	1.0"	1.0"	1.0"
W	ELECTRICAL CONNECTION, LEFT OR RIGHT SIDE (OPTIONAL)	-	-	-	-
X	DRAIN	1.5"	1.5"	1.5"	1.5"
Y	FLUE GAS CONNECTION, LEFT OR RIGHT SIDE (OPTIONAL)	10.0"	10.0"	12.0"	12.0"
Z	AIR INLET CONNECTION	6.0"	6.0"	6.0"	6.0"
AA	BOILER ADJUSTMENT FOOT	3.1"	3.1"	3.1"	3.1"
BB	GAS INLET	1"	1"	1"	1"
CC	CONDENSATE CONNECTION	3/4" (NPT)	3/4" (NPT)	3/4" (NPT)	3/4" (NPT)
DD	WATERSIDE INSPECTION PORT	--	--	--	--

NOTE: OUTPUT BASED ON 80% FIRING RATE AND 105° F RETURN WATER TEMPERATURE.

C-B Package Boiler Systems®

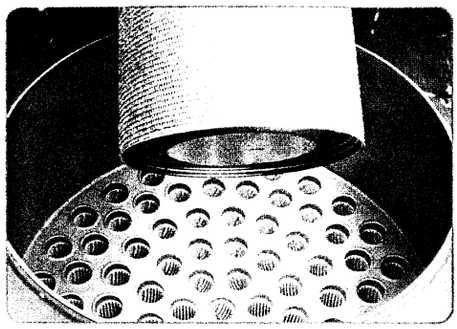
Our Skill And Strength Turns Fire Into Power!

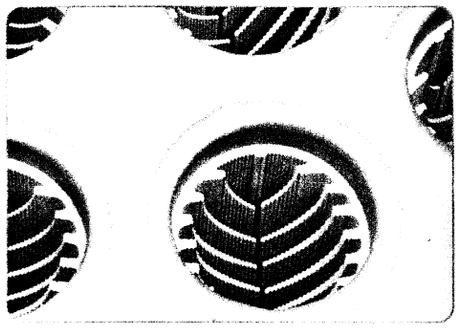
A Cleaver-Brooks Company

www.cleaver-brooks.com

HIGH COMBUSTION EFFICIENCY AND LOW EMISSIONS

The *Clearfire* Fecralloy metal fiber burner has been specifically designed to premix the air and fuel to achieve a precise ratio resulting in optimum combustion efficiency. The result is an almost flameless combustion of the homogenous gas/air mixture. The solid body radiation of the burner's surface cools the flame allowing extremely low emissions with NOx levels to sub 10 ppm. The Fecralloy metal fiber body is also flexible, preventing thermal stresses, resulting in extended life.





The [illegible] efficiency of the [illegible] boiler/burner package results from a combination of the burner and boiler working together to maximize heat transfer. One of the key components is a full condensing and 98% fuel to water efficiency are the [illegible] used in the *Clearfire*. The heat exchanger is constructed of stainless steel to provide complex alternating [illegible] to provide [illegible] maximizing the [illegible] capability of the burner. This design also provides [illegible] velocity and [illegible] flow which further [illegible] heat transfer while keeping the fireside surfaces clean.

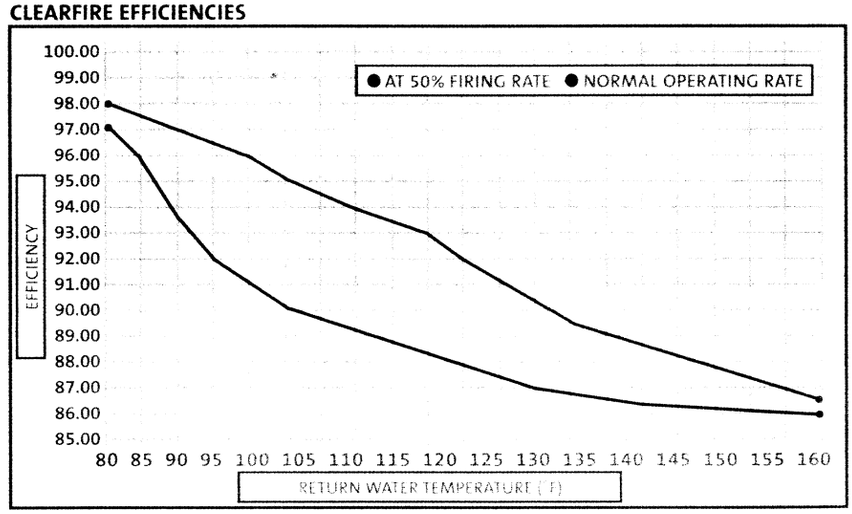
CLEARFIRE

The *Clearfire*, with a range of sizes to meet almost any commercial application, combines engineering expertise with ISO 9001 quality standards to deliver a product unsurpassed in the industry when it comes to peak performance and low environmental impact. When deciding on your next heating boiler to specify or buy, consider these ten *Clearfire* advantages:

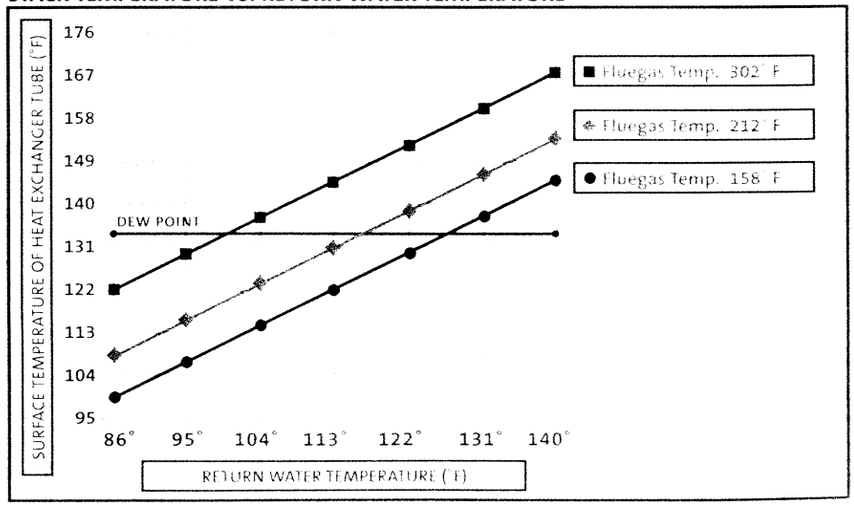
- *Modular boiler design offering sizes from 750 – 1800 MBH*
- *Rugged stainless steel construction with 20 year thermal shock guarantee*
- *Ultra high performance (full condensing) with efficiencies to 98%*
- *Fully modulating burner with variable speed fan*
- *"Whisper" quiet operation with a decibel rating of <70 dB at high fire*
- *Low emissions; NOx levels to sub 10 ppm*
- *Sealed combustion capability*
- *No minimum flow or water temperature requirements*
- *Low waterside pressure drop*
- *Fully backed by Cleaver-Brooks Authorized Sales and Service Network*

CLEARFIRE'S HIGH PERFORMANCE STANDARD

CLEARFIRE EFFICIENCIES



STACK TEMPERATURE VS. RETURN WATER TEMPERATURE



Appendix C

Heating & Cooling Load Calculations

Heating Plant Sizing Summary for 93% Boiler Plant

Sherwood Middle School OPTION #2
Johnson & Seaman Engineering

12/09/2009
06:52AM

1. Plant Information:

Plant Name	**93% Boiler Plant**
Plant Type	**Hot Water Boiler Plant**
Design Weather	**Worcester, Massachusetts**

2. Heating Plant Sizing Data:

Maximum Plant Load	**3132.0**	MBH
Load occurs at	**Winter Design**	
BTU/(hr-ft²)	**30.4**	BTU/(hr-ft²)
Floor area served by plant	**103155.0**	ft²

3. Coincident Air System Heating Loads for Winter Design

Air System Name	Mult.	System Heating Coil Load (MBH)
#2 ART ROOMS	1	57.9
#2 BAND	1	66.3
BATHROOMS	1	72.5
CAFE SYSTEM	1	414.8
#2 CLASS BOTTOM LEFT	1	279.7
#2 CLASS BOTTOM RIGHT	1	301.5
#2 CLASS TOP RIGHT BOTTOM	1	139.4
#2 CLASS TOP RIGHT TOP	1	2.5
GYM	1	811.0
KITCHEN	1	459.8
LOBBY	1	154.5
LOCKER ROOMS	1	73.4
MEDIA/TECH	1	121.4
#2 MUSIC/DRAMA	1	55.9
OFFICES	1	121.6

System loads are for coils whose heating source is ' Hot Water ' .

Air System Sizing Summary for MEDIA/TECH

Project Name: Sherwood Middle School OPTION #2
Prepared by: Johnson & Seaman Engineering

12/09/2009
06:43AM

Air System Information

Air System Name	**MEDIA/TECH**	Number of zones	**1**	
Equipment Class	**PKG ROOF**	Floor Area	**6211.0**	ft²
Air System Type	**VAV**	Location	**Worcester, Massachusetts**	

Sizing Calculation Information

Zone and Space Sizing Method:			
Zone CFM	**Peak zone sensible load**	Calculation Months	**Jan to Dec**
Space CFM	**Individual peak space loads**	Sizing Data	**Calculated**

Central Cooling Coil Sizing Data

Total coil load	**20.9**	Tons	Load occurs at	**Jul 1500**	
Total coil load	**250.2**	MBH	OA DB / WB	**86.0 / 73.0**	°F
Sensible coil load	**186.0**	MBH	Entering DB / WB	**79.4 / 64.7**	°F
Coil CFM at Jul 1500	**6673**	CFM	Leaving DB / WB	**52.6 / 51.4**	°F
Max block CFM at Jul 1400	**7292**	CFM	Coil ADP	**49.7**	°F
Sum of peak zone CFM	**7292**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**0.743**		Resulting RH	**48**	%
ft²/Ton	**297.9**		Design supply temp.	**55.0**	°F
BTU/(hr-ft²)	**40.3**		Zone T-stat Check	**1 of 1**	OK
Water flow @ 10.0 °F rise	**N/A**		Max zone temperature deviation	**0.0**	°F

Preheat Coil Sizing Data

Max coil load	**0.7**	MBH	Load occurs at	**Des Htg**	
Coil CFM at Des Htg	**2280**	CFM	Ent. DB / Lvg DB	**49.7 / 50.0**	°F
Max coil CFM	**7292**	CFM			
Water flow @ 20.0 °F drop	**0.07**	gpm			

Supply Fan Sizing Data

Actual max CFM at Jul 1400	**7292**	CFM	Fan motor BHP	**8.00**	BHP
Standard CFM	**7029**	CFM	Fan motor kW	**5.97**	kW
Actual max CFM/ft²	**1.17**	CFM/ft²	Fan static	**3.00**	in wg

Return Fan Sizing Data

Actual max CFM at Jul 1400	**7292**	CFM	Fan motor BHP	**8.00**	BHP
Standard CFM	**7029**	CFM	Fan motor kW	**5.97**	kW
Actual max CFM/ft²	**1.17**	CFM/ft²	Fan static	**3.00**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**2280**	CFM	CFM/person	**15.00**	CFM/person
CFM/ft²	**0.37**	CFM/ft²			

Zone Sizing Summary for MEDIA/TECH

Project Name: Sherwood Middle School OPTION #2
Prepared by: Johnson & Seaman Engineering

12/09/2009
06:43AM

Air System Information

Air System Name ..... **MEDIA/TECH**
Equipment Class ..... **PKG ROOF**
Air System Type ..... **VAV**

Number of zones **1**
Floor Area ..... **6211.0** ft²
Location ..... **Worcester, Massachusetts**

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM ..... **Peak zone sensible load**
Space CFM ..... **Individual peak space loads**

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Air Flow (CFM)	Minimum Air Flow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft²)	Zone CFM/ft²
Zone 1	151.8	7292	2280	Jul 1400	80.3	6211.0	1.17

Zone Terminal Sizing Data

Zone Name	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 20.0 °F	Zone Htg Coil Load (MBH)	Zone Htg Water gpm @ 20.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	0.0	-	120.6	12.07	0

Space Loads and Airflows

Zone Name / Space Name	Mult.	Cooling Sensible (MBH)	Time of Load	Air Flow (CFM)	Heating Load (MBH)	Floor Area (ft²)	Space CFM/ft²
Zone 1							
2 MEDIA CENTER	1	76.1	Jul 1400	3653	47.3	3561.0	1.03
2 TECH 1	1	37.9	Jul 1400	1819	16.5	1325.0	1.37
2 TECH 2	1	37.9	Jul 1400	1819	16.5	1325.0	1.37

Air System Design Load Summary for MEDIA/TECH

Project Name: Sherwood Middle School OPTION #2
Prepared by: Johnson & Seaman Engineering

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	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1500 COOLING OA DB / WB 86.0 °F / 73.0 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 0.0 °F / -1.6 °F		
ZONE LOADS	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**	**Details**	**Sensible (BTU/hr)**	**Latent (BTU/hr)**
Window & Skylight Solar Loads	524 ft²	9571	-	524 ft²	-	-
Wall Transmission	1328 ft²	1249	-	1328 ft²	4146	-
Roof Transmission	6211 ft²	15981	-	6211 ft²	17913	-
Window Transmission	524 ft²	1300	-	524 ft²	11658	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	6211 W	21192	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	17000 W	58004	-	0	0	-
People	152	37240	31160	0	0	0
Infiltration	-	7113	15719	-	46560	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**151649**	**46879**	**-**	**80276**	**0**
Zone Conditioning	-	147994	46879	-	76201	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	6673 CFM	16388	-	2280 CFM	-2699	-
Ventilation Load	2280 CFM	5226	17347	2280 CFM	50556	0
Supply Fan Load	6673 CFM	16388	-	2280 CFM	-2699	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**185995**	**64226**	**-**	**121360**	**0**
Central Cooling Coil	-	185995	64229	-	0	0
Preheat Coil	-	0	-	-	728	-
Zone Heating Unit Coils	-	0	-	-	120632	-
>> Total Conditioning	**-**	**185995**	**64229**	**-**	**121360**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

Air System Sizing Summary for OFFICES

Project Name: Sherwood Middle School OPTION #2 — 12/09/2009
Prepared by: Johnson & Seaman Engineering — 06:43AM

Air System Information

Air System Name	**OFFICES**		Number of zones	**16**	
Equipment Class	**PKG ROOF**		Floor Area	**7692.0**	ft²
Air System Type	**VAV**		Location	**Worcester, Massachusetts**	

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM	**Peak zone sensible load**		Calculation Months	**Jan to Dec**	
Space CFM	**Individual peak space loads**		Sizing Data	**Calculated**	

Central Cooling Coil Sizing Data

Total coil load	**18.3**	Tons	Load occurs at	**Jul 1600**	
Total coil load	**220.1**	MBH	OA DB / WB	**85.5 / 72.9**	°F
Sensible coil load	**161.1**	MBH	Entering DB / WB	**79.5 / 65.0**	°F
Coil CFM at Jul 1600	**5773**	CFM	Leaving DB / WB	**52.7 / 51.5**	°F
Max block CFM at Jul 1600	**6474**	CFM	Coil ADP	**49.8**	°F
Sum of peak zone CFM	**6570**	CFM	Bypass Factor	**0.100**	
Sensible heat ratio	**0.732**		Resulting RH	**48**	%
ft²/Ton	**419.3**		Design supply temp.	**55.0**	°F
BTU/(hr-ft²)	**28.6**		Zone T-stat Check	**16 of 16**	OK
Water flow @ 10.0 °F rise	**N/A**		Max zone temperature deviation	**0.0**	°F

Preheat Coil Sizing Data

Max coil load	**0.9**	MBH	Load occurs at	**Des Htg**	
Coil CFM at Des Htg	**1920**	CFM	Ent. DB / Lvg DB	**49.6 / 50.0**	°F
Max coil CFM	**6474**	CFM			
Water flow @ 20.0 °F drop	**0.09**	gpm			

Supply Fan Sizing Data

Actual max CFM at Jul 1600	**6474**	CFM	Fan motor BHP	**7.11**	BHP
Standard CFM	**6242**	CFM	Fan motor kW	**5.30**	kW
Actual max CFM/ft²	**0.84**	CFM/ft²	Fan static	**3.00**	in wg

Return Fan Sizing Data

Actual max CFM at Jul 1600	**6474**	CFM	Fan motor BHP	**7.11**	BHP
Standard CFM	**6242**	CFM	Fan motor kW	**5.30**	kW
Actual max CFM/ft²	**0.84**	CFM/ft²	Fan static	**3.00**	in wg

Outdoor Ventilation Air Data

Design airflow CFM	**1920**	CFM	CFM/person	**15.00**	CFM/person
CFM/ft²	**0.25**	CFM/ft²			

Zone Sizing Summary for OFFICES

Project Name: Sherwood Middle School OPTION #2
Prepared by: Johnson & Seaman Engineering

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Air System Information

Air System Name ..... **OFFICES**
Equipment Class ..... **PKG ROOF**
Air System Type ..... **VAV**

Number of zones **16**
Floor Area ..... **7692.0** ft²
Location ..... **Worcester, Massachusetts**

Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM ..... **Peak zone sensible load**
Space CFM ..... **Individual peak space loads**

Calculation Months ..... **Jan to Dec**
Sizing Data ..... **Calculated**

Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Air Flow (CFM)	Minimum Air Flow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft²)	Zone CFM/ft²
Zone 1	1.8	86	15	Jul 1500	1.2	160.0	0.54
Zone 2	14.3	689	210	Jul 1600	8.1	761.0	0.91
Zone 3	1.6	77	15	Jul 1500	1.0	140.0	0.55
Zone 4	5.9	281	195	Jul 1500	4.4	585.0	0.48
Zone 5	8.9	429	180	Jul 1500	4.6	620.0	0.69
Zone 6	27.8	1334	150	Jun 1700	13.9	660.0	2.02
Zone 7	11.2	536	45	Jun 1700	10.0	360.0	1.49
Zone 8	5.8	279	45	Jun 1700	5.5	330.0	0.84
Zone 9	11.1	532	150	Jul 1500	6.7	891.0	0.60
Zone 10	7.8	374	180	Jul 1500	3.7	500.0	0.75
Zone 11	7.2	348	180	Jul 1500	3.3	445.0	0.78
Zone 12	12.7	610	150	Jul 1500	10.2	840.0	0.73
Zone 13	0.8	37	15	Jul 1500	0.4	55.0	0.68
Zone 14	2.0	96	15	Jul 1400	1.5	140.0	0.68
Zone 15	7.4	355	195	Jul 1400	6.1	585.0	0.61
Zone 16	10.6	508	180	Jul 1400	6.4	620.0	0.82

Zone Terminal Sizing Data

Zone Name	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 20.0 °F	Zone Htg Coil Load (MBH)	Zone Htg Water gpm @ 20.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	0.0	-	1.5	0.15	0
Zone 2	0.0	-	11.8	1.18	0
Zone 3	0.0	-	1.3	0.13	0
Zone 4	0.0	-	7.8	0.78	0
Zone 5	0.0	-	7.8	0.78	0
Zone 6	0.0	-	16.5	1.66	0
Zone 7	0.0	-	10.8	1.08	0
Zone 8	0.0	-	6.3	0.63	0
Zone 9	0.0	-	9.3	0.93	0
Zone 10	0.0	-	6.9	0.69	0
Zone 11	0.0	-	6.5	0.65	0
Zone 12	0.0	-	12.9	1.29	0
Zone 13	0.0	-	0.7	0.07	0
Zone 14	0.0	-	1.7	0.17	0
Zone 15	0.0	-	9.5	0.95	0
Zone 16	0.0	-	9.6	0.96	0

Space Loads and Airflows

Zone Name /		Cooling Sensible	Time of	Air Flow	Heating Load	Floor Area	Space

Zone Sizing Summary for OFFICES

Project Name: Sherwood Middle School OPTION #2 — 12/09/2009
Prepared by: Johnson & Seaman Engineering — 06:43AM

Space Name	Mult.	(MBH)	Load	(CFM)	(MBH)	(ft^2)	CFM/ft^2
Zone 1							
B OFFICE	1	1.8	Jul 1500	86	1.2	160.0	0.54
Zone 2							
B SEMINAR	1	11.8	Jul 1600	568	6.5	551.0	1.03
B WORK	1	2.5	Jul 1500	121	1.6	210.0	0.58
Zone 3							
1 OFFICE	1	1.6	Jul 1500	77	1.0	140.0	0.55
Zone 4							
1 ELL	1	5.9	Jul 1500	281	4.4	585.0	0.48
Zone 5							
1 SEMINAR	1	5.2	Jul 1500	247	2.5	330.0	0.75
1 WORK	1	3.8	Jul 1500	182	2.2	290.0	0.63
Zone 6							
1 WAITING	1	27.8	Jun 1700	1334	13.9	660.0	2.02
Zone 7							
1 OFFICE 2	1	3.7	Jun 1700	179	3.3	120.0	1.49
1 OFFICE 3	1	3.7	Jun 1700	179	3.3	120.0	1.49
1 OFFICE 4	1	3.7	Jun 1700	179	3.3	120.0	1.49
Zone 8							
1 OFFICE 5	1	2.3	Jun 1700	112	2.2	120.0	0.94
1 OFFICE 6	1	3.5	Jul 1700	167	3.3	210.0	0.79
Zone 9							
1 GEN OFFICE	1	6.8	Jul 1500	326	4.1	550.0	0.59
1 MAIL	1	1.7	Jul 1500	82	0.9	126.0	0.65
1 WORK 2	1	2.6	Jul 1500	123	1.6	215.0	0.57
Zone 10							
1 CONFERENCE	1	7.8	Jul 1500	374	3.7	500.0	0.75
Zone 11							
1 OT/PT	1	7.2	Jul 1500	348	3.3	445.0	0.78
Zone 12							
1 NURSE	1	12.7	Jul 1500	610	10.2	840.0	0.73
Zone 13							
1 REC	1	0.8	Jul 1500	37	0.4	55.0	0.68
Zone 14							
2 OFFICE	1	2.0	Jul 1400	96	1.5	140.0	0.68
Zone 15							
2 SPEECH LAN	1	7.4	Jul 1400	355	6.1	585.0	0.61
Zone 16							
2 SEMINAR	1	6.0	Jul 1400	289	3.4	330.0	0.88
2 WORK	1	4.6	Jul 1400	219	3.0	290.0	0.75

Air System Design Load Summary for OFFICES

Project Name: Sherwood Middle School OPTION #2 — 12/09/2009
Prepared by: Johnson & Seaman Engineering — 06:43AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600 COOLING OA DB / WB 85.5 °F / 72.9 °F			HEATING DATA AT DES HTG HEATING OA DB / WB 0.0 °F / -1.6 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	875 ft²	29395	-	875 ft²	-	-
Wall Transmission	671 ft²	755	-	671 ft²	2095	-
Roof Transmission	1355 ft²	3142	-	1355 ft²	3908	-
Window Transmission	875 ft²	2131	-	875 ft²	19467	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	4502 ft²	0	-	4502 ft²	3961	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	7692 W	26245	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	9783 W	33379	-	0	0	-
People	128	31360	26240	0	0	0
Infiltration	-	8411	18764	-	57662	5
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
>> Total Zone Loads	**-**	**134817**	**45004**	**-**	**87092**	**5**
Zone Conditioning	-	129886	45004	-	83839	5
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	5773 CFM	13623	-	1920 CFM	-2332	-
Ventilation Load	1920 CFM	3974	14055	1920 CFM	42457	0
Supply Fan Load	5773 CFM	13623	-	1920 CFM	-2332	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
>> Total System Loads	**-**	**161107**	**59058**	**-**	**121632**	**5**
Central Cooling Coil	-	161107	59032	-	0	0
Preheat Coil	-	0	-	-	885	-
Zone Heating Unit Coils	-	0	-	-	120748	-
>> Total Conditioning	**-**	**161107**	**59032**	**-**	**121632**	**0**
Key:	**Positive values are clg loads Negative values are htg loads**			**Positive values are htg loads Negative values are clg loads**		

Appendix D

Energy Analysis Data

Annual Cost Summary

Sherwood Middle School
Johnson & Seaman Engineering

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Table 1. Annual Costs

Component	Sherwood Option #2 ($)
Air System Fans	22,761
Cooling	5,235
Heating	29,822
Pumps	3,386
Cooling Tower Fans	0
HVAC Sub-Total	**61,205**
Lights	35,631
Electric Equipment	22,051
Misc. Electric	0
Misc. Fuel Use	0
Non-HVAC Sub-Total	**57,683**
Grand Total	**118,888**

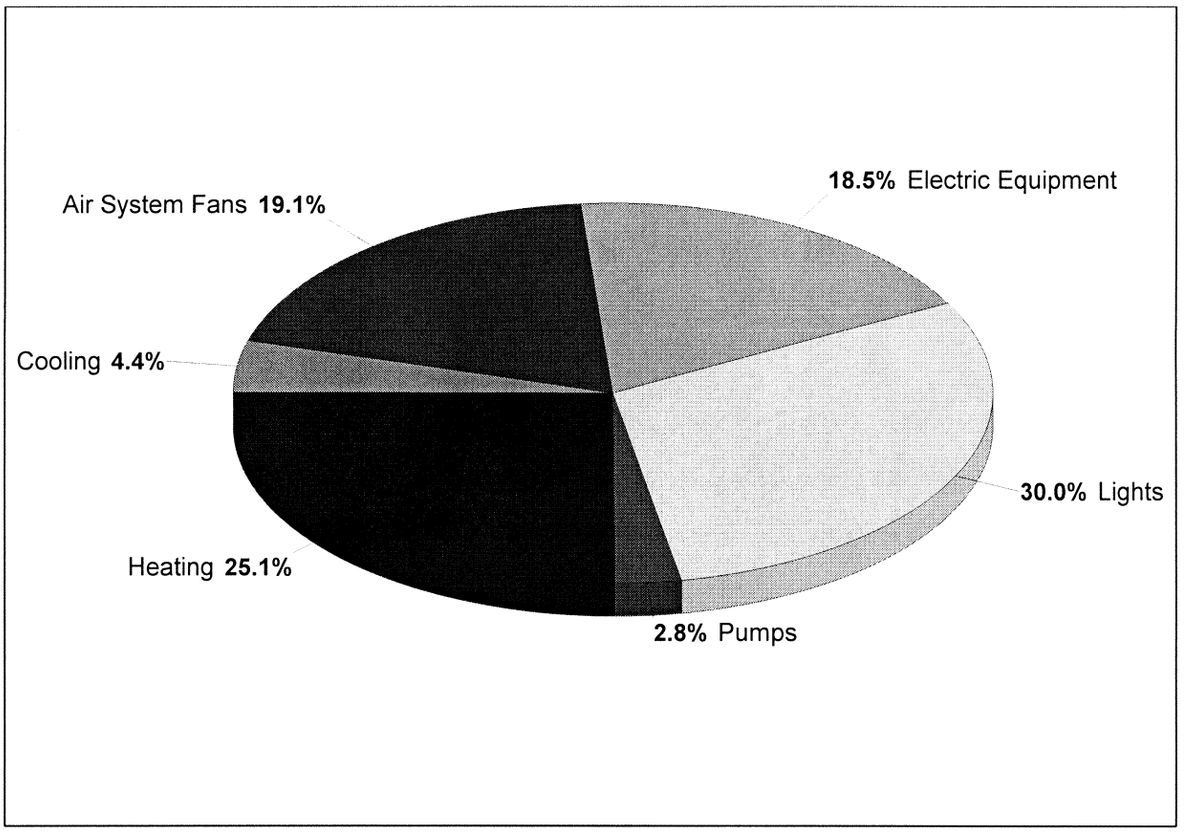
Table 2. Annual Cost per Unit Floor Area

Component	Sherwood Option #2 ($/ft²)
Air System Fans	0.221
Cooling	0.051
Heating	0.289
Pumps	0.033
Cooling Tower Fans	0.000
HVAC Sub-Total	**0.593**
Lights	0.345
Electric Equipment	0.214
Misc. Electric	0.000
Misc. Fuel Use	0.000
Non-HVAC Sub-Total	**0.559**
Grand Total	**1.153**
Gross Floor Area (ft²)	103155.0
Conditioned Floor Area (ft²)	103155.0

Note: Values in this table are calculated using the Gross Floor Area.

