Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

MSBA
Schematic Design Binder

DECEMBER 11, 2014

MSBA
Massachusetts School Building Authority
40 Broad Street, Suite 500, Boston, MA 02111

OWNER
City of Worcester, MA
Architectural Services Division
50 Skyline Drive, Worcester, MA 01605

OPM
Tishman Construction Corporation of MA
An AECOM Co.
66 Long Wharf, 2nd Floor, Boston, MA 02110

DESIGNER
Lamoureux Pagano & Associates, Inc.
108 Grove Street, Suite 300, Worcester, MA 01605

Prepared by:
# SCHEMATIC DESIGN

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4.1.1 DESE SUBMITTAL
Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

DESE Submittal

NOVEMBER 21, 2014

MSBA
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40 Broad Street, Suite 500, Boston, MA 02111

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4.1.1 DESE SUBMITTAL

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F. MSBA Enrollment Letter
4.1.1 DESE SUBMITTAL

A. Cover Letter
November 21, 2014

Ms. Mary Pichetti  
Director of Capital Planning  
Massachusetts School Building Authority  
40 Broad Street, Suite 500  
Boston, Massachusetts 02109

Dear Ms. Pichetti:

The District is pursuing execution of a Project Scope and Budget Agreement for the MSBA approved schematic design of the proposed Nelson Place Elementary School. The District's 2014 enrollment is 504 students. The design enrollment for the proposed school project is 600, see executed design enrollment certification. The existing Nelson Place Elementary school currently serves grades Pre-Kindergarten through 6, and is proposed to continue to serve grades Pre-Kindergarten through 6.

In accordance with G.L. c. 70 B, MSBA staff has assembled the documents required for the review of the special education program at Nelson Place Elementary School. The following are attached per the 'Submittal Requirements':

1. A letter from Superintendent Dr. Melinda Boone of Worcester Public Schools describing its special education program.
2. Proposed space summary that includes the existing facility, proposed spaces, and MSBA guidelines based on the agreed upon design enrollment. The first page of this summary indicates a total of 21,201 square feet of space dedicated to the delivery of special education.
3. The floor plans for the proposed 111,700 square foot Nelson Place Elementary School.
4. A completed Special Education Adjacency Table

I have reviewed the attached documents and confirm that the District's School Building Committee has officially approved the attached submittal on October 27, 2014 and verify that the space summary match the floor plan and is complete and conform to the MSBA requirements as described in Module 4 – Schematic Design Guidelines.

Sincerely,

TISHMAN CONSTRUCTION CORPORATION OF MASSACHUSETTS

Erick Bakstran  
Project Manager

Enclosures:

     Special Education Delivery Methodology  
     Signed Educational Space Summary  
     Floor Plans  
     Special Education Adjacency Table  
     MSBA enrollment letter dated November 18, 2010

cc: Ronald R. Roberge, MSBA  
    Julie Lynch, City of Worcester  
    Robert Poitrat, TCCMA,  
    Erick Bakstran, TCCMA  
    Mike Pagano, LPA  
    Nicholas Milano, MSBA  
    Dr. Melinda Boone, Superintendent of Schools  
    Eugene Caruso, TCCMA  
    Katie Crockett, LPA

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Tishman Construction Corporation
4.1.1 DESE SUBMITTAL

B. Special Education Delivery Methodology
November 20, 2014

We are pleased to present to the Department of Elementary and Secondary Education an exciting building project that will advance the Worcester school district in delivering 21st century education to all students in the Worcester community.

At the core of the planning and design of the new Nelson Place Elementary School building are elements to create conditions for the 21st century learning. The new facility will incorporate all the necessary educational spaces and features for the district to deliver high quality teaching and learning for all students.

The Nelson Place Elementary school currently serves students in Pre-Kindergarten through grade 6 and will service the same grade levels in the future school with:

- expansion of the Early Childhood Assessment for preschool age children with suspected disabilities and expansion of the Pre-Kindergarten program
- creation of a science lab to incorporate applied experiential STEM learning into the curriculum for all students with and without disabilities in grades 3 through 6
- technology capabilities for classroom instruction and for the computer labs,
- expansion of the existing special education programming for students with Autism
- creation of learning labs to support all students, with and without disabilities.

To align district practices and to provide comprehensive educational opportunities for all students, with and without disabilities, we designed a facility for the new Nelson Place Elementary School that will accommodate and maximize the school and district’s programmatic needs.

Also at the core of the planning and design of the new school are references to the district’s improvement strategy – a set of deliberate actions to develop, enhance, and support student achievement that include: a) increased achievement of English Language Learners, b) increased achievement of students with disabilities, c) increased reading ability by grade three, and d) increased readiness for college and career.
The most salient programmatic enhancements are:

   b. Add capability to run the Early Childhood Assessment during the summer months.

2. Creation of a science lab to incorporate applied experiential STEM learning into the curriculum for all students in grade 3-6 with and without disabilities:
   a. STEM is an approach to teaching and learning that integrates the content and skills of science, technology, engineering, and mathematics with behaviors needed for success in the 21st century workforce.
   b. These behaviors include engagement in inquiry, logical reasoning, collaboration, communication, investigation, and creativity and they must begin at the elementary level.

3. Secure technology capabilities for classroom instruction and for the computer labs.
   a. The use of technology is vital to the learning experience, in particular for students with disabilities and students and teachers should have access to a variety of technological tools that supports the teaching and learning process.
   b. The district is developing internal capacity to expand its tiered systems of support and technology plays a significant role in creating blended classroom models to support the diverse learning needs of our student population.
   c. In addition to electronic formative assessments utilized by the district, Massachusetts is in the process of transitioning toward implementing an electronic state standardized test.

4. Expansion of the existing special education programming.
   a. At Nelson Place, students with disabilities receive special education services in a variety of modalities and settings: full inclusion, push-in and pull-out models, and substantially separate classrooms.
   b. Nelson Place is one of two elementary schools in the district that houses a specialized program for students diagnosed with Autism.
   c. Students diagnosed with Autism receive educational and social-emotional supports through Applied Behavior Analysis techniques, Speech Therapy, OT, PT and clinical services.
   d. Families also participate in monthly clinical/therapeutic meetings with school personnel and home service providers to discuss how to best support their children in and outside their home.

5. Creation of learning labs to support all students, with and without disabilities.
   a. The learning lab is a multi-function room designed to accommodate instructional delivery beyond the core classroom instruction.
   b. The learning labs will support differentiated instructional practices in a strategically defined multi-tiered system of supports.
   c. Students will receive individualized or small group instruction – for the purpose of addressing their learning deficits, given specialized instruction and targeted interventions to accelerate their learning.
These programmatic enhancements are aligned to support increased achievement of all Nelson Place students with and without disabilities. Based on the Massachusetts system of school accountability, Nelson Place School was classified as a Level 2 school in 2014. Across the grade levels tested under MCAS, 60 percent of students scored Proficient or higher in English Language Arts (ELA), 62 percent scored Proficient or Higher in Mathematics, and 47 percent were at Proficient or Higher in Science Technology/Engineering (STE). In ELA and Mathematics, it is also possible to look at student growth from 2013 to 2014. The median student growth percentile (SGP) at Nelson Place School was 55.0 for ELA in 2014, indicating the students’ growth slightly exceeded the level of growth of students statewide who had similar historical performance on the MCAS. The SGP at Nelson Place School was 50.0 for Mathematics in 2014, indicating the students’ growth was at the same level as students in their academic group statewide.

Despite this level of performance, the school failed to meet its gap halving goals from the DESE’s School Accountability system, declining in ELA, having no change in Mathematics from the 2013 level of performance, and showing improvement in STE but still below performance targets. Worcester Public Schools is currently involved in a Coordinated Review Program, which will be utilized as a guide for further program development.

Among high needs students (defined as students that belong to either low income, English Language Learner (ELL), or Special Education subgroups), there was a decline in the level of performance in ELA in 2014, no change in Mathematics, and improvement but below the accountability target in STE. The SGP of 49.0 for High Needs students was below target in ELA and the SGP of 53.0 was On Target in Mathematics. Overall, 46 percent of High Needs students were Proficient or Higher in ELA, 49 percent Proficient or Above in Mathematics, and just 24 percent Proficient or Above in STE.

Similarly, the gap halving targets of Special Education students fell below expectations in both ELA and Mathematics. In ELA, students with disabilities showed some improvement but did not meet the performance target for 2014. In Mathematics, the aggregate level of student performance on MCAS for students with disabilities stayed at the same level as 2013. Overall, 20 percent of Special Education students were Proficient or Higher in ELA and 24 percent were Proficient or Above in Mathematics in 2014.

Nelson Place School currently supports teaching and learning for 504 students in preschool through sixth grade, including students in the district-wide autism spectrum disorder. The current building has 21 classrooms. However, to support all students the school currently utilizes 26 classrooms with four classes located in the basement and one class housed in a former teachers room. The basement of the building is used as classroom space for one general education grade four classroom, and three special education Specialized Approaches to Individualized Learning (SAIL) classrooms. Nelson Place supports an elementary district-wide autism (AU) program. The SAIL program at Nelson Place is one of two district-wide host programs for students with a primary diagnosis of autism spectrum disorder (ASD). ASD is a pervasive developmental disorder characterized by significant deficits in social interaction and verbal and nonverbal communication, extremely limited range of activities and interests, and often by the presence of repetitive, stereotyped behaviors. ASD students have difficulty filtering environmental sounds. The proposed building should be acoustically designed to filter background noises. A sound field system will insure high acuity of sound sensitivities throughout the building.
Specialized Approaches to Individualized Learning (SAIL)

The Specialized Approaches to Individualized Learning (SAIL) program is designed to educate students who have been identified as having Autism Spectrum Disorders. The SAIL program is highly structured to provide direct support and instruction as behavioral techniques are used to promote independence, reduce aberrant behaviors and increase academic, functional and social skills. Instruction may include: highly structured one on one instruction, small group learning and/or full inclusion to include emphasis on generalization. Classrooms must be designed to provide a designated area for students to receive specialized discrete trial instruction via the applied behavioral analysis (ABA) methodology. Program components include highly structured, individualized programming; intensive communication and language training; social skills training; utilization of natural environments for instruction, positive behavioral programming; and educationally based sensory activities as well as inclusion with typically developing peers and activities when appropriate. SAIL students receive related services including speech/language, occupational therapy, and physical therapy education is also provided based on the individual needs of our students.

During the month of July and August, extended school year services are required and mandated by IDEA Regulations for individualized students with disabilities to prevent regression and/or recoupment of academic, behavioral and social skills. The proposed building should be designed with central air conditioning and specific accommodations which may be required by Individualized Educational Plans and teams to provide extended learning time.

This fiscal year, 2013-2014, Nelson Place has seen an increase in our SAIL program enrollment which has resulted in the need to add a fourth classroom. According to the Center for Disease Controls (CDC), in 2000 1 out 150 children was diagnosed with ASD. In 2008, 1 out 88 children was diagnosed with autism spectrum disorder. Overall, the district continues to see an increase in our ASD students as the years progress, evidenced in the enrollment charts.
Currently the Nelson Place SAIL program consists of five classrooms:
- Preschool integrated classroom
- Substantially separate kindergarten/grade1,
- Substantially separate grade 3-4 classroom,
- Partial inclusion kindergarten
- Partial inclusion grade 1 and 2.

The following facility implications that also impact the education delivery methods at the existing Nelson Place School include:
- Location of preschool classroom is not in proximity to kindergarten classrooms and/or grade level cohorts, currently, the classroom is located next to grade 3 classrooms
- Need for preschool classroom to be located near an exit as well as close proximity to bathrooms due to the ADL needs of AU students
- Three of SAIL classrooms are located in the basement of the current school: substantially separate kindergarten/grade1, partial inclusion kindergarten and partial inclusion grade 1 and 2.
- The partial kindergarten inclusion and the partial grade 1 inclusion and grade 2 SAIL classrooms share a single classroom space in the basement

Partial inclusion kindergarten SAIL students spend 2.5 to 3 hours in the general kindergarten classrooms and then must transition to the classroom in the basement for students to receive specialized instruction. During the morning time, the partial grade 1 inclusion and grade 2 SAIL students receive specialized instruction in the basement classroom and in the afternoon transition to their general education grade level classrooms.

Parents and staff do not have opportunities to observe discrete trial programs and/or behavioral interventions which are an integral part of instruction and learning for ASD children. The need to build an observation area adjacent to the preschool classroom and adjacent to each substantially separate SAIL classrooms is critical. The rationale to have an observation room will allow opportunities for parents, school based staff, behavioral specialist and evaluators to observe ASD students in their natural learning environment unobtrusively. This will promote teachable moments, enhance parent training, and allow the opportunity for demonstration and modeling of effective strategies to increase effective teaching and learning.
The current lack of space at Nelson Place does not meet the DESE requirements given the location of the preschool and SAIL classrooms. As a result, the location of these classes restricts opportunities for ASD students to be integrated in close proximity to grade level cohorts. Currently, our preschool and three of our SAIL classrooms are segregated from their general education grade level equivalent. Therefore, it creates a challenge for ASD SAIL students to transition to their grade level general education classrooms. SAIL students must walk from one end of the building to the other, missing out on valuable learning time.

The general education and special education classrooms located in the basement have poor ventilation and lighting, and two of the classrooms do not have wireless access or hardwire access.

**Proposed spaces to support students with disabilities including students enrolled in the SAIL program:**

To support the unique needs of students in the primary grade (preschool- grade 2) and students in the intermediate grades (3-6) the proposed Nelson Place School will be divided into two academic neighborhoods referred to as the primary and the intermediate. This configuration allows for students to be surrounded by their aged peers and allows for regular opportunities for team teaching, collaborative planning, sharing resources, and for offering shared learning experiences among classrooms and student. The proposed school will provide one self-contained SPED (SAIL) classroom per grade level neighborhood.

**Occupational and Physical Therapy:**

Occupational and Physical Therapy services are related educational services that are provided for students requiring intervention in order to access the curriculum and the life of the school due to a disability. Occupational therapists work with children to improve fine motor and sensory functioning, while physical therapists focus on gross motor needs of students. Occupational and physical therapists often work collaboratively in a co-treatment model to infuse strategies that support student learning.

**Limitations at Nelson Place Due to Current Occupational and Physical Therapy Space:**

Currently, occupational and physical therapy take place in an area that was designed as an entry way. It is a drafty area open to a stairwell leading down to the original main entrance door to the school. There is inadequate space for gross motor equipment due to the size of motor equipment needed during therapy sessions. The current location is clearly not conducive to engage students in a wide range of physical therapy activities. A significant safety concern is due to the open stairwell; as a result physical activities are limited for safety considerations. Due to inadequate space for therapy as well as limitations for storage existing therapy materials cannot be used to engage children in a variety of sensory and fine motor activities.

**Proposal for Occupational Physical Therapy Space:**

Ideally, an Occupational and Physical Therapy motor room should be adequate in size similar to a full-size classroom to accommodate space for both gross and fine motor activities to be taught simultaneously. The IEP needs for students often recommend specialized motor equipment. The motor room should also allow space for gross motor activities, individual and/or small group therapy sessions. There would also need to be equipment for the children, including a large floor mat, balance beam, a swing, and a ball pit, as well as ample room for gross motor movement. Sensory motor activities and/or fine motor work would require a space for up to two tables and up to eight student chairs. If possible one of the walls should be mirrored to allow students to model and demonstrate their skills. One will be located in the primary wing with developmental learning tools that are size-appropriate for students in preschool through second grade and one will be located in the intermediate wing appropriately equipped for that age group. Location of
one Occupational Therapy / Physical Therapy room in each wing will be minimize transition times and maximize time for therapeutic supportive services.