Table 3. Component Cost as a Percentage of Total Cost

Component	Sherwood Option #2 (%)
Air System Fans	19.1
Cooling	4.4
Heating	25.1
Pumps	2.8
Cooling Tower Fans	0.0
HVAC Sub-Total	**51.5**
Lights	30.0
Electric Equipment	18.5
Misc. Electric	0.0
Misc. Fuel Use	0.0
Non-HVAC Sub-Total	**48.5**
Grand Total	**100.0**



1. Annual Costs

Component	Annual Cost ($)	($/ft²)	Percent of Total (%)
Air System Fans	22,761	0.221	19.1
Cooling	5,235	0.051	4.4
Heating	29,822	0.289	25.1
Pumps	3,386	0.033	2.8
Cooling Tower Fans	0	0.000	0.0
HVAC Sub-Total	**61,205**	**0.593**	**51.5**
Lights	35,631	0.345	30.0
Electric Equipment	22,051	0.214	18.5
Misc. Electric	0	0.000	0.0
Misc. Fuel Use	0	0.000	0.0
Non-HVAC Sub-Total	**57,683**	**0.559**	**48.5**
Grand Total	**118,888**	**1.153**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **103155.0** ft²
Conditioned Floor Area ..... **103155.0** ft²

Annual Energy Costs - Sherwood Option #2

Sherwood Middle School
Johnson & Seaman Engineering

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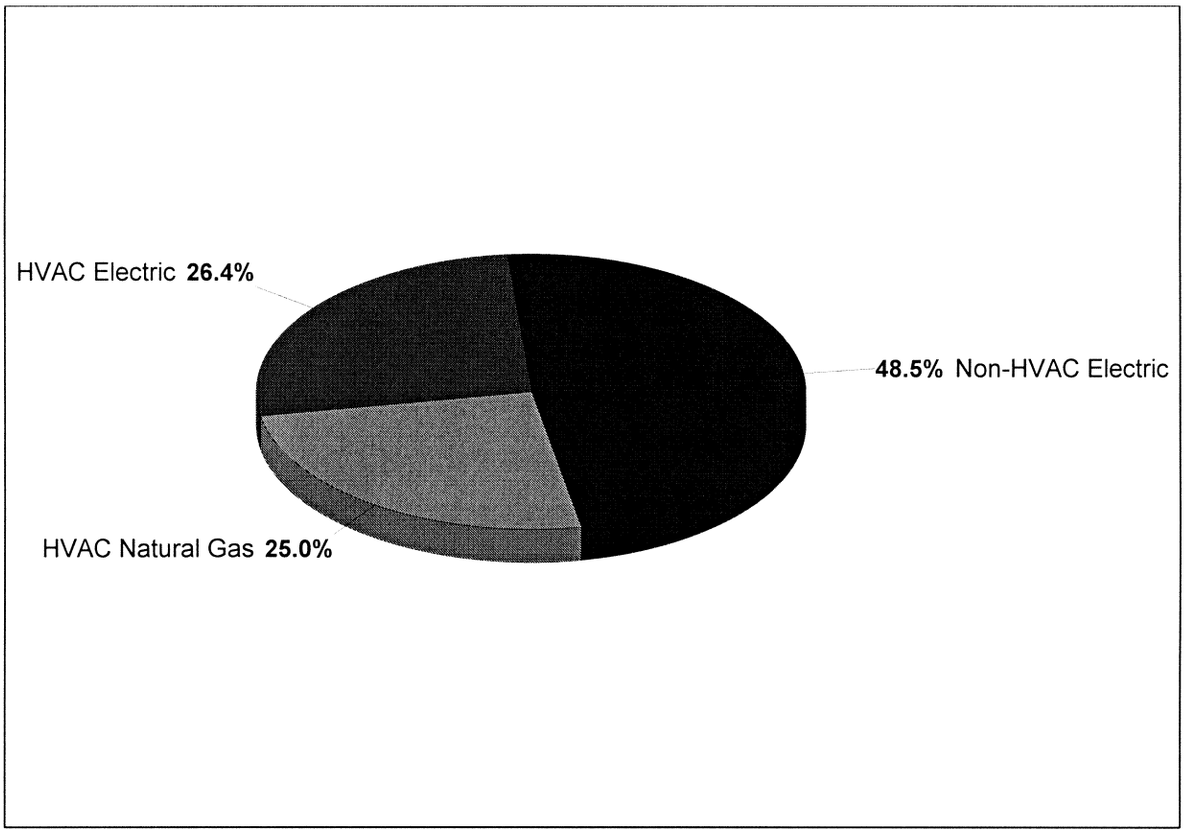

1. Annual Costs

Component	Annual Cost ($/yr)	($/ft²)	Percent of Total (%)
HVAC Components			
Electric	31,430	0.305	26.4
Natural Gas	29,774	0.289	25.0
Fuel Oil	0	0.000	0.0
Propane	0	0.000	0.0
Remote Hot Water	0	0.000	0.0
Remote Steam	0	0.000	0.0
Remote Chilled Water	0	0.000	0.0
HVAC Sub-Total	**61,205**	**0.593**	**51.5**
Non-HVAC Components			
Electric	57,682	0.559	48.5
Natural Gas	0	0.000	0.0
Fuel Oil	0	0.000	0.0
Propane	0	0.000	0.0
Remote Hot Water	0	0.000	0.0
Remote Steam	0	0.000	0.0
Non-HVAC Sub-Total	**57,682**	**0.559**	**48.5**
Grand Total	**118,886**	**1.153**	**100.0**

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... **103155.0** ft²
Conditioned Floor Area ..... **103155.0** ft²

Energy Budget by System Component - Sherwood Option #2

Sherwood Middle School
Johnson & Seaman Engineering

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1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/ft²)
Cooling Coil Loads	986,993	9.568
Heating Coil Loads	2,263,906	21.947
Grand Total	**3,250,898**	**31.515**

2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/ft²)	Source Energy (kBTU)	Source Energy (kBTU/ft²)
Air System Fans	554,726	5.378	1,981,165	19.206
Cooling	127,592	1.237	455,687	4.418
Heating	2,288,889	22.189	2,291,875	22.218
Pumps	82,526	0.800	294,735	2.857
Cooling Towers	0	0.000	0	0.000
HVAC Sub-Total	**3,053,734**	**29.603**	**5,023,462**	**48.698**
Lights	868,389	8.418	3,101,389	30.065
Electric Equipment	537,424	5.210	1,919,373	18.607
Misc. Electric	0	0.000	0	0.000
Misc. Fuel Use	0	0.000	0	0.000
Non-HVAC Sub-Total	**1,405,813**	**13.628**	**5,020,761**	**48.672**
Grand Total	**4,459,547**	**43.232**	**10,044,223**	**97.370**

Notes:
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
   Gross Floor Area ..... **103155.0** ft²
   Conditioned Floor Area ..... **103155.0** ft²

Monthly Component Costs - Sherwood Option #2

Sherwood Middle School
Johnson & Seaman Engineering

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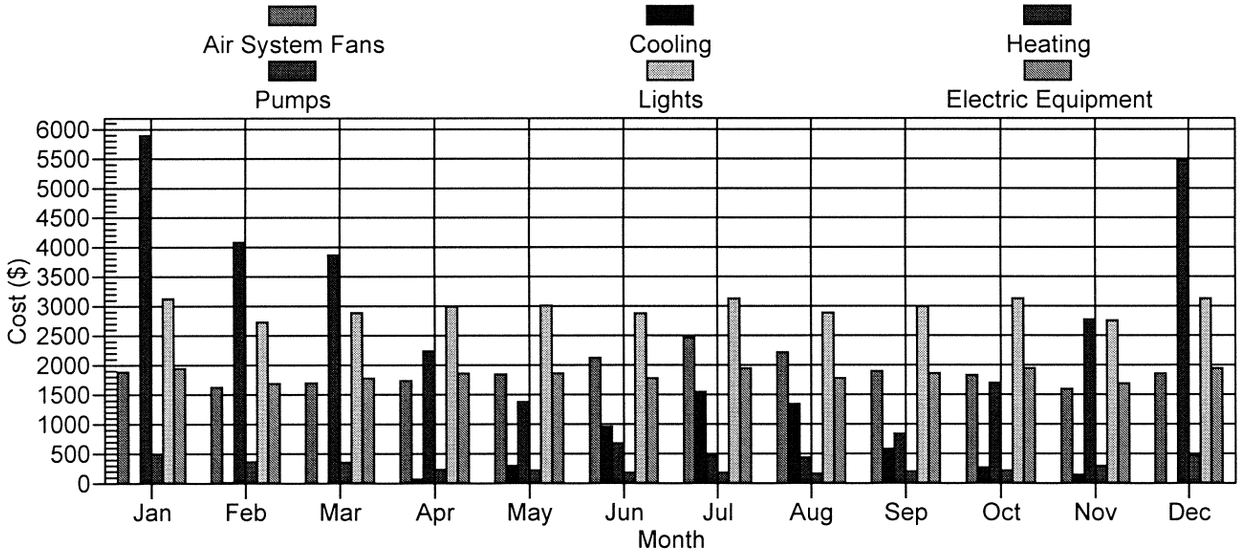

1. HVAC Component Costs

Month	Air System Fans ($)	Cooling ($)	Heating ($)	Pumps ($)	Cooling Towers ($)	HVAC Total ($)
January	1,886	4	5,892	492	0	8,274
February	1,626	14	4,082	369	0	6,091
March	1,699	4	3,864	355	0	5,922
April	1,732	69	2,236	234	0	4,271
May	1,842	300	1,379	222	0	3,743
June	2,124	950	676	182	0	3,932
July	2,465	1,549	470	180	0	4,664
August	2,215	1,342	440	167	0	4,164
September	1,895	587	840	198	0	3,520
October	1,830	268	1,698	217	0	4,013
November	1,595	143	2,772	295	0	4,805
December	1,853	4	5,474	475	0	7,806
Total	**22,761**	**5,235**	**29,822**	**3,386**	**0**	**61,205**

2. Non-HVAC Component Costs

Month	Lights ($)	Electric Equipment ($)	Misc. Electric ($)	Misc. Fuel Use ($)	Non-HVAC Total ($)	Grand Total ($)
January	3,126	1,943	0	0	5,070	13,344
February	2,731	1,690	0	0	4,421	10,512
March	2,886	1,774	0	0	4,660	10,582
April	2,994	1,859	0	0	4,853	9,124
May	3,006	1,859	0	0	4,865	8,608
June	2,874	1,774	0	0	4,649	8,581
July	3,126	1,943	0	0	5,070	9,734
August	2,886	1,774	0	0	4,660	8,824
September	2,994	1,859	0	0	4,853	8,373
October	3,126	1,943	0	0	5,070	9,083
November	2,754	1,690	0	0	4,444	9,249
December	3,126	1,943	0	0	5,070	12,876
Total	**35,631**	**22,051**	**0**	**0**	**57,683**	**118,888**

Monthly Energy Costs - Sherwood Option #2

Sherwood Middle School
Johnson & Seaman Engineering

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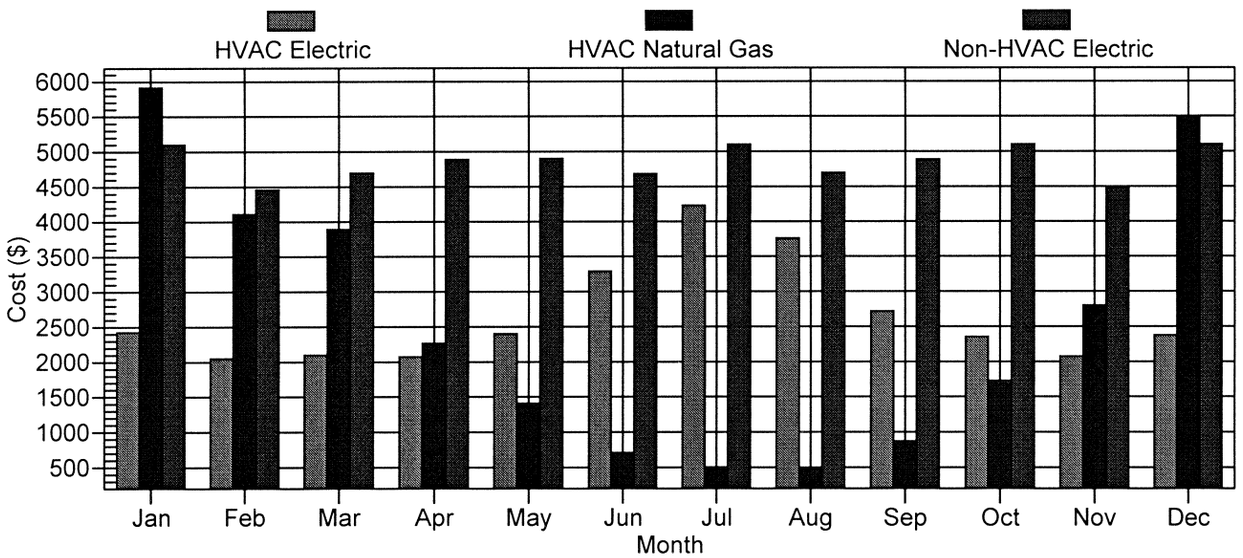

1. HVAC Costs

Month	Electric ($)	Natural Gas ($)	Fuel Oil ($)	Propane ($)	Remote Hot Water ($)	Remote Steam ($)	Remote Chilled Water ($)
January	2,391	5,883	0	0	0	0	0
February	2,016	4,075	0	0	0	0	0
March	2,064	3,858	0	0	0	0	0
April	2,038	2,232	0	0	0	0	0
May	2,366	1,377	0	0	0	0	0
June	3,257	675	0	0	0	0	0
July	4,194	469	0	0	0	0	0
August	3,725	439	0	0	0	0	0
September	2,682	839	0	0	0	0	0
October	2,318	1,695	0	0	0	0	0
November	2,037	2,767	0	0	0	0	0
December	2,342	5,465	0	0	0	0	0
Total	**31,430**	**29,774**	**0**	**0**	**0**	**0**	**0**

2. Non-HVAC Costs

Month	Electric ($)	Natural Gas ($)	Fuel Oil ($)	Propane ($)	Remote Hot Water ($)	Remote Steam ($)
January	5,069	0	0	0	0	0
February	4,420	0	0	0	0	0
March	4,660	0	0	0	0	0
April	4,853	0	0	0	0	0
May	4,865	0	0	0	0	0
June	4,648	0	0	0	0	0
July	5,069	0	0	0	0	0
August	4,660	0	0	0	0	0
September	4,853	0	0	0	0	0
October	5,069	0	0	0	0	0
November	4,444	0	0	0	0	0
December	5,069	0	0	0	0	0
Total	**57,682**	**0**	**0**	**0**	**0**	**0**

Natural Resources Canada | Ressources naturelles Canada

Canada

RETScreen® International

Clean Energy Project Analysis Software

Solar Air Heating Project Model

Clean Energy Decision Support Centre

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RETScreen® Energy Model - Solar Air Heating Project

Training & Support

Units: Imperial

Site Conditions		Estimate	Notes/Range
Project name		**Sherwood Middle School**	See Online Manual
Project location		**Shrewsbury, MA**	
Nearest location for weather data		Worcester, MA	Complete SR sheet
Annual solar radiation (tilted surface)	kWh/ft²	#NAME?	
Annual average temperature	ºF	46.8	
Annual average wind speed	mph	9.6	

System Characteristics		Estimate	Notes/Range
Heating application type	-	Ventilation air	
Base Case Heating System			
Heating fuel type	-	**Natural gas - 100 ft³**	
Heating system seasonal efficiency	%	93%	0% to 350%
Building			
Building type	-	Commercial	
Indoor temperature	ºF	72.0	68.0 to 77.0
Maximum delivered air temperature	ºF	80.0	
R-value of building wall	ft² - ºF/(Btu/h)	21.0	0.6 to 56.8
Airflow Requirements			
Design airflow rate	cfm	13,000	29 to 588,578
Operating days per week (weekday)	d/w	5.0	0.0 to 5.0
Operating hours per day (weekday)	h/d	12.0	5.0 to 24.0
Operating days per week (weekend)	d/w	2.0	0.0 to 2.0
Operating hours per day (weekend)	h/d	6.0	5.0 to 24.0
Solar Collector			
Design objective	-	High temperature rise	
Collector colour	-	Black	See Product Database
Solar absorptivity	-	0.95	0.20 to 0.99
Suggested solar collector area	ft²	6,604	
Solar collector area	ft²	3,000	
Percent shading during season of use	%	0%	0% to 50%
SAH fan flow rate	cfm/ft²	4	
Average air temperature rise	ºF	#NAME?	
Incremental fan power	W/ft²	0.0	0.0 to 0.7

Annual Energy Production (9.0 months analysed)		Estimate	Notes/Range
Incremental fan energy	MWh	**0.0**	
Specific yield	kWh/ft²	#NAME?	
Collector efficiency	%	#NAME?	
Solar availability while operating	%	#NAME?	
Renewable energy collected	million Btu	#NAME?	
Building heat loss recaptured	million Btu	#NAME?	
Renewable energy delivered	MWh	**#NAME?**	
	million Btu	#NAME?	

Complete Cost Analysis sheet

RETScreen® Solar Resource - Solar Air Heating Project

Site Latitude and Collector Orientation		Estimate	Notes/Range
Nearest location for weather data		Worcester, MA	See Weather Database
Latitude of project location	ºN	42.3	-90.0 to 90.0
Slope of solar collector	º	90.0	0.0 to 90.0
Azimuth of solar collector	º	20.0	0.0 to 180.0

Monthly Inputs

Month	Fraction of month used (0 - 1)	Monthly average daily radiation on horizontal surface (kWh/m²/d)	Monthly average temperature (ºF)	Monthly average wind speed (mph)	Monthly average daily radiation in plane of solar collector (kWh/m²/d)
January	1.00	1.89	23.0	11.2	#NAME?
February	1.00	2.76	25.0	11.0	#NAME?
March	1.00	3.78	33.8	11.0	#NAME?
April	1.00	4.68	44.4	10.7	#NAME?
May	1.00	5.48	55.8	9.4	#NAME?
June	0.25	5.95	64.4	8.5	#NAME?
July	0.00	5.92	69.8	7.8	#NAME?
August	0.00	5.23	67.8	7.8	#NAME?
September	0.75	4.19	60.1	8.3	#NAME?
October	1.00	2.99	49.8	8.9	#NAME?
November	1.00	1.88	39.4	9.8	#NAME?
December	1.00	1.54	27.7	10.5	#NAME?

		Annual	Season of use
Solar radiation (horizontal)	kWh/ft²	130.99	83.52
Solar radiation (tilted surface)	kWh/ft²	#NAME?	#NAME?
Average temperature	ºF	46.8	40.0
Average wind speed	mph	9.6	10.1

Return to Energy Model sheet

RETScreen® Cost Analysis - Solar Air Heating Project

Type of analysis: Pre-feasibility | Currency: $ | Cost references: None

Initial Costs (Credits)	Unit	Quantity	Unit Cost	Amount	Relative Costs	Quantity Range	Unit Cost Range
Feasibility Study							
Other - Feasibility study	Cost	0	$ -	$ -		-	-
Sub-total :				**$ -**	0.0%		
Development							
Other - Development	Cost	0	$ -	$ -		-	-
Sub-total :				**$ -**	0.0%		
Engineering							
Other - Engineering	Cost	1	$ 3,000	$ 3,000		-	-
Sub-total :				**$ 3,000**	5.7%		
Energy Equipment							
Solar collector materials	ft²	3,000	$ 10	$ 29,850		-	-
Equipment installation	ft²	3,000	$ 6	$ 18,000		-	-
Cladding material credit	ft²	-3,000		$ -		-	-
Cladding labour credit	ft²	-3,000		$ -		-	-
Incremental transportation	project	1	$ 2,000	$ 2,000		-	-
Other - Energy Equipment	Credit			$ -		-	-
Sub-total :				**$ 49,850**	94.3%		
Balance of Equipment							
Fans and ducting materials	cfm	13,000	$ -	$ -		-	-
Fans and ducting labour	cfm	13,000	$ -	$ -		-	-
Fan and duct material credit	cfm	-13,000	$ -	$ -		-	-
Fan and duct labour credit	cfm	-13,000	$ -	$ -		-	-
Incremental transportation	project	0	$ -	$ -		-	-
Other - Balance of Equipment	Cost	0	$ -	$ -		-	-
Sub-total :				**$ -**	0.0%		
Miscellaneous							
Overhead	%	0%	$ 49,850	$ -		-	-
Training	p-h	0	$ -	$ -		-	-
Contingencies	%	0%	$ 52,850	$ -		-	-
Sub-total :				**$ -**	0.0%		
Initial Costs - Total				**$ 52,850**	100.0%		

Annual Costs (Credits)	Unit	Quantity	Unit Cost	Amount	Relative Costs	Quantity Range	Unit Cost Range
O&M							
Property taxes/Insurance	project	0	$ -	$ -		-	-
O&M labour	project	0	$ -	$ -		-	-
Travel and accommodation	p-trip	0	$ -	$ -		-	-
Other - O&M	Cost	0	$ -	$ -		-	-
Contingencies	%	0%	$ 49,850	$ -		-	-
Sub-total :				**$ -**			
Fuel/Electricity	kWh	**0**	**$ -**	**$ -**		-	-
Annual Costs - Total				$ -			

Periodic Costs (Credits)		Period	Unit Cost	Amount	Interval Range	Unit Cost Range
				$ -	-	-
				$ -	-	-
				$ -	-	-
End of project life		-		**$ -**		

Go to GHG Analysis sheet

RETScreen® Greenhouse Gas (GHG) Emission Reduction Analysis - Solar Air Heating Project

Use GHG analysis sheet? Yes Type of analysis: Standard

Background Information

Project Information

Project name	erwood Middle School
Project location	Shrewsbury, MA

Global Warming Potential of GHG

1 tonne CH_4 =	21	tonnes CO_2	(IPCC 1996)
1 tonne N_2O =	310	tonnes CO_2	(IPCC 1996)

Base Case Electricity System (Baseline)

Fuel type	Fuel mix (%)	CO_2 emission factor (kg/GJ)	CH_4 emission factor (kg/GJ)	N_2O emission factor (kg/GJ)	Fuel conversion efficiency (%)	T & D losses (%)	GHG emission factor (t_{CO2}/MWh)
Diesel (#2 oil)	100.0%	74.1	0.0020	0.0020	30.0%	8.0%	0.975
Electricity mix	100%	268.5	0.0072	0.0072		8.0%	0.975

Base Case Heating System (Baseline)

Fuel type	Fuel mix (%)	CO_2 emission factor (kg/GJ)	CH_4 emission factor (kg/GJ)	N_2O emission factor (kg/GJ)	Fuel conversion efficiency (%)	GHG emission factor (t_{CO2}/MWh)
Heating system						
Natural gas	100.0%	56.1	0.0030	0.0010	93.0%	0.219

Proposed Case Heating System (Solar Air Heating Project)

Fuel type	Fuel mix (%)	CO_2 emission factor (kg/GJ)	CH_4 emission factor (kg/GJ)	N_2O emission factor (kg/GJ)	Fuel conversion efficiency (%)	GHG emission factor (t_{CO2}/MWh)
Heating system						
Electricity	#NAME?	268.5	0.0072	0.0072	100.0%	#NAME?
Solar	#NAME?	0.0	0.0000	0.0000	100.0%	#NAME?
Heating energy mix	#NAME?	#NAME?	#NAME?	#NAME?		#NAME?

GHG Emission Reduction Summary

	Base case GHG emission factor (t_{CO2}/MWh)	Proposed case GHG emission factor (t_{CO2}/MWh)	End-use annual energy delivered (MWh)	Annual GHG emission reduction (t_{CO2})
Heating system	0.219	#NAME?	#NAME?	#NAME?
			Net GHG emission reduction t_{CO2}/yr	**#NAME?**

Complete Financial Summary sheet

RETScreen® Financial Summary - Solar Air Heating Project

Annual Energy Balance

Project name		Sherwood Middle School	Electricity required	MWh	-
Project location		Shrewsbury, MA			
Renewable energy delivered	MWh	#NAME?	Net GHG reduction	t_{CO2}/yr	#NAME?
Heating fuel displaced	-	Natural gas	Net GHG emission reduction - 30 yrs	t_{CO2}	#NAME?

Financial Parameters

Avoided cost of heating energy	$/100 ft³	1.500	Debt ratio	%	0.0%
GHG emission reduction credit	$/$t_{CO2}$	-	Income tax analysis?	yes/no	No
Retail price of electricity	$/kWh	-			
Energy cost escalation rate	%	5.0%			
Inflation	%	2.5%			
Discount rate	%	9.0%			
Project life	yr	30			

Project Costs and Savings

Initial Costs				**Annual Costs and Debt**		
Feasibility study	0.0%	$	-	O&M	$	-
Development	0.0%	$	-	Fuel/Electricity	$	-
Engineering	5.7%	$	3,000			
Energy equipment	94.3%	$	49,850	**Annual Costs - Total**	**$**	**-**
Balance of equipment	0.0%	$	-			
Miscellaneous	0.0%	$	-	**Annual Savings or Income**		
Initial Costs - Total	100.0%	**$**	**52,850**	Heating energy savings/income	$	#NAME?
Incentives/Grants		$	-	RE production credit income - 15 yrs	$	#NAME?
				GHG reduction income - 10 yrs	$	#NAME?
				Annual Savings - Total	**$**	**#NAME?**
Periodic Costs (Credits)						
		$	-			
		$	-			
		$	-			
End of project life -		$	-			

Financial Feasibility

Pre-tax IRR and ROI	%	#VALUE!	Calculate GHG reduction cost?	yes/no	No
After-tax IRR and ROI	%	#VALUE!			
Simple Payback	yr	#NAME?	Project equity	$	52,850
Year-to-positive cash flow	yr	#NAME?			
Net Present Value - NPV	$	#NAME?			
Annual Life Cycle Savings	$	#NAME?			
Benefit-Cost (B-C) ratio	-	#NAME?			

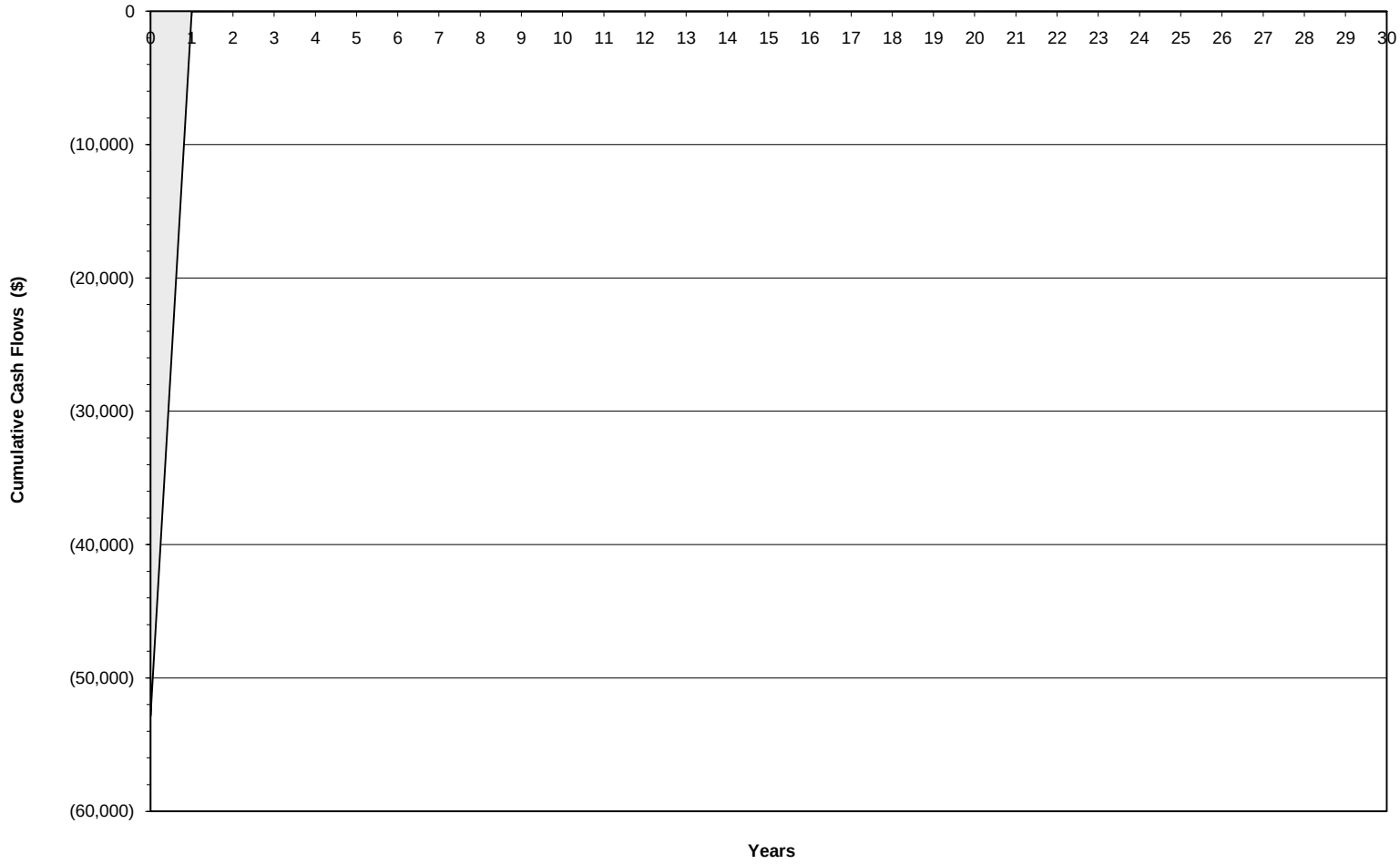
Yearly Cash Flows

Year	Pre-tax	After-tax	Cumulative
#	$	$	$
0	(52,850)	(52,850)	(52,850)
1	#NAME?	#NAME?	#NAME?
2	#NAME?	#NAME?	#NAME?
3	#NAME?	#NAME?	#NAME?
4	#NAME?	#NAME?	#NAME?
5	#NAME?	#NAME?	#NAME?
6	#NAME?	#NAME?	#NAME?
7	#NAME?	#NAME?	#NAME?
8	#NAME?	#NAME?	#NAME?
9	#NAME?	#NAME?	#NAME?
10	#NAME?	#NAME?	#NAME?
11	#NAME?	#NAME?	#NAME?
12	#NAME?	#NAME?	#NAME?
13	#NAME?	#NAME?	#NAME?
14	#NAME?	#NAME?	#NAME?
15	#NAME?	#NAME?	#NAME?
16	#NAME?	#NAME?	#NAME?
17	#NAME?	#NAME?	#NAME?
18	#NAME?	#NAME?	#NAME?
19	#NAME?	#NAME?	#NAME?
20	#NAME?	#NAME?	#NAME?
21	#NAME?	#NAME?	#NAME?
22	#NAME?	#NAME?	#NAME?
23	#NAME?	#NAME?	#NAME?
24	#NAME?	#NAME?	#NAME?
25	#NAME?	#NAME?	#NAME?
26	#NAME?	#NAME?	#NAME?
27	#NAME?	#NAME?	#NAME?
28	#NAME?	#NAME?	#NAME?
29	#NAME?	#NAME?	#NAME?
30	#NAME?	#NAME?	#NAME?

Cumulative Cash Flows Graph

SAH Project Cumulative Cash Flows
Sherwood Middle School, Shrewsbury, MA

Renewable energy delivered (MWh/yr): #NAME? **Total Initial Costs: $ 52,850** **Net average GHG reduction (t_{CO2}/yr): #NAME?**



Net Present Value: $ #NAME?

RETScreen® Sensitivity and Risk Analysis - Solar Air Heating Project

Use sensitivity analysis sheet?	No

November 18, 2009

Jerimey Moran
Seaman Engineers

I have attached the Sherwood Middle School Energy model for you to review based on the information provided. I sized the SolarWall @ 3,000ft2 with a cfm rate of 4.3/ft2.

- Engineering cost - $3,000 - approximate
- Shipping - $2,000 - you would be billed actual

- Installation - it varies from region to region I used $6 sq ft any reputable sheet metal install can do the install
- SolarWall System - includes 26gauge panels, framing, fasteners, flats {25% of panel area}, foam closures $9.95 sq ft

- I did not include fans, controls or ducting – usually the local HVAC has brands that they both service and sell –

- Average Temperature Rise – 14.6 Degrees Fahrenheit

- Greenhouse Gas [GHG] Emission Reduction 34.2 tons$CO_{2/year}$

- Annual Fuel Savings –Total - $8,687

- Positive cash flow payback 5.2 years - this factors in the expected 5% escalation of energy over the 30 yr life of the project - it is more accurate than the simple payback of 6.1 years

- If the feasibility of the SolarWall meets your financial parameters our engineer TJ Johnson would need:

    1. Picture of the building
    2. Elevation and section views
    3. Where the proposed wall would be installed
    4. Dimensions to scale w/ reference
    5. Structure material of building wall

Respectfully submitted,

John F. Hickey
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Sherwood Middle School
Sherwood Avenue, Shrewsbury, Massachusetts

Schematic Design - Electrical Systems Narrative November 23, 2009

ELECTRICAL SERVICE

The electrical service to the building will be 1600A, 277Y/480V, 3-phase, 4-wire electrical switchboards with ground fault protection, digital metering and TVSS located in the main electrical room. The digital metering system at the main switchboards will be capable of providing electrical consumption data at least daily and measured at 15 minute intervals. The new service will be underground and fed from new utility company padmount transformer located on the exterior of the building. The conductors for each electrical service will be 4 sets of 4-600 KCMIL in 4-4 in. conduits from the utility company padmount transformer to the switchboard. The grounding electrode system will be designed to have resistance of 5 ohms or less.

ELECTRICAL DISTRIBUTION

The electrical distribution will include new panelboards and feeders. The following distribution panels will be provided:

Main Electric Room
(1) 1600A, 277Y/480V, 3-Phase, 4-Wire, Switchboard
(2) 200A, 277Y/480V, 3-Phase, 4-Wire, 42-circuit panelboard
(2) 75kVA 480V to 120Y/208V, step-down transformers
(1) 225A, 120Y/208V, 3-Phase, 4-Wire, 84-circuit panelboard
(1) 225A, 120Y/208V, 3-Phase, 4-Wire, self-enclosed circuit breaker
(1) 45kVA 480V to 120Y/208V, K-13, step-down transformer with 200% neutral lugs
(1) 150A, 120Y/208V, 3-Phase, 4-Wire, 84-circuit panelboard with 200% neutral
(1) 200A, 277Y/480V, automatic transfer switch (Standby Power Branch)
(1) 175A, 277Y/480V, 3-Phase, 4-Wire, 42-circuit panelboard (Standby Power Branch)
(1) 15kVA 480V to 120Y/208V, step-down transformers (Standby Power Branch)
(1) 60A, 120Y/208V, 3-Phase, 4-Wire, 30-circuit panelboard (Standby Power Branch)
(1) 16 circuit lighting control panel

Telecom Server Room
(1) 125A, 120Y/208V, 3-Phase, 4-Wire, 42-circuit panelboard with TVSS and 200% neutral

Kitchen
(1) 225A, 120Y/208V, 3-Phase, 4-Wire, 84-circuit panelboard

First Floor Electric Room
(1) 100A, 277Y/480V, 3-Phase, 4-Wire, 42-circuit panelboard
(1) 45kVA 480V to 120Y/208V, K-13, step-down transformer with 200% neutral lugs
(1) 150A, 120Y/208V, 3-Phase, 4-Wire, 84-circuit panelboard with 200% neutral
(1) 30kVA, 480 to 120Y/208V UPS
(1) 16 circuit lighting control panel

Second Floor Electric Room
(1) 200A, 277Y/480V, 3-Phase, 4-Wire, 42-circuit panelboard
(2) 45kVA 480V to 120Y/208V, K-13, step-down transformer with 200% neutral lugs
(2) 150A, 120Y/208V, 3-Phase, 4-Wire, 84-circuit panelboard with 200% neutral
(1) 16 circuit lighting control panel

Third Floor Electric Room
(1) 200A, 277Y/480V, 3-Phase, 4-Wire, 42-circuit panelboard
(2) 45kVA 480V to 120Y/208V, K-13, step-down transformer with 200% neutral lugs
(2) 150A, 120Y/208V, 3-Phase, 4-Wire, 84-circuit panelboard with 200% neutral
(1) 16 circuit lighting control panel

EMERGENCY/STANDBY POWER

The emergency/standby power for the building will be provided by a 150kW/187.5kVA generator. The generator will be located on the exterior of the building and will have a base-mounted integral fuel oil tank. The generator will feed the emergency (life safety branch) distribution with one (1) 100A-3P circuit breaker and the standby distribution with one (1) 175A-3P circuit breaker. The emergency power transfer, distribution equipment and feeders will be 2-hour rated. The emergency electrical distribution will include new panelboards and feeders located in new 2-hour rated emergency electrical room and closets. The following distribution panels will be provided:

Emergency Electric Room (Life Safety Branch)
(1) 100A, 277Y/480V, automatic transfer switch
(1) 100A, 277Y/480V, 3-Phase, 4-Wire, 42-circuit panelboard
(1) 15kVA 480V to 120Y/208V, step-down transformers
(1) 60A, 120Y/208V, 3-Phase, 4-Wire, 30-circuit panelboard

First Floor Emergency Electric Closet (Life Safety Branch)
(1) 100A, 277Y/480V, 3-Phase, 4-Wire, 42-circuit panelboard

GENERAL PURPOSE POWER

Classrooms: A minimum of two double duplex receptacles will be provided on two walls for teacher stations; one double duplex will be provided for a student computer station; two GFCI duplex receptacles will be provided for the counter; one duplex receptacle will be mounted 96” AFF on two walls for interactive whiteboard and wireless access points; and two TVSS duplex receptacles will be provided in every other classroom for laptop charger carts.

A minimum of one general purpose 120V, 20A duplex receptacle will be provided in utility and storage rooms. A minimum of one general purpose receptacle will be provided on each wall in offices, conference rooms, etc. where walls exceed 12 feet, an additional duplex receptacle for each additional 12 feet of wall or fraction thereof will be provided. A minimum one general purpose receptacle will be provided every 50 ft. in hallways.

Each stand-alone, non-system furniture workstation will be provided with an adjacent double duplex receptacle on an independent single phase, 120V, 20A clean power circuit having not more than four duplex receptacles and a non-shared neutral. Each stand-alone, system furniture workstation will be provided with an adjacent double-duplex receptacle on an independent single phase, 120V, 20A clean power circuit having not more than six duplex

receptacles and a non-shared neutral. Each group of six (6) (or fraction thereof) modular, system furniture workstations will be provided with a five (5) wire furniture feed consisting of three isolated ground independent, single phase, 120V, 20A clean power circuits. This multi-wire branch circuit will be served by a three pole circuit breaker that simultaneously disconnects all ungrounded conductors of the multi-wire branch circuit.

Multiple service floor outlets or fire rated poke-thru outlets will be provided for equipment and appliances in the commons areas when the equipment is to be placed on worktables, counters, systems furniture, or cabinets that are not against fixed walls. Multi-outlet raceway will be provided above workbenches with receptacles 12 inches on center where required. Receptacle and power connections for kitchen, gymnasium, etc. will be provided.

INTERIOR LIGHTING SYTEM

High efficiency lighting will be provided in all interior spaces as well as on the exterior of the building. The light power density in the interior of the building will not exceed 0.7W/sq. ft. Linear direct/indirect fixtures with T5 will be provided; recessed downlight fixture with compact fluorescent or LED lamps will be provided. Interior lighting will be controlled with an automatic control device to shut off building lighting in all spaces. The automatic control device will function on either a scheduled basis using a time of day operated control device that turns lighting off at specific programmed times; or on occupant sensor that will turn lighting off within 30 minutes of an occupant leaving a space; or an unscheduled basis by occupant intervention.

Each space enclosed by ceiling-height partitions will have at least one control device to independently control the general lighting within the space. Each control device will be activated either manually by an occupant or automatically by sensing an occupant. Each perimeter office space enclosed by ceiling-height partitions will have a manual control to allow the occupant to uniformly reduce the connected lighting load by at least 50% or will be provided with automatic day-lighting controls.

Each perimeter classroom space will have a manual control to allow the occupant to uniformly reduce the connected lighting load by at least 50% or will be provided with automatic day-lighting controls. The lighting controls will be integrated with the HVAC controls.

EXTERIOR LIGHTING

Pedestrian walkways will be designed for an average maintained illuminance value of 0.6 footcandle horizontal, and 1.1 footcandle vertical, as measured 6’- 0" above ground, and will maintain an avg/min illuminance uniformity ratio not to exceed 4:1. All parking lots will be designed for a minimum level of 0.2 footcandle at the ground plane, a minimum vertical illuminance of 0.1 footcandle measured 5’-0” above the ground plane and a max/min uniformity ratio of 20:1 Roadways will be designed for an average maintained illuminance value of 0.6 footcandle and will maintain an average/minimum uniformity ratio not exceeding 4:1.

Pedestrian walkway lighting will be LED bollard type fixtures; parking and roadway lighting will be wired or solar powered LED fixtures mounted on 20 ft. poles.

EGRESS & EXIT LIGHTING

Egress lighting will be provided in egress pathways, classrooms, bathrooms, assembly areas and outside each egress door. Exit lighting will be provided in egress pathways and in assembly

areas. Egress and exit lighting will be connected to the life safety branch of the emergency/standby generator.

FIRE ALARM SYSTEM

A new addressable fire alarm system with voice evacuation and connection to the fire department will be provided. The design of the fire alarm system will be based on engineering criteria as defined by NFPA 72-2007 and the Massachusetts State Building Code 780 CMR. The system will be supported by standby batteries. The batteries will support 24-hours of full supervisory operation followed by 15 minutes of alarm. Combination audiovisual signaling appliances will be provided as required per NFPA 72-2007. Standalone devices may be used to augment combination units when necessary. The audiovisual notification appliances will be located in all egress pathways, classrooms, public and common areas. Visual devices will be provided in all offices. The devices will be in compliance with the Americans with Disabilities Act (ADA). Manual pull stations will be located within 5 ft. of each means of egress and mounted at 44 in. above the floor to the activating lever of the box. The pull stations will mechanically latch upon operation and remain so until manually reset by a key common to all system locks. Photoelectric smoke detectors will be located in all egress pathways spaced 30 feet on center, and 15 feet from all stairwells and opposing walls. Smoke detectors will also be located at the top, bottom of each stairway; mechanical equipment; electrical; transformer; telephone equipment; elevator machine; or similar room. Elevator recall smoke detectors will be located in the elevator lobby on each floor. Duct smoke detectors listed for use in the air distribution systems will be located down stream of the air filters and ahead of the branch connections in air systems of greater than 2000-cfm capacity. The sprinkler tamper switches will be connected to the fire alarm control panel and supervised for trouble signal. The sprinkler flow switches will be connected to the fire alarm control panel and wired for alarm.

TELECOMMUNICATIONS CABLING

The telecommunications cabling system will be in compliance with the latest EIA/TIA standards. The utility company services will be terminated in the telecommunications entrance facility (EF). Fire rated plywood backboards, grounding, equipment racks, 110-type punch down blocks, patch panels, conduit sleeves, and corridor cable tray system will be provided in the EF, telecommunications equipment room (TER) and telecommunications rooms (TR). The pathway system, racks and equipment will be sized for complete utilization of the service entrance cables and all voice and data outlets plus room for minimum of 50% growth. Voice and data outlets will be provided in all administration areas and in the classrooms. Voice and data horizontal cabling will be Category 6, unshielded, twisted pair, 8 conductor copper cable from each jack to the nearest telecommunications closet. Each end of each cable will be labeled, the cables will be terminated in accordance with ANSI/TIA/EIA-568-B configuration T568-A, and tested in accordance with ANSI/TIA/EIA- 568-B.

A minimum of two (2) voice/data outlets will be provided in each office; one (2) voice and six (6) data outlets in each classroom; two (2) data outlets in the ceiling in each classroom, one for interactive whiteboard and one for wireless access point; one (1) data outlet in the ceiling on 40’ centers in the corridors and in the assembly areas for wireless access points; one (1) data outlet for each computer workstation in the media and computer classrooms.

Backbone cables will be provided between the TER and each TR. Copper backbone cables will be voice grade Category 3 cable. The cables will be tested in accordance with ANSI/TIA/EIA 568-B. Optical fiber cables will be 12-strand multimode laser optimized cable and 12-strand

single mode cable. The cables will be terminated in fiber optic patch panels at both ends. The circuits will be tested for insertion loss at both ends at 1310 and 1550nm. High-resolution Optical Time Domain Reflectivity (OTDR) tests will be performed on each fiber at one end.

CLOCK SYSTEM

A Master Time & Control System will be provided. The system shall comprise a Master Clock that controls and synchronizes the time on peripheral clocks located throughout the school. The system will also control other peripheral devices such as bells, etc. and utilize the school public address system to sound pre-programmed tones for class changes. Clocks will be provided in classrooms, assembly areas and in administration areas.

INTERCOM/PUBLIC ADDRESS SYSTEM

An intercom/public address speakers will be provided. Speakers will be located in classrooms, in administration areas, assembly areas and in public and common areas. The system will provide administrators with the ability to make announcements throughout the school premises, to a limited area, or to an individual classroom. The system will incorporate a 'talkback' feature so that the speakers used for overhead paging in individual areas are also microphones for two-way intercom operations. A telephone handset in each classroom will initiate either a routine or emergency call. In the front office, the administrative staff can select whether they want to initiate or respond to individual 2-way conversations, make announcements, or play background music. The system will be capable of supporting multiple, simultaneous communications.

AUDIO-VIDEO SYSTEMS

A sound system will be provided in the cafeteria and gymnasium. The systems will be integrated with the public address system so that the sound system can either reinforce or be muted when an emergency announcement from the front office is generated. A theatrical sound system will be provided in the auditorium. The sound system will also be integrated with the fire alarm system so that the system is muted when the fire alarm system is activated. The sound systems in each area will incorporate two wireless microphones, 5-disk CD player and AM/FM tuner as well as two additional inputs.

Video projection systems consisting of a projector, motorized screen, and integrated with the sound system will be provided in the auditorium and in the cafeteria. The system will incorporate DVD/VCR players, computers, incoming TV signals, and video production equipment; and remote control (Play, Stop, Pause, Rewind, Fast Forward, etc.) of central located equipment. Interactive whiteboards with ultra-short throw projectors and speakers for sound will be provided in each classroom. A digital signage system will be provided at the main lobby and cafeteria. The system will be server based with multiple channels and capable of displaying different media content on a number of LCD HDTVs (one in the lobby and four in the cafeteria).

VIDEO DISTRIBUTION SYSTEM

The video distribution system will be capable of broadcasting live or on-demand lectures directly to PC and Mac desktops at top video quality across the school over the IP network. The system will convert the local area network (LAN) into a digital video delivery network and extend video delivery to the internet. The system will support the latest video formats in the market: MPEG-2, MPEG-4, H.264 and Adobe® Flash®.

The video distribution systems can be used to custom-tailor courses for individual student groups, to deliver interactive material to off-site students, to inform students and staff of new initiatives, to monitor classrooms, to provide entertaining content to the recreational areas (gymnasium, cafeteria, etc.) and to promote access to video archives for revisiting taped video content. The system can be used to connect with alumni, parents or the greater community, by making graduation ceremonies, guest lectures, sporting events, or the school plays available on the Internet.

The distribution of Audio-Video Signals will be accomplished using network wiring to classroom interactive whiteboards. Each classroom interactive whiteboard will be wired for power, audio, video, HDMI, VDA, data and USB cables for interface with teacher/student laptop computers.

ACCESS CONTROL, INTRUSUION DETECTION & VIDEO SURVEILLANCE SYSTEM

An access control system will be provided. At a minimum access control will be provided at each entry/egress door. The system will be server based and comprise of proximity card readers, badges, enrolment center and door hardware interface. An intrusion detection system will be provided. At a minimum the system will monitor all entry/egress doors and glass break detectors will be provided on the first floor of the building. A video surveillance system will be provided. At a minimum the system will monitor the building perimeter and each entry/egress door. The access control system will be integrated with the video surveillance system.

VOICE COMMUNICATIONS EQUIPMENT

A new voice communications system will be provided. The system will comprise of a voice-over-IP (VoIP) telephone switching system, voicemail, distribution infrastructure, and telephone handsets. Telephone handsets shall be provided in each classroom, in each administration office, gymnasium, cafeteria and in each telecommunications room.

DATA COMMUNICATIONS EQUIPMENT

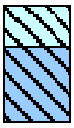
A new data communications system will be provided. The system will comprise of a server and storage farm, 10/100/1000 Power-over-Ethernet (PoE) switches, and wireless access points with a/b/g/n radios and controller. The servers and storage will provide a platform on which to run applications, like the school's enrollment and financial databases as well as student and teacher applications. The switches will provide connection of a number of devices together (PCs, servers, printers, etc.) over a wired data system and control access to various parts of the network. The wireless access points will provide connection of a number of devices together (PCs, servers, printers, etc.) over a wireless data system and control access to various parts of the network. The system will be setup with separate VLANs, authentication and security for administration, students and guests.

1.15 PREFERRED SCHEMATIC DESIGN

K. MA-CHPS Scorecard

Project: **Sherwood Middle School**
Date of Review: **October 14, 2009**

Massachusetts Collaborative for High Performance Schools (MA-CHPS)



Requirement for all schools

Requirement for green schools only

Point Thresholds
30 points - 1.5% Financing of Maximum Allowable Cost
34 points - 2.0% Financing of Maximum Allowable Cost

40 **Total Project Score**

10	Points		SITE	Associated LEED Credit
	---	SP 1	**Joint Use of Facilities**	SSc10
	---	SP 2	**Joint Use of Parks**	SSc10
1	1	SC 1.1	**Sustainable Site Selection**	SSc1
1	1	SC 1.2	**No Development on Floodplains**	SSc1
0	1	SC 1.3	**No Development Near Wetlands**	SSc1
1	1-2	SC 1.4	**No Development on Greenfields**	SSc1
1	1	SC 1.5	**Centrally Located Site/Smart Growth**	SSc2
1	1	SC 1.6	**Reduced Building Footprint**	none
1	1	SC 1.7	**Sustainable Site and Building Layout**	none
M	1	SC 2.1	**Locate Near Public Transit**	SSc4.1
1	1	SC 2.2	**Pedestrian/Bike Access**	SSc4.2
0	1	SC 2.3	**Minimize Parking**	SSc4.3
0	1	SC 3	**Post-Construction Stormwater Management**	SSc6.1&6.2
M	1	SC 4.1	**Design to Reduce Heat Islands, Non-Roof**	SSc7.1
1	1	SC 4.2	**Design to Reduce Heat Islands, Roof**	SSc7.2
2	2	SC 5	**Exterior Light Pollution Reduction**	SSc8

3	Points		WATER	Associated LEED Credit
	---	WP 1	**Indoor Water Use Reduction, 20% Reduction**	WEc3
1	1	WC 1.1	**Indoor Water Use Reduction, 30% Reduction**	WEc3
0	1	WC 1.2	**Reduce Water Used for Sewage Conveyance**	WEc2
M	1	WC 2.1	**No Permanent Irrigation For Landscaping**	WEc2
1	1	WC 2.2	**Water Reduction and Sports Turf Management**	WEc1
1	1	WC 2.3	**Irrigation System Commissioning**	none

6	Points		ENERGY	Associated LEED Credit
	---	EP 1	**Elimination of CFC-based Refrigerants**	EAp3
	---	EP 2	**Commissioning**	EAc3
	---	EP 3	**Fundamental Building Systems, Training**	EAc3
	---	EP 4	**Exceed Energy Code by 20%, Prescriptive Approach**	EAc1
	---	EP 4	**Exceed Energy Code by 20%, Performance Approach**	EAc1
0	1-2	EC 1	**Superior Energy Performance, Prescriptive Approach**	EAc1
3	1-10	EC 1	**Superior Energy Performance, Performance Approach**	EAc1
2	2	EC 2	**Minimize Air Conditioning**	none
M	2-11	EC 3	**Renewable Energy**	EAc2
1	1	EC 4.1	**Energy Management Systems**	none
0	1	EC 4.2	**Submetering**	none

4	Points		MATERIALS	Associated LEED Credit
	---	MP 1	**Storage & Collection of Recyclables**	MRp1
	---	MP 2	**Site Waste Management, 75% Diversion**	MRc2
1	1	MC 1	**Site Waste Management, 90% Diversion**	MRc2
0	1-4	MC 2.1	**Building Reuse, Maintain 50-95% of Existing Shell**	MRc1
0	1	MC 2.2	**Building Reuse, Maintain 50% Interior**	MRc1
3	1-7	MC 3	**Combined Materials Attributes**	MRc4, 6, 7

13	Points		IEQ	Associated LEED Credit
	---	IEQP 1	**ASHRAE Standard 62.1-2004 Compliance**	EQp1
	---	IEQP 2	**SMACNA IAQ Guidelines**	EQc3.1
	---	IEQP 3	**Construction IAQ, Duct Protection**	EQc3.1
	---	IEQP 4	**Pollutant Source Control, Off-gassing**	EQc5
	---	IEQP 5	**Walk-Off Mats**	EQc5
	---	IEQP 6	**Drainage**	none
	---	IEQP 7	**Irrigation Design**	none

	---	IEQP 8	**Mold Protection**	EQc3.1
	---	IEQP 9	**Electric Ignitions, Gas-Fired Equipment**	none
	---	IEQP 10	**Air Intake Location**	none
	---	IEQP 11	**Duct Liners**	none
	---	IEQP 12	**Prohibit Fossil Fuel Burning Equipment, Indoors**	none
	---	IEQP 13	**Filter Requirements for HVAC Equipment**	EQc5
	---	IEQP 14	**ASHRAE Standard 55-2004 Compliance**	EQc7.1
	---	IEQP 15	**Access to Views, 70%**	EQc8.2
2	2	IEQC 1.1	**Access to Views, 90%**	EQc8.2
2	1-4	IEQC 1.2	**Daylighting in Classrooms**	EQc8.1
4	1-4	IEQC 2.1	**Low-Emitting Materials**	EQc4
1	1	IEQC 2.2	**Pollutant Source Control, Ducted HVAC Returns**	none
M	1	IEQC 2.3	**Pollutant Source Control, High Efficiency Filters**	EQc5
1	1	IEQC 2.4	**Construction IAQ, HEPA Vacuuming**	none
M	2	IEQC 2.5	**Construction IAQ, Building Flushout**	EQc3.2
1	1	IEQC 3.1	**Acoustical Performance in Classrooms, Max 40 NC**	EQc9
M	1	IEQC 3.2	**Acoustical Performance in Classrooms, Max 35 NC**	EQc9
M	2	IEQC 3.3	**Acoustical Performance in Classrooms, Max 30 NC**	EQc9
M	1	IEQC 3.4	**Reducing Sound Transmission**	EQc9
1	1	IEQC 4.1	**Controllability of Systems, Operable Windows**	none
1	1	IEQC 4.2	**Controllability of Systems, Temperature/Light Control**	EQc6.1 &6.2

4	Points		**POLICY & OPERATIONS**	Associated LEED Credit
	---	P&OP 1	**Maintenance Plan**	none
	---	P&OP 2	**Anti-Idling Measures**	none
N	1	P&OC 1	**Maintenance Plan, CMMS**	none
1	1	P&OC 2	**Indoor Environmental Management Plan**	none
1	1	P&OC 3	**Energy Star Equipment Performance**	none
M	1	P&OC 4.1	**Clean Energy, 50%**	EAc6
M	1	P&OC 4.2	**Clean Energy, 100%**	EAc6
2	1-3	P&OC 5	**Innovation**	IDc1

1.15 PREFERRED SCHEMATIC DESIGN

L. Outline Specifications

- Table of Contents
- Proprietary Specifications

Outline Specification

SHERWOOD MIDDLE SCHOOL
SHREWSBURY, MASSACHUSETTS

TABLE OF CONTENTS

SPECIFICATIONS

DIVISION 1 GENERAL REQUIREMENTS

DIVISION 2 – EXISTING CONDITIONS

DIVISION 3 CONCRETE

DIVISION 4 MASONRY

DIVISION 5 METALS

DIVISION 6 WOOD AND PLASTICS

DIVISION 7 THERMAL AND MOISTURE PROTECTION

END OF TABLE OF CONTENTS

- Proprietary Specifications

See attached Building Committee Meeting Minutes authorizing four items as proprietary specification items for the Sherwood Middle School project. The primary reason for the proprietary specifications is that these items are part of a district wide system and maintenance programs, communications, and access are based on a particular manufacturer.

Throughout the schematic design package, particular manufacturer products are cited in the specifications and drawings to assist the cost estimating process with as much detail as possible. Other than those authorized by the Building Committee, no items are intended to be proprietary in nature, and in future design phases non-proprietary items will be specified as required by public bid laws.

MINUTES
SHERWOOD MIDDLE SCHOOL BUILDING COMMITTEE
November 10, 2009

Present: Mr. Fitzgerald, Mr. Carney, Dr. Sawyer, Mr. Lebeaux, Ms. Canzano, Mr. Hale (for Mr. Morgado), Ms. Nash

Also: Mr. Pagano, Mr. Queeney, Ms. Jones, Ms. Lizotte

Call to order at 7:04 PM.

On a motion by Mr. Lebeaux, second by Ms. Canzano, the minutes of October 27, 2009 were accepted.

On a motion by Ms. Nash, second by Mr. Lebeaux, the following bill schedules were approved

Company	Amount
PMA (#4)	$10,667.00
LPA	$63,258.50

- Mr. Queeney presented technical notes dated November 10, 2009, that were reviewed and discussed. He reported that the CM at risk application is near completion. He reported that the request for additional gym space is under review at MSBA and that he is working with the staff in justifying the request. He reported that the Special Education report to the Department of Elementary and Secondary Education has been completed by Shrewsbury staff and LPA. He confirmed that the MSBA will hold their final vote on January 27, 2010.

- Mr. Pagano presented the architect's report. He stated that the MSBA has informed LPA that all submittals must be completed by December 17th. Mr. Pagano stated that his firm is working to get all necessary filings complete by December 11th. Mr. Pagano stated that the LPA received proposals from Yankee Engineering and McPhail Associates for the second phase of geo-technical work. The work entails borings for the perimeter of the proposed building footprint. Mr. Pagano recommended Yankee Engineering at $7,780, significantly less that the $19,000 proposed by McPhail. On a motion by Dr. Sawyer, seconded by Ms. Canzano, the Committee voted unanimously in favor of hiring Yankee. Mr. Pagano reported that his kitchen consultant has met with Shrewsbury staff and has confirmed that the size of the kitchen is adequate. He stated that the dishwashing operation has changed from a separate room to a smaller area that will be used to wash pots and pans. Mr. Pagano presented a revised site plan that illustrates the proposed bus lanes, expanded parking area between Oak and Sherwood, and a fire lane around the perimeter of the building that was requested by the Fire Chief. He also stated that the mechanical room has been relocated to allow for ground level access. Mr. Pagano stated that he will be proposing some earthen mounds to buffer the new building from the homes located on Sherwood Road.

- Mr. Pagano asked the Committee how his firm might be able to help in preparing for the public hearing on the proposed project. Mr. Fitzgerald stated that the traffic proposal involving the new access point on Crescent Street must be clearly articulated. He suggested a clear map illustrating routes and counts during the morning and afternoon periods. He stated that this should be juxtaposed against the current traffic pattern.

- Mr. Pagano stated that a vote of the School Committee on the project prior to the final submittal of documents would be helpful.

- On a motion by Ms. Nash, seconded by Ms. Canzano, the Committee voted in favor of designating the following items as proprietary for the specifications pursuant to G.L. c.30, s39M(b). The reason for such designation is the purposes of standardization with several other buildings within the Town's building inventory.

Boilers	Cleaver-Brooks Inc.
HVAC Controls	Johnson Controls Inc
Door Hardware	Sargent Manufacturing Company
Telephone System	NEC/Blackbox

- The Committee reviewed the schedule of upcoming meetings. The next meeting will be an update before the School Committee on November 18th. The next regularly scheduled Committee meeting will be held on Monday, November 23rd at 730PM rather than the 24th as previously shown on the calendar. Mr. Fitzgerald asked Mr. Hale to assist in publicizing the hearing. The Committee will provide an update to the Board of Selectmen on Monday, November 30th and will have its final regularly scheduled meeting in calendar year 2009 on Tuesday, December 8th.

- Mr. Carney requested an update on the Board of Selectmen's review of the use of Crescent Street. Mr. Lebeaux reported that the Board voted in favor of the proposal.

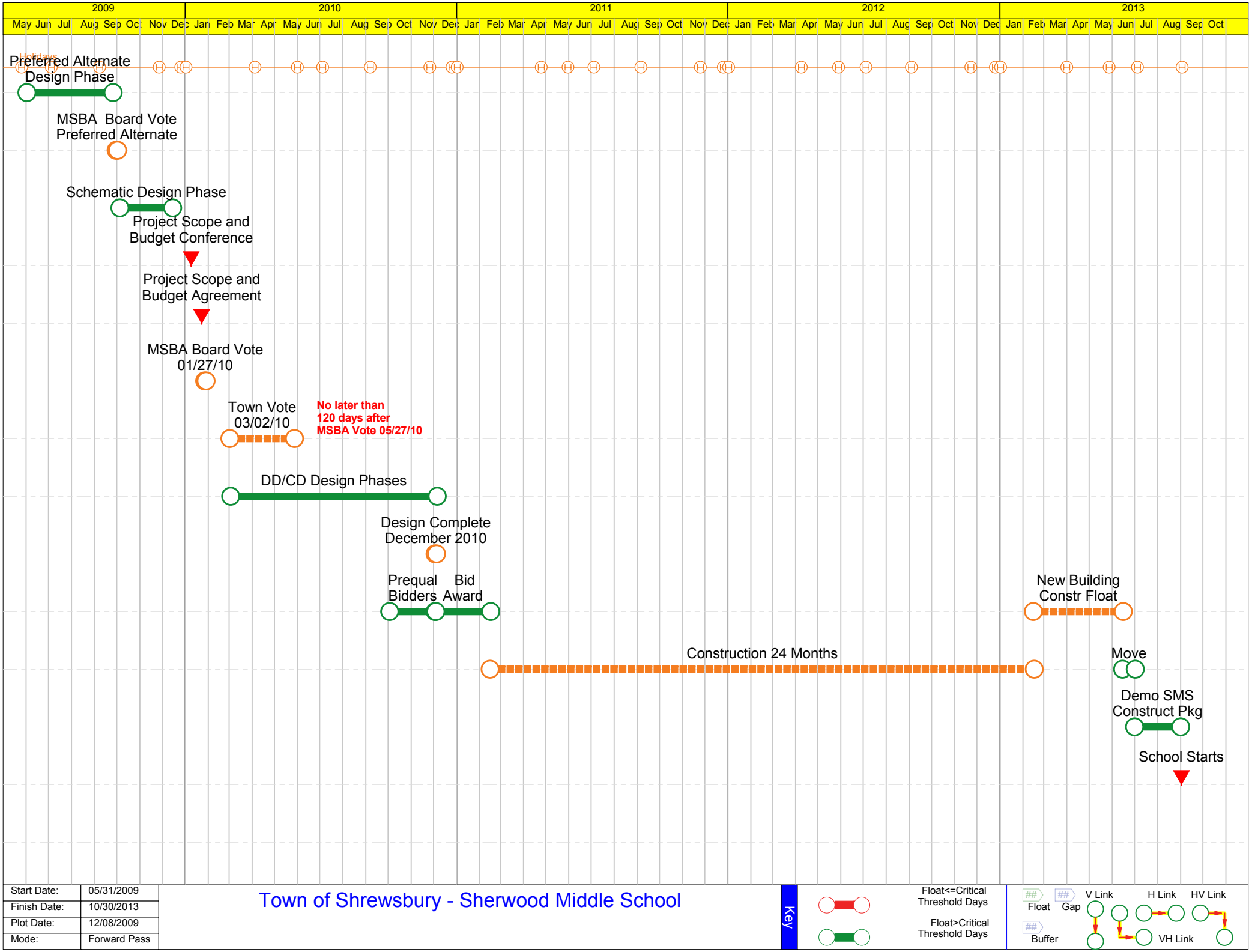
The meting adjourned at 7:52 PM.