**Therapeutic Planning Room**

A Therapeutic Planning Room is a nurturing environment where emotional and social skills are explicitly taught to children who exhibit these difficulties. This room is aesthetically calming and soothing, promoting noise reduction, and appropriate lighting. Students with difficulty regulating their bodies because of their emotional and social skills can be explicitly instructed to use several therapeutic interventions to build their self-regulation capacity. Therapeutic interventions include: explicit teaching of emotional and social skills; play therapy activities; non-directed play; relaxation activates; role-play; and access to sensory areas. This room is essential to meet the needs of all students including typically developing peers who are unable to fully access the curriculum due to their emotional and social needs. The existing Nelson Place School does not provide therapeutic planning spaces. The proposed school will provide one per grade level to promote early de-escalation of target behaviors and allow for therapeutic rehabilitation of students for a timely re-entry into the classroom.

**Speech Language Pathologist:**

The Speech Language Pathologist improves the communication skills of students in social and academic settings. SLP services insure that students with disabilities have access to the core curriculum through a range of interventions and research based strategies. The following responsibilities represent how SLP’s supports schools:

- Perform screenings and evaluations to assess the need for intervention
- Develop and implement Individual Education Plans and Section 504 Accommodation Plans
- Provide intervention services to students identified with communication and language based disabilities either individually or in a small group
- Services are provided in the following settings: inclusion, pull out models and substantially separate classrooms

**Nelson Place Speech Therapy Current Space:**

Currently, the Speech Language Pathologist (SLP) for the primary grades works in a small space that is accessed by walking through two kindergarten classrooms. This is not conducive to learning, as therapists are rotating students in and out of the space for therapy, and there can be disruption to the learning environment based on the proximity of the two kindergarten classrooms.

The therapy space is not adequate in size, and in addition, there is significant noise from the adjacent classroom. The noise level interferes with therapy and evaluation sessions for students. There is one computer and a printer for use by students and staff; however, there is no internet access which limits the instructional benefit from the available technology.

The Speech Language Pathologist for the intermediate grades is also working in a space that is shared with the learning disabilities teacher. When both staff members are working in the room at the same time, there is potential for distraction as well as confidentiality. Also, the teachers’ bathroom is accessed through this room, creating consistent traffic that is disruptive to the therapy sessions or evaluations of students.

**Proposal for Speech Therapy Space:**

Ideally, the speech therapy space should be acoustically designed to support up to three adults to work simultaneously and efficiently. The logistics of having large enough rooms to accommodate the evaluation of students, therapy sessions and observations would be highly recommended. Also, it is common practice to have a Speech Language Pathologist Assistant and/or a graduate level student working with a Speech Language Pathologist. Therefore, the
rooms would need to be large enough to accommodate tables, teacher desks and chairs for up to six students, as well as a work planning area for the adults. Additionally, the size of the SLP rooms should be designed to allow space to evaluate children while other children are receiving SLP therapy services. The room should be accessible from a hallway and should have a dry erase board. Acoustics should be a consideration, keeping noise levels to a minimum. Technology should include computers with wireless internet access, tablets for student use, and a shared printer. An observation area should be adjacent to the SLP room to allow parents, staff, evaluators and college students to observe sessions for training purposes. Storage space is also needed for therapy materials, evaluation materials, files, and supplies.

In the proposed Nelson Place School, two speech rooms are to be located in the primary wing and one in the intermediate wing to minimize transition time, and maximize time for therapy, as well as co-treatment opportunities with other related service providers.

Learning Labs
Teachers of moderate special needs will utilize the learning lab rooms to provide explicit instruction across the content areas. Each of these rooms are required for students whose IEPs stipulate that specialized instruction be delivered outside the general education setting in a distraction free environment. These classrooms will also be utilized during standardized state testing, annual testing, re-evaluations for students who require special testing accommodations. These rooms will also need to provide hardwired and wireless access for teaching and learning and assessment purposes. In the existing school, students with moderate special needs are served in two undersized spaces that don’t fully support specialized instruction. The proposed school will have one Learning Lab within each grade level neighborhood.

Family Learning Center
A Family Learning Center sends a clear message that the school wants parents to be true partners in the education of their child. This is a place set aside in the school for the purpose of making the school accessible to families and encourages adult engagement in the children’s education. The family learning center would be utilized to conduct family focused workshops for special education and general education parents. This space would also be utilized to conduct clinical meetings which include special education staff and parents to discuss student progress at school and to offer resources to assist parents and guardians.

Nelson Place has a very active and involved Parent Teacher Organization (PTO). The PTO will also utilize this space for planning and board meetings to organize our yearly family events and fundraising.

Early Childhood Assessment Center
Overview:
The Early Childhood Assessment Center is a district-wide service that supports the federal “Child Find” mandate. This area will be a multipurpose area required to conduct assessments for preschool age children with suspected developmental disabilities. WPS offers integrated preschool programs to enhance the development of preschool students with disabilities prior to their entering kindergarten. Referrals for preschool assessments are made by health service providers, pediatricians, early intervention programs, social service agencies, Head Start, child care centers and other community based providers. Children referred to these assessments typically range in age from 2 years, 5 months to 4 years, 11 months. Developmental assessments and screenings are conducted by a multidisciplinary team that typically includes a school psychologist, a speech and language therapist, and an occupational therapist and a physical therapist. In addition, parents/guardians are present, as well as community based providers who have been working with the family and/or are providing transportation. The assessment is conducted in a play-based format to maximize rapport building.
with both the child and the parent, as well as maximize the child’s performance in developmental tasks.

Standardized, qualitative and observational components are all included in a developmental Early Childhood Assessment. A parent interview is typically a component of the process, along with consultations with service providers. The existing district-wide assessment program and facility is operating at capacity for 9 months per year. The proposed Early Childhood Assessment Center at Nelson Place School will host a year round assessment program to enable WPS to increase the number of assessments that are performed during the course of the year.

**Goal:**
The purpose of developmental assessments is to conduct culturally and linguistically appropriate early developmental assessments of children with suspected developmental delays and/or children with high-risk psychosocial backgrounds. The integration of formal, qualitative and observational components in the assessment, as well as the parent and community providers input, significantly increases acquisition of data and information about the whole child, thus minimizing the risk of over-identifying young children at risk of having a disability as learning disabled. Likewise, the comprehensive assessment approach provides opportunity to evaluate both formal and functional skills in all major areas of development (cognitive, speech and language, gross-motor, fine-motor, social-emotional and behavioral), in order to develop an appropriate Individualized Educational Plan as well as targeted interventions for students who may require accommodations.

**Space:**
The Early Childhood Assessment area requires not only space for the assessment but also space for carrying out all phases that are involved in completing the full developmental evaluation. The space requires ground floor accessibility as children are very young and typically accompanied by young siblings and/or baby siblings in strollers. This accessibility supports families having proper access to the area.

**Assessment Space:** This space is required to conduct a comprehensive evaluation for preschool aged children. A large activity area is necessary to accommodate the mobility needs of young children as well as facilitate exploratory behavior from the children, which is a critical component of the assessment.

The area is typically equipped with developmentally appropriate materials and toys, such as pretend play stations, which also take space. These typically include a play kitchen, a doll house, a play tools area, and ample space for floor play with blocks, cars, and other toys / materials.

In addition, space is required to allow the children to run, do jumping drills, walk on a line to assess their balance, gait and posture and ability to use stairs safely. In addition, suitable space in this room will be required to hang a swing, place a board above the floor, a toy tunnel and other sensory based materials would be necessary to properly assess children with suspected Autism Spectrum Disorders.

**Observation Room:**
A one way mirror room adjacent to the assessment space is required to conduct observations during the assessment by other staff when necessary and to provide non-intrusive participation of parents and community providers when appropriate. It will also provide the opportunity for professional development and training of staff regarding the facilitation of developmental assessments.

**Parent Interview Area:**
An area adjacent to the Assessment Area is required to conduct interviews with the parent, so that the parent is not very far from the child being assessed, but also so that the interview is not conflicting with the assessment process with the child.

**Office Space:**
A room adjacent to the assessment area is needed for at least four staff members to maintain student files, work on reports, planning and phone calls and to meet with families. This work area requires computers to write reports and requires internet access.

**Bathroom:**
A bathroom facility with a child size toilet is required, as well as a changing table as the young children participating in the assessment process typically need to use the bathroom or to be changed if they are still in diapers. Having the bathroom integrated in the area would not only facilitate comfort and convenience for the parent, but also add to the assessment process as the child’s self-care skills would be more readily observable through his/her use of toileting skills.

**Storage:**
Multiple assessment materials are used in the arena Assessments. Many of the materials are standardized test booklets and other manipulatives which are costly and require proper storage when not in use. A closet area or at least two built in cabinets would be necessary to support storage.

The Early Childhood Assessment Center in the proposed School is located in the primary wing of the school near the Administrative Suite so that access to assessments that are scheduled during school hours do not disrupt instructional space. Adjacency to the Pre-K classrooms also allows children being assessed to integrate into small group play as needed.

The following chart indicates the high need of the district for a designated Early Childhood Assessment Center.

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<td></td>
<td>Emotional</td>
<td>2</td>
<td>2</td>
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<td></td>
<td>Health</td>
<td>3</td>
<td>3</td>
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<tr>
<td></td>
<td>Multiple Disab.</td>
<td>4</td>
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<td>Physical</td>
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<tr>
<td></td>
<td>Sensory/Vision</td>
<td>1</td>
<td>1</td>
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<tr>
<td>2013-2014 Total</td>
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<td>56</td>
<td>81</td>
<td>243</td>
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<tr>
<td>Total</td>
<td></td>
<td>98</td>
<td>139</td>
<td>495</td>
</tr>
</tbody>
</table>

Note: No IEP Developed means that:
A referral was entered in SAGE
An Arena Meeting was scheduled and possibly held
But the process ended for some reason before the IEP

Thank you for reviewing this information. The Worcester Public School District is very proud of the collaborative work accomplished thus far with the City of Worcester architects and Lamoureux Pagano & Associates in conceptualizing and designing the new Nelson Place School building. We are particularly pleased with the areas intentionally designed to properly accommodate and support our students with disabilities. Nelson Place School will be a state-of-the-art building crafted to support 21st century teaching and learning for all students.
Please feel free to contact us if you have require further information or clarification.

Respectfully,

Melinda J. Boone

Melinda J. Boone, Ed.D.
Superintendent

Kay C. Seale,
Manager of Special Education &
Intervention Services

Monica L. Poitras,
Principal Nelson Place School
4.1.1 DESE SUBMITTAL

C. Signed Educational Space Summary
### Proposed Space Summary - Elementary Schools

**Nelson Place Elementary**

<table>
<thead>
<tr>
<th>Existing Conditions</th>
<th>PROPOSED</th>
<th>MSBA Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ROOM TYPE</strong></td>
<td><strong>AREA</strong></td>
<td><strong># OF RMS</strong></td>
</tr>
<tr>
<td>CORE ACADEMIC SPACES</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre-Kindergarten w/ toilet</td>
<td>712</td>
<td>1</td>
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<tr>
<td>General Classrooms - Grade 1-6</td>
<td>715</td>
<td>4</td>
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<tr>
<td>SPECIAL EDUCATION</td>
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<tr>
<td>Self-Contained SPED</td>
<td>323</td>
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<td>Pre-K w/ toilet</td>
<td>761</td>
<td>1</td>
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<tr>
<td>Kindergarten w/ toilet</td>
<td>761</td>
<td>1</td>
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<tr>
<td>SAIL Classroom 16</td>
<td>32</td>
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<tr>
<td>SAIL Classroom 17</td>
<td>32</td>
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<tr>
<td>SAIL Classroom 26</td>
<td>118</td>
<td>4</td>
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<tr>
<td>SAIL Classroom 27</td>
<td>83</td>
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<tr>
<td>SAIL Classroom 28</td>
<td>60</td>
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<tr>
<td>Resource Room (Therapeutic Planning)</td>
<td>50</td>
<td>8</td>
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<tr>
<td>Observation Room (OT/PT)</td>
<td>1,080</td>
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<tr>
<td>SPED Resource room (Speech/ELL Room)</td>
<td>289</td>
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<tr>
<td>Speech/ELL Room</td>
<td>440</td>
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<tr>
<td>Early Childhood Assessment Center</td>
<td>1,057</td>
<td>1</td>
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</tbody>
</table>

*Comments:
- Includes storage and Prep rooms.

(Estimated) 440,000 to 450,000 square feet

Version:
11.24.2010
Elementary School Space Summary
**Proposed Space Summary- Elementary Schools**

<table>
<thead>
<tr>
<th>Room Type</th>
<th>Existing Conditions</th>
<th>New</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ART &amp; MUSIC</strong></td>
<td></td>
<td></td>
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<tr>
<td>Art Classroom - 25 seats</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Art Workroom w/ Storage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Art Workroom w/ Storage - 25-50 seats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Art Classroom - Large Group - 25-50 seats</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Music Classroom / Ensemble</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>HEALTH &amp; PHYSICAL EDUCATION</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gymnasium</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Gym Teacher Office w/ Toilet</td>
<td></td>
<td></td>
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</tr>
<tr>
<td><strong>MEDIA CENTER</strong></td>
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<tr>
<td>Media Center / Reading Room</td>
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</tr>
<tr>
<td><strong>DINING &amp; FOOD SERVICE</strong></td>
<td></td>
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</tr>
<tr>
<td>Cafeteria / Dining</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Stage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chair / Table / Equipment Storage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kitchen</td>
<td></td>
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</tr>
<tr>
<td>Staff Lunch Room</td>
<td></td>
<td></td>
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<tr>
<td><strong>MEDICAL</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Medical Suite Toilet / Shower</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurses' Office / Waiting Room</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examination Room / Resting</td>
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<tr>
<td><strong>ADMINISTRATION &amp; GUIDANCE</strong></td>
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<td></td>
</tr>
<tr>
<td>General Office / Waiting Room / Toilet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Office</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Staff Toilet</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Assistant Superintendent</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Psychologist Office</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Instructional Coach Office</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teachers' Mail and Time Room</td>
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<td></td>
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<tr>
<td>UnTele/Tele/Lobby Room</td>
<td></td>
<td></td>
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<tr>
<td>Records Room</td>
<td></td>
<td></td>
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<tr>
<td>Assistant Principal's Office</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Principal's Secretary / Waiting</td>
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<td><strong>ROOMS</strong></td>
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</tr>
<tr>
<td>Room NFA</td>
<td># of RMS</td>
<td>area totals</td>
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<tr>
<td>Family Learning Center</td>
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<tr>
<td>SPED Office</td>
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<tr>
<td>Small Group Room / Learning Lab</td>
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<tr>
<td>Small Group Room / Learning Lab</td>
<td>205</td>
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</table>

**Version**
11.24.2010

**Elementary School Space Summary**

**MSBA Guidelines**
(refer to MSBA Educational Program & Space Standard Guidelines)
# Proposed Space Summary- Elementary Schools

## Nelson Place Elementary

<table>
<thead>
<tr>
<th>Existing Conditions</th>
<th>Proposed</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>ROOM TYPE</strong></td>
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<td><strong># OF RMS</strong></td>
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<tr>
<td>Conference Room</td>
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<td>Conference Room</td>
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<tr>
<td>Guidance Office</td>
<td>400</td>
<td>2</td>
</tr>
<tr>
<td>Guidance Storeroom</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher's Planning Room</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CUSTODIAL &amp; MAINTENANCE</strong></td>
<td>2</td>
<td>1,292</td>
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<tr>
<td>Custodian's Office</td>
<td>155</td>
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<tr>
<td>Custodian's Workshop</td>
<td>375</td>
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<td>Custodian's Storage</td>
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<td>375</td>
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<tr>
<td>Cust. Closet</td>
<td>63</td>
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<tr>
<td>Cust. Closet</td>
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<td>Cust. Closet</td>
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<tr>
<td><strong>Basement Storage</strong></td>
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<td><strong>Recycling Room</strong></td>
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<tr>
<td>Recycling and General Supply</td>
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<tr>
<td><strong>Storeroom</strong></td>
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<tr>
<td>Network / Telecom Room</td>
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<tr>
<td><strong>Electrical room</strong></td>
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<tr>
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<tr>
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<td></td>
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<tr>
<td>Computer Lab</td>
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<tr>
<td><strong>Multipurpose</strong></td>
<td>1,200</td>
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</tr>
<tr>
<td><strong>Total Building Net Floor Area (NFA)</strong></td>
<td>35,262</td>
<td>0</td>
</tr>
</tbody>
</table>