Respectfully submitted,

Michael R. Hale
Assistant Town Manager

1.15 PREFERRED SCHEMATIC DESIGN

M. Project Schedule



Start Date:	05/31/2009
Finish Date:	10/30/2013
Plot Date:	12/08/2009
Mode:	Forward Pass

Town of Shrewsbury - Sherwood Middle School

Key

Float<=Critical Threshold Days

Float>Critical Threshold Days

Float Gap V Link H Link HV Link Buffer VH Link

N. Proposed Total Project Budget

- Building Cost Estimate
- Project Budget

A.M. Fogarty
& Assoc., Inc.
175 Derby St., Suite 5, Hingham, MA 02043
TEL: (781) 749-7272 • FAX: (781) 740-2652
ptim@amfogarty.com
"Construction Cost Consultants"

Sherwood Middle School
Shrewsbury, MA

7-Dec-09

Schematic Design
GRAND SUMMARY

BASE ESTIMATE		**$27,521,694**
TOTAL DIRECT COST		$27,521,694
GENERAL CONDITIONS	8%	$2,201,736
GENERAL ADMINISTRATIVE O&P	5%	$1,486,171
P&P BOND	1.5%	$412,825
PERMIT	1.0%	$316,224
CONTINGENCY	10%	$3,162,243
ESCALATION (FALL 2010)	6%	$2,106,054
TOTAL CONSTRUCTION COST		$37,206,947
COST PER S.F.		$287.58

PROJECT:	Sherwood Middle School	NO. OF SQ. FT.:	129,378
LOCATION:	Shrewsbury, MA	COST PER SQ. FT.:	$212.72
CLIENT:	Lamoureux Pagano Associates Architects		
DATE:	07-Dec-09		

No.: 08108

SUMMARY

	TOTAL	PERCENT OF PROJECT	COST PER SF
A. SUBSTRUCTURE			
A10 - FOUNDATIONS			
A1010 STANDARD FOUNDATIONS	1,131,962	4%	8.75
A1020 SPECIAL FOUNDATIONS	0	0%	0.00
A1030 SLAB ON GRADE	433,501	2%	3.35
A20 - BASEMENT CONSTRUCTION			
A2010 BASEMENT EXCAVATION	0	0%	0.00
A2020 BASEMENT WALLS	0	0%	0.00
B. SHELL			
B10 - SUPERSTRUCTURE			
B1010 FLOOR CONSTRUCTION	1,652,700	6%	12.77
B1020 ROOF CONSTRUCTION	1,148,564	4%	8.88
B20 - EXTERIOR ENCLOSURE			
B2010 EXTERIOR WALLS	2,578,733	9%	19.93
B2020 EXTERIOR WINDOWS	857,582	3%	6.63
B2030 EXTERIOR DOORS	49,950	0%	0.39
B30 - ROOFING			
B3010 ROOF COVERINGS	767,829	3%	5.93
B3020 ROOF OPENINGS	2,500	0%	0.02
C. INTERIORS			
C10 - INTERIOR CONSTRUCTION			
C1010 PARTITIONS	1,751,937	6%	13.54
C1020 INTERIOR DOORS	524,361	2%	4.05
C1030 FITTINGS	593,946	2%	4.59
C20 - STAIRS			
C2010 STAIR CONSTRUCTION	153,000	1%	1.18
C2020 STAIR FINISHES	9,600	0%	0.07
C30 - INTERIOR FINISHES			
C3010 WALL FINISHES	623,072	2%	4.82
C3020 FLOOR FINISHES	683,252	2%	5.28
C3030 CEILING FINISHES	576,934	2%	4.46
D. SERVICES			
D10 - CONVEYING			
D1010 ELEVATORS & LIFTS	127,500	0%	0.99
D1010 ESCALATORS & MOVING WALKS	0	0%	0.00
D1090 OTHER CONVEYING SYSTEMS	0	0%	0.00
D20 - PLUMBING			
D2010 PLUMBING FIXTURES	617,246	2%	4.77
D2020 DOMESTIC WATER DISTRIBUTION	308,947	1%	2.39
D2030 SANITARY WASTE	162,235	1%	1.25
D2040 RAIN WATER DRAINAGE	100,800	0%	0.78
D2090 OTHER PLUMBING SYSTEMS	55,000	0%	0.43
D30 - HVAC			
D3010 ENERGY SUPPLY	0	0%	0.00
D3020 HEAT GENERATING SYSTEMS	134,400	0%	1.04
D3030 COOLING GENERATING SYSTEMS	20,000	0%	0.15
D3040 DISTRIBUTION SYSTEMS	2,416,903	9%	18.68
D3050 TERMINAL & PACKAGE UNITS	248,155	1%	1.92

	TOTAL	PERCENT OF PROJECT	COST PER SF
D3060 CONTROLS AND INSTRUMENTATION	517,512	2%	4.00
D3070 SYSTEMS TESTING & BALANCING	77,627	0%	0.60
D3090 OTHER HVAC SYSTEMS & EQUIPMENT	0	0%	0.00
D40 - FIRE PROTECTION			
D4010 SPRINKLERS	558,007	2%	4.31
D4020 STANDPIPES	0	0%	0.00
D4030 FIRE PROTECTION SPECIALTIES	0	0%	0.00
D4090 OTHER FIRE PROTECTION SYSTEMS	0	0%	0.00
D50 - ELECTRICAL			
D5010 ELECTRICAL SERVICE & DISTRIBUTION	1,247,972	5%	9.65
D5020 LIGHTING & BRANCH WIRING	873,158	3%	6.75
D5030 COMMUNICATION & SECURITY	627,368	2%	4.85
D5090 OTHER ELECTRICAL SYSTEMS	90,804	0%	0.70
E. EQUIPMENT & FURNISHINGS			
E10 - EQUIPMENT			
E1010 COMMERCIAL EQUIPMENT	467,000	2%	3.61
E1020 INSTITUTIONAL EQUIPMENT	0	0%	0.00
E1030 VEHICULAR EQUIPMENT	0	0%	0.00
E1090 OTHER EQUIPMENT	189,540	1%	1.47
E20 - FURNISHINGS			
E 2010 FIXED FURNISHINGS	839,128	3%	6.49
E2020 MOVABLE FURNISHINGS	0	0%	0.00
F. SPECIAL CONSTRUCTION & DEMOLITION			
F10 - SPECIAL CONSTRUCTION			
F1010 SPECIAL STRUCTURES	0	0%	0.00
F1020 INTEGRATED CONSTRUCTION	0	0%	0.00
F1030 SPECIAL CONSTRUCTION SYSTEMS	0	0%	0.00
F1040 SPECIAL FACILITIES	0	0%	0.00
F1050 SPECIAL CONTROLS & INSTRUMENTATION	0	0%	0.00
F20 - SELECTIVE BUILDING DEMOLITION			
F2010 BUILDING ELEMENTS DEMOLITION	0	0%	0.00
F2020 HAZARDOUS COMPONENTS ABATEMENT	575,000	2%	4.44
G. BUILDING SITEWORK			
G10 - SITE PREPARATION			
G1010 SITE CLEARING	244,106	1%	1.89
G1020 SITE DEMOLITION & RELOCATIONS	789,218	3%	6.10
G1030 SITE EARTHWORK	410,225	1%	3.17
G1040 HAZARDOUS WASTE REMEDIATION	0	0%	0.00
G20 - SITE IMPROVEMENTS			
G2010 ROADWAYS	847,169	3%	6.55
G2020 PARKING LOTS	0	0%	0.00
G2030 PEDESTRIAN PAVING	121,912	0%	0.94
G2040 SITE DEVELOPMENT	104,990	0%	0.81
G2050 LANDSCAPING	621,958	2%	4.81
G30 - SITE MECHANICAL UTILITIES			
G3010 WATER SUPPLY	79,917	0%	0.62
G3020 SANITARY SEWER	89,358	0%	0.69
G3030 STORM SEWER	360,018	1%	2.78
G3040 HEATING DISTRIBUTION	0	0%	0.00
G3050 COOLING DISTRIBUTION	0	0%	0.00
G3060 FUEL DISTRIBUTION	22,500	0%	0.17
G3090 OTHER SITE MECHANICAL UTILITIES	0	0%	0.00
G40 - SITE ELECTRICAL UTILITIES			
G4010 ELECTRICAL DISTRIBUTION	12,600	0%	0.10
G4020 SITE LIGHTING	0	0%	0.00

Sherwood Middle School	TOTAL	PERCENT OF PROJECT	COST PER SF
G4030 SITE COMMUNICATIONS & SECURITY	24,000	0%	0.19
G4090 OTHER SITE ELECTRICAL UTILITIES	0	0%	0.00
G90 - OTHER SITE CONSTRUCTION			
G9010 SERVICE AND PEDESTRIAN TUNNELS	0	0%	0.00
G9090 OTHER SITE SYSTEMS	0	0%	0.00
TOTAL DIRECT COST	27,521,694	100%	212.72

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
A. SUBSTRUCTURE				
A10 - FOUNDATIONS				
A1010 STANDARD FOUNDATIONS				
Wall Footing 2'-6" x 1' (1,552 LF):				
4000 psi, NW, (incl. placement)	144	CY	142.00	20,448
Formwork	3,104	SFCA	6.00	18,624
Rebar	8,748	LBS	1.02	8,923
**unit cost $333.30*				
Stepped Wall Footing 2'-6" x 1 (53 LF):				
4000 psi, NW, (incl. placement)	5	CY	142.00	710
Formwork	212	SFCA	12.00	2,544
Rebar	405	LBS	1.02	413
**unit cost $733.42*				
Column Footing FX 5'x5'x1'-6" (156ea):				
4000 psi, NW, (incl. placement)	217	CY	142.00	30,814
Formwork	6,240	SFCA	8.00	49,920
Rebar	14,648	LBS	1.02	14,941
**unit cost $440.90*				
Retaining Wall Footing (1'-6" thick)				
4000 psi, NW, (incl. placement)	62	CY	142.00	8,804
Formwork 4'-8'	2,112	SFCA	16.00	33,792
Reinforcing steel	5,859	LBS	1.02	5,976
**unit cost $783.42*				
Foundation Retaining Wall 1'-6" thick x 14' high:				
4000 psi, NW, (incl. placement)	343	CY	142.00	48,706
Formwork	12,320	SFCA	16.00	197,120
Waterstop	440	LF	9.00	3,960
Reinforcing steel	37,044	LBS	1.02	37,785
**unit cost $838.40*				
Site Retaining Wall 1'-6" thick x 14' high:				
4000 psi, NW, (incl. placement)	49	CY	142.00	6,958
Formwork	1,764	SFCA	16.00	28,224
Waterstop	63	LF	9.00	567
Reinforcing steel	5,292	LBS	1.02	5,398
**unit cost $839.73*				
Foundation Frost Wall 1-4" x 4' deep:				
4000 psi, NW, (incl. placement)	292	CY	142.00	41,464
Formwork	11,824	SFCA	9.00	106,416
Brick Shelf	1,478	LF	12.00	17,736
Reinforcing steel	27,594	LBS	1.02	28,146
**unit cost $663.57*				
Foundation Interior 12" x 3' deep:				

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
4000 psi, NW, (incl. placement)	12	CY	142.00	1,704
Formwork	660	SFCA	9.00	5,940
Reinforcing steel	972	LBS	1.02	991
**unit cost $719.62*				
Foundation Stepped Frost Wall 1-4" x 9' deep Avg.:				
4000 psi, NW, (incl. placement)	25	CY	142.00	3,550
Formwork	1,008	SFCA	9.00	9,072
Brick Shelf	56	LF	12.00	672
Reinforcing steel	2,362	LBS	1.02	2,409
**unit cost $628.13*				
Elevator Mat	7	CY	575.00	4,025
Elevator Pit Wall	6	CY	650.00	3,900
Pilaster	20	CY	850.00	17,000
Equipment pads	1	LS	4,000.00	4,000
Thermal and Moisture:				
Dampproof frost wall	6,416	SF	1.75	11,228
Waterproof ground floor wall	7,040	SF	6.75	47,520
Elev. pit waterproofing	1	LS	3,850.00	3,850
3" Rigid found. insul	13,456	SF	2.95	39,695
Earthwork:				
Building Cut	2,900	CY	10.00	29,000
Structural fill	5,572	CY	28.00	156,016
Excavate Foundation	2,000	CY	10.00	20,000
Backfill Foundation (on site mat'l)	2,800	CY	10.00	28,000
Foundation drains	1	LS	25,000.00	25,000
				1,131,962
A1020 SPECIAL FOUNDATIONS				
			NOT USED	
				0
A1030 SLAB ON GRADE				
5" Slab on grade	56,233	SF	4.05	227,744
2" Rigid Slab Insul.	56,233	SF	2.65	149,017
10 Mil poly	56,233	SF	0.12	6,748
12" Gravel base	2,083	CY	24.00	49,992
				433,501
TOTAL A10 FOUNDATIONS				**1,565,463**

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
B. SHELL				
B10 - SUPERSTRUCTURE				
B1010 FLOOR CONSTRUCTION				
Structural steel (11 lbs/sf)	404	TONS	3,000.00	1,212,000
3" x 18 Ga comp deck	73,450	SF	2.65	194,643
3 1/2" NW deck fill	73,450	SF	3.35	246,058
				1,652,700
B1020 ROOF CONSTRUCTION				
Roof framing - (10 lbs/sf)	286	TONS	3,100.00	886,600
Galv. RTU dunnage	10	TONS	3,850.00	38,500
TS Roof screen support	6	TONS	3,850.00	23,100
3"x18 Ga. acoustical roof deck - band rm	5,972	SF	6.50	38,818
3"x18 Ga. acoustical roof deck - gym	10,462	SF	6.50	68,003
1 1/2"x20 Ga. roof deck	40,671	SF	2.30	93,543
				1,148,564
TOTAL B10 SUPERSTRUCTURE				**2,801,264**
B20 - EXTERIOR ENCLOSURE				
B2010 EXTERIOR WALLS				
Back-up:				
8" x 16 Ga. stud @ 16" oc	52,998	SF	8.65	458,433
3" Stud at soffit and Collector end and cap	10,360	SF	5.25	54,390
1/2" Dens glass	5,812	SF	2.60	15,111
Self adhered air & vapor membrane	5,812	SF	2.90	16,855
Dampproof concrete retaining wall	863	SF	2.00	1,726
Masonry Veneer:				
Brick veneer - watertable	3,709	SF	28.00	103,852
Brick veneer - loading dock/retaining wall	863	SF	28.00	24,164
Brick Watertable cap	1,126	LF	55.00	61,930
Retaining wall cap	49	LF	135.00	6,615
Solar Wall:				
Perforated solor collector	3,241	SF	27.00	87,507
Solor Panel collector end panel and cap	839	SF	27.00	22,653

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Centria Panels:				
Composite "Formawall" Centria Panel	7,587	SF	36.00	273,132
Metal wrap Insulated Liner panel	38,461	SF	15.00	576,915
Perforated screen panel	34,572	SF	20.00	691,440
Misc. Panels:				
Metal Spanderel panel at storefront	95	SF	65.00	6,175
Roof Screen Panel	2,174	SF	28.00	60,872
Roof screen cap	395	LF	25.00	9,875
Soffit Panel - eifs	2,571	SF	21.00	53,991
Column Covers	120	VLF	145.00	17,400
Misc Sealants	1	LS	25,000.00	25,000
MasonryWall flashing	1,126	LF	9.50	10,697
				2,578,733
B2020 EXTERIOR WINDOWS				
4 1/2" Alum. storefront	11,483	SF	65.00	746,395
Aluminum sun shade	510	LF	95.00	48,450
5 1/2" P.T. - perm blocking	5,386	LF	4.50	24,237
Exterior sealants	5,500	LF	7.00	38,500
				857,582
B2030 EXTERIOR DOORS				
Alum. Doors (Incl. Hardware):				
Alum. Entry Door - DBL	5	PR	5,850.00	29,250
Alum. Entry w/ Sidelight - SGL	1	EA	5,500.00	5,500
Alum. Entry Life skill - SGL	1	EA	3,000.00	3,000
Insulated Metal Doors (Incl. Hardware):				
Loading Dock - SGL	1	EA	1,200.00	1,200
Mech Rm - SGL	1	EA	1,200.00	1,200
Gym Egress - DBL	1	EA	2,300.00	2,300
Overhead Door - 10x10	3	EA	2,500.00	7,500
				49,950
TOTAL B20 - EXTERIOR ENCLOSURE				**3,486,265**

B30 - ROOFING

B3010 ROOF COVERINGS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
TPO roof w/4" rigid insul	57,105	SF	10.75	613,879
Allow for tappered insulation	1	LS	20,000.00	20,000
Membrane flashing/walkway pads	1	LS	30,000.00	30,000
Roof blocking	2,058	LF	12.50	25,725
Alum. Clad Trim & Flashing:				
Gravel stop	1,799	LF	25.00	44,975
Base flashing	254	LF	25.00	6,350
Roof drain	28	EA	425.00	11,900
Misc. Flashing	1	LS	15,000.00	15,000
				767,829
B3020 ROOF OPENINGS				
Elevator vent	1	LS	2,500.00	2,500
				2,500
TOTAL B30 ROOFING				**770,329**

C. INTERIORS

C10 - INTERIOR CONSTRUCTION

C1010 PARTITIONS

Carpentry:				
Interior Blocking	129,378	GSF	0.35	45,282
Misc. Rough Carpentry	129,378	GSF	1.00	129,378
Firestopping	129,378	GSF	0.35	45,282
Joint sealants	129,378	GSF	1.20	155,254
Drywall Partitions:				
1 lyr 5/8" at exterior	49,109	SF	2.00	98,218
Corridor partition	39,454	SF	8.00	315,632
2 hr Stair partition	3,481	SF	14.00	48,734
Interior Partition (typ)	51,249	SF	8.00	409,992
Plumbing Part.	5,631	SF	6.00	33,786
Elevator Shaft	1,391	SF	14.00	19,474
Acoustical Part.	2,431	SF	10.00	24,310
Gymnasium Part.	4,505	SF	13.00	58,565
2 hr Mech Part.	2,569	SF	14.00	35,966
Furr and Gyp Foundation	2,318	SF	6.00	13,908
Misc. drywall assemblies	129,378	GSF	2.00	258,756
Floding Partition Band/Drama	792	SF	75.00	59,400

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL

				1,751,937
C1020 INTERIOR DOORS				
H.M. Frames:				
Door Frame - SGL	198	EA	245.00	48,510
Door Frame - Dbl	27	EA	260.00	7,020
Door Sidelight	63	EA	420.00	26,460
HM Interior Window frame	169	SF	35.00	5,915
Hollow Metal Door:				
Kitchen -SGL	7	EA	650.00	4,550
Kitchen -DBL	2	EA	900.00	1,800
Mech/Elect - SGL	16	EA	400.00	6,400
Mech/Elect - DBL	2	EA	650.00	1,300
Wood Doors:				
Stair Hall - SGL	2	EA	400.00	800
Stair Hall - DBL	6	EA	800.00	4,800
Corridor -DBL	7	EA	800.00	5,600
Administration/Office - SGL	38	EA	275.00	10,450
Bathroom - SGL	19	EA	275.00	5,225
Storage - SGL	3	EA	275.00	825
Storage - DBL	5	EA	550.00	2,750
Classroom - SGL	61	EA	400.00	24,400
Interconnecting Classroom - SGL	46	EA	275.00	12,650
Music - DBL	1	EA	800.00	800
Music - SGL	1	EA	400.00	400
Band/ Drama - DBL	2	EA	800.00	1,600
Locker Room - SGL	5	EA	275.00	1,375
Gym - DBL	2	EA	800.00	1,600
Specialty Doors:				
Overhead coiling door at Café (4 ea)	430	SF	65.00	27,950
Access Panels	1	LS	15,000.00	15,000
Finish Hardware:				
Stair Hall - SGL	2	EA	1,800.00	3,600
Stair Hall - DBL	6	EA	2,700.00	16,200
Corridor -DBL	7	EA	2,700.00	18,900
Administration/Office - SGL	38	EA	550.00	20,900
Kitchen -SGL	7	EA	650.00	4,550
Kitchen -DBL	2	EA	900.00	1,800
Mech/Elect - SGL	16	EA	400.00	6,400
Mech/Elect - DBL	2	EA	650.00	1,300
Bathroom - SGL	19	EA	500.00	9,500
Storage - SGL	3	EA	350.00	1,050
Storage - DBL	5	EA	600.00	3,000
Classroom - SGL	61	EA	550.00	33,550
Interconnecting Classroom - SGL	46	EA	260.00	11,960
Music - DBL	1	EA	1,000.00	1,000

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Music - SGL	1	EA	700.00	700
Band/ Drama - DBL	2	EA	1,500.00	3,000
Locker Room - SGL	5	EA	550.00	2,750
Gym - DBL	2	EA	2,500.00	5,000
Glass and Glazing:				
HM Window frame	169	SF	14.00	2,366
Sidelights	665	SF	14.00	9,310
Door Glazing	93	LVS	150.00	13,950
Misc. Glazing	1	LS	5,000.00	5,000
Aluminum Storefront and Entries:				
Vestibule Door - DBL	5	EA	5,000.00	25,000
Interior Alum. Storefront	1,200	SF	65.00	78,000
Paint door - sgl	198	EA	75.00	14,850
Paint door - dbl	27	EA	125.00	3,375
HM Window Frame	834	SF	5.00	4,170
Paint window/sidelight	1	LS	5,000.00	5,000
				524,361
C1030 FITTINGS				
Interior Platforms:				
Frame and Subfloor at stage	308	SF	18.00	5,544
Stage stair framing	2	EA	950.00	1,900
Roof access catwalk	500	SF	30.00	15,000
Lobby Glazed railing	52	LF	275.00	14,300
Stage stair rail	21	LF	185.00	3,885
HC Ramp Wall Rail	79	LF	90.00	7,110
Misc. metals	129,378	GSF	0.75	97,034
Platform trim	1	LS	25,000.00	25,000
Corridor Display cabinet	3	EA	7,500.00	22,500
Solid Plastic Toilet Partitions:				
Std. partition	19	EA	102.00	1,938
HC Partition	10	EA	1,225.00	12,250
Urinal screen	4	EA	275.00	1,100
Locker room changing stall	15	EA	1,300.00	19,500
Solid Surface lav countertop	24	LF	270.00	6,480
Toilet and Shower Accessories:				
Paper towel dispenser/disposal	29	EA	250.00	7,250
Toilet tissue dispenser	42	EA	48.00	2,016
Grab bars	46	EA	95.00	4,370
Soap dispenser	39	EA	42.00	1,638
Framed mirror - 3'	39	EA	195.00	7,605

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Coat hooks	29	EA	20.00	580
Janiter shelf	4	EA	200.00	800
Misc. accessories	1	LS	2,000.00	2,000
*Excludes classroom accessories				
Student Lockers	972	EA	250.00	243,000
Gym Lockers - basket	225	EA	75.00	16,875
Life Skill Locker 15" DBL	8	EA	265.00	2,120
Fire extinguisher and cab - allow	6	EA	450.00	2,700
Building directory - allow	1	EA	5,000.00	5,000
Int. ADA signage	129,378	GSF	0.15	19,407
16" Alum. Letters	20	EA	350.00	7,000
Cubicle curtain track w/ Curtain	60	LF	95.00	5,700
Misc. specialties	129,378	GSF	0.25	32,345
				593,946
TOTAL C10 - INTERIOR CONSTRUCTION				**2,870,244**

C20 - STAIRS

C2010 STAIR CONSTRUCTION

Egress Stair	5	FLTS	17,500.00	87,500
Lobby Stair	2	FLTS	25,000.00	50,000
Conc stair pan fill	7	FLTS	1,500.00	10,500
Ship ladder to roof	2	EA	2,500.00	5,000
				153,000

C2020 STAIR FINISHES

Rubber treads and risers	768	LFR	12.50	9,600
*landing tile carried with stairs				
				9,600
TOTAL C20 - STAIRS				**162,600**

C30 - INTERIOR FINISHES

C3010 WALL FINISHES

Acoustical wall panel - Music Rms	1	LS	20,000.00	20,000
Gym Wall Padding	1,260	SF	12.50	15,750

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Gym Acoustical panels - each end	840	SF	20.00	16,800
Band Orchastra Acoustical wall panel	500	SF	25.00	12,500
Misc. Music Room panels	1	LS	10,000.00	10,000
Ceramic Wall Tile:				
Toilet rm - 5' wainscott	6,540	SF	13.00	85,020
Corridors - 7'	11,467	SF	13.00	149,071
Stair Halls - 7' avg	2,168	SF	13.00	28,184
Café - 7'	1,081	SF	13.00	14,053
Interior painting	129,378	SF	2.10	271,694
				623,072
C3020 FLOOR FINISHES				
Ceramic Tile:				
Ceramic floor tile - thin set	4,663	SF	15.00	69,945
Ceramic floor tile waterproofing	3,500	SF	7.00	24,500
Marble Threshold	29	EA	48.00	1,392
Built-up Ceramic base	1,308	LF	10.00	13,080
Quarry tile - thin set	3,190	SF	16.00	51,040
Quarry tile base	271	LF	7.50	2,033
Resilient Flooring:				
VCT	76,726	SF	2.85	218,669
Sheet Linoleum	11,132	SF	8.50	94,622
Rubber tile at stair	1,468	SF	7.50	11,010
Vinyl base	12,728	LF	1.65	21,001
Wood Flooring:				
Gym floor with sleepers and insul.	8,524	SF	15.25	129,991
Stage Floor	206	SF	12.00	2,472
Vented base	335	LF	4.25	1,424
Carpet	8,718	SF	4.50	39,231
Conc. Sealer	2,992	SF	0.95	2,842
				683,252
C3030 CEILING FINISHES				
ACT - 2x2 typ	91,967	SF	4.00	367,868
ACT - MR 2x2 kitchen	4,800	SF	5.50	26,400
Premium tiole at band and music	1	LS	20,000.00	20,000
Magna Grid	913	SF	15.00	13,695
Unistrut grid	519	SF	10.00	5,190
Gyp ceiling and Soffit	5,462	SF	7.50	40,965
Interior light shelf	1,286	LF	40.00	51,440
Gyp soffit	2,087	LF	22.00	45,914

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Paint Ceiling	5,462	SF	1.00	5,462

				576,934
TOTAL C30 - INTERIOR FINISHES				**1,883,258**

D. SERVICES

D10 - CONVEYING

D1010 ELEVATORS & LIFTS

Stage lift	1	LS	18,000.00	18,000
3500 lbs Hydraulic Elevator	3	STOP	35,000.00	105,000
Elev. framing	1	LS	3,000.00	3,000
Elev. pit ladder	1	EA	1,500.00	1,500

				127,500
TOTAL D10 - CONVEYING				**127,500**

D20 - PLUMBING

D2010 PLUMBING FIXTURES

HC Toilet - flr mtd	23	EA	1,100.00	25,300
Reg Toilet - flr mtd	19	EA	1,100.00	20,900
Wall Lav	33	EA	975.00	32,175
Counter Lav	6	EA	825.00	4,950
Classroom sink	61	EA	1,075.00	65,575
Art rm sink	4	EA	1,250.00	5,000
Double bowl sink	2	EA	1,350.00	2,700
Mop sink	4	EA	1,450.00	5,800
Urinal	8	EA	1,200.00	9,600
Drinking fountain	6	EA	2,400.00	14,400
Shower Stall	3	EA	2,200.00	6,600
Fixture rough in	169	EA	2,000.00	338,000
Washer dryer rough-in	1	EA	750.00	750
Floor drain (inc. rough)	18	EA	750.00	13,500
Kitchen Rough-in	1	LS	35,000.00	35,000
4" Water heater flue	125	LF	75.00	9,375
Grease tramp	1	EA	5,000.00	5,000
Grease interceptor	1	EA	4,500.00	4,500
Pressure reducing station	1	EA	3,000.00	3,000

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Gas Pipe:				
2 /12"	355	LF	18.65	6,621
6"	100	LF	85.00	8,500
				617,246
D2020 DOMESTIC WATER DISTRIBUTION				
Water service (inc. bfp)	1	LS	8,500.00	8,500
4" UG water service	10	LF	75.00	750
Copper (Mains Only):				
3/4"	1,800	LF	17.20	30,960
1"	200	LF	21.00	4,200
1 1/2"	1,060	LF	32.00	33,920
2"	1,500	LF	46.00	69,000
2 1/2"	830	LF	64.00	53,120
3"	270	LF	85.00	22,950
4"	400	LF	105.00	42,000
1" Pipe Insulation:				
3/4"	1,800	LF	6.20	11,160
1"	200	LF	6.55	1,310
1 1/2"	1,060	LF	6.90	7,314
2"	1,500	LF	7.35	11,025
2 1/2"	830	LF	7.90	6,557
3"	270	LF	8.30	2,241
4"	400	LF	9.85	3,940
				308,947
D2030 SANITARY WASTE				
Sewer service	1	LS	2,500.00	2,500
UG D/W/V:				
3"	185	LF	24.50	4,533
4"	1,000	LF	29.00	29,000
6"	125	LF	38.50	4,813
10"	10	LF	88.00	880
FCO	10	EA	275.00	2,750
AC D/W/V:				
2"	650	LF	22.00	14,300
4"	180	LF	26.00	4,680
6"	920	LF	40.50	37,260
8"	700	LF	66.50	46,550
10"	135	LF	90.00	12,150
CO	12	EA	235.00	2,820

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
				162,235
D2040 RAIN WATER DRAINAGE				
Roof drain (inc. rough)	28	EA	3,600.00	100,800
Underslab drainage		nic		
				100,800
D2090 OTHER PLUMBING SYSTEMS				
Hot water generation	1	LS	45,000.00	45,000
Grease trap and connection	1	LS	10,000.00	10,000
				55,000
TOTAL D20 - PLUMBING	**$9.62**	**/sf**		**1,244,228**
D30 - HVAC				
D3020 HEAT GENERATING SYSTEMS				
Boilers	3	EA	27,000.00	81,000
Pumps	2	EA	5,500.00	11,000
ET	2	EA	950.00	1,900
VFD Drive	1	LS	8,000.00	8,000
Chenical treatment	1	LS	7,500.00	7,500
Boiler valve and trim	1	LS	25,000.00	25,000
				134,400
D3030 COOLING GENERATING SYSTEMS				
*DX Cooling inc. w/ RTU's				
Split AC system at elev. Mach rm	1	LS	8,000.00	8,000
Split AC system at elev. Data rm	1	LS	12,000.00	12,000
				20,000
D3040 DISTRIBUTION SYSTEMS				
RTU 1-11	42,780	CFM	9.00	385,020
AHU 1-3	3	EA	60,000.00	180,000
UH	8	EA	950.00	7,600

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
CUH	19	EA	2,500.00	47,500
ECH	5	EA	1,800.00	9,000
EF	5	EA	3,500.00	17,500
Sloar wall fan and equipment	1	LS	40000	40000
Supply:				
Grilles	195	EA	245.00	47,775
4' Lin dif	133	EA	235.00	31,255
VD	263	EA	240.00	63,120
Flex conn	203	EA	65.00	13,195
Ductwork	65,000	LBS	8.50	552,500
Duct Insul	50,000	SF	4.10	205,000
Return:				
Grilles	142	EA	190.00	26,980
VD	133	EA	235.00	31,255
Flex conn	52	EA	65.00	3,380
Ductwork	35,000	LBS	8.50	297,500
Kitchen hood duct (welded)	260	LBS	15.00	3,900
Fire wrap	200	SF	8.00	1,600
Mechanical piping	129,378	GSF	3.50	452,823
				2,416,903
D3050 TERMINAL & PACKAGE UNITS				
Fan coil unit	2	EA	2,800.00	5,600
VAV boxes	101	EA	1,350.00	136,350
FTR	1,931	LF	55.00	106,205
				248,155
D3060 CONTROLS AND INSTRUMENTATION				
DDC Controls	129,378	GSF	4.00	517,512
				517,512
D3070 SYSTEMS TESTING & BALANCING				
Test and Balance	129,378	GSF	0.60	77,627
				77,627

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
TOTAL D30 - HVAC	**$26.39**	**/SF**		**3,414,597**

D40 - FIRE PROTECTION

D4010 SPRINKLERS

Heads/br piping (not shown)	129,683	SF	4.00	518,732
Valve assembly	1	EA	5,200.00	5,200
8" UG fire service	10	LF	75.00	750
8" Gate vlv	2	EA	1,650.00	3,300
8" Check vlv	2	EA	3,500.00	7,000
4" Check vlv	1	EA	2,250.00	2,250
6" BF vlv	5	EA	850.00	4,250
Flow switch	7	EA	225.00	1,575
2 1/2" FDV	12	EA	825.00	9,900
Siamese conn	1	EA	1,000.00	1,000
6" FCVA	3	EA	1,350.00	4,050

				558,007

TOTAL D40 - FIRE PROTECTION	**$4.31**	**/sf**		**558,007**

D50 - ELECTRICAL

D5010 ELECTRICAL SERVICE & DISTRIBUTION

POWER DISTRIBUTION				
MAIN SWITCHBOARD				
1600 AMP	1	EA	38,500.00	38,500
PANELBOARDS				
120-208 Volt 100% Neutral:				
225 AMP main lug	3	EA	1,766.00	5,298
100 AMP main brkr	2	EA	1,549.00	3,098
225 AMP main brkr	3	EA	2,053.00	6,159
120-208 Volt 200% Neutral:				
225 AMP main lug	5	EA	1,792.00	8,960
225 AMP main brkr	5	EA	2,336.00	11,680
277-480 Volt 100% Neutral:				
100 AMP main lug	2	EA	3,730.00	7,460
225 AMP main lug	4	EA	4,189.00	16,756
225 AMP main brkr	1	EA	3,831.00	3,831
Misc. Panel and feeder allow	1	LS	40,000.00	40,000
METERING				
Single meter can	1	EA	500.00	500
100% NEUTRAL FEEDERS				
FEEDERS - IN EMT				

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
100 AMP	970	LF	25.35	24,590
125 AMP	450	LF	29.30	13,185
175 AMP	80	LF	32.00	2,560
200 AMP	1,250	LF	34.25	42,813
225 AMP	125	LF	43.25	5,406
FEEDERS, UNDERGROUND - IN PVC				
100 AMP	65	LF	14.30	930
175 AMP	65	LF	21.00	1,365
1600 AMP	65	LF	258.85	16,825
SPARE OR EMPTY RACEWAYS				
PVC - UNDERGROUND				
3"	900	LF	9.45	8,505
4"	600	LF	13.35	8,010
5"	380	LF	21.65	8,227
GENERATOR SIGNAL - UNDERGROUND				
Annunciator circuits	65	LF	7.40	481
Data signal	65	LF	4.35	283
GROUNDING				
Ground rod 3/4" x 10'	4	EA	75.00	300
1/0 Bare copper wire	50	LF	1.60	80
CABLE TRAY - LADDER TYPE				
12" Ladder	120	LF	25.50	3,060
UNINTERRUPTABLE POWER SUPPLY				
30KVA	1	EA	27,560.00	27,560
ENCLOSED CIRCUIT BREAKER - 3 PHASE - TO 600 VOLTS				
225 AMP	1	EA	1,665.00	1,665
LIGHTING CONTACTORS				
20 AMP 12 pole	1	EA	1,093.00	1,093
Time clock	1	EA	255.00	255
Photocell	1	EA	55.00	55
DISCONNECT SWITCHES - HEAVY DUTY				
3 POLE - TO 600 VOLTS				
60 AMP 3P NF WP	7	EA	310.00	2,170
60 AMP 3P NF WP	2	EA	400.00	800
60 AMP 3P NF WP	3	EA	476.00	1,428
60 AMP 3P NF WP	12	EA	587.00	7,044
60 AMP 3P NF WP	3	EA	885.00	2,655
DRY TYPE TRANSFORMER - NON K RATED				
15 KVA	2	EA	1,844.00	3,688
45 KVA	2	EA	3,555.00	7,110
75 KVA	2	EA	5,407.00	10,814
DRY TYPE - K13 RATED				
45 KVA	5	EA	5,010.00	25,050