### MSBA Guidelines

(Refer to MSBA Educational Program & Space Standard Guidelines)

<table>
<thead>
<tr>
<th><strong>ROOM NFA</strong></th>
<th><strong># OF RMS</strong></th>
<th><strong>area totals</strong></th>
<th><strong>Comments</strong></th>
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<tbody>
<tr>
<td>Conference Room</td>
<td>250</td>
<td>1</td>
<td>250</td>
</tr>
<tr>
<td>Conference Room</td>
<td>150</td>
<td>2</td>
<td>300</td>
</tr>
<tr>
<td>Guidance Office</td>
<td>450</td>
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<td>450</td>
</tr>
<tr>
<td>Guidance Storeroom</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teacher's Planning Room</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>CUSTODIAL &amp; MAINTENANCE</strong></td>
<td></td>
<td>2</td>
<td>2,000</td>
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<tr>
<td>Custodian's Office</td>
<td>150</td>
<td>1</td>
<td>150</td>
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<tr>
<td>Custodian's Workshop</td>
<td>375</td>
<td>1</td>
<td>375</td>
</tr>
<tr>
<td>Custodian's Storage</td>
<td>375</td>
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<td>375</td>
</tr>
<tr>
<td><strong>Basement Storage</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td><strong>Basement Storage</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Recycling Room</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Recycling and General Supply</td>
<td>300</td>
<td>1</td>
<td>300</td>
</tr>
<tr>
<td><strong>Storeroom</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Network / Telecom Room</td>
<td>400</td>
<td>1</td>
<td>400</td>
</tr>
<tr>
<td><strong>Electrical room</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>OTHER</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Space (specify)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Lab</td>
<td>300</td>
<td>1</td>
<td>300</td>
</tr>
<tr>
<td><strong>Multipurpose</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total Building Gross Floor Area (GFA)</strong></td>
<td>111,700</td>
<td></td>
<td>87,000</td>
</tr>
</tbody>
</table>

### Notes

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.
# Proposed Space Summary - Elementary Schools

<table>
<thead>
<tr>
<th>Nelson Place Elementary</th>
<th>Existing Conditions</th>
<th>PROPOSED</th>
<th>MSBA Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROOM TYPE</td>
<td>ROOM NFA</td>
<td># OF RWS</td>
<td>area totals</td>
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<td>[Table data]</td>
<td>[Table data]</td>
<td>[Table data]</td>
<td>[Table data]</td>
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</tbody>
</table>

**Architect Certification**

I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulations and policies of the Massachusetts School Building Authority to the best of my knowledge and belief. A true statement, made under the penalties of perjury.

Name of Architect Firm: Lamoureux & Pagan Associates  
Name of Principal Architect: Michael A. Pagan, AIA  
Signature of Principal Architect: [Signature]  
Date: 21 November 2016

---

**Version**  
**Elementary School Space Summary**
4.1.1 DESE SUBMITTAL

D. Floor Plans
4.1.1 DESE SUBMITTAL

E. Special Education Adjacency Table
<table>
<thead>
<tr>
<th>Ground Level</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Self-Contained SPED</strong></td>
<td><strong>Proposed Room Name</strong></td>
</tr>
<tr>
<td></td>
<td>6th Grade SPED</td>
</tr>
<tr>
<td><strong>Self-Contained SPED - Toilet</strong></td>
<td>Tlt.</td>
</tr>
<tr>
<td>*Unique to District</td>
<td>Therapeutic Planning</td>
</tr>
<tr>
<td>*Unique to District</td>
<td>Observation</td>
</tr>
<tr>
<td><strong>Resource Room</strong></td>
<td>Learning Lab</td>
</tr>
<tr>
<td><strong>Small Group Room/Reading</strong></td>
<td>Speech</td>
</tr>
<tr>
<td><strong>Self-Contained SPED</strong></td>
<td>5th Grade SPED</td>
</tr>
<tr>
<td><strong>Self-Contained SPED - Toilet</strong></td>
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</table>
## Special Education Adjacency Table

<table>
<thead>
<tr>
<th>MSBA Guidelines Space</th>
<th>MSBA Guidelines SF</th>
<th>Proposed Room Name</th>
<th>Floor Plan Designation (A-Z)</th>
<th>Proposed SF</th>
<th>Proposed Space Description and Reasoning for Adjacencies</th>
<th>Notes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>*Unique to District</td>
<td>Therapeutic Planning</td>
<td>C.2</td>
<td>50</td>
<td>A safe, stimulant free space for students with limited emotional and social self-regulation capacity. May contain manipulatives. Located with direct access from Self-Contained SPED classroom support space to ensure efficiency of de-escalation of target behaviors based on explicit interventions to address the therapeutic rehabilitation of students to facilitate a timely re-entry into the classroom.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td>Observation</td>
<td>D.2</td>
<td>75</td>
<td>Observation spaces are located directly adjacent to Self-Contained SPED Classrooms, with access from the corridor to reduce disruption of the classroom and to allow for observation of the student in the authentic learning environment. Observation rooms are equipped with mirrored windows to allow for discrete observation by staff and parents into both the Self-Contained SPED Classroom and the general classroom. This proximity provides maximum flexibility if the future student population requires the adjacent general classroom to be used as a partial inclusion or substantially separate SPED classroom. The Observation room will also have a window into the adjacent Therapeutic Planning room, to facilitate safe monitoring of a de-escalating student.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Room</td>
<td>Learning Lab</td>
<td>E.2</td>
<td>485</td>
<td>Each grade level &quot;neighborhood&quot; includes one Learning Lab, a flexible space that supports student IEPs requiring specialized instruction outside the general education setting in a distraction free environment, including E.L.L., Reading Specialists, individualized or read-aloud testing, part-time tutors or above grade-level enrichment. The Learning Labs are integrated within the general classroom wings to support a culture of access and inclusion, and to minimize transition time and maximize instructional time.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Main Level</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Self-Contained SPED</td>
<td>Kindergarten SPED (w/ Toilet)</td>
<td>A.3</td>
<td>1100</td>
<td>Early Childhood Education classroom intended to support variety of teaching methods for Kindergarten. This SPED classroom will be equipped to serve students enrolled in the substantially separate SAIL program, and will be integrated within the Kindergarten &quot;neighborhood&quot; to promote a culture of access and inclusion. The Kindergarten SPED classroom has direct adjacency to a support space that includes a dedicated toilet room with changing area, a Therapeutic Planning room and a discrete Observation space. This classroom requires three (3) modular cubbies with partitions for discrete trials.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td>Therapeutic Planning</td>
<td>C.3</td>
<td>50</td>
<td>A safe, stimulant free space for students with limited emotional and social self-regulation capacity. May contain manipulatives. Located with direct access from Self-Contained SPED classroom support space to ensure efficiency of de-escalation of target behaviors based on explicit interventions to address the therapeutic rehabilitation of students to facilitate a timely re-entry into the classroom.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td>Observation</td>
<td>D.3</td>
<td>75</td>
<td>Observation spaces are located directly adjacent to Self-Contained SPED Classrooms, with access from the corridor to reduce disruption of the classroom and to allow for observation of the student in the authentic learning environment. Observation rooms are equipped with mirrored windows to allow for discrete observation by staff and parents into both the Self-Contained SPED Classroom and the general classroom. This proximity provides maximum flexibility if the future student population requires the adjacent general classroom to be used as a partial inclusion or substantially separate SPED classroom. The Observation room will also have a window into the adjacent Therapeutic Planning room, to facilitate safe monitoring of a de-escalating student.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Resource Room</td>
<td>Learning Lab</td>
<td>E.3</td>
<td>455</td>
<td>Each grade level &quot;neighborhood&quot; includes one Learning Lab, a flexible space that supports student IEPs requiring specialized instruction outside the general education setting in a distraction free environment, including E.L.L., Reading Specialists, individualized or read-aloud testing, part-time tutors or above grade-level enrichment. The Learning Labs are integrated within the general classroom wings to support a culture of access and inclusion and to maximize instructional time.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## Special Education Adjacency Table

<table>
<thead>
<tr>
<th>MSBA Guidelines Space</th>
<th>MSBA Guidelines SF</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Small Group Room/Reading</td>
<td></td>
<td>OT/PT</td>
<td>G.1</td>
<td>1080</td>
<td>Special Education space to teach students manual and physical dexterity. Students rotate into this space during the day. This OT/PT room is located in close proximity to the elevator to service both levels of the primary classroom wing; to minimize transition time and maximize therapy. The primary level OT/PT room is larger than the intermediate level OT/PT room due to greater need to support co-treatment services, which may require additional staff and space.</td>
<td></td>
</tr>
<tr>
<td>Small Group Room/Reading</td>
<td></td>
<td>Speech</td>
<td>F.2</td>
<td>450</td>
<td>Space used for the specialized instruction of Speech for students with 504 Accommodation Plans and students with disabilities. A speech room is located on each floor level of the school with specialized support materials appropriate for grades serviced, located to maximize student development by minimizing transition time and maximizing therapy.</td>
<td></td>
</tr>
<tr>
<td>Resource Room</td>
<td>500</td>
<td>Learning Lab</td>
<td>E.4</td>
<td>455</td>
<td>Each grade level “neighborhood” includes one Learning Lab, a flexible space that supports student IEPs requiring specialized instruction outside the general education setting in a distraction free environment, including E.L.L., Reading Specialists, individualized or read-aloud testing, part-time tutors or above grade-level enrichment. The Learning Labs are integrated within the general classroom wings to support a culture of access and inclusion, and to minimize transition time and maximize instructional time.</td>
<td></td>
</tr>
<tr>
<td>Self-Contained SPED</td>
<td>950</td>
<td>Pre-Kindergarten (w/Toilet)</td>
<td>A.4</td>
<td>1080</td>
<td>Early Childhood Education classroom intended to support variety of teaching methods for Pre-Kindergarten. All three Pre-K classrooms will serve as a Self-Contained SPED classrooms. This Pre-K SPED classroom has direct adjacency to a support space that includes a toilet room with changing area, a Therapeutic Planning room, and discrete Observation space. Each Pre-K classroom requires three (3) modular cubbies with partitions for discrete trials.</td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td></td>
<td>Therapeutic Planning</td>
<td>C.4</td>
<td>50</td>
<td>A safe, stimulant free space for students with limited emotional and social self-regulation capacity. May contain manipulatives. Located with direct access from Self-Contained SPED classroom support space to ensure efficiency of de-escalation of target behaviors based on explicit interventions to address the therapeutic rehabilitation of students to facilitate a timely re-entry into the classroom.</td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td></td>
<td>Observation</td>
<td>D.4</td>
<td>75</td>
<td>Observation spaces are located directly adjacent to Self-Contained SPED Classrooms, with access from the corridor to reduce disruption of the classroom and to allow for observation of the student in the authentic learning environment. Observation rooms are equipped with mirrored windows to allow for discrete observation by staff and parents into both the Self-Contained SPED Classroom and the general classroom. This proximity provides maximum flexibility if the future student population requires the adjacent general classroom to be used as a partial inclusion or substantially separate SPED classroom. The Observation room will also have a window into the adjacent Therapeutic Planning room, to facilitate safe monitoring of a de-escalating student.</td>
<td></td>
</tr>
<tr>
<td>Self-Contained SPED</td>
<td>950</td>
<td>Pre-Kindergarten (w/Toilet)</td>
<td>A.5</td>
<td>1080</td>
<td>Early Childhood Education classroom intended to support variety of teaching methods for Pre-Kindergarten. All three Pre-K classrooms will serve as a Self-Contained SPED classrooms. This Pre-K SPED classroom has direct adjacency to a support space that includes a toilet room with changing area, a Therapeutic Planning room, and a discrete Observation space. Each Pre-K classroom requires three (3) modular cubbies with partitions for discrete trials.</td>
<td></td>
</tr>
<tr>
<td>Self-Contained SPED</td>
<td>950</td>
<td>Pre-Kindergarten (w/Toilet)</td>
<td>A.6</td>
<td>1080</td>
<td>Early Childhood Education classroom intended to support variety of teaching methods for Pre-Kindergarten. All three Pre-K classrooms will serve as a Self-Contained SPED classrooms. This Pre-K SPED classroom has direct adjacency to toilet rooms with changing area, and a discrete Observation space. Each Pre-K classroom requires three (3) modular cubbies with partitions for discrete trials.</td>
<td></td>
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## Special Education Adjacency Table