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
MOTOR CONTROLS				
LOCAL MOTOR CONTROL:				
MANUAL STARTERS				
120 Volt 1 pole	97	EA	100.00	9,700
GENERATORS DIESEL				
150 KW	1	EA	57,548.00	57,548
SPECIAL ENCLOSURES				
100-200 KW	1	EA	22,000.00	22,000
AUTOMATIC TRANSFER SWITCH				
100 AMP	1	EA	3,923.00	3,923
225 AMP	1	EA	6,205.00	6,205
WIRING DEVICES				
METAL CLAD WIRING - PLASTIC PLATES				
SWITCHES				
S	32	EA	110.00	3,520
S3	4	EA	120.00	480
SS	50	EA	169.00	8,450
S3S3	2	EA	188.00	376
Occupancy sensor	98	EA	177.00	17,346
COMBO SWITCHES				
SSD	4	EA	183.00	732
SSSD	1	EA	231.00	231
DIMMER SWITCHES				
600 Watt	1	EA	115.00	115
RECEPTACLE				
Duplex	353	EA	127.00	44,831
Duplex GFI	135	EA	148.00	19,980
Double duplex	286	EA	140.00	40,040
20 AMP twist lock	26	EA	153.00	3,978
30 AMP recept	4	EA	165.00	660
EMT RACEWAYS - PLASTIC PLATES				
RECEPTACLES				
Duplex GFI WP	24	EA	190.00	4,560
Rough In:				
Tel/data/video	479	EA	82.00	39,278
Smart board rough in	122	LOC	750.00	91,500
AV System and Roughin	1	LS	75,000.00	75,000
Smart Board	61	EA	2,200.00	134,200
PVC RACEWAY - UNDERSLAB				
2 GANG floor box w/dbl duplex/tel	9	EA	610.00	5,490
PUBLIC ADDRESS SYSTEM				
Rough In:				
Amplifier	2	EA	269.00	538
Ceiling/wall speaker	178	EA	34.00	6,052
Scoreboard	1	EA	12,000.00	12,000
Volume control	45	EA	85.00	3,825
Mike outlet	2	EA	85.00	170
Install:				

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Amplifier	2	EA	2,111.00	4,222
Ceiling/wall speaker	178	EA	138.00	24,564
Volume control	45	EA	121.00	5,445
Mike outlet	2	EA	133.00	266
CLOCK SYSTEM				
Rough In:				
Clock backbox	42	EA	34.00	1,428
Clock-speaker backbox	50	EA	67.00	3,350
Install:				
Clock	92	EA	171.00	15,732
BRANCH CIRCUITS				
IN EMT				
20 AMP CIRCUIT:				
One circuit	290	EA	435.00	126,150
30 AMP CIRCUIT:				
One circuit	8	EA	430.00	3,440
MOTOR CIRCUITS				
IN EMT				
SINGLE PHASE:				
20 AMP	42	EA	525.00	22,050
THREE PHASE				
20 AMP	9	EA	556.00	5,004
30 AMP	1	EA	595.00	595
40 AMP	1	EA	641.00	641
50-60 AMP	13	EA	687.00	8,931
100 AMP	3	EA	1,726.00	5,178
Lightning protection	1	LS	18,000.00	18,000
Permit/temporary electric	1	LS	20,000.00	20,000
				1,247,972

D5020 LIGHTING & BRANCH WIRING

LIGHTING FIXTURES				
Type A8	1	EA	278.30	278
Type A12	19	EA	382.80	7,273
Type A16	136	EA	487.30	66,273
Type A20	16	EA	591.80	9,469
Type A24	4	EA	765.60	3,062
Type A36	4	EA	974.60	3,898
Type A38	2	EA	1,461.90	2,924
Type B	103	EA	262.90	27,079
Type B1	21	EA	361.90	7,600
Type C	77	EA	139.70	10,757
Type D	193	EA	233.20	45,008
Type D1	73	EA	332.20	24,251
Type D2	6	EA	243.10	1,459
Type E	28	EA	189.20	5,298

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Type E1	11	EA	288.20	3,170
Type F	15	EA	233.20	3,498
Type F1	3	EA	332.20	997
Type G	18	EA	275.00	4,950
Type G1	6	EA	363.00	2,178
Type H	9	EA	308.00	2,772
Type J	23	EA	203.50	4,681
Type K	23	EA	244.20	5,617
Type L4	11	EA	203.50	2,239
Type L8	2	EA	356.40	713
Type L12	3	EA	622.60	1,868
Type L16	5	EA	792.00	3,960
Type M	1	EA	198.00	198
Type N	20	EA	253.00	5,060
Type O	2	EA	233.20	466
Type P1	47	EA	233.20	10,960
Type S3	25	EA	6,750.00	168,750
Type S3G	14	EA	6,750.00	94,500
Type S5	4	EA	6,750.00	27,000
Type SWG	6	EA	6,750.00	40,500
Exit	67	EA	234.30	15,698
Allow for additional lighting	129,378	GSFD	2.00	258,756
				873,158

D5030 COMMUNICATION & SECURITY

SECURITY SYSTEM				
Security panel	1	EA	2,654.00	2,654
Key pad	2	EA	780.00	1,560
Door switch	22	EA	222.00	4,884
Motion detector	8	EA	504.00	4,032
Break glass station	50	EA	271.00	13,550
Card reader	9	EA	948.00	8,532
CCTV camera	10	EA	2,155.00	21,550
Monitor	1	EA	1,808.00	1,808
Misc. Security	129,378	GSF	0.50	64,689
Tel/data/video:				
Install:				
Tel/data	479	EA	281.00	134,599
Each addl cable	694	EA	265.00	183,910
Smart Board rough-in	113	EA	1,200.00	135,600
Misc. Teledat connection	1	LS	50,000.00	50,000
				627,368

D5090 OTHER ELECTRICAL SYSTEMS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
FIRE ALARM - ADDRESSABLE				
PLENUM CABLE				
Fire alarm control panel to 20 zones	1	EA	5,551.00	5,551
Smoke detector	120	EA	222.00	26,640
Duct smoke detector	15	EA	510.00	7,650
Pull station	18	EA	242.00	4,356
Remove indicator	11	EA	147.00	1,617
Remote test switch	15	EA	174.00	2,610
Horn-strobe unit	124	EA	252.00	31,248
Strobe unit only	34	EA	193.00	6,562
Weatherproof beacon	1	EA	480.00	480
Monitor module	23	EA	165.00	3,795
Knox box	1	EA	295.00	295
				90,804
TOTAL D50 - ELECTRICAL	**$21.95**	**/SF**		**2,839,301**

E. EQUIPMENT & FURNISHINGS

E10 - EQUIPMENT

E1010 COMMERCIAL EQUIPMENT

Kitchen Equipment	1	LS	467,000.00	467,000
				467,000

E1090 OTHER EQUIPMENT

Athletic Equipment:				
Basketball backstops - electric	6	EA	7,500.00	45,000
Motorized gym divider curtain	2,940	SF	21.00	61,740
Volley ball court equip.	4	EA	700.00	2,800
Scoreboard	1	EA	10,000.00	10,000
Shot clock	1	EA	2,500.00	2,500
Folding Bleachers	500	SEAT	125.00	62,500
Misc. athletic equip	1	LS	5,000.00	5,000
				189,540
TOTAL E10 - EQUIPMENT				**656,540**

E20 - FURNISHINGS

E 2010 FIXED FURNISHINGS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Staging curtain and rigging	1	LS	20,000.00	20,000
Entrance Mats	3	EA	2,500.00	7,500
Window treatment	11,483	SF	4.00	45,932
Architectural Casework:				
General Classroom (41ea):				
M1 Teacher wardrobe - DBL	41	EA	1,750.00	71,750
M2 Storage Unit - DBL	41	EA	1,900.00	77,900
M3 Base and Wall Cabinet	328	LF	360.00	118,080
M4 Window low shelving unit	984	LF	145.00	142,680
V2 - 8' Marker board	82	EA	550.00	45,100
V3 - 4' Markerboard	164	EA	200.00	32,800
Common Rooms:				
Ceiling mounted 8' projection screen	5	EA	750.00	3,750
V2 - 8' Marker board	20	EA	550.00	11,000
Prep Room:				
P.L. Countertop	16	LF	120.00	1,920
M5 Shelving unit	233	LF	20.00	4,660
M2 Storage Unit - DBL	3	EA	1,900.00	5,700
Seminar/Work Room:				
M5 Shelving unit - 18"	27	LF	20.00	540
M6 Base and Wall Cabinet	27	LF	360.00	9,720
V2 - 8' Marker board	3	EA	550.00	1,650
SPED Resource Room:				
M1 Teacher wardrobe - DBL	5	EA	1,750.00	8,750
M2 Storage Unit - DBL	10	EA	1,900.00	19,000
M3 Base and Wall Cabinet	5	LF	360.00	1,800
M4 Window low shelving unit	130	LF	145.00	18,850
V2 - 8' Marker board	10	EA	550.00	5,500
V3 - 4' Markerboard	10	EA	200.00	2,000
Reading/Speech:				
M1 Teacher wardrobe - DBL	4	EA	1,750.00	7,000
M2 Storage Unit - DBL	4	EA	1,900.00	7,600
M3 Base and Wall Cabinet	16	LF	360.00	5,760
M4 Window low shelving unit	72	LF	145.00	10,440
V2 - 8' Marker board	8	EA	550.00	4,400
V3 - 4' Markerboard	4	EA	200.00	800
Life Skill:				
M1 Teacher wardrobe - DBL	1	EA	1,750.00	1,750
M2 Storage Unit - DBL	1	EA	1,900.00	1,900
M2 Clean-up Cabinet	4	LF	1,900.00	7,600
M4 Window low shelving unit	20	LF	145.00	2,900
M12 Kitchen Base and Wall	19	LF	360.00	6,840
V2 - 8' Marker board	1	EA	550.00	550
V3 - 4' Markerboard	1	EA	200.00	200
Media Center:				
M3 Base and Wall Cabinet	10	LF	360.00	3,600

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
M6 Base and Wall Cabinet	12	LF	360.00	4,320
M10 Custom Desk Unit	10	LF	550.00	5,500
Technology Labs:				
M1 Teacher wardrobe - DBL	2	EA	1,750.00	3,500
M2 Storage Unit - DBL	2	EA	1,900.00	3,800
M4 Window low shelving unit	40	LF	145.00	5,800
V2 - 8' Marker board	2	EA	550.00	1,100
V3 - 4' Markerboard	4	EA	200.00	800
Art Room:				
M1 Teacher wardrobe - DBL	2	EA	1,750.00	3,500
M2 Storage Unit - DBL	2	EA	1,900.00	3,800
M4 Window low shelving unit	40	LF	145.00	5,800
V2 - 8' Marker board	8	EA	550.00	4,400
Art Storage:				
M7 30"x40" adj shelving unit	4	EA	1,500.00	6,000
Kiln	1	EA	3,500.00	3,500
M11 Base Cabinet w/ shelving above	16	LF	260.00	4,160
M5 Shelving unit	36	LF	20.00	720
Music Room:				
M1 Teacher wardrobe - DBL	1	EA	1,750.00	1,750
M2 Storage Unit - DBL	1	EA	1,900.00	1,900
M3 Base and Wall Cabinet	6	LF	360.00	2,160
V2 - 8' Marker board	2	EA	550.00	1,100
Band/Orchestra;				
M1 Teacher wardrobe - DBL	2	EA	1,750.00	3,500
M2 Storage Unit - DBL	2	EA	1,900.00	3,800
M3 Base and Wall Cabinet	15	LF	360.00	5,400
V2 - 8' Marker board	2	EA	550.00	1,100
Choral/Drama:				
Motorized projection screen 16'	1	EA	5,000.00	5,000
Administration Suite:				
M10 Office Counter	40	LF	300.00	12,000
M8 Closet shelf	8	LF	22.00	176
M3 Base and Wall Cabinet	12	LF	360.00	4,320
M6 Base and Wall Cabinet	22	LF	360.00	7,920
MP Mail box unit w/ base cabinet	24	LF		0
V2 - 8' Marker board	1	EA	550.00	550
Nurse Suite:				
M3 Base and Wall Cabinet	12	LF	360.00	4,320
M5 Adjustable shelving	13	LF	20.00	260
V2 - 8' Marker board	2	EA	550.00	1,100
Locker Room:				
V3 - 4' Tackboard	2	EA	200.00	400
Cafeteria:				

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Motorized projection screen 12'	1	EA	4,000.00	4,000
Faculty Dining:				
M3 Base and Wall Cabinet	8	LF	360.00	2,880
V2 - 8' Marker board	1	EA	550.00	550
Janitor Closet:				
M5 Adjustable shelving	16	LF	20.00	320
				839,128
E2020 MOVABLE FURNISHINGS				
	not included			
				0
TOTAL E20 - FURNISHINGS				**839,128**

F. SPECIAL CONSTRUCTION & DEMOLITION

TOTAL F10 - SPECIAL CONSTRUCTION	**0**

F20 - SELECTIVE BUILDING DEMOLITION

F2010 BUILDING ELEMENTS DEMOLITION				
				0
F2020 HAZARDOUS COMPONENTS ABATEMENT				
Hazardous Waste Removal	1	LS	575,000.00	575,000
				575,000
TOTAL F20 - SELECTIVE BUILDING DEMOLITION				**575,000**

G. BUILDING SITEWORK

G10 - SITE PREPARATION

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
G1010 SITE CLEARING				
Erosion control	4,387	LF	3.85	16,890
Construction fence	5,500	LF	13.00	71,500
Construction entrance	3	EA	5,000.00	15,000
Clear & grub	73,127	SF	0.70	51,189
Strip and stack topsoil - 6"	12,532	CY	4.75	59,527
Misc. site preparation	1	LS	30,000.00	30,000
				244,106
G1020 SITE DEMOLITION & RELOCATIONS				
Sawcut pavement	434	LF	5.00	2,170
Cut and cap utilities	1	LS	5,000.00	5,000
Remove Existing:				
Curbing	3,551	LF	5.50	19,531
Sidewalk	18,785	SF	1.15	21,603
Pavement	192,162	SF	0.80	153,730
Chain link fence	1,921	LF	3.00	5,763
Catch basin	8	EA	400.00	3,200
Light pole	7	EA	75.00	525
Utility pole	4	EA	75.00	300
Sewer manhole	5	EA	400.00	2,000
Drain manhole	1	EA	400.00	400
Water/sewer/drain lines	3,179	LF	5.00	15,895
Hydrant	1	EA	75.00	75
Jersey barriers	52	LF	7.00	364
Gas line	761	LF	3.50	2,664
Misc. site demolition	1	LS	25,000.00	25,000
Remove Existing:				
Brick elementary school 2 story	88,000	GSF	5.50	484,000
Portable classroom	12,000	GSF	3.50	42,000
Septic tank & pump chamber	1	LS	5,000.00	5,000
				789,218
G1030 SITE EARTHWORK				
Site Cut	14,500	CY	8.00	116,000
Site fill - on site mat'l	9,500	CY	7.25	68,875
Site grading	81,000	SY	0.85	68,850
Dewatering - allow	1	LS	25,000.00	25,000
Haul away surplus	7,100	CY	15.00	106,500
Misc. site earthwork	1	LS	25,000.00	25,000
				410,225

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
G1040 HAZARDOUS WASTE REMEDIATION				
Soil classifications		NIC		
				0
TOTAL G10 - SITE PREPARATION				**1,443,549**
G20 - SITE IMPROVEMENTS				
G2010 ROADWAYS				
Bituminous drive/parking (1 1/2" wearing)	24,710	SY	12.00	296,520
Bituminous drive/parking (2" base)	24,710	SY	13.00	321,230
12" Gravel base @ drive	8,237	CY	21.50	177,096
Parking/Traffic signage	1	LS	2,500.00	2,500
Granite curb straight	874	LF	27.50	24,035
Granite curb radius	192	LF	30.50	5,856
Berm	5,219	LF	2.25	11,743
Parking striping	6,170	LF	1.00	6,170
HC Pavement markings	8	EA	65.00	520
Misc. pavement markings	1	LS	1,500.00	1,500
				847,169
G2020 PARKING LOTS				
*Included with G2010				
				0
G2030 PEDESTRIAN PAVING				
4" Conc. Ped. pavement	10,412	SF	3.55	36,963
Concrete plaza	5,551	SF	10.00	55,510
BB Court surface	3,400	SF	3.00	10,200
HC Detectable warning pad	11	EA	1,200.00	13,200
Gravel Base:				
6" Gravel @ bit. walk	257	CY	23.50	6,040
				121,912
G2040 SITE DEVELOPMENT				

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
35' Flag pole w/conc base	1	EA	5,500.00	5,500
Site sign - allow	1	LS	5,000.00	5,000
Site bench - allow	4	EA	1,500.00	6,000
Bicycle rack (10 bikes)	2	EA	1,250.00	2,500
Basketball goal post	2	EA	1,250.00	2,500
Steel bollard	4	EA	600.00	2,400
Baseball dugout fence 8' CLF	313	LF	45.00	14,085
Baseball dugout bench	60	LF	40.00	2,400
Baseball home plate & pitching rubber	1	LS	2,500.00	2,500
Baseball back stop	1	EA	10,000.00	10,000
Chain link fence	155	LF	32.00	4,960
Stair handrailing	49	LF	155.00	7,595
Concrete stair tread	190	LFR	55.00	10,450
Concrete stair foundation	12	CY	650.00	7,800
CL Gate - DBL	2	EA	1,800.00	3,600
Walkway light pole base	14	EA	550.00	7,700
Misc. site improvements	1	LS	10,000.00	10,000
				104,990

G2050 LANDSCAPING

Fields:				
Infield mix - softball	8,456	SF	2.75	23,254
Infield mix - baseball	11,656	SF	2.75	32,054
Resurface existing outfield	11,517	SY	2.50	28,793
New turf	35,307	SY	7.00	247,149
Planting allowance	1	LS	75,000.00	75,000
Mulch - allowance	1	LS	5,000.00	5,000
Irrigation system	421,416	SF	0.50	210,708
				621,958

TOTAL G20 - SITE IMPROVEMENTS	**1,696,029**

G30 - SITE MECHANICAL UTILITIES

G3010 WATER SUPPLY

Site connection	2	EA	2,500.00	5,000
Gate valve	5	EA	1,250.00	6,250
8" water line	144	LF	76.00	10,944
8" Dom. Fire loop	155	LF	76.00	11,780
6" Fire service line	613	LF	61.00	37,393
Hydrant	3	EA	1,850.00	5,550
Tie into existing structure	6	EA	500.00	3,000
				79,917

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
G3020 SANITARY SEWER				
Grease trap (4,000 gal)	see plumbing			
PVC Sanitary main	1,235	LF	45.00	55,575
Sanitary manhole	5	EA	2,250.00	11,250
Maintain exist. sys during construction	1	LS	5,000.00	5,000
10" PVC	299	LF	42.00	12,558
Adjust catch basin rim	9	EA	325.00	2,925
Adjust drain manhole	4	EA	325.00	1,300
Convert existing CB to DMH	1	EA	750.00	750
				89,358
G3030 STORM SEWER				
Stormwater collection system:				
Stormceptor	4	EA	15,000.00	60,000
Catchbasin	8	EA	3,500.00	28,000
Outlet control structure	1	EA	2,500.00	2,500
Drainage manhole	5	EA	2,250.00	11,250
Area drain/inlet structure	3	EA	1,250.00	3,750
Drain line	2,076	LF	44.00	91,344
Roof drain line	408	LF	38.00	15,504
Infiltration field	7,500	SF	18.00	135,000
Flared end w/ rip rap	2	EA	1,500.00	3,000
Clean out	1	EA	750.00	750
Detention catch basin	2	EA	2,250.00	4,500
12" RCP Culvert	85	LF	52.00	4,420
				360,018
G3060 FUEL DISTRIBUTION				
Gas meter pad	1	EA	1,500.00	1,500
Trench excavation/backfill	500	LF	42.00	21,000
Gas service	By Gas Co.			
*Central Street gas line extension by Gas Co.				
				22,500
G3090 OTHER SITE MECHANICAL UTILITIES	N/A			
				0

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
TOTAL G30 - SITE MECHANICAL UTILITIES				**551,793**
G40 - SITE ELECTRICAL UTILITIES				
G4010 ELECTRICAL DISTRIBUTION				
Transformer pad	1	EA	1,500.00	1,500
Emergency generator pad	1	EA	1,500.00	1,500
Conc. ductbank	200	LF	48.00	9,600
Removal utility poles		By others		
Utility Backcharge		By others		
				12,600
G4020 SITE LIGHTING				
		With D5010		
				0
G4030 SITE COMMUNICATIONS & SECURITY				
4" Conduit -Conc. Ductbank	500	LF	48.00	24,000
				24,000
G4090 OTHER SITE ELECTRICAL UTILITIES		N/A		
				0
TOTAL G40 - SITE ELECTRICAL UTILITIES				**36,600**
G90 - OTHER SITE CONSTRUCTION				
G9010 SERVICE AND PEDESTRIAN TUNNELS		N/A		
				0
G9090 OTHER SITE SYSTEMS		N/A		

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
				0
TOTAL G90 - OTHER SITE CONSTRUCTION				**0**

Schematic Design Submission

Sherwood Middle School
New School and Sitework Package

Shrewsbury, MA

Prepared for:

PMA Associates

December 7, 2009

PM&C

Sherwood Middle School
New School and Sitework Package
Shrewsbury, MA

07-Dec-09

Schematic Design Submission

MAIN CONSTRUCTION COST SUMMARY

	Construction Start	Gross Floor Area	$/sf	Estimated Construction Cost
NEW MIDDLE SCHOOL	Apr-11	129,060	$181.59	$23,435,672
HAZARDOUS MATERIAL ABATEMENT				$575,000
DEMOLITION OF EXISTING SCHOOL				$450,000
SITEWORK				$2,763,056
SUB-TOTAL		129,060	$210.94	$27,223,728
GENERAL CONDITIONS				$1,812,299
BONDS	0.65%			$176,954
INSURANCE	1.25%			$340,297
PERMIT	1.00%			$272,237
OVERHEAD AND FEE	4%			$1,088,949
ESCALATION TO MID-POINT (2nd QTR 2012) -3% per year	7%			$1,905,661
DESIGN AND PRICING CONTINGENCY	10%			$3,282,013
TOTAL OF ALL CONSTRUCTION		129,060	$279.73	**$36,102,138**

This Schematic Design Construction cost estimate was produced from drawings, outline specifications and other documentation prepared by Lamoureux Pagano and their design team dated November 17, 2009. 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, general contractor's overhead and profit and design contingency. Cost escalation assumes start dates indicated.

Bidding conditions are expected to be public bidding under Chapter 149 of the Massachusetts General Laws to pre-qualified general contractors, and pre-qualified sub-contractors, open specifications for materials and manufactures.

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:

- All professional fees and insurance
- Building Permit costs
- Land acquisition, feasibility, and financing costs
- 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 (e.g. draperies, furniture and equipment)
- Rock excavation; special foundations (unless indicated by design engineers)
- Utility company back charges, including work required off-site
- Work to City streets and sidewalks, (except as noted in this estimate)
- Construction or occupancy phasing or off hours' work, (except as noted in this estimate)

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Sherwood Middle School 07-Dec-09
New School and Sitework Package
Shrewsbury, MA

GFA
Schematic Design Submission 129,060

CONSTRUCTION COST SUMMARY

	BUILDING SYSTEM	**TOTAL SD Estimate**
NEW MIDDLE SCHOOL AND SITEWORK		
A10	FOUNDATIONS	$1,538,520
A20	BASEMENT CONSTRUCTION	$0
B10	SUPERSTRUCTURE	$2,894,201
B20	EXTERIOR CLOSURE	$3,760,846
B30	ROOFING	$816,166
C10	INTERIOR CONSTRUCTION	$2,326,976
C20	STAIRCASES	$197,570
C30	INTERIOR FINISHES	$1,634,188
D10	CONVEYING SYSTEMS	$106,500
D20	PLUMBING	$868,299
D30	HVAC	$3,461,866
D40	FIRE PROTECTION	$550,350
D50	ELECTRICAL	$3,483,791
E10	EQUIPMENT	$700,969
E20	FURNISHINGS	$1,095,430
F10	SPECIAL CONSTRUCTION	$0
F20	HAZMAT REMOVALS	$0
G10	SITEWORK	$2,763,056
TOTAL DIRECT COST (Trade Costs)		***$26,198,728***

GFA	129,060
$/sf	$203.00

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Sherwood Middle School
New School and Sitework Package
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CONSTRUCTION COST SUMMARY IN CSI FORMAT

NEW MIDDLE SCHOOL AND SITEWORK

		NEW ELEMENTARY SCHOOL		*SITEWORK*		*TOTAL PROJECT*	
		Subtotal	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*
DIV. 2	**SITEWORK**		**$318,139**		**$2,590,790**		**$2,908,929**
02050	Selective Demolition	$0		$0		$0	
02100	Site Demolition	$0		$305,186		$305,186	
02121	Hazardous Material	$0		$0		$0	
02200	Earthwork	$318,139		$669,647		$987,786	
02500	Storm/Sanitary Utilities	$0		$328,936		$328,936	
02550	Water Utilities	$0		$81,870		$81,870	
02610	Paving and curbing	$0		$598,418		$598,418	
02700	Site Improvements	$0		$149,110		$149,110	
02800	Fencing	$0		$14,787		$14,787	
02830	Landscaping	$0		$442,836		$442,836	
DIV. 3	**CONCRETE**		**$1,453,613**		**$107,390**		**$1,561,003**
03300	Cast-in-Place Concrete	$1,453,613		$107,390		$1,561,003	
DIV. 4	**MASONRY**		**$160,835**		**$0**		**$160,835**
04200	Masonry	$160,835		$0		$160,835	
DIV. 5	**METALS**		**$3,233,768**		**$0**		**$3,233,768**
05120	Structural Steel	$2,562,700		$0		$2,562,700	
05400	Cold Formed Metal Framing	$336,923		$0		$336,923	
05500	Metal Fabrications	$189,045		$0		$189,045	
05510	Metal Stairs	$133,600		$0		$133,600	
05720	Ornamental Handrails & Railing	$11,500		$0		$11,500	
05800	Expansion Control	$0		$0		$0	
DIV. 6	**WOODS & PLASTICS**		**$353,795**		**$0**		**$353,795**
06100	Rough Carpentry	$124,395		$0		$124,395	
06200	Finish Carpentry	$87,120		$0		$87,120	
06400	Architectural Woodwork	$142,280		$0		$142,280	
DIV. 7	**THERMAL & MOISTURE PROTECTION**		**$3,214,679**		**$0**		**$3,214,679**
07100	Waterproofing	$3,900		$0		$3,900	
07150	Dampproofing	$65,925		$0		$65,925	
07210	Building Insulation	$165,424		$0		$165,424	
07240	Roof and Deck Insulation	$355,514		$0		$355,514	
07250	Spray-on Fireproofing	$0		$0		$0	

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CONSTRUCTION COST SUMMARY IN CSI FORMAT

	NEW ELEMENTARY SCHOOL		*SITEWORK*		*TOTAL PROJECT*	
	Subtotal	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*
NEW MIDDLE SCHOOL AND SITEWORK						
07270 Fire stopping	$10,000		$0		$10,000	
07461 Metal Exterior Wall Panels	$0		$0		$0	
07420 Metal panels	$2,089,236		$0		$2,089,236	
07500 Membrane Roofing	$358,046		$0		$358,046	
07620 Flashing and Trim	$0		$0		$0	
07660 Gravel Stops	$45,342		$0		$45,342	
07830 Hatches/Vents	$4,000		$0		$4,000	
07900 Sealants	$107,292		$0		$107,292	
07950 Expansion Joints	$10,000		$0		$10,000	
DIV. 8 DOORS & WINDOWS		**$1,333,309**		**$0**		**$1,333,309**
08100 Metal Doors and Frames	$41,950		$0		$41,950	
08140 Wood Doors	$122,358		$0		$122,358	
08305 Access Doors	$7,500		$0		$7,500	
08330 Coiling Doors	$22,160		$0		$22,160	
084113 Aluminum Doors and Frames	$31,900		$0		$31,900	
084413 Curtainwall and Storefront	$543,000		$0		$543,000	
08520 Aluminum Windows	$209,576		$0		$209,576	
08600 Skylights	$0		$0		$0	
08710 Finish Hardware	$201,440		$0		$201,440	
08800 Glazing	$153,425		$0		$153,425	
DIV. 9 FINISHES		**$2,700,161**		**$0**		**$2,700,161**
09242 EIFS	$46,368		$0		$46,368	
09250 Gypsum Wallboard Assemblies	$1,177,703		$0		$1,177,703	
09300 Tile	$368,607		$0		$368,607	
09350 Terrazzo	$0		$0		$0	
09510 Acoustical Ceilings and walls	$285,002		$0		$285,002	
09550 Athletic Flooring	$142,248		$0		$142,248	
09650 Resilient Flooring	$404,743		$0		$404,743	
09680 Carpeting	$48,790		$0		$48,790	
09900 Painting	$226,700		$0		$226,700	
DIV 10 SPECIALTIES		**$327,356**		**$0**		**$327,356**
10100 Markerboards and Tackboards	$127,488		$0		$127,488	
10160 Toilet and Shower Partitions	$48,533		$0		$48,533	
10200 Louvers and Vents	$1,350		$0		$1,350	
10226 Operable Partitions	$42,210		$0		$42,210	

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CONSTRUCTION COST SUMMARY IN CSI FORMAT

	NEW ELEMENTARY SCHOOL		*SITEWORK*		*TOTAL PROJECT*	
	Subtotal	*Total*	*Subtotal*	*Total*	*Subtotal*	*Total*
NEW MIDDLE SCHOOL AND SITEWORK						
10400 Identifying Devices	$32,350		$0		$32,350	
10475 Fire Extinguishers and Cabinets	$15,050		$0		$15,050	
10670 Storage Shelving	$0		$0		$0	
10700 Trash Compactor	$0		$0		$0	
10800 Toilet & Bathroom Accessories	$45,775		$0		$45,775	
10999 Projection Screens	$14,600		$0		$14,600	
DIV. 11 EQUIPMENT		**$686,369**		**$0**		**$686,369**
11400 Food Service Equipment	$449,645		$0		$449,645	
11500 Athletic Equipment	$73,136		$0		$73,136	
11530 Laboratory Equipment	$0		$0		$0	
11510 Kiln	$3,088		$0		$3,088	
11970 Stage Equipment and Curtains	$160,500		$0		$160,500	
DIV. 12 FURNISHINGS		**$1,184,342**		**$0**		**$1,184,342**
12320 Manufactured Casework	$845,000		$0		$845,000	
12500 Window Treatment	$71,892		$0		$71,892	
12600 Lockers	$259,200		$0		$259,200	
12610 Fixed Seating	$0		$0		$0	
12670 Rugs & Mats	$8,250		$0		$8,250	
DIV. 13 SPECIAL CONSTRUCTION		**$0**		**$0**		**$0**
No Items in This Division						
DIV. 14 CONVEYING SYSTEMS		**$105,000**		**$0**		**$105,000**
14200 Elevators	$105,000				$105,000	
DIV. 15 MECHANICAL		**$4,880,515**		**$0**		**$4,880,515**
15100 Plumbing	$868,299		$0		$868,299	
15200 Fire Protection	$550,350		$0		$550,350	
15300 HVAC	$3,461,866		$0		$3,461,866	
DIV. 16 ELECTRICAL		**$3,483,791**		**$64,876**		**$3,548,667**
16100 Electrical	$3,483,791		$64,876		$3,548,667	
SUBTOTAL DIRECT (TRADE) COST		**$23,435,672**		**$2,763,056**		**$26,198,728**

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Sherwood Middle School
New School and Sitework Package
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CONSTRUCTION COST SUMMARY

	BUILDING SYSTEM		*SUB-TOTAL*	*TOTAL*	*$/SF*	*%*
NEW MIDDLE SCHOOL						
A10	**FOUNDATIONS**					
	A1010	Standard Foundations	$934,372			
	A1020	Special Foundations	$0			
	A1030	Lowest Floor Construction	$604,148	**$1,538,520**	$11.92	6.6%
A20	**BASEMENT CONSTRUCTION**					
	A2010	Basement Excavation (Structural Fill)	$0			
	A2020	Basement Walls	$0	**$0**	$0.00	0.0%
B10	**SUPERSTRUCTURE**					
	B1010	Upper Floor Construction	$2,292,451			
	B1020	Roof Construction	$601,750	**$2,894,201**	$22.43	12.3%
B20	**EXTERIOR CLOSURE**					
	B2010	Exterior Walls	$2,853,610			
	B2020	Windows	$861,339			
	B2030	Exterior Doors	$45,897	**$3,760,846**	$29.14	16.0%
B30	**ROOFING**					
	B3010	Roof Coverings	$812,166			
	B3020	Roof Openings	$4,000	**$816,166**	$6.32	3.5%
C10	**INTERIOR CONSTRUCTION**					
	C1010	Partitions	$1,104,767			
	C1020	Interior Doors	$574,721			
	C1030	Specialties/Millwork	$647,488	**$2,326,976**	$18.03	9.9%
C20	**STAIRCASES**					
	C2010	Stair Construction	$151,000			
	C2020	Stair Finishes	$46,570	**$197,570**	$1.53	0.8%
C30	**INTERIOR FINISHES**					
	C3010	Wall Finishes	$506,744			
	C3020	Floor Finishes	$650,814			
	C3030	Ceiling Finishes	$476,630	**$1,634,188**	$12.66	7.0%
D10	**CONVEYING SYSTEMS**					
	D1010	Elevator	$106,500	**$106,500**	$0.83	0.5%
D20	**PLUMBING**					
	D20	Plumbing	$868,299	**$868,299**	$6.73	3.7%
D30	**HVAC**					
	D30	HVAC	$3,461,866	**$3,461,866**	$26.82	14.8%