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</tr>
</thead>
<tbody>
<tr>
<td>*Unique to District</td>
<td>Observation</td>
<td>D.6</td>
<td>75</td>
<td></td>
<td>Observation spaces are located directly adjacent to Self-Contained SPED Classrooms, with access from the corridor to reduce disruption of the classroom and to allow for observation of the student in the authentic learning environment. Due to the unique layout, this Observation room serves one Pre-Kindergartened classroom.</td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td>BCBA Office</td>
<td>H</td>
<td>300</td>
<td></td>
<td>The proposed Nelson Place Elementary School will host three full time BCBA’s (Board Certified Behavior Analysts), who serve Students with Autism/Social emotional behavior. The BCBA Office has an observation window into the Early Childhood Assessment Center to assist with eligibility determination. The BCBA Office also shares a work area and office equipment with the Assessment center.</td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td>Early Childhood Assessment Center</td>
<td>I</td>
<td>1657</td>
<td></td>
<td>The Early Childhood Assessment Center is a district-wide service that supports the federal “Child Find” mandate. It is the responsibility of the Worcester Public Schools to identify any child who is a resident of Worcester, who may have a disability, and evaluate those students to determine if they are eligible for special education or related services. Worcester Public Schools is committed to identifying children before their third birthday in order to provide early intervention services for three and four year olds. The Assessment Center requires a large activity room for play-based assessment with a dedicated toilet room as well as adjacent spaces for discrete observation and interviews, team meetings, and office work. The Assessment Center is located near the Main Administration Suite so that access to assessments (scheduled during school hours) does not disrupt the instructional spaces. The proximity to the Pre-K wing also allows students being assessed to integrate into small group play as needed.</td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td>SPED Conference</td>
<td>J</td>
<td>255</td>
<td></td>
<td>Conference room for staff and parent meetings, as well as SPED staff training, team evaluations and annual reviews. Located within the Main Administration Suite close to the main entrance to allow access without disruption of instructional spaces.</td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td>SPED Office</td>
<td>K</td>
<td>150</td>
<td></td>
<td>Office for full time SPED Evaluation Team Chair (ETC), requires proximity to SPED Conference Room, and secure space to maintain confidential student records.</td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td>Family Learning Center</td>
<td>L</td>
<td>250</td>
<td></td>
<td>A multipurpose space utilized to conduct family focused workshops for SPED and general education parents, providing resources to assist parents and guardians in support of student development, as well as clinical meetings evaluating student progress. The Family Learning Center is located within the Main Administration suite so that parents may enter and exit for workshops within school hours without disrupting instructional spaces.</td>
<td></td>
</tr>
<tr>
<td>Self-Contained SPED</td>
<td>950</td>
<td>3rd Grade SPED</td>
<td>A.7</td>
<td>950</td>
<td>Each grade level “neighborhood” includes one Self-Contained SPED classroom, which will be equipped to serve students enrolled in the substantially separate SAIL program. The location within the general classroom wing embeds a culture of access and inclusion. Each SPED classroom has direct adjacency to a support space which includes a dedicated toilet room with changing area, a Therapeutic Planning room and a discrete Observation space. Each Self-Contained SPED classroom requires three (3) modular cubbies with partitions for discrete trials.</td>
<td></td>
</tr>
<tr>
<td>Self-Contained SPED - Toilet</td>
<td>60</td>
<td>Tilt</td>
<td>B.7</td>
<td>116</td>
<td>Self-Contained SPED toilets are located in the connecting corridor between a Self-Contained SPED classroom and a general or partial inclusion classroom. Grades 3-6 dedicated SPED toilets require one toilet room with adequate space for a Hoyer lift, changing table and wheelchair accessibility.</td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td>Select SF</td>
<td>Therapeutic Planning</td>
<td>C.7</td>
<td>50</td>
<td>A safe, stimulant free space for students with limited emotional and social self-regulation capacity. May contain manipulatives. Located with direct access from Self-Contained SPED classroom support space to ensure efficiency of de-escalation of target behaviors based on explicit interventions to address the therapeutic rehabilitation of students to facilitate a timely re-entry into the classroom.</td>
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<th>Notes:</th>
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<tbody>
<tr>
<td>*Unique to District</td>
<td>Select SF</td>
<td>Observation</td>
<td>D.7</td>
<td>75</td>
<td>Observation spaces are located directly adjacent to Self-Contained SPED Classrooms, with access from the corridor to reduce disruption of the classroom and to allow for observation of the student in the authentic learning environment. Observation rooms are equipped with mirrored windows to allow for discrete observation by staff and parents into both the Self-Contained SPED Classroom and the general classroom. This proximity provides maximum flexibility if the future student population requires the adjacent general classroom to be used as a partial inclusion or substantially separate SPED classroom. The Observation room will also have a window into the adjacent Therapeutic Planning room, to facilitate safe monitoring of a de-escalating student.</td>
<td></td>
</tr>
<tr>
<td>Resource Room</td>
<td>Select SF</td>
<td>Learning Lab</td>
<td>E.7</td>
<td>485</td>
<td>Each grade level &quot;neighborhood&quot; includes one Learning Lab, a flexible space that supports student IEPs requiring specialized instruction outside the general education setting in a distraction free environment, including E.L.L., Reading Specialists, individualized or read-aloud testing, part-time tutors or above grade-level enrichment. The Learning Labs are integrated within the general classroom wings to support a culture of access and inclusion and to maximize instructional time.</td>
<td></td>
</tr>
<tr>
<td>Small Group Room/Reading</td>
<td>Select SF</td>
<td>OT/PT</td>
<td>G.2</td>
<td>800</td>
<td>Special Education space to teach students manual and physical dexterity. Students rotate into this space during the day. This OT/PT room is located in close proximity to the elevator to service both levels of the intermediate classroom wing; to minimize transition time and maximize therapy.</td>
<td></td>
</tr>
<tr>
<td>Self-Contained SPED</td>
<td>950</td>
<td>4th Grade SPED</td>
<td>A.8</td>
<td>950</td>
<td>Each grade level &quot;neighborhood&quot; includes one Self-Contained SPED classroom, which will be equipped to serve students enrolled in the substantially separate SAIL program. The location within the general classroom wing embeds a culture of access and inclusion. Each SPED classroom has direct adjacency to a support space which includes a dedicated toilet room with changing area, a Therapeutic Planning room and a discrete Observation space. Each Self-Contained SPED classroom requires three (3) modular cubbies with partitions for discrete trials.</td>
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<td>Self-Contained SPED - Toilet</td>
<td>60</td>
<td>Tlt.</td>
<td>B.8</td>
<td>116</td>
<td>Self-Contained SPED toilets are located in the connecting corridor between a Self-Contained SPED classroom and a general or partial inclusion classroom. Grades 3-6 dedicated SPED toilets require one toilet room with adequate space for a Hoyer lift, changing table and wheelchair accessibility.</td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td>Select SF</td>
<td>Therapeutic Planning</td>
<td>C.8</td>
<td>50</td>
<td>A safe, stimulant free space for students with limited emotional and social self-regulation capacity. May contain manipulatives. Located with direct access from Self-Contained SPED classroom support space to ensure efficiency of de-escalation of target behaviors based on explicit interventions to address the therapeutic rehabilitation of students to facilitate a timely re-entry into the classroom.</td>
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<tr>
<td>*Unique to District</td>
<td>Select SF</td>
<td>Observation</td>
<td>D.8</td>
<td>75</td>
<td>Observation spaces are located directly adjacent to Self-Contained SPED Classrooms, with access from the corridor to reduce disruption of the classroom and to allow for observation of the student in the authentic learning environment. Observation rooms are equipped with mirrored windows to allow for discrete observation by staff and parents into both the Self-Contained SPED Classroom and the general classroom. This proximity provides maximum flexibility if the future student population requires the adjacent general classroom to be used as a partial inclusion or substantially separate SPED classroom. The Observation room will also have a window into the adjacent Therapeutic Planning room, to facilitate safe monitoring of a de-escalating student.</td>
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<tr>
<td>Resource Room</td>
<td>Select SF</td>
<td>Learning Lab</td>
<td>E.8</td>
<td>485</td>
<td>Each grade level &quot;neighborhood&quot; includes one Learning Lab, a flexible space that supports student IEPs requiring specialized instruction outside the general education setting in a distraction free environment, including E.L.L., Reading Specialists, individualized or read-aloud testing, part-time tutors or above grade-level enrichment. The Learning Labs are integrated within the general classroom wings to support a culture of access and inclusion and to maximize instructional time.</td>
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<tr>
<td>Self-Contained SPED</td>
<td>950</td>
<td>1st Grade SPED</td>
<td>A.9</td>
<td>950</td>
<td>Each grade level &quot;neighborhood&quot; includes one Self-Contained SPED classroom, which will be equipped to serve students enrolled in the substantially separate SAIL program. The location within the general classroom wing embeds a culture of access and inclusion. Each SPED classroom has direct adjacency to a support space which includes a dedicated toilet room with changing area, a Therapeutic Planning room and a discrete Observation space. Each Self-Contained SPED classroom requires three (3) modular cubbies with partitions for discrete trials.</td>
<td></td>
</tr>
<tr>
<td>Self-Contained SPED - Toilet</td>
<td>60</td>
<td>Tlt.</td>
<td>B.9</td>
<td>60</td>
<td>Self-Contained SPED toilets are located in the connecting corridor between a Self-Contained SPED classroom and a general or partial inclusion classroom. Grades 1 &amp; 2 require a standard changing table.</td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td></td>
<td>Therapeutic Planning</td>
<td>C.9</td>
<td>50</td>
<td>A safe, stimulant free space for students with limited emotional and social self-regulation capacity. May contain manipulatives. Located with direct access from Self-Contained SPED classroom support space to ensure efficiency of de-escalation of target behaviors based on explicit interventions to address the therapeutic rehabilitation of students to facilitate a timely re-entry into the classroom.</td>
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<td></td>
<td>Observation</td>
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<td>Learning Lab</td>
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<td>Small Group Room/Reading</td>
<td></td>
<td>Speech</td>
<td>F.3</td>
<td>360</td>
<td>Space used for the specialized instruction of Speech for students with 504 Accommodation Plans and students with disabilities. A speech room is located on each floor level of the school with specialized support materials appropriate for grades serviced, and to maximize student development by minimizing transition time and maximizing therapy.</td>
<td></td>
</tr>
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<td>Self-Contained SPED</td>
<td>950</td>
<td>2nd Grade SPED</td>
<td>A.10</td>
<td>950</td>
<td>Each grade level &quot;neighborhood&quot; includes one Self-Contained SPED classroom, which will be equipped to serve students enrolled in the substantially separate SAIL program. The location within the general classroom wing embeds a culture of access and inclusion. Each SPED classroom has direct adjacency to a support space which includes a dedicated toilet room with changing area, a Therapeutic Planning room and a discrete Observation space. Each Self-Contained SPED classroom requires three (3) modular cubbies with partitions for discrete trials.</td>
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</tr>
<tr>
<td>Self-Contained SPED - Toilet</td>
<td>60</td>
<td>Tlt.</td>
<td>B.10</td>
<td>60</td>
<td>Self-Contained SPED toilets are located in the connecting corridor between a Self-Contained SPED classroom and a general or partial inclusion classroom. Dedicated SPED toilets for grades 1 &amp; 2 require a standard changing table.</td>
<td></td>
</tr>
<tr>
<td>*Unique to District</td>
<td></td>
<td>Therapeutic Planning</td>
<td>C.10</td>
<td>50</td>
<td>A safe, stimulant free space for students with limited emotional and social self-regulation capacity. May contain manipulatives. Located with direct access from Self-Contained SPED classroom support space to ensure efficiency of de-escalation of target behaviors based on explicit interventions to address the therapeutic rehabilitation of students to facilitate a timely re-entry into the classroom.</td>
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<td>Learning Lab</td>
<td>E.10</td>
<td>455</td>
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<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>Total</strong> 21,201</td>
<td></td>
</tr>
</tbody>
</table>

**Square Footage Summary:**

The proposed overall gross square footage of the new building is xx; Average square feet of General Classrooms is 950.

MSBA guidelines allows for 6,540 net square feet of dedicated special education space. The proposed program is 14,661 nsf in excess of the guidelines.

*Indicates that space is unique to District’s program and does not appear in MSBA space guidelines.
4.1.1 DESE SUBMITTAL

F. MSBA Enrollment Letter
January 25, 2013

The Honorable Joseph M. Petty, Mayor  
City of Worcester  
City Hall, Room 206  
455 Main Street  
Worcester, MA 01608

Re: Worcester Public Schools, Nelson Place School

Dear Mayor Petty:

I would like to thank your team for speaking with the Massachusetts School Building Authority (“MSBA”) staff on January 3, 2013 regarding enrollment projections and methodologies. As discussed, the next critical step is for the MSBA and the District to agree on the design enrollment for the proposed project at the Nelson Place School.

The Nelson Place School serves grades K-6 and accordingly, this enrollment analysis will be focused on the enrollment projections for those grades. Included below is a table that charts Worcester’s district-wide enrollment over the last 10 years. The table indicates that over the last five years Worcester’s K-6 and 6-8 enrollments have steadily increased. During this same period, the high school grades have experienced a declining enrollment trend as the smaller class sizes from the previous decade progress through the system. While District-wide total enrollment decreased from 2002 to 2007, total enrollment has been increasing each year subsequently. The 2011-2012 school year showed an increase of approximately 640 students over the 2007-2008 school year.

<table>
<thead>
<tr>
<th>Year</th>
<th>K-5</th>
<th>6-8</th>
<th>9-12</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002</td>
<td>12,211</td>
<td>5,963</td>
<td>6,589</td>
</tr>
<tr>
<td>2003</td>
<td>11,758</td>
<td>5,832</td>
<td>6,760</td>
</tr>
<tr>
<td>2004</td>
<td>11,108</td>
<td>5,599</td>
<td>7,106</td>
</tr>
<tr>
<td>2005</td>
<td>10,806</td>
<td>5,284</td>
<td>7,210</td>
</tr>
<tr>
<td>2006</td>
<td>10,736</td>
<td>5,011</td>
<td>7,117</td>
</tr>
<tr>
<td>2007</td>
<td>10,500</td>
<td>4,689</td>
<td>6,958</td>
</tr>
<tr>
<td>2008</td>
<td>10,745</td>
<td>4,712</td>
<td>6,882</td>
</tr>
<tr>
<td>2009</td>
<td>11,029</td>
<td>4,768</td>
<td>6,796</td>
</tr>
<tr>
<td>2010</td>
<td>11,228</td>
<td>4,760</td>
<td>6,650</td>
</tr>
<tr>
<td>2011</td>
<td>11,236</td>
<td>4,900</td>
<td>6,651</td>
</tr>
</tbody>
</table>
The enrollment for the 2011-2012 school year at the Nelson Place School was reported at 467 students, not including pre-kindergarten, as of October 1, 2011. The MSBA understands that the District is proposing a design enrollment to accommodate approximately 600 students, in grades K-6, at the Nelson Place School.

With respect to future enrollments, the MSBA’s base enrollment forecast indicates Worcester’s K-6 enrollment will experience an increasing trend over the next six years with an average K-6 enrollment of approximately 13,189 students. This average over the next six years is approximately 138 students greater than the K-6 enrollment for the 2011-2012 school year.

As a result of discussions with the District the following factors have been considered in order to further inform the MSBA’s recommended design enrollment for this facility:

- **Expansion of Existing Special Education Program**
  - Currently, approximately 30 Special Education students from the Nelson Place neighborhood district attend school at other facilities within the quadrant. The District has stated that a priority of the proposed project is to expand the existing Special Education program at the Nelson Place School in order to accommodate the return of these students to their neighborhood school.

- **Voluntary Transfer Within Doherty Quadrant**
  - Based on discussions with the District, and the *Policies Handbook for the Worcester Public Schools*, the MSBA understands that students in Worcester attend school within their neighborhood district lines. However, students are also eligible to attend one of the City’s six magnet schools or transfer to any school within their quadrant of residence as permitted by the “Voluntary Controlled Transfer Policy.” This policy allows for choice to take place within quadrants subject to District-wide policies on diversity and the capacity of the receiving schools. The Nelson Place School is located within the Doherty Quadrant of the District’s school system. The Doherty Quadrant contains ten elementary schools that house approximately 30% of the total K-6 enrollment in the District.

The current 2012-2013 Nelson Place School enrollment, exclusive of pre-school students, was reported to the MSBA as 474 students. A design enrollment of 600 students for the school would accommodate an expansion of the special education program, as well as provide the additional capacity the District seeks as a result of the voluntary transfer policy within the Doherty Quadrant.

Based on the MSBA enrollment forecast, capacity analysis and discussions with the District described above, the MSBA recommends a design enrollment of 600 students for the Nelson Place School project. The MSBA believes this design enrollment positions the District to efficiently meet space capacity needs throughout future enrollment variations. Attached is the certification to confirm agreement on design enrollment.
January 25, 2013
Worcester Enrollment Letter

The MSBA believes that the proposed design enrollment will position the District to efficiently meet space capacity needs throughout future enrollment variations. Please sign and return the attached certification within 21 calendar days to confirm agreement on this design enrollment. If the District feels that the proposed design enrollment does not meet the needs of the District, please respond to this letter via e-mail to Diane Sullivan, and propose three meeting/conference call times for which the District can be available to discuss enrollment.

If you have any questions, please do not hesitate to contact myself or Diane Sullivan (Diane.Sullivan@MassSchoolBuildings.org) at 617-720-4466.

Sincerely,

Mary Pichetti
Director of Capital Planning

cc:   District Legislators
      Michael V. O’Brien, City Manager, City of Worcester
      Dr. Melinda Boone, Superintendent, Worcester Public Schools
      Brian A. O’Connell, Esq, Chair, Worcester School Committee
      File: Letters 10.2 (Region 2)
As a result of a collaborative analysis with the Massachusetts School Building Authority ("MSBA") of enrollment projections and space capacity needs for the Proposed Project at the Nelson Place School, the City of Worcester hereby acknowledges and agrees that the design of the Proposed Project at the Nelson Place School shall be based on an enrollment of no more than 600 students. The City of Worcester further acknowledges and agrees that, pursuant to 963 CMR 2.00 et seq., the MSBA shall determine the square feet per student space allowance and total square footage for a K-6 school serving 600 students. The City of Worcester acknowledges and agrees that it has no right or entitlement to any particular design enrollment, square feet per student space allowance, or total square footage and that it has no right or entitlement to a design enrollment any greater than 600 students for the Nelson Place School, and further acknowledges and agrees that it shall not bring any claim or action, legal or equitable, against the MSBA, or any of its officers or employees, for the purpose of obtaining an increase in the design enrollment of the Nelson Place School that it has acknowledged and agreed to herein. The City of Worcester further acknowledges and agrees that, among other things, the design enrollment, square feet per student space allowance, and total square footage of the Nelson Place School shall be subject to the approval of the MSBA’s Board and that the final approval of a Proposed Project at the Nelson Place School shall be within the sole discretion of the MSBA’s Board.

The undersigned, for themselves and City of Worcester, hereby certify that that they have read and understand the contents of this Design Enrollment Certification and that each of the above statements is true, complete and accurate. The undersigned also hereby certify that they have been duly authorized by the appropriate governmental body to execute this Certification on behalf of the City of Worcester and to bind the City of Worcester to its terms.

[Signatures and dates]

Chief Executive Officer

Duly Authorized Representative of School Committee

Superintendent of Schools

Date

Date

Date
4.1.2 SCHEMATIC DESIGN BINDER

A. Introduction
B. Final Design Program
C. Traffic Analysis
D. Environmental Assessment
E. Geotechnical Analysis
F. Code Analysis
G. Utility Analysis
H. Massing Study
I. Narrative Building Systems
J. LEED-S
K. ADA-AAB Compliance
L. Room Data Sheets
M. Reimbursement Rate
N. Total Project Budget
O. Designer Cost Estimate
P. Independent OPM Cost Estimate
Q. Design Work Plan
R. Project Schedule
S. Schematic Design Review – VE
T. Local Actions & Approvals Certification
4.1.2 SCHEMATIC DESIGN BINDER

A. Introduction
1. Introduction
2. City of Worcester Budget Statement
3. Visual Aids
4. CM@Risk Approval Letter
5. MSBA Approval to Proceed to Schematic Design
6. MSBA PSR Review Responses
The Preferred Solution, approved by the MSBA Board of Directors in a letter dated July 30th (included in this section), consists of a 600 student Pre-kindergarten through Grade 6 New Construction solution to replace the existing Nelson Place Elementary School. The proposed building and associated site development will be located on the existing Nelson Place property behind the existing facility. The school is currently occupied and will continue to be occupied while the new building is under construction. The Preferred Solution includes eminent domain land takings and temporary grading easements from six abutting properties. The City of Worcester has contacted the affected abutters, and upon approval of the project by MSBA and completion of project funding agreement, the City will finalize the process of eminent domain. The City has proceeded with all the filings, notifications, and required appraisals for the eminent domain process, and the plans are included in this submittal.

In addition to the ongoing efforts of the City to educate the local community (via the Nelson Place School website and Public Hearings), the project team has made several presentations to various City Boards and Committees. Key meetings and votes include the following:

- June 24, 2014 MSBA Facilities Sub Committee Meeting
- September 15, 2014 Public Hearing: Schematic Design Project Update
- September 18, 2014 Worcester Interdepartmental Review Team (IRT) Meeting
- October 27, 2014 School Building Committee update and Schematic Design review, open to public.
- December 8, 2014 School Building Committee Meeting: Vote to approve submission of the Schematic Design to MSBA, open to public.
- Schematic Submission to MSBA December 11, 2014
- MSBA Board of Directors Meeting and Vote: Scheduled January 14, 2015

Minutes documenting the public meetings above may be found in section 4.1.2 T. Local Actions and Approvals.
SCHEMATIC DESIGN

A. Introduction

Following is an updated description of the project:

- Grades served: Pre-Kindergarten – 6th Grade
- 600 students including district wide special education program plus neighborhood population
  - Size of original site 9.70 acres (City-owned parcel), additions through the Eminent Domain taking will increase the site area to 10.8 Acres.
  - *(The project also proposes temporary grading easements and temporary construction easements on abutter parcels, not calculated in this total.)*
- GSF of proposed building: 111,700 GSF, this is an increase from the 109,620 GSF area reported in the PSR supplement; this increase is reported on in section 4.1.12 B Changes to the Space Summary narrative.
- The City’s total not-to-exceed Total Project budget has been established at $58,216,878.
- Total project construction budget is currently $46,697,300 ($46,546,300 construction cost + $151,000 Pre-construction fee)
- The project was budgeted by LPA/AM Fogarty and Tishman, and reconciliation meeting was held on November 25th. The schematic reconciled budgets exceeded the City’s budget, and a Value Engineering list was produced and reviewed for items to be implemented in the design development phase to bring the total project cost in line with the City’s budget. Refer to the published budget and the VE list.
- Construction delivery methodology: CM @ Risk. A letter of acceptance of the CM @ Risk delivery method is included in this section.

Presentation graphics including rendered site plan, floor plans and elevations are included within this section for use at the MSBA Board meeting.

Supplements to the Preferred Schematic Report for the Nelson Place Elementary School were submitted on July 23, 2014 and on September 11, 2014, and a final letter (attached at the end of this section) was sent on October 10, 2014 to address the final comments 9/11 interim submission. As indicated in the October 10th letter, the following items have been addressed in the following Schematic Design Submission:

- The full Geotechnical and Soils report is located in section 4.1.2 E Geotechnical Analysis, updated survey/topo drawings are filed in section 4.1.4 Schematic Design Drawings
- Conservation Commission review and approval of the ILSF boundaries is submitted in section 4.1.2 D Environmental Assessment.
The Schematic Design plans and documents comply with all Worcester guidelines, setbacks and regulations. The Notice of Intent is scheduled to be filed in the spring of 2015.

As shown in the attached site plan, and within the Schematic Design Drawings, the access from Romola/Hapgood Road is designed as a 10’ wide bicycle/pedestrian path, with 4’ clearance and reinforcement on each side for emergency vehicle passage.

The Schematic Design Floor Plans and updated Space Summary Template and Narrative of changes filed in 4.1.2 B Final Design Program addresses all discrepancies and changes made to the Space Summary Template since the PSR submission, including the Therapeutic Planning rooms, Gym Teacher Office, and Custodial Support Spaces.

Code review and egress capacity calculations and plans are submitted in section 4.1.2 F Code Analysis.

The drawings submitted within section 4.1.4 Schematic Design Drawings include refined building plans, section and elevations that address MSBA’s concerns regarding the Science Lab, interior academic spaces, and the Kitchen layout.

The proposed greenhouse has been removed from the Space summary Template and will be developed separately by the City of Worcester should third party funding be made available.
December 9, 2014

Ms. Diane Sullivan
Senior Capital Program Manager
40 Broad Street
Boston, Massachusetts 02109

Dear Ms. Sullivan:

The City of Worcester is providing the attached financial data in support of the submission to the Massachusetts School Building Authority (MSBA) for approval of Schematic Design (SD) for the Nelson Place Elementary School feasibility study. The Nelson Place School Building Committee voted unanimously on December 8, 2014 to approve the Schematic Design phase of this feasibility study. The Schematic Design Report contains a design for which a comparative Total Project Cost Budget Estimate has been established.

Additionally, a narrative summary of the City of Worcester’s Capital Budget Statement follows. Detailed reports were submitted with the PDP response to MSBA Comments, which include the Fiscal Year 2014 Capital Improvement Plan and the Five Point Financial Plan and serve to identify the City’s financial commitments and Capital Planning strategy.

As of June 30, 2014, the City of Worcester had $620 million dollars in total long term debt obligations which includes $131 million dollars in self-supported debt netting out to $490.01 million dollars in net direct debt. Included in the net direct debt is $152 million dollars of Pension Obligation Bonds, replacement debt, issued to fund the Worcester Retirement system.

The net direct debt equates to approximately 4% of the 2013/14 equalized valuation of the City. Approximately 71% of the aforementioned principal debt shall be retired over the next 10 years. Additionally, the City maintains in excess of $10.4 million dollars in unused levy capacity.

With regards to future debt offerings, the City is governed by its Five Point Financial Plan (5Pt Plan) which dictates the amount of annual debt issued, factored for inflation. Within the confines of this plan the City has allocated sufficient capacity to undertake school building renovations and replacements in conjunction with the Massachusetts School Building Authority.

The Owner, City of Worcester, the Owner’s Project Manager, Tishman Construction, and the Designer, Lamoureux Pagano Associates have developed a not to exceed Total Project Cost Estimate based on the Schematic Design in the amount of $58,216,878 to construct, furnish and equip a new Nelson Place School. The City Council is prepared to approve a loan authorization for this total project cost, authorizing the respective notes/bonds to fund this Nelson Place Elementary School project.

Sincerely,

Thomas F. Zidelis
City of Worcester
Chief Financial Officer

City Hall, Main Street, Room 203, Worcester, Massachusetts 01608
Telephone (508) 799-1225 Facsimile (508)799-1097
Main Level Floor Plan

1/32" = 1'-0"
**SCHEMATIC DESIGN**

<table>
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<th>Land transfer/ Acquisition (SF)</th>
<th>Temporary Grading Easement (SF)</th>
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</table>

Existing City-Owned
Nelson Place School Parcel: 422,955 SF (9.71 Acres)

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**Scale 1:100**

Worcester Public Schools
Worcester, MA
PHASE I
Feb 2016-May 2017

PHASE II
May 2017-Aug. 2017
Gym Demo & Access

PHASE III
June 2017-Sept. 2017
Building demo & site completion through Nov. 2017

Potential construction fill storage & parking area

Fence & erosion control at perimeter

Access Road 18’ wide; Detail to be reviewed w/ DPW requirements

Temporary drain line

Block retaining & solid wall/fence

Temporary grading easement

Land from abutter

Land to abutter

Deliveries entry & exit

New Walk

Project street improvements, Widen paved way

Temporary drainage connection (potential permanent system - to be reviewed at DD phase

Temporary storm water detention system (potential permanent system - to be reviewed at DD phase

Upper FFE: 665’

Main FFE: 651’

Lower FFE: 637’
November 4, 2014

Paul J. Moosey  
Commissioner, Department of Public Works & Parks  
City of Worcester  
20 East Worcester St.  
Worcester, MA 01605

Re: Application to Use the Construction Management At-Risk Alternative Delivery Method for the Nelson Place Elementary School Project

Dear Mr. Moosey:

On October 8, 2014, pursuant to M.G.L. c. 149A and 945 CMR 2.00, the City of Worcester ("City") submitted an application to use the construction management at-risk ("CM at-risk") alternative delivery method for its Nelson Place Elementary School project.

Based on all the information provided, the City has met the statutory requirements for using the CM at-risk delivery method. Accordingly, the Office of the Inspector General ("Office") is issuing this notice to proceed to use the CM at-risk delivery method as specified in M.G.L. c. 149A, §§ 1-13, and to use the plan and procedures submitted.

This approval is conditioned on the City using a CM at-risk firm that the Division of Capital Asset Management and Maintenance ("DCAMM") has certified, as well as DCAMM-certified trade contractors. Therefore, the City must require each CM at-risk firm to supply both a certificate of eligibility and an update statement during both the prequalification phase and the technical proposal phase of the selection process. In addition, the City must require each trade contractor to supply a certificate of eligibility and an update statement during the prequalification phase and again at the bidding phase of the selection process. The City must reject as invalid all contractors' statements of qualifications, proposals and bids that do not include such certificates of eligibility or update statements.

If, during the course of the project, the City changes its owner’s project manager or designer, please submit information about the new project manager or designer to the Office. Also, if the City decides not to proceed with the CM at-risk delivery method, please notify the Office.
Please feel free to contact me or David Gately, Policy Analyst/Associate General Counsel, if you have any questions or concerns.

Sincerely,

Glenn A. Cunha
Inspector General

cc: K. Russell Adams, City of Worcester
Robert Poitrast, Project Executive, Tishman Construction Corporation of Massachusetts
July 30, 2014

Mr. Edward M. Augustus, City Manager
City of Worcester
455 Main Street, Room 309
Worcester, MA 01608

Re: City of Worcester, Nelson Place School

Dear Mr. Augustus:

I am pleased to report that the Board of the Massachusetts School Building Authority (the “MSBA”) has voted to approve the City of Worcester (the “City”), as part of its invitation for Feasibility Study, to proceed into schematic design to replace the existing Nelson Place School (the “Proposed Project”), on the existing site with additional land. This vote is contingent upon the MSBA’s receipt, review, and acceptance of a Preferred Schematic Report Supplement that shall be submitted to the MSBA by the District on or before September 11, 2014, and approval of the Proposed Project, if any, shall be contingent upon the City obtaining full ownership, control, and use of the additional land.

It is my understanding that the City anticipates seeking community approval for this Proposed Project in July 2015. Therefore, it is critical that the City, in conjunction with its Owner’s Project Manager and Designer, submit a schedule to the MSBA as soon as possible, which should include: the work plan to complete all of the required documentation for presentation to the MSBA’s Board of Directors at a future Board meeting; the date of the City Meeting(s) at which the Proposed Project will be considered; and the anticipated design and construction schedule.

We will be contacting you soon to discuss these next steps in more detail, but in the meantime, I wanted to share with you the Board’s vote to approve the City of Worcester to proceed into schematic design to replace the existing Nelson Place School with a new facility located on the existing site with additional land, contingent upon MSBA’s receipt of a Preferred Schematic Report Supplement of sufficient detail and to the satisfaction of the MSBA on or before September 11, 2014.

I look forward to continuing to work with you as the MSBA’s grant program progresses. As always, feel free to contact me or my staff at (617) 720-4466 should you have any questions.
Page 2
July 30, 2014
Worcester Board Action Letter

Sincerely,

[Signature]
John K. McCarthy
Executive Director

Cc: Legislative Delegation
    The Honorable Joseph M. Petty, Mayor, City of Worcester
    John F. Monfredo, Vice Chair, Worcester School Committee
    Dr. Melinda Boone, Superintendent, Worcester Public Schools
    Paul J. Moosey, Co-Chair, Worcester School Building Committee
    Julie A. Lynch, City Architect, Architectural Services, City of Worcester
    Eugene Caruso, Owner's Project Manager, Tishman Construction Corporation
    Michael Pagano, Principal Architect, Lamoureux Pagano Associates
    File: 10.2 Letters (Region 2)
23 July 2014

Mary Pichetti, Director of Capital Planning
Massachusetts School Building Authority
40 Broad Street, Suite 500
Boston, MA 02111

Re: City of Worcester, MA
Nelson Place Elementary School
PSR Supplement

Dear Ms. Pichetti:

This letter is in response to MSBA’s PSR Review Comments received via email from Nicholas Milano on July 10, 2014. Each item of your comments is listed below with the team response in red font.

Attachment “A” Module 3 Preferred Schematic Report Review Comments

**Items Requiring Immediate Action:**

*Based on MSBA staff’s review of the Preferred Schematic submittal, MSBA believes this project would benefit from further development of the Preferred Schematic scheme. Among items the MSBA would like to see addressed are the following:*

- **Provide a Preferred Schematic Supplement that includes the requirements of sections “3.3.2.4 Preferred Solution” and “3.3.2.9 Local Actions and Approvals” of Module 3 – Feasibility Study by August 18, 2014. If the District and its consultants believe additional time is required beyond August 18, 2014 please notify the MSBA assigned PM when this work could be complete and the impact to the District’s project schedule. The MSBA is available to answer any questions the District and its consultants may have regarding the supplement.*

- **Per subsequent conversation with MSBA, LPA to submit site and building development drawings on September 11th.**

- **Development of a schedule for land acquisition proceedings.**

- **Please refer to the attached letter from the City of Worcester DPW&P dated July 19, 2014.**

- **An updated project schedule to accommodate further development of the Preferred Schematic.**

- **Please refer to the attached revised Project Schedule dated July 18, 2014.**

- **Completion of civil evaluation of existing conditions.**

- **Please see responses as outlined for the specific questions later in this letter.**
- Further plan development, see comments below.
- LPA to submit site and building development drawings on September 11th.
- Further definition of proposed enhanced energy conservation methods and coordination of values within the proposed project construction budget.
- In the PSR narrative, LPA noted that the enhanced energy features will be developed during the schematic design process, and are currently being developed for the Preferred Solution. Grants for super-insulation, Geothermal systems, Biomass boilers will be filed by August 24, 2014. Response to the grant applications is expected within 3 to 4 weeks after filing. LPA has developed a schedule outlining what decisions are required, and when, in order to develop, design and cost as part of the Schematic Design submission. LPA will report on progress as part of the September 11th PSR Supplement.