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CONSTRUCTION COST SUMMARY

	BUILDING SYSTEM		*SUB-TOTAL*	*TOTAL*	*$/SF*	*%*
NEW MIDDLE SCHOOL						
D40	**FIRE PROTECTION**					
	D40	Fire Protection	$550,350	**$550,350**	$4.26	2.3%
D50	**ELECTRICAL**					
	D5010	Service & Distribution	$659,556			
	D5020	Lighting & Power	$1,192,360			
	D5030	Communication & Security Systems	$1,505,080			
	D5040	Other Electrical Systems	$126,795	**$3,483,791**	$26.99	14.9%
E10	**EQUIPMENT**					
	E10	Equipment	$700,969	**$700,969**	$5.43	3.0%
E20	**FURNISHINGS**					
	E2010	Fixed Furnishings	$1,095,430			
	E2020	Movable Furnishings	NIC	**$1,095,430**	$8.49	4.7%
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)				***$23,435,672***	*$181.59*	*100.0%*

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CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW MIDDLE SCHOOL							
	GROSS FLOOR AREA CALCULATION						
	Ground Floor			32,849			
	First Floor			55,858			
	Second Floor			40,353			
	TOTAL GROSS FLOOR AREA (GFA)				**129,060** ***sf***		
	A10 FOUNDATIONS						
	A1010 STANDARD FOUNDATIONS						
	Strip footings to exterior walls - 2'-2" x 1'-0"						
02200	Excavation	**1,714**	cy	8.00	13,712		
02200	Store on site for reuse	**1,714**	cy	6.00	10,284		
02200	Backfill with existing fill	**1,587**	cy	8.00	12,696		
03300	Formwork	**3,000**	sf	8.00	24,000		
03300	Re-bar	**15,000**	lbs	0.90	13,500		
03300	Concrete material; 3,000 psi	**127**	cy	114.00	14,478		
03300	Placing concrete	**127**	cy	45.00	5,715		
	Strip footings to ramp walls - 2'-2" x 1'-0"						
02200	Excavation	**91**	cy	8.00	728		
02200	Store on site for reuse	**91**	cy	6.00	546		
02200	Backfill with existing fill	**84**	cy	8.00	672		
03300	Formwork	**160**	sf	8.00	1,280		
03300	Re-bar	**800**	lbs	0.90	720		
03300	Concrete material; 3,000 psi	**7**	cy	114.00	798		
03300	Placing concrete	**7**	cy	45.00	315		
	Strip footings to retaining walls - 10'-0" x 1'-6"						
02200	Excavation	**2,694**	cy	8.00	21,552		
02200	Store on site for reuse	**2,694**	cy	6.00	16,164		
02200	Backfill with existing fill	**2,411**	cy	8.00	19,288		
03300	Formwork	**1,455**	sf	8.00	11,640		
03300	Re-bar	**29,100**	lbs	0.90	26,190		
03300	Concrete material; 3,000 psi	**283**	cy	114.00	32,262		
03300	Placing concrete	**283**	cy	45.00	12,735		
	Tie beam; 34" x 34" at bracing						
02200	Excavation	**176**	cy	10.00	1,760		
02200	Store on site for reuse	**176**	cy	6.00	1,056		
02200	Backfill with existing fill	**89**	cy	8.00	712		
03300	Formwork	**1,573**	sf	8.00	12,584		
03300	Re-bar	**2,780**	lbs	0.90	2,502		
03300	Concrete material; 3,000 psi	**87**	cy	114.00	9,918		
03300	Placing concrete	**87**	cy	45.00	3,915		
	Foundation walls at ramp - 12" thick						
03300	Formwork	**480**	sf	9.00	4,320		
03300	Re-bar	**1,142**	lbs	0.90	1,028		
03300	Concrete material; 4,000 psi	**9**	cy	120.00	1,080		
03300	Placing concrete	**9**	cy	45.00	405		
07150	Dampproofing foundation wall and footing	**480**	sf	1.60	768		
07210	Insulation to foundation walls; 2" thick	**320**	sf	2.00	640		
03300	Form shelf	**80**	lf	8.00	640		
	Foundation walls at exterior - 18" thick						
03300	Formwork	**9,000**	sf	9.00	81,000		
03300	Re-bar	**21,405**	lbs	0.90	19,265		
03300	Concrete material; 4,000 psi	**263**	cy	120.00	31,560		
03300	Placing concrete	**263**	cy	45.00	11,835		
07150	Dampproofing foundation wall and footing	**9,000**	sf	1.60	14,400		
07210	Insulation to foundation walls; 2" thick	**6,000**	sf	2.00	12,000		
03300	Form shelf	**1,500**	lf	8.00	12,000		
	Retaining walls at exterior - 18" thick						

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW MIDDLE SCHOOL							
62	03300	Formwork	**14,065**	sf	9.00	126,585		
63	03300	Re-bar	**35,163**	lbs	0.90	31,647		
64	03300	Concrete material; 4,000 psi	**410**	cy	120.00	49,200		
65	03300	Placing concrete	**410**	cy	45.00	18,450		
66	07150	Waterproofing foundation wall	**7,033**	sf	4.00	28,132		
67	07210	Insulation to foundation walls; 2" thick	**7,033**	sf	2.00	14,066		
68	03300	Form shelf	**485**	lf	8.00	3,880		
69	02200	Perimeter drain	**485**	lf	13.00	6,305		
70		Column footings F5.0 - 5' x 5' x 1'-3" - Exterior						
71	02200	Excavation	**723**	cy	8.00	5,784		
72	02200	Store on site for reuse	**723**	cy	6.00	4,338		
73	02200	Backfill with existing fill	**631**	cy	8.00	5,048		
74	03300	Formwork	**1,900**	sf	8.00	15,200		
75	03300	Re-bar	**4,940**	lbs	0.90	4,446		
76	03300	Concrete material; 3,000 psi	**92**	cy	114.00	10,488		
77	03300	Placing concrete	**92**	cy	45.00	4,140		
78	03300	Set anchor bolts grout plates	**76**	ea	150.00	11,400		
79		Column footings F7.0 - 7' x 7' x 1'-9" - Interior						
80	02200	Excavation	**582**	cy	8.00	4,656		
81	02200	Store on site for reuse	**582**	cy	6.00	3,492		
82	02200	Backfill with existing fill	**445**	cy	8.00	3,560		
83	03300	Formwork	**2,009**	sf	8.00	16,072		
84	03300	Re-bar	**7,052**	lbs	0.90	6,347		
85	03300	Concrete material; 3,000 psi	**137**	cy	114.00	15,618		
86	03300	Placing concrete	**137**	cy	45.00	6,165		
87	03300	Set anchor bolts grout plates	**41**	ea	150.00	6,150		
88		Miscellaneous						
89	03300	Form key in footing	**1,985**	lf	4.00	7,940		
90	03300	Parge exposed concrete foundation wall	**2,250**	lf	3.00	6,750		
91	02200	Gravel fill to bottom of footings	**425**	cy	30.00	12,750		
92	03300	Piers/Pilasters						
93	03300	Formwork	**1,216**	sf	9.00	10,944		
94	03300	Re-bar	**11,880**	lbs	0.90	10,692		
95	03300	Concrete material; 4,000 psi	**45**	cy	120.00	5,400		
96	03300	Placing concrete	**45**	cy	45.00	2,025		
97		Elevator Pits						
98	02200	Excavation for elevator pit	**84**	cy	8.00	672		
99	02200	Remove off site	**84**	cy	15.00	1,260		
100	02200	Backfill with gravel	**4**	cy	26.00	104		
101		Elevator pit walls						
102	03300	formwork	**480**	sf	9.00	4,320		
103	03300	reinforcement	**720**	lbs	0.90	648		
104	03300	concrete material	**6**	cy	120.00	720		
105	03300	placing concrete	**6**	cy	45.00	270		
106		Slab						
107	03300	formwork	**60**	sf	8.00	480		
108	03300	reinforcement	**750**	lbs	0.90	675		
109	03300	concrete material in slab	**6**	cy	120.00	720		
110	03300	placing concrete	**6**	cy	45.00	270		
111	07100	Bentonite waterstops	**1**	ls	500.00	500		
112	07100	Cementitous waterproofing to elevator pit	**340**	sf	10.00	3,400		
113		SUBTOTAL					$934,372	
114								
115	**A1020**	**SPECIAL FOUNDATIONS**						
116		**No Work in this section**						
117		SUBTOTAL						
118								
119	**A1030**	**LOWEST FLOOR CONSTRUCTION**						

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW MIDDLE SCHOOL						
	New Slab on grade, 5" thick	*53,976*	sf				
02200	Gravel fill, 6"	**1,000**	cy	28.00	28,000		
07210	Rigid insulation	**53,976**	sf	1.87	100,935		
07210	Vapor barrier	**53,976**	sf	0.20	10,795		
07210	Compact existing sub-grade	**53,976**	sf	0.50	26,988		
03300	Mesh reinforcing 15% lap	**62,072**	sf	0.60	37,243		
03300	Concrete - 5" thick; 4,000 psi	**882**	cy	120.00	105,840		
03300	Placing concrete	**882**	cy	45.00	39,690		
03300	Finishing and curing concrete	**53,976**	sf	1.50	80,964		
03300	Control joints - saw cut	**53,976**	sf	0.10	5,398		
07900	Isolation joints at columns	**328**	lf	2.50	820		
	Miscellaneous						
02200	Structural fill	**5,500**	cy	26.00	143,000		
03300	Loading dock slab	**105**	sf	30.00	3,150		
03300	Loading dock steps	**1**	ls	1,500.00	1,500		
05500	Loading dock guardrails	**35**	lf	135.00	4,725		
05500	Loading dock handrails to steps	**1**	ls	500.00	500		
03300	Concrete Ramp	**320**	sf	30.00	9,600		
03300	Equipment pads	**1**	ls	5,000.00	5,000		
	SUBTOTAL					$604,148	
	TOTAL - FOUNDATIONS						***$1,538,520***
	A20 BASEMENT CONSTRUCTION						
	A2010 BASEMENT FILL						
	No Work in this section						
	SUBTOTAL						
	A2020 BASEMENT WALLS						
	No Work in this section						
	SUBTOTAL						
	TOTAL - BASEMENT CONSTRUCTION						
	B10 SUPERSTRUCTURE						
		744	tns		-		
	B1010 FLOOR CONSTRUCTION	**11.53**	lbs/gsf		-		
	Floor Structure - Steel:						
05120	Structural steel; W flange members	**300**	tns	2,400.00	720,000		
05120	Structural steel; HSS members; columns	**290**	tns	2,600.00	754,000		
05120	Shear studs	**10,216**	ea	2.50	25,540		
05120	Moment connections	**1**	ls	20,000.00	20,000		
05120	Base plates	**117**	loc	500.00	58,500		
	Floor Structure						
05120	3" 18 Ga. Metal galvanized floor Deck	**75,084**	sf	3.39	254,535		
03300	WWF reinforcement	**86,347**	sf	0.80	69,078		
03300	Concrete Fill to metal deck; 5-1/2" thick; Normal Weight	**1,337**	cy	120.00	160,440		
03300	Place and finish concrete	**75,084**	sf	2.50	187,710		
03300	Rebar to decks	**22,525**	lbs	0.90	20,273		
	Miscellaneous						
05120	Catwalk over Mechanical space	**225**	sf	55.00	12,375		
07270	Fire stopping floors	**1**	ls	10,000.00	10,000		
	SUBTOTAL					$2,292,451	

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		NEW MIDDLE SCHOOL						
177		**B1020 ROOF CONSTRUCTION**						
178		Roof Structure - Steel:						
179	05120	Structural steel; W flange members	**154**	tns	2,400.00	369,600		
180	05120	Structural steel; HSS members; galvanized at roof	**7**	tns	3,500.00	24,500		
181		Roof Structure						
182	05120	1-1/2" 20 Ga. galvanized Metal Roof Deck	**45,599**	sf	2.25	102,598		
183	05120	1-1/2" 20 Ga. galvanized Metal Roof Deck; acoustic deck	**10,259**	sf	6.00	61,554		
184		Miscellaneous						
185	05120	Structural steel angles at roof edges	**24,732**	lbs	1.50	37,098		
186	05120	Structural steel support for rooftop equipment	**2**	tns	3,200.00	6,400		
187		SUBTOTAL					$601,750	
188								
189		***TOTAL - SUPERSTRUCTURE***						***$2,894,201***
190								
191								
192		***B20 EXTERIOR CLOSURE***						
193								
194		**B2010 EXTERIOR WALLS**						
195		Interior skin						
196	05400	8" metal stud backup	**44,923**	sf	7.50	336,923		
197	07420	Metal wrap insulated panel; 2-3/4" thick	**44,923**	sf	26.00	1,167,998		
198	07150	Air barrier/flashing at windows	**4,525**	lf	5.00	22,625		
199	09250	Drywall lining to interior face of stud backup	**44,923**	sf	1.65	74,123		
200		Exterior skin						
201	07420	Centria perforated one piece metal panel system	**30,584**	sf	20.00	611,680		
202	07420	Centria siding formabond series	**7,410**	sf	25.00	185,250		
203	07420	Solar wall system	**3,424**	sf	25.02	85,668		
204	04200	Brick veneer base with water table brick; 16" Emperor brick	**3,505**	sf	27.00	94,635		
205		Miscellaneous						
206	07420	Centria perforated one piece metal panel system to equipment screens	**1,932**	sf	20.00	38,640		
207	05120	Structural steel; HSS members at façade	**40**	tns	2,900.00	116,000		
208	04200	FRP column covers; 10ft high	**9**	loc	1,800.00	16,200		
209	10400	Allowance for entrance sign	**1**	ls	7,500.00	7,500		

CSI CODE		DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
NEW MIDDLE SCHOOL								
09242		EIFS at exterior soffits; including light gauge framing and insulation	**2,576**	sf	18.00	46,368		
04200		Lifts to exterior wall	**1**	ls	50,000.00	50,000		
		SUBTOTAL					$2,853,610	
	B2020	**WINDOWS**	*10,322*			-		
08520		Windows; aluminum insulated; fixed; project-in with custom perimeter panning	**3,082**	sf	68.00	209,576		
84413		Storefront system	**7,240**	sf	75.00	543,000		
05500		Trifab sunshade system	**520**	lf	150.00	78,000		
10200		Louvers	**30**	sf	45.00	1,350		
07900		Backer rod & double sealant	**4,525**	lf	4.00	18,100		
06100		Wood blocking at openings	**4,525**	lf	2.50	11,313		
		SUBTOTAL					$861,339	
	B2030	**EXTERIOR DOORS**						
84113		Glazed entrance doors including frame and hardware; double door	**5**	pr	5,200.00	26,000		
84113		HM doors, HM frames and hardware- Single	**3**	ea	1,300.00	3,900		
84113		HM doors, frames and hardware- Double	**1**	pr	2,000.00	2,000		
08330		Overhead doors; 11ft x 10ft	**2**	loc	3,200.00	6,400		
08330		Overhead doors; 10ft x 9ft	**1**	loc	2,800.00	2,800		
05500		Bollards	**4**	loc	900.00	3,600		
07900		Backer rod & double sealant	**171**	lf	4.00	684		
06100		Wood blocking at openings	**171**	lf	3.00	513		
		SUBTOTAL					$45,897	
		TOTAL - EXTERIOR CLOSURE						***$3,760,846***
	B30	***ROOFING***						
	B3010	**ROOF COVERINGS**						
		Flat roofing						
07500		TPO roof membrane fully adhered	**57,341**	sf	6.00	344,046		
07500		Allowance for working membrane roofing around roof penetrations	**1**	ls	10,000.00	10,000		
07240		Insulation; R-30	**57,341**	sf	4.25	243,699		
07240		1/2" dens-deck protection board	**57,341**	sf	1.50	86,012		
07240		Reinforced vapor barrier	**57,341**	sf	0.45	25,803		
06100		Rough blocking	**8,244**	lf	6.00	49,464		
		Miscellaneous Roofing						
07660		Metal edge stop at roof edge; zinc coated copper	**2,061**	lf	22.00	45,342		
05500		Roof ladder	**4**	loc	950.00	3,800		
07500		Walk pads	**800**	sf	5.00	4,000		
		SUBTOTAL					$812,166	
	B3020	**ROOF OPENINGS**						
07830		Prefabricated elevator vent	**1**	loc	4,000.00	4,000		
		SUBTOTAL					$4,000	
		TOTAL - ROOFING						**$816,166**

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		NEW MIDDLE SCHOOL						
260		***C10 INTERIOR CONSTRUCTION***						
261								
262		**C1010 PARTITIONS**						
263	09250	2 Hr walls at mechanical/electrical rooms	**1,750**	sf	9.45	16,538		
264	09250	Furred wall at retaining wall; including thermal insulat	**6,365**	sf	6.40	40,736		
265	09250	Typ GWB partitions	**56,610**	sf	7.45	421,745		
266	09250	GWB partitions (1hour) at stairwells 1 hour	**2,969**	sf	7.65	22,713		
267	09250	GWB corridor partitions	**37,118**	sf	8.45	313,647		
268	09250	GWB plumbing chase partitions	**3,175**	sf	8.00	25,400		
269	09250	Shaftwall at elevator	**1,455**	sf	10.00	14,550		
270	09250	Sound walls at choir and music rooms	**2,808**	sf	15.30	42,962		
271	09250	Partitions at gymnasium with impact resistant GWB	**4,013**	sf	12.40	49,761		
272	09250	Furred walls	**691**	sf	4.75	3,282		
273	09250	Premium for impact resistant sheet rock at perimeter of gymnasium	**4,992**	sf	1.50	7,488		
274	10226	Operable partition at band/orchestra	**490**	sf	45.00	22,050		
275	10226	Operable partition at platform	**448**	sf	45.00	20,160		
276	05500	Support framing to operable partition	**67**	lf	90.00	6,030		
277	07900	Miscellaneous sealants throughout building	**129,060**	sf	0.50	64,530		
278	07900	Sealants & caulking at partitions	**1**	ls	10,000.00	10,000		
279	06100	Rough blocking	**7,725**	lf	3.00	23,175		
280		SUBTOTAL					$1,104,767	
281								
282		**C1020 INTERIOR DOORS**						
283	08140	Solid Core Wood Doors	**239**	ea	480.00	114,720		
284	08140	HM Doors	**19**	ea	402.00	7,638		
285	08100	HM frame single	**194**	ea	175.00	33,950		
286	08100	HM Frame double	**32**	pr	250.00	8,000		
287	08710	Hardware allowance	**258**	ea	680.00	175,440		
288	08800	Premium for full vision panels	**79**	loc	650.00	51,350		
289	08800	Premium for small vision panels	**29**	loc	300.00	8,700		
290	08710	Allowance for Acoustical Gasketing	**52**	loc	500.00	26,000		
291	08800	Sidelights	**62**	loc	472.50	29,295		
292	08800	Glazed walls and borrowed lights	**1,424**	sf	45.00	64,080		
293	08330	Coiling doors at cafeteria	**4**	loc	3,240.00	12,960		
294	09900	Paint doors and frames	**258**	ea	85.00	21,930		
295	07900	Sealants & caulking	**258**	ea	51.00	13,158		
296	08305	Allowance for access doors	**1**	ls	7,500.00	7,500		
297		SUBTOTAL					$574,721	
298								
299		**C1030 SPECIALTIES / MILLWORK**						
300	10160	Toilet Partitions; handicapped; Phenolic; including grab bars	**11**	ea	1,803.00	19,833		
301	10160	Toilet Partitions; Phenolic	**19**	ea	1,300.00	24,700		
302	10160	Toilet Partitions; urinal screens	**4**	ea	310.00	1,240		
303	10160	Grab bars	**23**	ea	120.00	2,760		
304	05500	Miscellaneous metal to ceiling supported toilet partitions	**30**	ea	200.00	6,000		
305	10800	Mirror; SS frame; 24" x 36"	**41**	ea	150.00	6,150		
306	10800	SS soap dispenser	**41**	ea	125.00	5,125		
307	10800	SS 2-roll tp dispenser	**49**	ea	75.00	3,675		
308	10800	Sanitary napkin dispenser/disposal	**6**	ea	450.00	2,700		
309	10800	Paper towel dispenser/disposal	**23**	ea	375.00	8,625		
310	10800	Changing cubicles	**12**	ea	1,200.00	14,400		
311	10800	Changing cubicles; HC	**2**	ea	2,100.00	4,200		
312	06100	Backer panels in electrical closets	**1**	ls	1,000.00	1,000		
313	06200	Vanity counter	**24**	lf	400.00	9,600		
317	06100	Wood framing to support stage floor	**230**	sf	25.00	5,750		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW MIDDLE SCHOOL							
318	06100	Stage steps	**2**	loc	1,200.00	2,400		
319	05500	Wall mounted handrails to ramp	**81**	lf	40.00	3,240		
320	05500	Wall mounted handrails to stage stairs	**20**	lf	40.00	800		
321	05500	Swing in Occu. Phy. Therapy	**1**	loc	2,000.00	2,000		
322	05500	Structural Support for Swing in Occu. Phy. Therapy	**1**	ls	4,000.00	4,000		
323	06400	Window sill; solid surface	**1,582**	lf	40.00	63,280		
324	06400	Miscellaneous trim	**1**	ls	5,000.00	5,000		
325	06400	Miscellaneous trim/wood paneling to stage	**1**	ls	30,000.00	30,000		
326	05720	Tempered Glass Railings at second floor	**46**	lf	250.00	11,500		
327	10400	Building directory	**1**	loc	3,000.00	3,000		
328	10400	Bronze dedication plaque	**1**	loc	2,500.00	2,500		
329	06400	Staff mailboxes/casework	**24**	lf	400.00	9,600		
330	06400	Staff mailboxes	**130**	ea	60.00	7,800		
331	10400	Room Signs	**258**	loc	75.00	19,350		
332	10475	Fire extinguisher cabinets	**43**	ea	350.00	15,050		
333	06100	Wood base to lockers	**972**	lf	15.00	14,580		
334	10800	Janitors Closet Accessories	**3**	rms	300.00	900		
335	12600	Benches to locker rooms	**50**	lf	30.00	1,500		
336	12600	Double Tier Metal Lockers locker rooms	**225**	opng	100.00	22,500		
337	12600	Double Tier Metal Lockers to life skills	**8**	opng	240.00	1,920		
338	12600	Double Tier Metal Lockers with baked enamel finish	**972**	opng	240.00	233,280		
339	07950	Expansion joints	**1**	ls	10,000.00	10,000		
340	05500	Rail support for elevator cab	**1**	ls	3,000.00	3,000		
341	05500	Miscellaneous metals throughout building	**129,060**	sf	0.50	64,530		
278		SUBTOTAL					$647,488	
279								
280		***TOTAL - INTERIOR CONSTRUCTION***						***$2,326,976***
281								
282								
283		***C20 STAIRCASES***						
284								
285		**C2010 STAIR CONSTRUCTION**						
286	05510	Lobby staircase; Steel pan	**2**	flt	20,000.00	40,000		
287	05510	Egress staircase; Steel pan	**6**	flt	15,600.00	93,600		
288	03300	Concrete material in pan infill	**1**	ls	14,400.00	14,400		
289	05500	Access ladder to roof	**2**	ea	1,500.00	3,000		
290		SUBTOTAL					$151,000	
291								
292		**C2020 STAIR FINISHES**						
293	09300	Rubber to stair	**960**	lfr	22.00	21,120		
294	09300	Rubber to landings	**1,200**	sf	12.00	14,400		
295	09550	Wood finish to stage treads and risers	**21**	lfr	50.00	1,050		
296	09900	Paint to staircases	**8**	flt	1,250.00	10,000		
297		SUBTOTAL					$46,570	
298								
299		***TOTAL - STAIRCASES***						***$197,570***
300								
301								
302		***C30 INTERIOR FINISHES***						
303								
304		**C3010 WALL FINISHES**						
305	09900	Paint to GWB	**241,149**	sf	0.54	130,220		
306	09300	Ceramic tile to bathrooms, lockers and janitor walls ; Full height; 4" x 4" tiles	**10,360**	sf	10.00	103,600		
307	09300	Ceramic tile to corridors - 7'-0" ft high	**11,389**	sf	12.00	136,668		
308	09300	Ceramic tile to kitchen - 7'-0" ft high	**1,834**	sf	10.00	18,340		
309	09300	Ceramic tile to cafeteria/faculty dining - 7'-0" ft high	**1,533**	sf	12.00	18,396		
310	09510	Acoustical wall panels in music room; allowance	**500**	sf	16.00	8,000		
311	09510	Acoustical wall panels in gymnasium; allowance	**1,000**	sf	14.00	14,000		
312	06200	PLam paneling at lobby walls; 8ft high	**920**	sf	30.00	27,600		

PM&C

Sherwood Middle School
New School and Sitework Package
Shrewsbury, MA

07-Dec-09

Schematic Design Submission

GFA 129,060

	CSI CODE		DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW MIDDLE SCHOOL								
313	06200		PLam paneling at lower lobby walls; 8ft high	**784**	sf	30.00	23,520		
314	06200		PLam paneling at upper lobby walls; 8ft high	**880**	sf	30.00	26,400		
315			SUBTOTAL					$506,744	
316									
317		**C3020**	**FLOOR FINISHES**						
318	09650		VCT	**70,541**	sf	2.65	186,934		
319	09650		Linoleum to cafeteria/faculty dining	**5,856**	sf	6.50	38,064		
320	09650		Linoleum to upper lobby	**1,939**	sf	6.50	12,604		
321	09650		Linoleum to lower lobby	**1,656**	sf	6.50	10,764		
322	09650		Linoleum to lobby	**3,890**	sf	6.50	25,285		
323	09300		Quarry tiles in kitchen and serving	**3,190**	sf	14.31	45,649		
324	09550		Athletic Flooring wood; including sanding and finishing	**8,510**	sf	16.00	136,160		
325	09550		Wood flooring at stage platform	**222**	sf	9.00	1,998		
326	09680		Carpet to office, guidance, music, band, drama and media center	**1,394**	sy	35.00	48,790		
327	09650		Ceramic Tile to toilet rooms and showers	**4,784**	sf	11.00	52,624		
328	09650		Waterproofing beneath Ceramic Tile	**3,500**	sf	4.00	14,000		
328	09650		Sealed concrete	**3,338**	sf	1.50	5,007		
329	09550		Ventilated wood base at Gym	**380**	lf	8.00	3,040		
330	09650		Ceramic Tile Base	**1,478**	lf	9.00	13,302		
331	09300		Quarry Tile base	**413**	lf	16.79	6,934		
332	09650		Rubber base	**15,917**	lf	2.90	46,159		
333	09300		Allowance for thresholds	**1**	ls	3,500.00	3,500		
334			SUBTOTAL					$650,814	
335									
336		**C3030**	**CEILING FINISHES**						
337	09510		ACT ceilings; 24 x 24	**93,619**	sf	2.75	257,452		
338	09510		ACT ceilings; 8" x 8" magna grid	**925**	sf	6.00	5,550		
339	09250		Drywall ceilings 2Hr rated	**230**	sf	10.00	2,300		
340	09250		Drywall ceilings	**242**	sf	8.00	1,936		
341	09250		Light shelf; 24" deep	**1,314**	lf	20.00	26,280		
342	09250		Vertical soffit	**14,010**	sf	5.00	70,050		
343	09250		Horizontal soffit	**5,524**	sf	8.00	44,192		
344	09900		Paint to ceilings	**19,776**	sf	1.25	24,720		
345	05500		Unistrut framing	**540**	sf	8.00	4,320		
346	09900		Paint to exposed structure	**7,422**	sf	2.50	18,555		
347	09900		Paint to exposed structure to gymnasium	**8,510**	sf	2.50	21,275		
348			SUBTOTAL					$476,630	
349									
350			***TOTAL - INTERIOR FINISHES***						***$1,634,188***
351									
352									

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		NEW MIDDLE SCHOOL						
353		***D10 CONVEYING SYSTEMS***						
354								
355		**D1010 ELEVATOR**						
356	14200	Passenger elevator, 3 stop;	**1**	ea	80,000.00	80,000		
357	14200	HC lift	**1**	ea	25,000.00	25,000		
358	05500	Pit ladders	**1**	ea	900.00	900		
359	05500	Sill angles	**24**	lf	25.00	600		
360		SUBTOTAL					$106,500	
361								
362		***TOTAL - CONVEYING SYSTEMS***						***$106,500***
363								
364								
365		***D20 PLUMBING***						
366								
367		**D20 PLUMBING, GENERALLY**						
368	15100	Equipment						
369	15100	Gas fired water heater 100 gallon	**3**	ea	3,000.00	9,000		
370	15100	Hot water circulator pump 10 GPM	**2**	ea	2,000.00	4,000		
371	15100	Hot water expansion tank	**1**	ea	750.00	750		
372	15100	Plumbing Fixtures						
373	15100	Water meter	**1**	ea	4,266.00	4,266		
374	15100	Domestic water backflow	**1**	ea	6,782.00	6,782		
375	15100	Water closets, P-1, P-1A	**40**	ea	1,025.00	41,000		
376	15100	Urinals, P-2 water free	**8**	ea				
377	15100	Lavatories, P-3, P-3A	**33**	ea	900.00	29,700		
378	15100	Lavatories, P-3B	**6**	ea	800.00	4,800		
379	15100	Electric water coolers, P-6	**4**	ea	3,200.00	12,800		
380	15100	Showers	**2**	ea	1,455.00	2,910		
381	15100	Janitor sink, P-5	**3**	ea	1,080.00	3,240		
382	15100	Work sink	**1**	ea	845.00	845		
383	15100	Prep work sink, P-4B	**2**	ea	525.00	1,050		
384	15100	Nurse sink, P-4B	**2**	ea	855.00	1,710		
385	15100	Art sink, P-4A	**4**	ea	1,100.00	4,400		
386	15100	Double bowl sink, P-4C	**2**	ea	1,000.00	2,000		
387	15100	Classroom sink, P-4	**50**	ea	900.00	45,000		
388	15100	Kitchen rough in	**1**	ls	10,000.00	10,000		
389	15100	Kitchen & culinary grease interceptors	**1**	ea	4,189.50	4,190		
390	15100	Floor drains	**16**	ea	436.50	6,984		
391	15100	Trap primer controller (4 per drain)	**4**	ea	472.50	1,890		
392	15100	Hose bibs	**8**	ea	220.50	1,764		
393	15100	Non freeze wall hydrant	**6**	ea	436.50	2,619		
394	15100	Connection to gas meter	**1**	ea	315.00	315		
395	15100	Exterior grease trap	**1**	ea	4,800.00	4,800		
396	15100	Roof drains with overflow drains	**14**	ea	685.00	9,590		
397	15100	Domestic Water Supply And Return, Type L Copper						
398	15100	1/2"	**1,509**	lf	9.22	13,913		
399	15100	3/4"	**920**	lf	10.65	9,798		
400	15100	1"	**736**	lf	11.99	8,825		
401	15100	1-1/4"	**588**	lf	15.67	9,214		
402	15100	1-1/2"	**470**	lf	18.18	8,545		
403	15100	2"	**377**	lf	24.39	9,195		
404	15100	Valves & fittings	**1**	ls	14,000.00	14,000		
405	15100	Fixture rough in / connections domestic water	**183**	ea	180.00	32,940		
406	15100	Pipe insulation						
407	15100	Pipe insulation	**4,601**	lf	5.97	27,468		
408	15100	Sanitary Waste And Vent Pipe w/ Hangers						
409	15100	6"	**600**	lf	45.27	27,162		
410	15100	4"	**2,000**	lf	31.61	63,220		
411	15100	3"	**1,200**	lf	25.55	30,660		
412	15100	2"	**2,200**	lf	21.73	47,806		
413	15100	Fittings	**1**	ls	17,000.00	17,000		
414	15100	Fixture rough in / connections sanitary	**173**	ea	200.00	34,600		
415	15100	Storm Drainage, Hubless Cast Iron Pipe						