### 3.3 Preferred Schematic Report

Preferred Schematic Report shall include the following:

- OPM certification of completeness & conformity - Complete.
- Table of Contents - Complete.
- Introduction - Complete, see comments.
- Evaluation of Existing Conditions - Incomplete, see comments.
- Final Evaluation of Alternatives - Complete.
- Preferred Solution - Complete, see comments below.
- Local Actions and Approvals - Complete.

#### 3.3.1 Introduction including the following:

- Overview of the process undertaken since submittal of the Preliminary Design Program including any new information and changes to previously submitted information;
  - The submittal indicates that the most significant change since the submission of the Preliminary Design Program (PDP) was the City's negotiation with Assumption College regarding an expanded site plan alternate. Following discussions with the college, the City decided to modify the parameters of site development. The City provided MSBA with a proposed alternate scheme (04/08/14) in lieu of what was presented in the PDP utilizing the rear land of abutting private property and a right of way and grading easements on a limited portion of the Assumption property. The PDP was amended to incorporate this option. The modified parameter of site development has become the basis for the preferred scheme identified within this Preferred Schematic submittal.
3.3.2 Evaluation of Existing Conditions

Describe any changes resulting from new information that informs the conclusions of the evaluation of the existing conditions.

- Please provide anticipated completion of open items from the existing conditions study – civil as prepared by Nitsch Engineering (dated: May 2014 - Revised):
  - Final determination if any underground tanks exist on the site.
  - Please refer to Phase I environmental site assessment, filed with the PDP -3.1.4 H, attachment A, Worcester Fire Department permit to remove the tank, and attachment B photographs of the tank removal. To the best of our knowledge, based on the environmental consultant’s review, the underground tank was removed from the site.
  - Provide updated information for completion of the scheduled test pits, borings and site percolation analysis scheduled to be completed during the summer of 2014.
  - The ANRAD was filed with the Conservation Commission, and the wetland borders were approved at meeting on July 14, 2014. With the wetland boundaries confirmed by the commission, and the test pit/boring locations reviewed and input from the commission, the test pit locations will be laid out in the field by the surveyor, Nitsch, between July 30 and August 1, reviewed in the field with the owner the week of August 4th, and the test pits conducted the week of August 18th.
  - The “Abbreviated Notice of Resource Area Delineation” as prepared by CR Environmental as part of the Nitsch Engineering submittal notes a requested approval of Isolated Land Subject to Flooding (ISLF) boundary and verification that the identified western isolated wetland is not a state or local wetland resource area. Please provide conclusions to these issues.
  - The ANRAD was filed with the Conservation Commission and the wetland borders and wetland designations were approved at site meeting on July 14th. LPA will include the findings of the Conservation Commission in the Schematic Design filing.
  - The eastern ISLF is identified as regulated by the state and Worcester Wetland Protection Regulations. The submitted site plans identify these two ISLF areas and indicate a required 30-foot no build zone and a 15-foot no disturbance zone at their locations. Please provide recommended construction environmental protection procedures to be implemented to meet the requirement.
  - The recommended protection will be filed with the commission as part of the NOI filing, and will be included as part of the specifications at the schematic phase, and be developed in future phases. The order of conditions are also to be included as part of the contract documents, and submissions to MSBA when obtained. Please also refer to PSR section 3.3.2.3 B matrix of permitting, where necessary filings and requirements are noted.

3.3.4 Preferred Solution – Provide the following:

- Building Plans
  - Provide conceptual floor plans of the preferred solution, in color that are clearly labeled to identify educational spaces in the preferred solution.
As requested, updated plans will be submitted for the September 11th PSR Supplement. To the greatest extent possible, all elements listed below will be addressed.

- Programmed Administration area development to provide security and control of building access for each academic wing.

- The proposed Media Center is also planned to serve as satellite facility for the Worcester Public Library. The proposed floor plan does not locate the Media Center with direct access from the exterior. Please indicate how the proposed Media Center will be used by the public while maintaining separate controlled access to the new facility.

- Development of interior circulation and egress.

- Definition of room adjacencies and egress.

- Please indicate the location for the 1,000 NSF Stage identified within the Space Summary.

- Please indicate the location for the 1,000 NSF Greenhouse identified within the Space Summary.

- Determination of Common Areas, spaces will be assumed within the Gross Floor Area calculation.

- Please indicate the proposed locations for the 65,000 square feet required for a planned solar photovoltaic system as identified within the ART Engineering recommendation (3.3.1.3.D.4).

- For comparative study purposes, the 60,000 sf area of PV arrays was the benchmark for the PSR options analysis. During schematic design, the proposed PV array area and locations will be refined. Factors will include grant funding availability and site and building orientation opportunities. Regardless, the roof support capabilities, locations for power connections, inverter locations for the future panel installations will be included in the scope of this contract work. Further information on this topic will be included in the September 11 submission.

- Site Plans - Provide clearly labeled site plans of the preferred solution including, but not limited to:
  - Site access and circulation;
    - Land Taking Site Plan indicates 5 portions of abutting residential properties totaling +/- 1.04 acres and +/- 1.26 acres for a grading and access easement from Assumption College are required to accommodate the preferred schematic site plan. An undated letter from Paul Moosey, Commissioner of the City of Worcester DPW&P states “Upon approval of the project by the Massachusetts School Building Authority (MSBA), and completion of a project funding agreement, the City of Worcester will commence with the process of eminent domain.” Please note that the MSBA will not issue a Project Funding Agreement without the City of Worcester providing written confirmation of full control of the identified properties. Please provide MSBA with a schedule of land taking procedures.
    - Please refer to the attached letter from the City of Worcester DPW&P dated July 19, 2014.
- The preferred site plan (3.3.2.4) locates a potential pedestrian/bicycle access path from the site to Romola Road and notes its inclusion as “to be reviewed”. Please provide confirmation if the access route which is also identified to be used for emergency use will be included within the project. The land indicated for this access route is part of the identified Grading Easement eminent domain land taking from Assumption College.
- Please refer to the attached letter from the City of Worcester DPW&P dated July 19, 2014.

Parking and paving;
- The preferred site plan (3.3.2.4.E) indicates 78 parking spaces and a potential for an additional 120 spaces. Please provide a description of how the number of parking spaces was determined.
- The program calls for 140 parking spaces, ongoing discussions with the City (with consideration of neighborhood concerns) as to the final location of the parking, is being determined. These locations will be shown as part of the PSR Supplement filing on September 11th.
- Please confirm location(s) for handicapped parking with access to the building.
- These locations will be shown as part of the PSR Supplement filing on September 11th.

Easements and environmental buffers;
- Please confirm planned construction and site mitigation efforts to protect identified Isolated Land Subject to Flooding areas.
- The recommended protection will be filed with the Conservation Commission as part of the NOI filing, and will be included as part of the specifications at the schematic phase, and be developed in future phases, the order of conditions are also to be included as part of the contract documents, and submissions to MSBA when obtained. Please also refer to PSR section 3.3.2.3 B matrix of permitting, where necessary filings and requirements are noted.

Site orientation.
- The design team should provide further development of the Preferred Solution to coordinate plan development and building orientation to support the proposed solar photovoltaic system.
- This development will be shown as part of the PSR Supplement filing on September 11th.

- Budget - Provide an overview of the Total Project Budget and local funding including the following:
  o Estimated total construction cost;
    - The submitted estimate prepared by A.M. Fogarty identifies a total construction cost for Scheme C.2 (preferred scheme) of $40,552,818. The Total Project Budget list the total construction cost as $41,250,000. Please evaluate the total construction cost estimate and provide coordinated values.
The Total Project Budget showing total construction cost as $41,250,000 was included as part of the PDP Supplement #1. The Total Construction Cost for Preferred Solution scheme C-2 was refined at the PSR phase to be $40,552,818.

- District’s not-to-exceed Total Project Budget;
  - Section 3.3.2.4.F includes a letter dated June 5, 2014 from Thomas Zidelis, City of Worcester CFO which identifies a total project estimate for the Preferred Schematic in the amount of $54,563,819 with indication that the City Administration is prepared to recommend for City Council to approve a loan authorization for this amount. The submitted Total Project Budget identifies a different total project estimate value of $55,036,000. Please provide a coordinated Total Project Budget and confirmation from the City that they support the coordinated value.
  - The Total Project Budget showing total project cost as $55,036,000 was included as part of the PDP Supplement #1. The Total Project Budget for Preferred Solution scheme C-2 was refined at the PSR phase to be $54,563,819 and was confirmed by the City of Worcester in a letter dated 06/05/14, submitted with the PSR.

- Estimated impact to local property tax, if applicable;
  - Not provided. Please address any anticipated impact.
  - City of Worcester response: There will be no local property tax increase as a result of this project. The Nelson Place School will be funded within the current City budget.

- Schedule - Provide an updated project schedule including the following projected dates
  - Summary of updated project schedule;
    - MSBA proposes a revision to the schedule to accommodate further development of the Preferred Schematic submittal. Include the additional milestones and activities as part of the Preferred Schematic Supplement:
      - Submittal of Preferred Schematic Supplement.
      - Potential MSBA FAS Meeting date of August 18, 2014 or September 10, 2014.
      - Potential MSBA Board of Directors presentation: September 24, 2014.
      - Schematic Design Submittal date.
      - MSBA Project Scope & Budget conference.
      - Please provide an updated project schedule and identify a proposed date for a Design Development document progress submittal to MSBA.
    - The proposed date for the Design Development submission is April 30, 2015. Please refer to the attached revised Project Schedule dated July 18, 2014.

Attachment “B” Module 3 Preferred Schematic Space Summary Review

The MSBA review comments are as follows:

- Core Academic – The District is proposing to provide a total of 21,900 net square feet (nsf) which is 4,050 nsf below the MSBA guidelines. The proposed area in this category has not
changed since the Preliminary Design Program submittal. The MSBA accepts this variation to the guidelines. No further action required.

- **Noted**

- **Special Education** – The District is proposing to provide a total of 20,085 net square feet (nsf) which exceeds the MSBA guidelines by 13,545 nsf. The proposed area in this category has increased by 300 nsf since the Preliminary Design Program submittal with the addition of a 300 nsf programmed office for a Board Certified Behavior Analyst associated with the Special Education program. While the Special Education category increased, the total building area remains as per the Preliminary Design submittal. Please note that the Special Education program is subject to approval by the Department of Elementary and Secondary Education (DESE). The District should provide the information required with its Schematic Design submittal. Formal approval of the District’s proposed Special Education program by the DESE is a prerequisite for executing a Project Funding Agreement with the MSBA.

- **Noted**

- **Art and Music/Voc-Tech** – The District is proposing to provide a combined total of 5,000 nsf which meets the MSBA guidelines. The proposed area in this category has not changed since the Preliminary Design Program submittal. The MSBA accepts this variation to the guidelines. No further action required.

- **Noted**

- **Health and Physical Education** – The District is proposing to provide a total of 6,300 nsf which meets the MSBA guidelines. The proposed area in this category has not changed since the Preliminary Design Program submittal. The MSBA accepts this variation to the guidelines. No further action required.

- **Noted**

- **Media Center** – The District is proposing to provide a total of 3,370 nsf which meets the MSBA guidelines. The proposed area in this category has not changed since the Preliminary Design Program submittal. The MSBA accepts this variation to the guidelines. No further action required.

- **Noted**

- **Dining and Food Service** – The District is proposing to provide a total of 8,950 nsf which exceeds the MSBA guidelines by 900 nsf. The proposed area in this category has not changed since the Preliminary Design Program submittal. Please confirm proper accounting of net educational spaces and gross areas are consistent with MSBA policy and reduce the overall area to conform to MSBA guidelines.

- **This will be addressed in the Schematic Design submission.**

- **Medical** – The District is proposing to provide a total of 840 nsf which exceeds the MSBA guidelines by 230 nsf. The proposed area in this category has not changed since the Preliminary Design Program submittal. MSBA will participate in the support of space as included within the
guidelines in this category, all areas in excess of MSBA guidelines will be considered ineligible for reimbursement.

- **This will be addressed in the Schematic Design submission.**

- **Administration and Guidance** – The District is proposing to provide a total of 2,970 nsf which exceeds the MSBA guidelines by 385 nsf. The proposed area in this category has not changed since the Preliminary Design Program submittal. The variance narrative states there will be one administration area per each of the two programmed classroom clusters (Primary cluster grades Pre-K-2 and Intermediate cluster grades 3-6). The Preliminary Design Program review request of a description of how the administration areas will be programmed, designed and staffed to provide security and control of building access for each academic cluster, was not provided. Further development of the Preferred Schematic scheme should address these concerns in order for the MSBA to consider the variation to the overall area of the proposed space.
  - **This will be addressed in the September 11th PSR Supplement.**

- **Custodial and Maintenance** – The District is proposing to provide a total of 2,200 nsf which meets the MSBA guidelines. The proposed area in this category has not changed since the Preliminary Design Program submittal. The MSBA accepts this variation to the guidelines. No further action required.
  - **Noted**

- **Other** - The District is proposing to provide a total of 2,900 nsf which exceeds the MSBA guidelines by 2,900 nsf. The proposed area in this category has not changed since the Preliminary Design Program submittal.

  o The proposed program includes two Computer Labs each at 950 nsf. The MSBA does not object to two Computer Labs being included in the proposed project, but based on the review of the educational program, anticipated utilization rates and our experience with other elementary schools, MSBA will consider the space associated with the second Computer Lab as ineligible for reimbursement.
  
  o The City would like the opportunity to discuss the second computer lab reimbursement qualification further and plans to submit further information supporting the need for this second Computer Lab in the September 11 submission.
  
  o The Space Summary identified inclusion of a 1,000 nsf Greenhouse to be included in the proposed project. The MSBA does not object to this space being included in the project but will consider this space ineligible for reimbursement. Note: the Greenhouse is not identified on the submitted Preferred Schematic submittal drawings and only noted on the submitted Space Summary.
  
  o The owner would like to maintain the Greenhouse in the program, but develop it as a freestanding building, and as a bid alternate within the project pending pursuit of grant funding.

- **Total Building Net Floor Area** – The District is proposing to provide a total of 74,515 nsf which exceeds the MSBA guidelines by 13,910 nsf. The proposed area has increased by 300 nsf since the Preliminary Design Program submittal, refer to specific comments above.
- Noted

- **Total Building Gross Floor Area** – The District is proposing to provide a total of 110,000 gsf which exceeds the MSBA guidelines by 23,000 gsf. The proposed area has not changed since the Preliminary Design Program submittal. *As noted in the categories above and within Attachment ‘A’, The District and design team must address the comments provided to facilitate a better understanding and allow for further review of the proposed project.*

- Noted

Please note that upon moving forward into subsequent phases of the proposed project, the Designer will be required to confirm in writing, with each submission, that the design remains in accordance with the MSBA guidelines and that they have not deviated from the allowable gross square footage and educational program approved in the previous submittals.

- Noted

If you have any questions or comments, please contact me.

Sincerely,

Robert Para, Jr., AIA

RP/aw

RP/aw
July 19, 2014

Ms. Diane Sullivan
Senior Capital Program Manager
40 Broad Street
Boston, Massachusetts 02109

Dear Ms. Sullivan:

The Nelson Place School Building Committee voted unanimously on June 2, 2014 to approve a revised Preliminary Design Program (PDP), as well as a preferred solution, as defined in the Preferred Schematic Report, for further development in the Schematic Design phase of the Nelson Place School Feasibility Study. The Nelson Place preferred solution: *New Construction on the Existing Nelson Place Site with Additional Land* incorporates parcels of privately held land that will be necessary to obtain through the process of eminent domain in order to best meet the proposed site program.

To date, two Public Hearings and one School Building Committee meeting have been held and included discussion on the necessity of obtaining portions of abutting properties. These fee takings provide relief to a narrow segment of land on the existing Nelson Place property, and alleviate the need for excessive retaining walls. Additionally, Assumption College is donating an easement along the south property line, connecting to Romola Road for the purposes of emergency access, and grading to avoid extensive retaining walls. During the Schematic Design Phase the areas necessary for takings will be definitively identified.

The City has contacted all affected abutters and is prepared to obtain the required property through the process of eminent domain. This process includes a survey and description of the properties’ metes and bounds, as well as an appraisal which will be used as the basis for compensation to the impacted land owners, as depicted in the attached site plan. The City of Worcester understands that the approval of the project by the Massachusetts School Building Authority (MSBA) will be contingent upon the acquisition of these parcels. Following this conditional approval, during the process of obtaining a Project Funding Agreement, the City of Worcester will finalize the eminent domain takings, including filing *Order of Takings* with the Registry of Deeds and providing land owners with a *Notice of Taking*. The City of Worcester obtains control of the properties upon filing of the *Order of Takings*. 
Land Taking Schedule:

**August 2014:** Survey and Metes and Bound Descriptions of six parcels.

**September 2014 – October 2014:** Property appraisals completed.

**September - November 2014:** City of Worcester Law Department completion of *Order of Takings*.

**December 2014 – January 2015:** Project approval by the MSBA conditional on land acquisition.

**January 2015 – February 2015:** Project Funding Agreement including vote by City Council.

**January 2015:** *Order of Takings* filed with the Registry of Deeds; land owners provided with a *Notice of Taking*.

Sincerely,

Paul J. Moosey, Commissioner
City of Worcester, DPW&P

“Serving Our Community”

“Pride in Our Parks”
| **CITY OF WORCESTER** |  |
| **NELSON PLACE SCHOOL** |  |
| **PROJECT SCHEDULE - DRAFT** |  |

**ID** | **Task Name** | **Duration** | **Start** | **Finish** |
| 1 | WORKERSON NELSON PLACE SCHOOL SUMMARY SCHEDULE | 240 days | Tue 11/19/13 | Mon 10/14/14 |
| 2 | Designer Selection | 0 days | Tue 11/19/13 | Tue 11/19/13 |
| 3 | Feasibility Study | 132 days | Tue 12/3/13 | Wed 6/4/14 |
| 4 | Negotiate Contract Fee with Architect | 13 days | Wed 12/10/13 | Fri 12/13/13 |
| 5 | Project team meeting with School representatives | 2 days | Tue 12/10/13 | Wed 12/11/13 |
| 6 | Project team meeting with Building Committee and Community | 1 day | Mon 12/9/13 | Mon 12/9/13 |
| 7 | Programmatic Design | 80 days | Mon 12/9/13 | Fri 2/28/14 |
| 8 | Site review meeting | 1 day | Tue 12/10/13 | Tue 12/10/13 |
| 9 | Educational Meeting for PSR | 1 wk | Wed 12/11/13 | Wed 12/11/13 |
| 10 | Kick off meeting with MSBA | 1 day | Wed 1/8/14 | Wed 1/8/14 |
| 11 | School Building Committee meeting: Approval role for PSR | 1 day | Mon 2/24/14 | Mon 2/24/14 |
| 12 | Remit PSR to MSBA for comment and input | 1 day | Mon 3/3/14 | Mon 3/3/14 |
| 13 | Public Information meeting | 1 wk | Mon 3/3/14 | Mon 3/3/14 |
| 14 | MSBA review: comments and input for PSR submission | 35 days | Mon 3/3/14 | Fri 3/28/14 |
| 15 | City to establish site constraints for Design scheme | 18 days | Wed 3/29/14 | Fri 4/18/14 |
| 16 | Project team response to MSBA PSR comments | 1 wk | Fri 3/28/14 | Wed 4/3/14 |
| 17 | Commerce activities with Architect for PREFERRED SCHEMATIC REPORT (PSR) | 46 days | Fri 3/28/14 | Fri 5/30/14 |
| 18 | Review PSR with WPS personnel | 1 day | Tue 4/29/14 | Tue 4/29/14 |
| 19 | PSR Options estimates | 11 days | Fri 5/2/14 | Fri 5/16/14 |
| 20 | Public Information meeting for PSR | 1 day | Mon 5/19/14 | Mon 5/19/14 |
| 21 | School Building Committee presentation and Vote for PSR | 1 day | Mon 6/2/14 | Mon 6/2/14 |
| 22 | Submit PSR to MSBA for review | 1 day | Thu 6/5/14 | Thu 6/5/14 |
| 23 | MSBA Sub-committee review of PSR | 10 days | Fri 6/13/14 | Wed 6/18/14 |
| 24 | MSBA review meeting with Project team for PDS | 1 day | Thu 6/19/14 | Thu 6/19/14 |
| 25 | MSBA Board Approval of PDS. Study for SD | 1 day | Wed 7/9/14 | Wed 7/9/14 |
| 26 | PSR COMMENTS RETURNED TO MSBA | 1 day | Thu 7/10/14 | Thu 7/10/14 |
| 27 | Submit FS Completion Checklist | 14 days | Thu 7/10/14 | Mon 7/21/14 |
| 28 | Project team review ARCH, MEP and SITE SD Drawings for review | 96 days | Mon 7/7/14 | Mon 10/17/14 |
| 29 | User needs meeting and assessments LPA-LA/WPS | 11 days | Mon 8/26/14 | Mon 7/11/14 |
| 30 | LPA prepare 3D tracing and site layout for review | 22 days | Fri 8/15/14 | Mon 9/14/14 |
| 31 | Project team review Tracing and site layout for comment | 4 days | Mon 9/11/14 | Thu 9/14/14 |
| 32 | LPA review tracing and site layout comments from Project team | 3 days | Thu 9/14/14 | Mon 9/18/14 |
| 33 | LPA prepare SD BUILDING ENVELOPE for review | 45 days | Fri 9/14/14 | Thu 10/11/14 |
| 34 | Net Design review required by LPA for design | 1 day | Wed 9/16/14 | Wed 9/16/14 |
| 35 | Project team review BUILDING ENVELOPE for comment | 3 days | Thu 9/11/14 | Mon 9/15/14 |
| 36 | LPA Provide updated PSR plans for submission to MSBA | 1 day | Thu 9/11/14 | Thu 9/11/14 |
| 37 | LPA review BUILDING ENVELOPE per comments from Project team | 4 days | Mon 9/15/14 | Thu 9/18/14 |
| 38 | LPA prepare ARCH, MEP and SITE SD Drawings for review | 30 days | Mon 9/18/14 | Wed 11/17/14 |
| 39 | Project team review ARCH, MEP and SITE SD Drawings for comment | 8 days | Wed 11/17/14 | Wed 11/12/14 |
| 40 | LPA review ARCH, MEP and SITE SD Drawings for review | 3 days | Wed 11/12/14 | Fri 11/14/14 |
| 41 | Submit SD Drawings to COST ESTIMATORS LPA/OPM | 15 days | Wed 11/15/14 | Tue 11/25/14 |
| 42 | RECONCILE Cost Estimates as needed LPA/OPM | 9 days | Tue 11/25/14 | Fri 12/5/14 |
| 43 | Prepare DESE proposed project requirements | 76 days | Wed 7/23/14 | Wed 11/14/14 |
| 44 | Project team review DESE documents | 11 days | Wed 11/15/14 | Wed 11/19/14 |
| 45 | Revise DESE per comments from Project team | 13 days | Wed 11/19/14 | Fri 12/5/14 |
| 46 | Completion of Schematic Design & Bid documentation | 92 days | Thu 7/31/14 | Fri 12/5/14 |
| 47 | Completion of Schematic Design Project Manual | 92 days | Thu 7/31/14 | Fri 12/5/14 |
| 48 | Issue Project Manual for Final review by Project team | 264 days | Fri 12/5/14 | Wed 12/15/14 |
| 49 | Computer and advisory fees for design and drafting | 36 days | Wed 11/19/14 | Wed 11/19/14 |
| 50 | Completion of comprehensive project budget | 33 days | Wed 10/22/14 | Fri 12/5/14 |
| 51 | Project team review architectural drawings and plans | 35 days | Wed 5/28/14 | Fri 7/22/14 |
| 52 | Local District Approval for the Schematic Design | 1 day | Thu 11/27/14 | Thu 12/14/14 |
| 53 | Submit SD Report to MSBA | 1 day | Thu 12/11/14 | Thu 12/11/14 |
| 54 | Submit DESE to MSBA | 1 day | Thu 12/11/14 | Thu 12/11/14 |
| 55 | DESE approved Schematic Design drawings and plans | 35 days | Wed 11/19/14 | Fri 12/5/14 |
| 56 | MSBA Board Approval of Schematic Design | 1 day | Wed 12/18/15 | Wed 12/18/15 |
| 57 | Complete MSBA Project Agreement items | 120 days | Wed 12/18/15 | Thu 7/14/15 |
| 58 | CoW signed Reimbursement Rate Certificate | 45 days | Wed 3/2/14 | Mon 4/8/15 |
| 59 | School Building Committee to VOTE for FUNDING the project | 1 day | Tue 2/4/15 | Tue 2/4/15 |
| 60 | Project schedule for design, bid, construction milestones | 4 days | Mon 3/3/15 | Fri 3/5/15 |
| 61 | Project Cash Flow summary | 1 day | Mon 3/3/15 | Mon 3/3/15 |
| 62 | Project site evaluation | 4 days | Mon 3/3/15 | Fri 3/6/15 |
| 63 | Provide detailed listing of all FF&E Items | 30 days | Mon 4/20/15 | Fri 5/15/15 |
### CITY OF WORCESTER
### NELSON PLACE SCHOOL
### PROJECT SCHEDULE - DRAFT

<table>
<thead>
<tr>
<th>Task Name</th>
<th>Duration</th>
<th>Start</th>
<th>Finish</th>
</tr>
</thead>
<tbody>
<tr>
<td>CoW SBC Vote for PFA execution</td>
<td>15 days</td>
<td>Mon 5/4/14</td>
<td>Fri 5/22/15</td>
</tr>
<tr>
<td>CoW Legal Counsel certification for PFA execution</td>
<td>15 days</td>
<td>Fri 5/15/15</td>
<td>Thu 6/4/15</td>
</tr>
<tr>
<td>CoW signed PFA returned to MSBA</td>
<td>25 days</td>
<td>Mon 5/25/15</td>
<td>Thu 6/19/15</td>
</tr>
<tr>
<td>Preliminary Design Program outline PDP</td>
<td>59 days</td>
<td>Tue 9/16/14</td>
<td>Fri 2/3/14</td>
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<tr>
<td>Preferred Schematic Report outline PDR</td>
<td>94 days</td>
<td>Mon 9/22/14</td>
<td>Thu 9/25/14</td>
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<tr>
<td>Additional evaluation and summary updates of Existing conditions</td>
<td>25 days</td>
<td>Mon 2/24/14</td>
<td>Fri 3/28/14</td>
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<tr>
<td>Prepare comprehensive Preferred Solution package</td>
<td>25 days</td>
<td>Mon 2/24/14</td>
<td>Thu 3/9/14</td>
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<tr>
<td>Project Schedule</td>
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<td>Thu 3/19/14</td>
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<tr>
<td>Prepare Introduction documents</td>
<td>35 days</td>
<td>Wed 2/26/14</td>
<td>Wed 4/1/14</td>
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<tr>
<td>Site analysis for the 3 alternatives as applicable</td>
<td>30 days</td>
<td>Wed 2/26/14</td>
<td>Thu 4/10/14</td>
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<tr>
<td>prepare Arch &amp; Site concept drawings for each alternative</td>
<td>30 days</td>
<td>Wed 2/26/14</td>
<td>Thu 4/10/14</td>
</tr>
<tr>
<td>General Contractor Bids</td>
<td>1 day</td>
<td>Thu 3/7/14</td>
<td>Thu 3/7/14</td>
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<tr>
<td>MEP and Technology systems including estimated loads</td>
<td>30 days</td>
<td>Mon 3/10/14</td>
<td>Mon 4/3/14</td>
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<tr>
<td>Update Site plan for the Preferred solution</td>
<td>46 days</td>
<td>Mon 3/10/14</td>
<td>Mon 4/3/14</td>
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<tr>
<td>Determination of swing space, phased construction etc</td>
<td>40 days</td>
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<td>Thu 3/13/14</td>
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<tr>
<td>Total Project Budget for the Preferred solution</td>
<td>46 days</td>
<td>Mon 3/10/14</td>
<td>Mon 4/17/14</td>
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<tr>
<td>updated Project schedule for the Preferred solution</td>
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<td>Mon 4/17/14</td>
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<td>Structural systems intended for each alternative</td>
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<td>Conceptual building plans for the Preferred solution</td>
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<td>Thu 4/17/14</td>
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<td>Project total budget for each alternative</td>
<td>30 days</td>
<td>Thu 3/20/14</td>
<td>Wed 4/15/14</td>
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<tr>
<td>Construction Cost Estimate for each alternative</td>
<td>13 days</td>
<td>Fri 3/31/14</td>
<td>Tue 4/15/14</td>
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<td>Permitting requirements</td>
<td>6 days</td>
<td>Thu 6/17/14</td>
<td>Thu 6/24/14</td>
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<tr>
<td>Complete Cost Comparative summary for three alternatives</td>
<td>10 days</td>
<td>Fri 3/24/14</td>
<td>Thu 3/31/14</td>
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<tr>
<td>Review MSBA comments and amendment PDP accordingly</td>
<td>5 days</td>
<td>Wed 5/14/14</td>
<td>Thu 5/22/14</td>
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<tr>
<td>Public Information Presentation for PDR</td>
<td>1 day</td>
<td>Mon 5/19/14</td>
<td>Mon 5/19/14</td>
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<tr>
<td>School Building Committee presentation and Vote</td>
<td>1 day</td>
<td>Mon 5/20/14</td>
<td>Mon 5/20/14</td>
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<tr>
<td>Submit PSR to MSBA</td>
<td>1 day</td>
<td>Thu 6/12/14</td>
<td>Thu 6/12/14</td>
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<tr>
<td>SCHEMATIC DESIGN</td>
<td>56 days</td>
<td>Thu 7/3/14</td>
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<tr>
<td>Design Development Submission for MSBA review</td>
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<td>Construction Document Place holders</td>
<td>407 days</td>
<td>Thu 12/29/14</td>
<td>Fri 1/13/15</td>
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<tr>
<td>60% Construction documents</td>
<td>99 days</td>
<td>Thu 12/29/14</td>
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<tr>
<td>Submit 60% docs to MSBA</td>
<td>1 day</td>
<td>Wed 1/15/15</td>
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<tr>
<td>Prepar Cost estimate for 60% CD's</td>
<td>10 days</td>
<td>Thu 2/15/15</td>
<td>Wed 2/21/15</td>
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<td>Recomile OPM Cost estimate with Designer for 60% CD's</td>
<td>10 days</td>
<td>Wed 2/15/15</td>
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<tr>
<td>Submit 60% Cost estimate to MSBA</td>
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<td>90% Construction Documents</td>
<td>65 days</td>
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<td>Finalize documents to make ready for Bid</td>
<td>43 days</td>
<td>Wed 6/15/15</td>
<td>Fri 7/2/15</td>
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<tr>
<td>Prepare Cost estimate for 90% CD's</td>
<td>10 days</td>
<td>Wed 6/15/15</td>
<td>Thu 3/9/15</td>
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<tr>
<td>Recomile OPM Cost estimate with Designer for 90% CD's</td>
<td>10 days</td>
<td>Wed 6/22/15</td>
<td>Mon 7/2/15</td>
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<tr>
<td>Submit 90% Cost estimate to MSBA</td>
<td>1 day</td>
<td>Wed 7/2/15</td>
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<td>Pre-Construction Activities</td>
<td>159 days</td>
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<td>Pre-quality Subcontractors</td>
<td>41 days</td>
<td>Wed 5/6/14</td>
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<td>Pre-quality GC or CM all Risk</td>
<td>41 days</td>
<td>Mon 6/1/14</td>
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<td>Final Subcontractor Bids</td>
<td>17 days</td>
<td>Fri 11/13/15</td>
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<td>CONSTRUCTION ACTIVITIES</td>
<td>448 days</td>
<td>Mon 14/16</td>
<td>Wed 1/15/17</td>
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<td>AID Contract NTP</td>
<td>1 day</td>
<td>Mon 1/14/16</td>
<td>Mon 1/14/16</td>
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<td>Mobilization &amp; Construction</td>
<td>412 days</td>
<td>Tue 1/15/16</td>
<td>Wed 6/27/17</td>
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<td>Building Systems Punch list</td>
<td>78 days</td>
<td>Fri 4/14/17</td>
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<td>COMMISSIONING for Building systems</td>
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<td>Building systems final loading and acceptance w/O&amp;M submittals</td>
<td>32 days</td>
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<td>Fri 7/28/17</td>
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<td>Substantial Completion</td>
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<td>Thu 8/16/17</td>
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<td>FF &amp; E Delivery, Install, cleanup</td>
<td>30 days</td>
<td>Thu 8/15/17</td>
<td>Wed 8/22/17</td>
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<tr>
<td>Last Day of Classes</td>
<td>1 day</td>
<td>Fri 8/22/17</td>
<td>Fri 8/22/17</td>
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<tr>
<td>ABATEMENT of existing school buildings</td>
<td>16 days</td>
<td>Mon 8/26/17</td>
<td>Mon 9/7/17</td>
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<td>DEMOLITION of existing abandoned school buildings</td>
<td>40 days</td>
<td>Mon 8/26/17</td>
<td>Thu 9/1/17</td>
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<td>FINAL CLEANING for new school prior to occupancy</td>
<td>12 days</td>
<td>Fri 7/14/17</td>
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<td>School move in and Final CoO</td>
<td>25 days</td>
<td>Wed 8/17/17</td>
<td>Mon 9/14/17</td>
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<tr>
<td>First day of School</td>
<td>1 day</td>
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<td>Lower Parking and related sitework</td>
<td>43 days</td>
<td>Fri 8/17/17</td>
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<tr>
<td>Site Punch list</td>
<td>11 days</td>
<td>Wed 9/11/17</td>
<td>Wed 9/11/17</td>
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Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