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		NEW MIDDLE SCHOOL						
416	15100	Pipe insulation	**2,000**	lf	38.61	77,220		
417	15100	6"	**1,200**	lf	45.27	54,324		
418	15100	8"	**800**	lf	63.12	50,496		
419	15100	10"	**200**	lf	75.00	15,000		
420	15100	Fittings	**1**	ls	18,000.00	18,000		
421	15100	Gas And Fuel Distribution Pipe						
422	15100	Gas pipe, schedule 40 steel						
423	15100	6"	**200**	lf	77.66	15,532		
424	15100	2 1/2"	**400**	lf	35.21	14,084		
425	15100	2"	**200**	lf	24.56	4,912		
426	15100	1 1/4"	**100**	lf	17.39	1,739		
427	15100	1"	**100**	lf	14.35	1,435		
428	15100	3/4"	**100**	lf	12.06	1,206		
429	15100	Valves & fittings	**1**	ls	10,000.00	10,000		
430	15100	Reimbursable						
431	15100	Coordination & management	**1**	ls	17,000.00	17,000		
432	15100	Coring & patching	**1**	ls	2,000.00	2,000		
433	15100	Commissioning of system	**1**	ls	3,000.00	3,000		
434	15100	Testing and sterilization	**1**	ls	3,000.00	3,000		
435	15100	Fees & permits	**1**	ls	8,600.00	8,600		
436		SUBTOTAL					$868,299	
437								
438		***TOTAL - PLUMBING***						***$868,299***
439								
440								
441		***D30 HVAC***						
442								
443		**D30 HVAC, GENERALLY**						
444	15300	Heating equipment						
445	15300	Gas fired boiler with controls ? hp	**3**	ea	18,000.00	54,000		
446	15300	Fin tube radiation	**1,900**	lf	85.50	162,450		
447	15300	Cabinet unit heater	**24**	ea	886.50	21,276		
448	15300	Cabinet unit heater electric	**5**	ea	650.00	3,250		
449	15300	Unit heater	**8**	ea	589.50	4,716		
450	15300	Expansion tank	**2**	ea	720.00	1,440		
451	15300	Air separator tank	**2**	ea	1,080.00	2,160		
452	15300	Chemical treatment system	**1**	ls	6,344.00	6,344		
453	15300	Pumps						
454	15300	P-1, P-2, Heating	**2**	ea	4,500.00	9,000		
455	15300	VFD's	**2**	ea	3,500.00	7,000		
456	15300	Air distribution						
457	15300	Air Handling Unit						
458	15300	AHU-1 6,000 CFM for kitchen	**1**	ea	30,000.00	30,000		
459	15300	AHU-2 6,000 CFM for café with ERU	**1**	ea	48,000.00	48,000		
460	15300	AHU-4 8,000 CFM for gym	**1**	ea	40,000.00	40,000		
461	15300	VAV's with reheat	**97**	ea	1,800.00	174,600		
462	15300	VFD's	**3**	ea	3,150.00	9,450		
463	15300	Roof Top Unit						
464	15300	RTU-1 1,900 CFM art room with ERU	**1**	ea	15,200.00	15,200		
465	15300	RTU-2 8,000 CFM media room with ERU	**1**	ea	64,000.00	64,000		
466	15300	RTU-3 7,000 CFM offices with ERU	**1**	ea	56,000.00	56,000		
467	15300	RTU-4 4,100 CFM classrooms with ERU	**1**	ea	32,800.00	32,800		
468	15300	RTU-5 3,000 CFM classrooms with ERU	**1**	ea	24,000.00	24,000		
469	15300	RTU-6 6,300 CFM classrooms with ERU	**1**	ea	50,400.00	50,400		
470	15300	RTU-7 5,400 CFM classrooms with ERU	**1**	ea	43,200.00	43,200		
471	15300	RTU-8 810 CFM band room with ERU	**1**	ea	6,480.00	6,480		
472	15300	RTU-9 945 CFM music / drama with ERU	**1**	ea	7,560.00	7,560		
473	15300	RTU-10 2,400 CFM locker room with ERU	**1**	ea	19,200.00	19,200		
474	15300	RTU-11 2,700 CFM bathrooms with ERU	**1**	ea	21,600.00	21,600		
475	15300	Ductless Split Units						
476	15300	Split units with ACCU for telecom server/elect	**2**	ea	3,500.00	7,000		
477	15300	Exhaust fan						

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		NEW MIDDLE SCHOOL						
478	15300	Fan allowance	**1**	ls	25,000.00	25,000		
479	15300	Sheetmetal & Accessories						
480	15300	Ductwork	**136,500**	lbs	7.75	1,057,875		
481	15300	Duct insulation	**81,900**	sf	3.00	245,700		
482	15300	Black iron welded kitchen exhaust	**1,000**	lbs	15.00	15,000		
483	15300	Aluminum ductwork for dishwasher	**300**	lbs	13.00	3,900		
484	15300	Breeching & flue	**100**	lf	150.00	15,000		
485	15300	RGD's	**650**	ea	125.00	81,250		
486	15300	Ductwork and connections for solar wall	**1**	ls	15,000.00	15,000		
487	15300	Piping						
488	15300	Hot Water Pipe						
489	15300	Hot water pipe with fittings & hangers	**8500**	lf	28.00	238,000		
490	15300	Valves & fittings	**1**	ls	62,250.00	62,250		
491	15300	Refrigeration Pipe						
492	15300	Refrigeration pipe with fittings & hangers	**900**	lf	9.00	8,100		
493	15300	Valves & fittings	**1**	ls	2,025.00	2,025		
494	15300	Piping Insulation	**8,900**	lf	6.00	53,400		
495	15300	Controls (DDC)						
496	15300	Automatic temperature controls	**129,060**	sf	3.50	451,710		
497	15300	Balancing						
498	15300	System testing & balancing	**129,060**	sf	0.50	64,530		
499	15300	Reimbursable						
500	15300	Coordination & management	**1**	ls	65,500.00	65,500		
501	15300	Commissioning	**1**	ls	40,000.00	40,000		
502	15300	Coring & patching	**1**	ls	5,000.00	5,000		
503	15300	Rigging & equipment rental	**1**	ls	25,000.00	25,000		
504	15300	Vibration & seismic restraints	**1**	ls	32,500.00	32,500		
505	15300	Fees & permits	**1**	ls	34,000.00	34,000		
506		SUBTOTAL					$3,461,866	
507								
508		***TOTAL - HVAC***						***$3,461,866***
509								
510								
511		***D40 FIRE PROTECTION***						
512								
513		**D40 FIRE PROTECTION, GENERALLY**						
514	15200	Double check valve assembly 8"	**1**	ea	7,200.00	7,200		
515	15200	Alarm check valve assembly 8"	**2**	ea	4,500.00	9,000		
516	15200	Siamese twin	**1**	ea	2,000.00	2,000		
517	15200	Kitchen hood suppression system allow	**1**	ls	11,900.00	11,900.00		
518	15200	Floor control valve station	**3**	ea	1,500.00	4,500		
519	15200	Fire department valve cabinet	**11**	ea	750.00	8,250		
520	15200	Sprinkler head	**1,000**	ea	75.00	75,000		
521	15200	Branch sprinkler piping with fittings & hangers	**12,000**	lf	24.00	288,000		
522	15200	Main sprinkler piping with fittings & hangers	**4,000**	lf	30.00	120,000		
523	15200	Reimbursable						
524	15200	Coordination & management	**1**	ls	10,000.00	10,000		
525	15200	Hydraulic calculations	**1**	ls	3,000.00	3,000		
526	15200	Coring & patching	**1**	ls	1,000.00	1,000		
527	15200	Commissioning of system	**1**	ls	5,000.00	5,000		
528	15200	Fees & permits	**1**	ls	5,500.00	5,500		
529		SUBTOTAL					$550,350	
530								
531		***TOTAL - FIRE PROTECTION***						***$550,350***
532								
533								
534		***D50 ELECTRICAL***						
535								
536		**D5010 SERVICE & DISTRIBUTION**						
537	16100	Service and distribution gear						
538	16100	Meter socket installation	**1**	ea	350.00	350		
539	16100	1600A 480/277V main distribution panelboard	**1**	ls	25,000.00	25,000		
540	16100	200A 480/277V panelboard	**4**	ea	1,782.00	7,128		
541	16100	100A 480/277V panelboard	**1**	ea	1,458.00	1,458		
542	16100	75KVA dry type transformer	**2**	ea	4,811.40	9,623		
543	16100	45KVA dry type transformer	**6**	ea	3,685.50	22,113		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		NEW MIDDLE SCHOOL						
544	16100	225A 208/120V double tub panelboard	**1**	ea	4,050.00	4,050		
545	16100	225A 208/120V panelboard	**1**	ea	1,782.00	1,782		
546	16100	150A 208/120V double tub panelboard	**6**	ea	4,000.00	24,000		
547	16100	225A enclosed circuit breaker	**1**	ea	1,883.25	1,883		
548	16100	Feeders						
549	16100	Normal power feeders	**129,060**	sf	1.00	129,060		
550	16100	Grounding and bonding	**1**	ls	10,000.00	10,000		
551	16100							
552	16100	Generator Power						
553	16100	150KW diesel fueled generator set with controls in	**1**	ls	50,000.00	50,000		
554	16100	225A 4 pole automatic transfer switch	**1**	ea	6,237.00	6,237		
555	16100	100A 4 pole automatic transfer switch	**1**	ea	5,000.00	5,000		
556	16100	175A 480/277V panelboard	**1**	ea	1,782.00	1,782		
557	16100	100A 480/277V panelboard	**2**	ea	1,458.00	2,916		
558	16100	15KVA dry type transformer	**2**	ea	2,367.00	4,734		
559	16100	60A 208/120V panelboard	**2**	ea	1,200.00	2,400		
560	16100	Feeders						
561	16100	Emergency power feeders	**129,060**	sf	0.50	64,530		
562	16100							
563	16100	UPS System						
564	16100	30KVA UPS	**1**	ls	11,000.00	11,000		
565	16100	125A 208/120V panelboard	**1**	ea	1,500.00	1,500		
566	16100	*Feeders carried in Emergency*						
567	16100							
568	16100	Photovoltaic System						
569	16100	2" empty EMT for future system	**100**	lf	10.00	1,000		
570	16100	4" empty EMT, allow	**100**	lf	18.00	1,800		
571	16100							
572	16100	Equipment wiring						
573	16100	AHU feed, connection & FSS	**3**	ea	1,500.00	4,500		
574	16100	AHU feed, connection & FSS WP	**1**	ea	2,000.00	2,000		
575	16100	CEX feed, connection & thermal switch	**9**	ea	800.00	7,200		
576	16100	CU feed, connection & FSS WP	**2**	ea	1,500.00	3,000		
577	16100	CUH feed, connection & thermal switch	**20**	ea	800.00	16,000		
578	16100	ECH feed and connection	**5**	ea	400.00	2,000		
579	16100	Elevator feed, connection, & enclosed circuit breaker, allow	**1**	ea	4,500.00	4,500		
580	16100	Exhaust fan feed, connection & FSS WP	**1**	ea	1,500.00	1,500		
581	16100	FC feed, connection & FSS	**2**	ea	1,200.00	2,400		
582	16100	Heat trace, allow	**1**	ls	12,000.00	12,000		
583	16100	HWB feed, connection & thermal switch	**3**	ea	1,000.00	3,000		
584	16100	Pump feed, connection & FSS	**7**	ea	1,200.00	8,400		
585	16100	RTU feed, connection, & FSS WP	**11**	ea	2,500.00	27,500		
586	16100	UH feed, connection & thermal switch	**3**	ea	800.00	2,400		
587	16100	VAV feed, connection & thermal switch	**57**	ea	400.00	22,800		
588	16100	*Kitchen equipment wiring:*						
589	16100	CU 15A feed, connection, & 30A FSS	**2**	ea	1,000.00	2,000		
590	16100	Dishwasher 60A feed, connection, & 60A FSS	**1**	ea	1,750.00	1,750		
591	16100	Kitchen equipment 20A feed and connection	**17**	ea	1,000.00	17,000		
592	16100	Mixer 25A feed, connection, & 30A FSS	**1**	ea	1,200.00	1,200		
593	16100	Allow for mechanical equipment wiring not yet depicted	**129,060**	sf	1.00	129,060		
594		SUBTOTAL					$659,556	
595								
596		**D5020 LIGHTING & POWER**						
597	16100	Lighting						
598	16100	Lighting fixtures materials & installation labor:						
599	16100	Type A12	**19**	ea	800.00	15,200		
600	16100	Type A16	**194**	ea	1,000.00	194,000		
601	16100	Type A20	**16**	ea	1,300.00	20,800		
602	16100	Type A24	**4**	ea	1,560.00	6,240		
603	16100	Type A36	**4**	ea	2,350.00	9,400		
604	16100	Type A48	**2**	ea	3,100.00	6,200		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		NEW MIDDLE SCHOOL						
605	16100	Type A8	**1**	ea	520.00	520		
606	16100	Type B	**103**	ea	200.00	20,600		
607	16100	Type B1	**21**	ea	200.00	4,200		
608	16100	Type C	**73**	ea	250.00	18,250		
609	16100	Type C1	**4**	ea	250.00	1,000		
610	16100	Type D	**204**	ea	350.00	71,400		
611	16100	Type D1	**78**	ea	350.00	27,300		
612	16100	Type D2	**6**	ea	350.00	2,100		
613	16100	Type E	**28**	ea	220.00	6,160		
614	16100	Type E1	**11**	ea	220.00	2,420		
615	16100	Type F	**15**	ea	275.00	4,125		
616	16100	Type F1	**3**	ea	275.00	825		
617	16100	Type G	**18**	ea	350.00	6,300		
618	16100	Type G1	**6**	ea	350.00	2,100		
619	16100	Type H	**10**	ea	230.00	2,300		
620	16100	Type J	**23**	ea	250.00	5,750		
621	16100	Type K	**23**	ea	350.00	8,050		
622	16100	Type L12	**3**	ea	800.00	2,400		
623	16100	Type L16	**5**	ea	1,000.00	5,000		
624	16100	Type L4	**11**	ea	260.00	2,860		
625	16100	Type L8	**2**	ea	500.00	1,000		
626	16100	Type M	**1**	ea	150.00	150		
627	16100	Type N	**21**	ea	300.00	6,300		
628	16100	Type O	**2**	ea	275.00	550		
629	16100	Type P1	**63**	ea	300.00	18,900		
630	16100	Exit sign	**67**	ea	160.00	10,720		
631	16100	Emergency battery unit	**14**	ea	108.00	1,512		
632	16100	Wireguard	**4**	ea	54.00	216		
633	16100	Single pole switch	**166**	ea	17.41	2,890		
634	16100	Three-way switch	**8**	ea	25.25	202		
635	16100	Single pole dimmer switch	**6**	ea	52.79	317		
636	16100	Lighting control panel	**4**	ea	2,500.00	10,000		
637	16100	Ceiling mounted occupancy sensor	**80**	ea	91.80	7,344		
638	16100	Motion sensor switch	**51**	ea	20.00	1,020		
639	16100	Daylight sensor	**58**	ea	72.68	4,215		
640	16100	Daylight harvesting sensor system	**1**	ls	100,000.00	100,000		
641	16100	Time clock, allow	**1**	ea	300.00	300		
642	16100	Site lighting						
643	16100	Type S3	**26**	ea	6,949.00	180,674		
644	16100	Type S3G	**14**	ea	4,380.00	61,320		
645	16100	Type SWG	**6**	ea	3,860.00	23,160		
646	16100	Type S5	**4**	ea	6,948.00	27,792		
647	16100	Ground mounted flag pole light, allow	**6**	ea	400.00	2,400		
648	16100	Pole base	**50**	ea	413.00	20,650		
649	16100	Circuitry 2-#8 & 1-#10 in 1" conduit	**1,600**	lf	9.00	14,400		
650	16100	*Note - fixtures type S3 & S5 are solar and do not get circuitry*						
651	16100	Small power devices						
652	16100	Duplex receptacle	**405**	ea	18.00	7,290		
653	16100	Double duplex receptacle	**381**	ea	36.00	13,716		
654	16100	GFI duplex receptacle	**187**	ea	23.00	4,301		
655	16100	Double duplex receptacle in floor box	**13**	ea	36.00	468		
656	16100	Special purpose receptacle	**34**	ea	65.00	2,210		
657	16100	Partition connection	**2**	ea	100.00	200		
658	16100	Faucet connection	**8**	ea	60.00	480		
659	16100	Projection screen connection & control switch	**1**	ea	250.00	250		
660	16100	Lift connection	**1**	ea	150.00	150		
661	16100	Branch circuitry						
662	16100	WP device plate	**23**	ea	8.50	196		
663	16100	Device plate	**1,260**	ea	2.70	3,402		
664	16100	Device box	**2,400**	ea	15.00	36,000		
665	16100	Two gang floor box	**13**	ea	230.00	2,990		
666	16100	3/4" EMT	**11,200**	lf	4.50	50,400		
667	16100	1" PVC	**400**	lf	4.50	1,800		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		NEW MIDDLE SCHOOL						
668	16100	#12 THHN	**70,000**	lf	0.48	33,600		
669	16100	12-2 MC	**25,000**	lf	2.63	65,750		
670	16100	12-3 MC	**8,500**	lf	3.25	27,625		
671		SUBTOTAL					$1,192,360	
672								
673		**D5030 COMMUNICATION & SECURITY SYSTEMS**						
674	16100	Fire alarm						
675	16100	Fire alarm materials quote by Northeast Integrated Systems	**1**	ls	36,433.42	36,433		
676	16100	Fire alarm control panel	**1**	ea		Included in quote		
677	16100	Digital communicator	**1**	ls		"		
678	16100	Remote annunciator	**1**	ea		"		
679	16100	SNAC panel	**3**	ea		"		
680	16100	100 watt audio amplifier	**2**	ea		"		
681	16100	Master box, allow	**1**	ea		"		
682	16100	Exterior beacon	**1**	ea		"		
683	16100	Knox box	**1**	ea		"		
684	16100	Manual pull station	**15**	ea		"		
685	16100	Smoke detector	**98**	ea		"		
686	16100	Heat detector, allow	**1**	ea		"		
687	16100	Ductsmoke detector with remote test station	**15**	ea		"		
688	16100	Audio/visual device	**130**	ea		"		
689	16100	Visual device	**36**	ea		"		
690	16100	Remote alarm indicator	**11**	ea		"		
691	16100	Monitoring/control module	**45**	ea		"		
692	16100	Wireguard	**6**	ea		"		
693	16100	Testing and programming	**1**	ls		"		
694	16100	Quoted materials installation labor:						
695	16100	Fire alarm control panel	**1**	ea	2,040.00	2,040		
696	16100	Digital communicator	**1**	ls	268.00	268		
697	16100	Remote annunciator	**1**	ea	650.00	650		
698	16100	SNAC panel	**3**	ea	650.00	1,950		
699	16100	100 watt audio amplifier	**2**	ea	268.00	536		
700	16100	Master box, allow	**1**	ea	650.00	650		
701	16100	Exterior beacon	**1**	ea	80.00	80		
702	16100	Knox box	**1**	ea	40.00	40		
703	16100	Manual pull station	**15**	ea	40.00	600		
704	16100	Smoke detector	**98**	ea	40.00	3,920		
705	16100	Heat detector, allow	**1**	ea	40.00	40		
706	16100	Ductsmoke detector with remote test station	**15**	ea	160.00	2,400		
707	16100	Audio/visual device	**130**	ea	40.00	5,200		
708	16100	Visual device	**36**	ea	40.00	1,440		
709	16100	Remote alarm indicator	**11**	ea	80.00	880		
710	16100	Monitoring/control module	**45**	ea	40.00	1,800		
711	16100	Wireguard	**6**	ea	20.00	120		
712	16100	FP equipment connection	**22**	ea	190.00	4,180		
713	16100	Elevator recall connection	**2**	ea	101.00	202		
714	16100	Kitchen anul system connection	**1**	ea	190.00	190		
715	16100	Rough In:						
716	16100	Device box	**400**	ea	15.00	6,000		
717	16100	3/4" EMT	**11,500**	lf	4.50	51,750		
718	16100	#14 THHN	**34,400**	lf	0.35	12,040		
719	16100	FA cable	**5,700**	lf	0.68	3,876		
720	16100							
721	16100	Telephone/CATV/Data System						
722	16100	Devices and cabling						
723	16100	Telephone device	**1**	ea	16.88	17		
724	16100	1 port data	**115**	ea	16.88	1,941		
725	16100	2 port data	**48**	ea	33.75	1,620		
726	16100	2 port data in floor box	**10**	ea	33.75	338		
727	16100	4 port data	**12**	ea	67.50	810		
728	16100	Tel/data device	**54**	ea	33.75	1,823		
729	16100	Tel/2 data device	**124**	ea	33.75	4,185		
730	16100	Tel/2 data device in floor box	**3**	ea	50.63	152		
731	16100	AP wifi access point ceiling device	**34**	ea	350.00	11,900		
732	16100	AV device	**115**	ea	253.20	29,118		
733	16100	Projector device	**6**	ea	33.75	203		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		NEW MIDDLE SCHOOL						
734	16100	Data B device, blank cover plate	**88**	ea	3.15	277		
735	16100	CAT 6 UTP	**120,000**	lf	0.90	108,000		
736	16100	RG-6	**105,000**	lf	0.80	84,000		
737	16100	Backbone, allow	**300**	lf	15.00	4,500		
738	16100	MDF fit out	**1**	ea	3,200.00	3,200		
739	16100	IDF fit out	**3**	ea	1,800.00	5,400		
740	16100	Rough In						
741	16100	Single gang device box with 3/4"EMT to ceiling	**500**	ea	85.00	42,500		
742	16100	Five gang device box with 3-1.25" conduit to ceiling	**115**	ea	200.00	23,000		
743	16100	Cable tray, closets	**200**	lf	25.00	5,000		
744	16100	Wirebasket cable tray, allow	**1,200**	lf	20.00	24,000		
745	16100	4" EMT	**820**	lf	18.00	14,760		
746	16100	4" EMT sleeves	**24**	ea	120.00	2,880		
747	16100	Backboard	**4**	ea	250.00	1,000		
748	16100	MDF power	**1**	ea	590.63	591		
749	16100	IDF power	**3**	ea	253.13	759		
750	16100	Closet grounding	**4**	ea	350.00	1,400		
751	16100							

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
		NEW MIDDLE SCHOOL						
752	16100	Clock systems						
753	16100	Master clock control panel	**1**	ea	30,000.00	30,000		
754	16100	Clock/speaker	**65**	ea	121.50	7,898		
755	16100	12" clock	**44**	ea	135.00	5,940		
756	16100	Wireguard	**1**	ea	50.63	51		
757	16100	Rough-In:						
758	16100	Single gang device box with 3/4"EMT to ceiling	**110**	ea	85.00	9,350		
759	16100	12-3 MC	**7,000**	lf	3.25	22,750		
760	16100	24V power supply, allow	**4**	ea	250.00	1,000		
761	16100	Low voltage cable	**400**	lf	0.60	240		
762	16100							
763	16100	PA/Local Sound Systems						
764	16100	Intercom control panel	**1**	ls	18,750.00	18,750		
765	16100	Speaker, ceiling mounted - PA system *(assumes back can comes with speaker)*	**117**	ea	150.00	17,550		
766	16100	Exterior speaker	**13**	ea	250.00	3,250		
767	16100	Volume control	**45**	ea	81.00	3,645		
768	16100	Wireguard	**4**	ea	50.63	203		
769	16100	Speaker cable, allow	**12,000**	lf	1.00	12,000		
770	16100	Device box with conduit to ceiling	**60**	ea	85.00	5,100		
771	16100	Conduit to programmable output and telephone system	**1**	ls	11,250.00	11,250		
772	16100							
773	16100	Digital Signage System						
774	16100	Digital Signage System equipment, allow:	**1**	ls	30,000.00	30,000		
775	16100	42" LCD HDTV	**5**	ea		Included above		
776	16100	Carousel Pro rack mounted unit	**1**	ea		"		
777	16100	Carousel 220 player	**5**	ea		"		
778	16100	TV box	**5**	ea		"		
779	16100	Rough-In, allow	**1**	ls	15,000.00	15,000		
780	16100							
781	16100	Classroom Interactive Whiteboard System						
781	16100	Rough-in for future smartboards	**41**	loc	500.00	20,500		
782	16100	Smartboard - Hitachi FX 77 Duo whiteboard	**108**	ea	3,500.00	378,000		
783	16100	Hitachi projector	**6**	ea	1,800.00	10,800		
784	16100	Smart USB audio system	**6**	ea	1,200.00	7,200		
785	16100	Rough-In, allow	**1**	ls	15,000.00	15,000		
786	16100							
787	16100	Video Distribution System						
788	16100	Video Distribution System	**129,060**	sf	0.75	96,795		
789	16100	Rough-In, allow	**129,060**	sf	0.35	45,171		
790	16100							
791	16100	Cafeteria Systems						
792	16100	Sound system, allow	**1**	ls	20,000.00	20,000		
793	16100	Rough-in	**1**	ls	8,000.00	8,000		
794	16100							
795	16100	Gymnasium Equipment						
796	16100	Sound system, allow	**1**	ls	30,000.00	30,000		
797	16100	Microphone outlet, wall	**2**	ea	81.00	162		
798	16100	Speaker, ceiling mount	**2**	ea	270.00	540		
799	16100	Rough-in	**1**	ls	10,000.00	10,000		
800	16100	Scoreboard with controls and (2) shot clocks & wireless controller	**1**	ea	10,800.00	10,800		
801	16100	Motorized back stop 20A feed, connection, & feed to key switch	**2**	ea	1,656.00	3,312		
802	16100	Motorized divider curtain 30A feed, connection, & feed to key switch	**2**	ea	1,620.00	3,240		
803	16100							
804	16100	Drama/Choral Room						
805	16100	Lutron style dimming system	**1**	ls	30,000.00	30,000		
806	16100	Rough-in	**1**	ls	12,000.00	12,000		
807	16100	Stage track lighting	**1**	ls	20,000.00	20,000		
808	16100							
809	16100	Security system						
810	16100	Intrusion alarm panel/CCTV headend	**1**	ea	35,000.00	35,000		
811	16100	Card reader	**9**	ea	315.00	2,835		
812	16100	CCTV camera	**3**	ea	900.00	2,700		

	CSI CODE		DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW MIDDLE SCHOOL								
813	16100		CCTV camera WP	**7**	ea	1,300.00	9,100		
814	16100		Door release	**1**	ea	108.00	108		
815	16100		Door contact	**22**	ea	108.00	2,376		
816	16100		Intercom	**1**	ea	405.00	405		
817	16100		Glass break detector	**50**	ea	108.00	5,400		
818	16100		External contact input	**15**	ea	108.00	1,620		
819	16100		Motion detector, ceiling mount	**10**	ea	108.00	1,080		
820	16100		Security cable	**9,000**	lf	1.00	9,000		
821	16100		RG6 cable	**1,000**	lf	0.80	800		
822	16100		Device box with 1" conduit to ceiling	**85**	ea	100.00	8,500		
823			SUBTOTAL					$1,505,080	
824									
825		**D5040**	**OTHER ELECTRICAL SYSTEMS**						
826			Lightning protection						
827	16100		UL Master label lightning protection	**129,060**	sf	0.35	45,171		
828	16100		Temporary services						
829	16100		Temporary power and lights	**129,060**	sf	0.40	51,624		
830	16100		Reimbursable						
831	16100		Fees & permits	**1**	ls	30,000.00	30,000		
832			SUBTOTAL					$126,795	
833									
834			***TOTAL - ELECTRICAL***						***$3,483,791***
835									
836									
837		***E10***	***EQUIPMENT***						
838									
839		**E10**	**EQUIPMENT, GENERALLY**						
840	11500		Gym wall pads	**1,281**	sf	9.63	12,336		
841	11500		Basketball backstops; swing up; electric operated	**6**	ea	9,800.00	58,800		
842	11500		Volleyball net and standards	**1**	ea	2,000.00	2,000		
843	11970		Gym curtains and supports	**2**	loc	30,000.00	60,000		
844	11970		Telescoping bleachers	**550**	seat	110.00	60,500		
845	11400		Kitchen equipment	**1**	ls	446,645	446,645		
846	11400		Loading dock equipment	**1**	ls	3,000.00	3,000		
847	11400		Refrigerator/freezer	**2**	loc	1,800.00	NIC		
848	11400		Washer/Dryer	**2**	loc	1,900.00	NIC		
849	11400		Stove	**1**	loc	1,500.00	NIC		
850	11400		Microwave	**1**	loc	250.00	NIC		
851	11510		Kiln	**1**	ea	3,088.00	3,088		
852	11970		Stage curtains/rigging	**1**	ls	40,000.00	40,000		
853	10999		Ceiling mounted projection screen; 8 x 8	**5**	loc	1,200.00	6,000		
854	10999		Electrically operated projection screen; 12 x 15	**1**	loc	5,000.00	5,000		
855	10999		Electrically operated projection screen; 12 x 8	**1**	loc	3,600.00	3,600		
856	10999		Manually operated projection screens; ceiling mounted 70" x 70"				NIC		
857			SUBTOTAL					$700,969	
858									
859			***TOTAL - EQUIPMENT***						***$700,969***
860									
861									

PM&C

Sherwood Middle School
New School and Sitework Package
Shrewsbury, MA

07-Dec-09

Schematic Design Submission

GFA 129,060

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW MIDDLE SCHOOL						
	E20 FURNISHINGS						
	E2010 FIXED FURNISHINGS						
12670	Entry mats & frames - recessed with carpet/rubber strips	**330**	sf	25.00	8,250		
12500	Curtain and track to health suite	**4**	loc	600.00	2,400		
12500	Electrically Operated Shades in Media Rm.	**840**	sf	15.00	12,600		
12500	Window blinds	**9,482**	sf	6.00	56,892		
12320	Base cabinets and counters at classrooms	**385**	lf	280.00	107,800		
12320	Upper Cabinets in classrooms	**385**	lf	180.00	69,300		
12320	Base cabinets and counters at art	**40**	lf	340.00	13,600		
12320	Upper Cabinets in art	**16**	lf	180.00	2,880		
12320	Tall storage	**120**	ea	1,400.00	168,000		
12320	Low shelving 50%; custom cabinets 50% at classrooms; along perimeter wall at Unit Vents	**1,314**	lf	260.00	341,640		
12320	Base cabinets and counters in Teachers Dining	**8**	lf	280.00	2,240		
12320	Wall cabinets in Teachers Dining	**8**	lf	140.00	1,120		
12320	Base cabinets and counters in nurses	**12**	lf	280.00	3,360		
12320	Wall cabinets in nurses	**12**	lf	140.00	1,680		
12320	Base cabinets and counters in work room	**95**	lf	280.00	26,600		
12320	Shelving units in storage/work rooms; (5) shelves	**372**	lf	110.00	40,920		
12320	Wall cabinets in work room	**73**	lf	140.00	10,220		
12320	Instrument storage	**48**	lf	350.00	16,800		
12320	Base cabinets in life skills room	**19**	lf	280.00	5,320		
12320	Counters in life skills room	**19**	lf	80.00	1,520		
06400	Office work counter	**40**	lf	300.00	12,000		
06400	Clothes pole and shelf	**8**	lf	25.00	200		
06100	Blocking for smart boards	**108**	loc	150.00	16,200		
10100	Marker boards	**7,808**	sf	16.00	124,928		
10100	Marker boards with staff lines	**128**	sf	20.00	2,560		
06400	Media Reception desk	**18**	lf	800.00	14,400		
06400	Library shelving				NIC		
12320	Display case	**4**	loc	8,000.00	32,000		
	SUBTOTAL					$1,095,430	
	E2020 MOVABLE FURNISHINGS						
	All movable furnishings to be provided and installed by owner						
	SUBTOTAL					NIC	
	TOTAL - FURNISHINGS						***$1,095,430***
	F10 SPECIAL CONSTRUCTION						
	F10 SPECIAL CONSTRUCTION						
	No items in this section						
	SUBTOTAL						
	TOTAL - SPECIAL CONSTRUCTION						

PM&C

Sherwood Middle School 07-Dec-09
New School and Sitework Package
Shrewsbury, MA

Schematic Design Submission GFA 129,060

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	NEW MIDDLE SCHOOL						
	F20 SELECTIVE BUILDING DEMOLITION						
	F2010 BUILDING ELEMENTS DEMOLITION						
	See main summary for demolition of existing buildings						
	SUBTOTAL						
	F2020 HAZARDOUS COMPONENTS ABATEMENT						
02121	See main summary for HazMat allowance				See Summary		
	SUBTOTAL						
	TOTAL - SELECTIVE BUILDING DEMOLITION						

CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
SITEWORK							
	G SITEWORK						
	G10 SITE PREPARATION & DEMOLITION						
	Site Demolitions and Relocations						
02100	Clear trees remove all stumps etc.	**1.69**	acre	6,000.00	10,140		
02100	New 6ft CLF construction fence	**4,516**	lf	22.00	99,352		
02100	Salvage material to be reused in new construction	**1**	ls	10,000.00	10,000		
02100	Demolish existing Chain Link Fence	**2,220**	lf	6.00	13,320		
02100	Saw cut Bituminous paving for utility and hardscape improvements	**500**	lf	5.00	2,500		
02100	Remove and dispose Bituminous Paving; grind and reuse as base where possible	**187,940**	sf	0.60	112,764		
02100	Remove and dispose concrete sidewalks & pads	**3,500**	sf	1.00	3,500		
02100	Remove and store existing granite curb	**462**	lf	5.00	2,310		
02100	Remove and dispose Utility Poles	**3**	loc	2,000.00	6,000		
02100	Remove & dispose other existing utilities	**1**	ls	5,000.00	5,000		
02100	Remove existing miscellaneous site items	**1**	ls	10,000.00	10,000		
02100	Remove & dispose existing catch basins & manholes and backfill	**6**	loc	500.00	3,000		
02100	Protect and Maintain Utility Poles	**1**	ls	500.00	500		
02100	Remove & dispose existing utilities	**2,080**	lf	10.00	20,800		
02100	Cut and cap utilities at street	**3**	loc	2,000.00	6,000		
	Site Earthwork						
02200	Strip topsoil, store	**17,963**	cy	6.00	107,778		
02200	Remove existing baseball field & construct Contractor Laydown	**14,444**	sy	1.00	14,444		
02200	Rebuild softball field and soccer field	**14,444**	sy	1.50	21,666		
02200	Cuts/Fills	**1**	ls	90,000.00	90,000		
02200	Fine grading	**63,851**	sy	1.00	63,851		
02200	Ledge removal	**1**	ls	50,000.00	50,000		
02200	Silt fence/erosion control	**4,516**	lf	10.00	45,160		
	Hazardous Waste Remediation						
02121	Remove contaminated soils				NIC		
02121	Dispose/treat contaminated water				NIC		
	SUBTOTAL					$698,085	
	G20 SITE IMPROVEMENTS						
	Roadways and Parking Lots						
	Bituminous concrete paving						
02200	gravel base; 12" thick	**8,233**	cy	28.00	230,524		
02610	bituminous concrete; 4" thick	**24,698**	sy	20.00	493,960		
02610	Granite curbs; 6" x 18"	**940**	lf	28.00	26,320		
02610	Bituminous concrete berm	**5,720**	lf	5.00	28,600		
02610	Single solid lines, 4" thick	**262**	space	25.00	6,550		
02610	Crosswalk Hatching	**6**	loc	900.00	5,400		
02610	Pavement marking allowance	**1**	ls	5,000.00	5,000		
02610	HC curb cuts w/detectable pavers (1/L5.02)	**12**	loc	500.00	6,000		
	Pedestrian paving						
	Concrete paving						
02200	gravel base; 8" thick	**409**	cy	28.00	11,452		
03300	concrete paving; 4" thick	**16,500**	sf	3.50	57,750		
03300	concrete paving; at trash and transformer pads (allowa	**1**	ls	4,000.00	4,000		
03300	concrete stairs	**196**	lfr	90.00	17,640		
02610	Bituminous concrete paving						
02200	gravel base; 8" thick	**349**	cy	28.00	9,772		
02610	bituminous concrete; 3.5" thick	**1,564**	sy	17.00	26,588		
	Site Improvements						
02700	Line marking for two 1/2 outdoor basketball courts	**1**	ls	1,500.00	1,500		
02700	Basketball backboard	**2**	loc	1,800.00	3,600		
02700	New baseball backstop and benches w/dugout	**1**	loc	50,000.00	50,000		
03300	concrete retaining wall @ dumpster	**560**	sf	50.00	28,000		

	CSI CODE	DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	SITEWORK							
59	02800	8ft high BVC CL Fencing at dumpster vinyl privacy slats - (allowance)	**140**	lf	45.00	6,300		
60	02800	8ft high BVC CL Gates at dumpster/generator - (allowance)	**2**	ea	600.00	1,200		
61	02800	6ft high BVC CL Fencing	**154**	lf	35.63	5,487		
62	02800	6ft high gates	**4**	loc	450.00	1,800		
63	02700	Bicycle rack allowance	**1**	ls	10,000.00	10,000		
64	02700	Flag pole; 40 feet high with integral winch	**1**	loc	3,650.00	3,650		
65	02700	Trash receptacle allowance	**10**	loc	350.00	3,500		
66	02700	Wheel stop - allowance	**262**	loc	80.00	20,960		
67	02700	Bollards	**3**	loc	450.00	1,350		
68	02700	Benches - allowance	**18**	loc	2,250.00	40,500		
69	02700	handrail @ stairs and sidewalk	**90**	lf	45.00	4,050		
70	02700	New traffic signs - (allowance)	**1**	ls	10,000.00	10,000		
71		Landscaping & Plantings:						
72	02830	Spread existing amended topsoil, 6" @ turf areas	**5,959**	cy	14.00	83,426		
73	02830	Planter soil, **2'**	**100**	cy	30.00	3,000		
74	02830	New turf areas	**321,800**	sf	0.20	64,360		
75	02830	Irrigation system to existing areas to remain				NIC		
76	02830	Allowance for irrigation system to new areas	**321,800**	sf	0.75	241,350		
77	02830	Other plants at planters, ground cover etc.	**1**	ls	5,000.00	5,000		
78	02830	Evergreen Tree	**14**	ea	800.00	11,200		
79	02830	Deciduous Tree	**46**	ea	750.00	34,500		
80		SUBTOTAL					$1,564,289	
81								
82	**G30**	**CIVIL MECHANICAL UTILITIES**						
83		Water supply						
84	02550	New water and fire DI piping; 8" (Cement lined)	**180**	lf	65.00	11,700		
85	02550	New water and fire DI piping; 6" (Cement Lined)	**740**	lf	53.00	39,220		
86	02550	Connect to existing line (Wet Taps)	**5**	loc	3,000.00	15,000		
87	02550	New fire hydrant	**3**	loc	2,600.00	7,800		
88	02550	FD connection	**1**	loc	2,000.00	2,000		
89	02550	Post Indicator Valve - allowance	**1**	loc	900.00	900		
90	02550	Gate valves	**7**	loc	750.00	5,250		
91		Sanitary sewer						
92	02500	10" SDR-35 PVC Sanitary sewer	**900**	lf	20.00	18,000		
93	02500	6" SDR-35 PVC Sanitary sewer	**620**	lf	13.00	8,060		
94	02500	4" SDR-34 PVC Sanitary Vent - allowance	**30**	lf	10.00	300		
95	02500	Sanitary sewer manhole	**5**	loc	3,000.00	15,000		
96	02500	Grease trap; **4,000** gallon - allowance	**1**	ls	9,000.00	9,000		
97		Storm Sewer						
98	02500	Subsurface retention system						
99	02500	Excavation and disposal on site	**1,622**	cy	12.00	19,464		
100	02500	Gravel fill	**1,437**	cy	26.00	37,362		
101	02500	CPP pipe	**700**	lf	50.00	35,000		
102	02500	Access MH	**4**	loc	3,000.00	12,000		
103	02500	12" CPP	**1,880**	lf	30.00	56,400		
104	02500	8" CPP (AD and RD)	**550**	lf	14.00	7,700		
105	02500	12" RCP Culvert at Crescent road	**90**	lf	150.00	13,500		
106	02500	RD clean outs	**1**	loc	100.00	100		
107	02500	Area Drains	**3**	loc	250.00	750		
108	02500	Outlet Control Structure	**1**	loc	2,800.00	2,800		
109	02500	New drainage manholes	**5**	loc	3,200.00	16,000		
110	02500	New drainage catch basins	**10**	loc	3,000.00	30,000		
111	02500	Stormceptor 900 gal WQ structures	**4**	loc	10,000.00	40,000		
112	02500	Convert existing CB to DMH	**1**	loc	1,500.00	1,500		
113	02500	Connect to existing drainage	**6**	loc	500.00	3,000		

PM&C

Sherwood Middle School
New School and Sitework Package
Shrewsbury, MA

07-Dec-09

Schematic Design Submission

	CSI CODE		DESCRIPTION	QTY	UNIT	UNIT COST	EST'D COST	SUB TOTAL	TOTAL COST
	SITEWORK								
114	02500		Construct Drainage outfalls	**2**	loc	1,500.00	3,000		
115	02200		Construct Wetland Replication Area	**5,000**	sf	5.00	25,000		
116			***Assumed that new gas connection is by the utility company***						
117			SUBTOTAL					$435,806	
118									
119		**G40**	**ELECTRICAL UTILITIES**						
120	16100		Primary service						
121	16100		Riser pole	**1**	ea	2,500.00	2,500		
122	16100		Primary ductbank AA 2-4", 3-3"	**200**	lf	95.00	19,000		
123	16100		Transformer by Utility Company	**1**	ea		NIC		
124	16100		Transformer pad	**1**	ea	1,875.00	1,875		
125	16100		Secondary service						
126	16100		Secondary electrical service ductbank BB 4-4", 1600A feeder	**50**	lf	355.00	17,750		
127	16100		Emergency service						
128	16100		Emergency ductbank CC 3-2" & 3-3/4" with 200A & 100A feeders and control wiring	**70**	lf	90.00	6,300		
129	16100		Generator pad	**1**	ea	1,875.00	1,875		
130	16100		Site communications and security						
131	16100		Communication riser pole	**1**	ea	2,500.00	2,500		
132	16100		Low voltage handhole	**2**	ea	338.00	676		
133	16100		Communication ductbank DD 2-5"	**310**	lf	40.00	12,400		
134			SUBTOTAL					$64,876	
135									
136									
137			***TOTAL - SITEWORK***						**$2,763,056**

PM&C

Project:	Sherwood Middle School	**Date:**	7-Dec-09
		Estimator:	PB
Description:	Schematic Design Submission	**S/f:**	129,060
		Project Duration Wks:	108
		Project Duration Months:	24

Labor Rates	Quantity	Units	@		Total
Senior Project Executive	0	day	1,000.00	$	-
Project Executive	0	day	880.00	$	-
Senior Project Manager	0	day	800.00	$	-
Project Manager	432	day	900.00	$	388,800.00
Assistant Project Manager	216	day	400.00	$	86,400.00
Mechanical Coordinator	0	day	760.00	$	-
General Super	0	day	1,000.00	$	-
Project Super	108	wk	4,000.00	$	432,000.00
Project Super - OT	20	wk	4,360.00	$	87,200.00
Assistant Super	54	wk	2,500.00	$	135,000.00
Assistant Super - OT	0	wk	3,120.00	$	-
Traffic coordinator	0	hr	45.00	$	-
Carpenter Forman - OT	0	wk	3,760.00	$	-
Carpenter	0	wk	2,600.00	$	-
Carpenter - OT	0	wk	3,360.00	$	-
Labor Forman	0	wk	2,200.00	$	-
Labor Forman - OT	0	wk	2,880.00	$	-
Labor	108	wk	1,600.00	$	172,800.00
Labor - OT	0	wk	2,640.00	$	-
Chief Estimator	0	day	840.00	$	-
Senior Estimator	0	day	720.00	$	-
Estimator	0	day	504.00	$	-
Safety Director	0	day	696.00	$	-
Project Accountant	0	day	480.00	$	-
Permit Administrator	0	day	400.00	$	-
MIS - Director	0	day	720.00	$	-
MIS - Coordinator	0	day	440.00	$	-
Administrative	0	day	280.00	$	-
TOTAL				**$**	**1,302,200.00**

Engineering & Testing	Quantity	Units	@		Total
Field Engineer	10	day	448.00	$	4,480.00
Field Engineer - OT	0	day	624.00	$	-
Surveyor	0	day	396.00	$	-
TOTAL				**$**	**4,480.00**

Office Expense	Quantity	Units	@		Total
Telephone	24	mos.	150.00	$	3,600.00
Facsimile	24	mos.	150.00	$	3,600.00

PM&C

Project:	Sherwood Middle School	**Date:**	7-Dec-09
		Estimator:	PB
Description:	Schematic Design Submission	**S/f:**	129,060
		Project Duration Wks:	108
		Project Duration Months:	24

Labor Rates	**Quantity**	**Units**	**@**		**Total**
Nextel/Cell Phone	24	mos.	100.00	$	2,400.00
Internet Connection	24	mos.	200.00	$	4,800.00
Field Office Equipment	1	LS	1,500.00	$	1,500.00
Field Office Supplies	1	LS	150.00	$	150.00
Photocopying	24	LS	150.00	$	3,600.00
Document Repro - Plans & Specs.	24	LS	100.00	$	2,400.00
Mail & Messenger	24	LS	500.00	$	12,000.00
Job Site Meetings	108	LS	150.00	$	16,200.00
First Aid & Safety Supplies	1	LS	75.00	$	75.00
Project Signs	1	LS	750.00	$	750.00
Project Closeout: Punch list	1	LS	10,000.00	$	10,000.00
Project Closeout: Record Drawings	1	LS	5,000.00	$	5,000.00
Project Closeout: As Built Site Drawings	0	LS	0.00	$	-
Project Closeout: Lien Wavers	0	LS	0.00	$	-
TOTAL				**$**	**66,075.00**

Temporary Protection	**Quantity**	**Units**	**@**		**Total**
Elevator Protection	0	ls	1,000.00	$	-
Rubbish Chute	1	ls	5,000.00	$	5,000.00
Dust Partition	0	ls	2,500.00	$	-
Temp Stairs	0	ls	0.00	$	-
Barricades	0	ls	0.00	$	-
Temp Fence	0	ls	0.00	$	-
Sidewalk & Street Rentals	0	ls	15,000.00	$	-
Off site rentals/parking	24	mnth	5,000.00	$	120,000.00
TOTAL				**$**	**125,000.00**

Temporary Facilities	**Quantity**	**Units**	**@**		**Total**
Office Trailers	24	Month	650.00	$	15,600.00
40' Storage Boxes - Rental per Month	24	Month	175.00	$	4,200.00
20' Storage Boxes - Rental per Month	24	Month	125.00	$	3,000.00
Job Box With Small Tools	24	Month	450.00	$	10,800.00
TOTAL				**$**	**33,600.00**

Temporary Utilities/Sanitary	**Quantity**	**Units**	**@**		**Total**
Temp Power	24	Month	2,000.00	$	48,000.00
Temp Heat	6	Month	10,000.00	$	60,000.00
Temp Water	24	Month	400.00	$	9,600.00
Temp Sanitary (1 per 10 men, heated)	24	Month	200.00	$	4,800.00

PM&C

Project:	Sherwood Middle School	**Date:**	7-Dec-09
		Estimator:	PB
Description:	Schematic Design Submission	**S/f:**	129,060
		Project Duration Wks:	108
		Project Duration Months:	24

Labor Rates	**Quantity**	**Units**	**@**		**Total**
Temp Fire Extinguisher	7	ea	75.00	$	525.00
Potable Water/Cooler	2	ea	150.00	$	300.00
Temporary Meters	0	ls	0.00	$	-
TOTAL				**$**	**123,225.00**

Cleanup & Debris Disposal	**Quantity**	**Units**	**@**		**Total**
Final Interior Clean	129,060	s.f.	0.15	$	19,359.00
Final Glass Clean	10	day	336.00	$	3,360.00
Dumpsters	108	Units	750.00	$	81,000.00
Trucking	108	ea	500.00	$	54,000.00
Cleanup/Trash Removal Labor	0	Day	0.00	$	-
TOTAL				**$**	**157,719.00**

GENERAL CONDITIONS TOTAL	**$**	**1,812,299**

% OF TOTAL BUDGET		**6.26%**
Cost per week	**$**	**16,780.55**

Sherwood Middle School			12/11/2009
TOTAL PROJECT BUDGET - ALL COSTS ASSOCIATED WITH THE PROJECT ARE SUBJECT TO 963 CMR 2.16(5)	**Estimated Budget**	***Cost/Scope Items Excluded from the Total Facilities Grant**	***Ineligible Costs**
Administration			
Legal Counsel	$25,000		
Bond Counsel	$50,000		
Owner's Project Manager			
Programming	$32,000		
Feasibility Study	$32,000		
Schematic Design	$44,650		
Owner's Project Manager	$1,136,360		
Full-Time On-Site P.M. (24 months)	$270,400		
Advertising	$10,000		
Printing	$50,000		
Owner's Insurance	$25,000		
Other Administrative Costs	$10,000		
Subtotal	**$1,685,410**	**$0**	**$0**
Architecture and Engineering			
Basic Services			
Architect and Engineer Fees			
Feasibility Study/Schematic Design	$503,600		
Design Development	$400,800		
Construction Contract Documents	$904,400		
Bidding/Construction Contract	$775,200		
Other Basic Services	$20,000		
Other Services			
Specialty Subconsultants (Not in Basic Services)	$372,000		
Expenses (Not in Basic Services)	$40,000		
Subtotal	**$3,016,000**	**$0**	**$0**
Pre-Construction Services			
CM-at-Risk Fee	**$370,000**		
Site Acquisition			
Land/Building Purchase	$0		
Appraisal Fees	$0		
Recording fees	$0		
Subtotal	**$0**	**$0**	**$0**
Construction Costs			
SUBSTRUCTURE			
Foundations	$1,565,463		
Basement Construction	$0		
SHELL			
SuperStructure	$2,801,264		
Exterior Closure	$3,486,265		
Roofing	$770,329		
INTERIORS			
Interior Construction	$2,870,244		
Staircases	$162,600		
Interior Finishes	$1,883,258		

Sherwood Middle School			12/11/2009
TOTAL PROJECT BUDGET - ALL COSTS ASSOCIATED WITH THE PROJECT ARE SUBJECT TO 963 CMR 2.16(5)	**Estimated Budget**	***Cost/Scope Items Excluded from the Total Facilities Grant**	***Ineligible Costs**
SERVICES			
Conveying Systems	$127,500		
Plumbing	$1,244,228		
HVAC	$3,414,597		
Fire Protection	$558,007		
Electrical (refls $134,200 deduct of smart board costs that are covered by $1,200/student IT allowance)	$2,705,102		
EQUIPMENT & FURNISHINGS			
Equipment	$656,540		
Furnishings	$839,128		
SPECIAL CONSTRUCTION & DEMOLITION			
Special Construction	$0		
Existing Building Demolition	$531,000		
In-Building Hazardous Mat'l Abatement	$575,000		
BUILDING SITEWORK			
Site Preparation	$912,549		
Site Improvements	$1,696,029		
Site Civil/ Mechanical Utilities	$551,793		
Site Electrical Utilities	$36,600		
Other Site Construction	$0		
CONSTRUCTION TRADES SUBTOTAL	**$27,387,496**	$0	$0
Insurance & Permit	$314,682		
Sub-Contractor Bonds	$410,812		
Contingencies (Design and Pricing)	$3,146,669		
General Conditions	$2,191,000		
Overhead & Profit	$1,478,924		
Escalation to Mid-Point Construction	$2,095,775		
CONSTRUCTION COST SUBTOTAL	**$37,025,359**	$0	$0
Add Alternates			
Alternates Subtotal	$0	$0	$0
Contingencies			
Construction Contingency (5%)	$1,851,268		
CONSTRUCTION COST SUBTOTAL	**$38,876,627**	**$0**	**$0**
Miscellaneous Project Costs			
Hazmat Monitoring & Testing	$50,000		
Material Testing (concrete, steel, masonry, windows, etc.)	$60,000		
Material Testing - Geotech	$25,000		
Reproduction/Mailing (included w/ printing above in Admin section)	$0		
Moving	$40,000		
Subtotal	**$175,000**	**$0**	**$0**

Sherwood Middle School			**12/11/2009**
TOTAL PROJECT BUDGET - ALL COSTS ASSOCIATED WITH THE PROJECT ARE SUBJECT TO 963 CMR 2.16(5)	**Estimated Budget**	***Cost/Scope Items Excluded from the Total Facilities Grant**	***Ineligible Costs**
Furnishings and Equipment			
Furnishings and Equipment	$1,080,000		
Maintenance Equipment	$0		
Computer/IT Equipment	$1,080,000		
Other Furnishings and Equipment	$0		
Subtotal	**$2,160,000**	**$0**	**$0**
Owner's Contingency			
Owner's Contingency	**$762,741**		
Other			
FF&E Consultant	$70,000		
IT Consultant	$50,000		
Move Consultant	$10,000		
Allowance for Electric and other Utility Backcharges	$50,000		
Mass CHPS Registration Fee	$5,000		
Professional Land Survey Services (by Owner)	$20,000		
Cafeteria Point of Sale Equipment	$10,000		
Structural Peer Review	$6,000		
Consultant, Advertisement, Misc. Expenses	(covered elsewhere)		
Subtotal, Other	**$221,000**	**$0**	**$0**
Total Project Budget	**$47,266,778**	**$0**	**$0**
Alternates	***$0***		
Ineligible cost	$0		
Scope items excluded	$0		
Basis of Total Facilities Grant	$47,266,778		

***NOTE: This document was prepared by the MSBA based on a preliminary review of information and estimates provided by the Town of Shrewsbury for the Sherwood Middle School project. Based on this preliminary review, certain budget, cost and scope items have been determined to be ineligible for reimbursement, however, this document does not contain a final, exhaustive list of all budget, cost and scope items which may be ineligible for reimbursement by the MSBA. Nor is it intended to be a final determination of which budget, cost and scope items may be eligible for reimbursement by the MSBA. All project budget, cost and scope items shall be subject to review and audit by the Authority, and the Authority shall determine, in its sole discretion whether any such budget, cost and scope items are eligible for reimbursement. The MSBA may determine that certain additional budget, cost and scope items are ineligible for reimbursement.**

O. OPM Review of SD Documents

PMA Consultants
Est. 1971
25 Braintree Hill Office Park, Suite 303 ▪ Braintree, MA 02184
Tel: 781.794.1404 ▪ Fax: 781.794.1405

Town of Shrewsbury, Sherwood Middle School
O.P.M. Commentary on Schematic Design Drawing Review
Prepared by PMA Consultants, LLC

Background

As part of its services as Owner's Project Manager for the Town of Shrewsbury's Sherwood Middle School project, PMA Consultants LLC (PMA) has reviewed the schematic design drawings that have been prepared by the architect, Lamoureux Pagano Associates (LPA). These drawings and other schematic design documentation are being submitted to the Massachusetts School Building Authority (MSBA) for the purpose of advancing the project to a Project Scope and Budget Agreement and an MSBA Board Vote to approve the agreement. The delivery of the documents to the MSBA is planned for December 11, 2009 and the MSBA Board vote is scheduled to occur on January 27, 2010.

The submittal of the schematic design documents to the MSBA marks the completion of 6 month effort that included: review of the educational program needs, an evaluation of the existing Sherwood Middle School and site, identification of deficiencies, the development of various options (no-build, add/reno, & new-build), the selection and approval of a preferred option, and the design of the preferred option. PMA has served as the Town of Shrewsbury's OPM throughout these 6 months and has monitored and reviewed the progress of the design and made periodic reports to the Sherwood Middle School Building Committee and the MSBA. Through out this process all of the MSBA's formal requirements were met, all informal MSBA guidance was followed, and all of the necessary interim MSBA approvals were received and documented through MSBA Board votes and MSBA letters.

MSBA Requirements for Schematic Design Drawings

The schematic design requirements are documented in 963 CMR 2.00 and the MSBA's Feasibility Study Requirements for MSBA Funded Projects. These requirements indicate that the schematic design shall include site plans and building plans of all floors and roofs. The drawings must depict all elements of the building with overall dimensions and indications of the gross square footage of each floor and the net square footage of each space. The plans must also include exterior elevation views of each exterior side of the building and indicate the exterior finishes. Also required by the MSBA are schematic plans of the plumbing, HVAC, fire protection, and electrical systems – these plans are required to show the basic distribution concepts of the systems and indicate the major pieces of equipment for each system.

Content of the Schematic Design Drawings

All of the schematic design drawings prepared by LPA either met or exceeded the MSBA requirements for schematic design. Many drawings went beyond showing "the basic distribution concepts of the systems" to such an extent that they were very close to, or met, the requirements for the subsequent design development (DD) phase for a building project of this type. Particularly worthy of note for their high quality were the site drawings, architectural floor plans, electrical drawings, and HVAC drawings. The schematic design estimators for this project (A. M. Fogarty and PM&C) had high praise for the quality and detail of the drawings and indicated that this level of quality and detail allowed for the use of more precise cost estimating techniques that provided a higher level of confidence in the total project cost than is normally achieved in a schematic design estimate.

Comments on the Schematic Design

In addition to the drawing requirements discussed above, the MSBA's schematic design requirements dictate that the architect consider site conditions (including topography, existing utilities, and subsurface soil conditions), the building code, ADA and special education requirements, environmental regulations, energy efficiency, sustainable design, traffic, and coordination with the surrounding neighborhood – all while meeting the educational objectives and operational requirements of the School District and the mandate of the Building Committee to provide an efficient, practical design at a reasonable cost. Thus far, the schematic design of the Sherwood Middle School has met or exceeded all of these requirements. Interim acceptance and/or approvals have been received from the MSBA, the Building Committee, the School Committee, and the Board of Selectman. Design attributes that have been receiving particular appreciation include: the proximity of the building to the nearby Oak Middle School, new site access and traffic patterns, the compactness and energy efficiency of the building, and the configuration of administrative and common spaces with adjoining class room wings that are configured to support the cluster and team teaching approach employed by the District.

PMA Consultants

Sherwood Middle School Project

Town of Shrewsbury

PMA PROJECT NUMBER:	**3350**
PROJECT ARCHITECT:	**Lamoureaux Pagano Associates**
PROJECT OPM:	**PMA Construction Services**
REVIEW TYPE:	**SCHEMATIC DESIGN DRAWINGS REVIEW**

Comment Code	*Description*	
A	Major Concern	
B	Possible Conflict	
C	Insufficient Detail	
D	Recommendation	
E	Minor Concern	

ITEM NO.	DWG REF	ISSUE NUMBER	COMMENT	COMMENT CODE	REVIEW DATE	REVIEW BY
1	C0.01	1	Above North arrow on left side of dwg, location of match sheet C0.02/C0.01 should be adjusted.	D	4-Dec-09	PHQ
2	L-2	1	Provide dimensions of new backstop and chain link fences at new baseball field and indicate reference to dwg L-4 for details.	D	4-Dec-09	PHQ
3	L-2, L-3	1	Indicate removal of existing fence and backstop at existing baseball field and relocation of existing bleachers. Extend limit of work line to include fence, backstop, and bleachers	D	4-Dec-09	PHQ
4	L-4	1	Extend limit of work to indicate removal of existing BCW at Crescent St end of new access road .	D	4-Dec-09	PHQ
5	L-4	1	Details 1 thru 5 should indicate L-2 rather than L-3.	D	4-Dec-09	PHQ
6	L-2	1	Add basketball hoop to legend or label the symbol on the courts.	D	4-Dec-09	PHQ
7	L-2	1	Provide details for planter	C	4-Dec-09	PHQ
8	L-2	1	Put flag pole on plan, it is shown on detail sheet L-4.	D	4-Dec-09	PHQ
9	L-4	1	Show add'l grade lines on access road between the current 584 foot elevation line and the existing grade at intersection with Crescent St.	D	4-Dec-09	PHQ
10	C200	1	General note 1, suggest adding text to indicate that the existing conditions drawings are included with the contract dwgs C0.01 thru C0.04.	D	4-Dec-09	PHQ
11	C200	1	On note 20, fill in date and DEP # for order of conditions by Shrewsbury Conservation Commission.	D	4-Dec-09	PHQ
12	C200	1	Eliminate stray arrow on detail for bituminous concrete Cape Cod berm.	D	4-Dec-09	PHQ
13	C203	1	Underground detention plan indicates "access manhole (see detail)" yet detail is not provided (there are 4 black circles, 2 on each end, that designate these manholes.	C	4-Dec-09	PHQ
14	C100	1	Where underground detention system is shown on plan, add note to refer reader to C203 for details.	D	4-Dec-09	PHQ
15	C203	1	Suggest additional details be provided for the underground detention plan, such as the length of the piping, length of the excavation, and details of how the 4 access manholes fit in the excavation and connect to the pipes.	C	4-Dec-09	PHQ

ITEM NO.	DWG REF	ISSUE NUMBER	COMMENT	COMMENT CODE	REVIEW DATE	REVIEW BY
16	S1.0-S1.3	4	Although adequate for schematic design, additional info is required as design progresses; including bracing details with elev views, loading of bracing so that connections can be designed, and the weights of members.	D	4-Dec-09	PHQ
17	S1.0-S1.3	4	Section-1 requires indication of rebar sizes and spacings.	D	4-Dec-09	PHQ
18	FP-2 thru FP-4	5	Subsequent dwgs should show layout of sprinkler heads.	D	4-Dec-09	PHQ
19	A-6, A-7	2	Suggest providing the reflected ceiling plan legend on dwgs A-6 and A-7; it is shown on first refl ceiling plan A-5, repeating it on A-6 and A-7 will elim the need to refer back to A-5	D	4-Dec-09	PHQ
20	A-5, A-6, A-7	2	Will future reflected ceiling plans indicate sprinkler heads, lighting fixtures, and supply/return diffusers/registers?	D	4-Dec-09	PHQ
21	A-7	2	At upper lobby and art room, should details be provided for unistrut grid? If it is industry practice to leave this to be designed and submitted by the contractor, then perhaps a reference to the spec should be put on the plan.	D	4-Dec-09	PHQ
22	A-8	2	Section cuts should be provided for solar wall panel.	D	4-Dec-09	PHQ
23	A-8, A-10	2	Where reference is made to particular manufacturer's and products, the phrase "or equal" should be included.	D	4-Dec-09	PHQ
24	S1.0	4	Although adequate for schematic design, additional info is required as design progresses; including bracing details, connection details, and weights of members.	D	4-Dec-09	PHQ
25	E-3, E-4, E-5	8	At classroom wings there is a note that says "refer to dwg E5 for typical classroom lighting requirements" this should refer to E-6 instead of E-5.	D	4-Dec-09	PHQ
26	E-7, E-8, E-9	8	At classroom wings there is a note that says "refer to dwg E-9 for typical classroom fire alarm, power and low voltage requirements" this should refer to E-10 instead of E-9	D	4-Dec-09	PHQ
27	A-4, A-7	2	For art rooms, are the roof details above the art room (A-4) compatible with the reflected ceiling plan on A-7?	B	4-Dec-09	PHQ
28	A-4, A-7	2	For sloping roof above art rooms, elev 625'-4" is provided at high end of the slope; an elevation at the low end of the slope should also be provided, or an indication of what the slope is.	C	4-Dec-09	PHQ
29	A-1	2	Should the architectural dwgs have a general notes page with abbreviations?	D	4-Dec-09	PHQ
30	A-4	2	Gymnasium roof doesn't show access from the catwalk that is indicated on drawing A-3 of the mechanical room that is beneath the gym roof. Also, it might be worth considering if the lobby stairwell should include access to the admin/media/classroom wing roof (622'-8"), so that the RTUs on this roof can be serviced.	C	4-Dec-09	PHQ
31	A-9	2	Although it is obvious where the building sections on dwg A-9 are taken, it would be good to number the sections on A-9 and show on the plan view dwgs A-1, A-2, & A-3 where these sections are taken.	D	4-Dec-09	PHQ
32	A-10	2	The locations where these wall sections are taken should be shown on the plan view dwgs.	D	4-Dec-09	PHQ
33	HVAC/Plumbing	7	Although adequate for schematic design, as the design progresses, future dwgs should show the fin tube radiator lines (currently not indicated on plumbing or HVAC dwgs).	D	4-Dec-09	PHQ
34						
35						