MSBA
Final PSR Supplement
(In response to MSBA PSR comments dated July 10, 2014)

SEPTEMBER 11, 2014

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

OWNER
City of Worcester, MA
Architectural Services Division
50 Skyline Drive, Worcester, MA 01605

OPM
Tishman Construction Corporation of Massachusetts
84 State Street, Boston, MA 02108

DESIGNER
Lamoureux Pagano & Associates, Inc.
108 Grove Street, Suite 300, Worcester, MA 01605

Prepared by:
11 September 2014

Mary Pichetti, Director of Capital Planning
Massachusetts School Building Authority
40 Broad Street, Suite 500
Boston, MA 02109

Re: City of Worcester, MA
    Nelson Place Elementary School
    Final PSR Supplement

Dear Ms. Pichetti:

This Final PSR Supplement addresses items not included in the initial July 23, 2014 PSR Supplement. All items are in response to MSBA’s PSR Review Comments received via email from Nicholas Milano on July 10, 2014. To help clarify that all items have been addressed, the initial responses included in the July 23, 2014 PSR Supplement are in red font and the final responses included in this September 11, 2014 Final PSR Supplement are in blue font.

Attachment “A” Module 3 Preferred Schematic Report Review Comments

Items Requiring Immediate Action:

Based on MSBA staff’s review of the Preferred Schematic submittal, MSBA believes this project would benefit from further development of the Preferred Schematic scheme. Among items the MSBA would like to see addressed are the following:

- Provide a Preferred Schematic Supplement that includes the requirements of sections “3.3.2.4 Preferred Solution” and “3.3.2.9 Local Actions and Approvals” of Module 3 – Feasibility Study by August 18, 2014. If the District and its consultants believe additional time is required beyond August 18, 2014 please notify the MSBA assigned PM when this work could be complete and the impact to the District’s project schedule. The MSBA is available to answer any questions the District and its consultants may have regarding the supplement.

- Per subsequent conversation with MSBA, LPA to submit site and building development drawings on September 11th.

- Site and building plans are attached. These graphics are as reviewed and approved by the school, and meet the program requirements as developed.

- Development of a schedule for land acquisition proceedings.

- Please refer to the attached letter from the City of Worcester DPW&P dated July 19, 2014.

- Site plan attached shows additional detail on the proposed land acquisition, Eminent Domain taking. The City has requested that the land takings for the residences be minimized without compromising the site/building program. The plans indicate a combination of temporary grading easements and land transfer/acquisitions.
- An updated project schedule to accommodate further development of the Preferred Schematic.
  - Please refer to the attached revised Project Schedule dated July 18, 2014.

- Completion of civil evaluation of existing conditions.
  - Please see responses as outlined for the specific questions later in this letter.

- Further plan development, see comments below.
- LPA to submit site and building development drawings on September 11th.
- Site and building plans are attached.

- Further definition of proposed enhanced energy conservation methods and coordination of values within the proposed project construction budget.
- In the PSR narrative, LPA noted that the enhanced energy features will be developed during the schematic design process, and are currently being developed for the Preferred Solution. Grants for super-insulation, Geothermal systems, Biomass boilers will be filed by August 24, 2014. Response to the grant applications is expected within 3 to 4 weeks after filing. LPA has developed a schedule outlining what decisions are required, and when, in order to develop, design and cost as part of the Schematic Design submission. LPA will report on progress as part of the September 11th PSR Supplement.
- Three grant applications have been filed: one for enhanced insulation of the roof and wall systems plus triple glazing window systems, one for biomass boilers, and one for geothermal. Cost, payback analyses and energy usage matrixes have been filed with the applications. The City has authorized the team to proceed with the enhanced insulation as part of the design, and energy calculations, systems designs, and envelope design are proceeding accordingly. Once the biomass and geothermal grant funding opportunities have been finalized, the owner will determine the extent of the proposed systems to be included in the final project.

### 3.3 Preferred Schematic Report

Preferred Schematic Report shall include the following:

- OPM certification of completeness & conformity - Complete.
- Table of Contents - Complete.
- Introduction - Complete, see comments.
- Evaluation of Existing Conditions - Incomplete, see comments.
- Final Evaluation of Alternatives - Complete.
- Preferred Solution - Complete, see comments below.
- Local Actions and Approvals - Complete.

#### 3.3.1 Introduction

including the following:

- Overview of the process undertaken since submittal of the Preliminary Design Program including any new information and changes to previously submitted information;
The submittal indicates that the most significant change since the submission of the Preliminary Design Program (PDP) was the City’s negotiation with Assumption College regarding an expanded site plan alternate. Following discussions with the college, the City decided to modify the parameters of site development. The City provided MSBA with a proposed alternate scheme (04/08/14) in lieu of what was presented in the PDP utilizing the rear land of abutting private property and a right of way and grading easements on a limited portion of the Assumption property. The PDP was amended to incorporate this option. The modified parameter of site development has become the basis for the preferred scheme identified within this Preferred Schematic submittal.

3.3.2 Evaluation of Existing Conditions

Describe any changes resulting from new information that informs the conclusions of the evaluation of the existing conditions.

- Please provide anticipated completion of open items from the existing conditions study – civil as prepared by Nitsch Engineering (dated: May 2014 - Revised):
  - Final determination if any underground tanks exist on the site.
  - Please refer to Phase I environmental site assessment, filed with the PDP -3.1.4 H, attachment A, Worcester Fire Department permit to remove the tank, and attachment B photographs of the tank removal. To the best of our knowledge, based on the environmental consultant’s review, the underground tank was removed from the site.
  - Provide updated information for completion of the scheduled test pits, borings and site percolation analysis scheduled to be completed during the summer of 2014.
  - The ANRAD was filed with the Conservation Commission, and the wetland borders were approved at meeting on July 14, 2014. With the wetland boundaries confirmed by the commission, and the test pit/boring locations reviewed and input from the commission, the test pit locations will be laid out in the field by the surveyor, Nitsch, between July 30 and August 1, reviewed in the field with the owner the week of August 4th, and the test pits conducted the week of August 18th.
  - Test pits, soils borings, soils sampling, infiltration testing, etc. were conducted, and report is underway. In short, the findings were consistent with the previous record information.
  - The “Abbreviated Notice of Resource Area Delineation” as prepared by CR Environmental as part of the Nitsch Engineering submittal notes a requested approval of Isolated Land Subject to Flooding (ISLF) boundary and verification that the identified western isolated wetland is not a state or local wetland resource area. Please provide conclusions to these issues.
  - The ANRAD was filed with the Conservation Commission and the wetland borders and wetland designations were approved at site meeting on July 14th. LPA will include the findings of the Conservation Commission in the Schematic Design filing.
  - The eastern ILSF is identified as regulated by the state and Worcester Wetland Protection Regulations. The submitted site plans identify these two ISLF areas
and indicate a required 30-foot no build zone and a 15-foot no disturbance zone at their locations. Please provide recommended construction environmental protection procedures to be implemented to meet the requirement.

- The recommended protection will be filed with the commission as part of the NOI filing, and will be included as part of the specifications at the schematic phase, and be developed in future phases. The order of conditions are also to be included as part of the contract documents, and submissions to MSBA when obtained. Please also refer to PSR section 3.3.2.3 B matrix of permitting, where necessary filings and requirements are noted.

### 3.3.4 Preferred Solution – Provide the following:

- **Building Plans**
  - Provide conceptual floor plans of the preferred solution, in color that are clearly labeled to identify educational spaces in the preferred solution.
  - As requested, updated plans will be submitted for the September 11th PSR Supplement. To the greatest extent possible, all elements listed below will be addressed.
    - Programmed Administration area development to provide security and control of building access for each academic wing.
    - 9/11/14 plans show the main lobby area, and doors separating the academic wings from the core facilities for secure after school use. Security consultant has reviewed the building and site plans, and their recommendations were reviewed with the City. More comprehensive proposed security system scope will be included in the Schematic Design submission.
    - The proposed Media Center is also planned to serve as satellite facility for the Worcester Public Library. The proposed floor plan does not locate the Media Center with direct access from the exterior. Please indicate how the proposed Media Center will be used by the public while maintaining separate controlled access to the new facility.
    - 9/11/14 plans show separate entrance to the Media Center through the main entry vestibule. There have been subsequent meetings with the Library and School department, the submitted plan reflects their input including a Media Center suite with a rest room so that the Public Library can function after hours without impacting the balance of the school.
    - Development of interior circulation and egress.
    - 9/11/14 plans show circulation, stairs and egress.
    - Definition of room adjacencies and egress.
    - 9/11/14 plans show adjacent rooms, and layouts
    - Please indicate the location for the 1,000 NSF Stage identified within the Space Summary.
    - 9/11/14 plans show the stage and accessible route solution.
    - Please indicate the location for the 1,000 NSF Greenhouse identified within the Space Summary.
- 9/11/14 site plans show the proposed greenhouse location on site separate from the main school facility. Understanding that the MSBA is not participating in this program, the City is pursuing separate funding for the greenhouse—see attached summary.

- Determination of Common Area locations and confirmation that Common spaces will be assumed within the Gross Floor Area calculation.

- 9/11/14 plans show the common areas, and the space is included within the gross square footage calculation.

- Please indicate the proposed locations for the 65,000 square feet required for a planned solar photovoltaic system as identified within the ART Engineering recommendation (3.3.1.3.D.4).

- For comparative study purposes, the 60,000sf area of PV arrays was the benchmark for the PSR options analysis. During schematic design, the proposed PV array area and locations will be refined. Factors will include grant funding availability and site and building orientation opportunities. Regardless, the roof support capabilities, locations for power connections, inverter locations for the future panel installations will be included in the scope of this contract work. Further information on this topic will be included in the September 11 submission.

- The photovoltaic panels/system is not included in the current scope, but is planned to be included in ongoing grant programs established in the City as funding allows. Studies for the PV array location options on the building roof are underway and will be further developed for the Schematic Design submission. As noted, the roof area will be planned for panel location and coordinated with the equipment locations.

- **Site Plans** - Provide clearly labeled site plans of the preferred solution including, but not limited to:
  - Site access and circulation;
    - Land Taking Site Plan indicates 5 portions of abutting residential properties totaling +/- 1.04 acres and +/- 1.26 acres for a grading and access easement from Assumption College are required to accommodate the preferred schematic site plan. An undated letter from Paul Moosy, Commissioner of the City of Worcester DPW&P states “Upon approval of the project by the Massachusetts School Building Authority (MSBA), and completion of a project funding agreement, the City of Worcester will commence with the process of eminent domain.” Please note that the MSBA will not issue a Project Funding Agreement without the City of Worcester providing written confirmation of full control of the identified properties. Please provide MSBA with a schedule of land taking procedures.
    - Please refer to the attached letter from the City of Worcester DPW&P dated July 19, 2014.
    - Discussion with the landowners is ongoing, and the City is proceeding as outlined in the referenced document.

- The preferred site plan (3.3.2.4) locates a potential pedestrian/bicycle access path from the site to Romola Road and notes its inclusion as “to be
reviewed”. Please provide confirmation if the access route which is also identified to be used for emergency use will be included within the project. The land indicated for this access route is part of the identified Grading Easement eminent domain land taking from Assumption College.

- Please refer to the attached letter from the City of Worcester DPW&P dated July 19, 2014.

- Parking and paving;
  - The preferred site plan (3.3.2.4.E) indicates 78 parking spaces and a potential for an additional 120 spaces. Please provide a description of how the number of parking spaces was determined.
  - The program calls for 140 parking spaces, ongoing discussions with the City (with consideration of neighborhood concerns) as to the final location of the parking, is being determined. These locations will be shown as part of the PSR Supplement filing on September 11th.
  - Parking locations are indicated on the included site plans and meet the program requirements.

  - Please confirm location(s) for handicapped parking with access to the building.
  - These locations will be shown as part of the PSR Supplement filing on September 11th.
  - Accessible spaces are indicated on the included site plan.

- Easements and environmental buffers;
  - Please confirm planned construction and site mitigation efforts to protect identified Isolated Land Subject to Flooding areas.
  - The recommended protection will be filed with the Conservation Commission as part of the NOI filing, and will be included as part of the specifications at the schematic phase, and be developed in future phases, the order of conditions are also to be included as part of the contract documents, and submissions to MSBA when obtained. Please also refer to PSR section 3.3.2.3 B matrix of permitting, where necessary filings and requirements are noted.

- Site orientation.
  - The design team should provide further development of the Preferred Solution to coordinate plan development and building orientation to support the proposed solar photovoltaic system.
  - This development will be shown as part of the PSR Supplement filing on September 11th.
  - The building orientation is established based on the site development and site opportunities, the panels will be installed on the roof as area allows. Further development is underway, as noted earlier, the photovoltaic installation is part of a separate project, and will be coordinated.

- **Budget** - Provide an overview of the Total Project Budget and local funding including the following:
  - Estimated total construction cost;
- The submitted estimate prepared by A.M. Fogarty identifies a total construction cost for Scheme C.2 (preferred scheme) of $40,552,818. The Total Project Budget lists the total construction cost as $41,250,000. Please evaluate the total construction cost estimate and provide coordinated values.
  - The Total Project Budget showing total construction cost as $41,250,000 was included as part of the PDP Supplement #1. The Total Construction Cost for Preferred Solution scheme C-2 was refined at the PSR phase to be $40,552,818.

  - District’s not-to-exceed Total Project Budget;
  - Section 3.3.2.4.F includes a letter dated June 5, 2014 from Thomas Zidelis, City of Worcester CFO which identifies a total project estimate for the Preferred Schematic in the amount of $54,563,819 with indication that the City Administration is prepared to recommend for City Council to approve a loan authorization for this amount. The submitted Total Project Budget identifies a different total project estimate value of $55,036,000. Please provide a coordinated Total Project Budget and confirmation from the City that they support the coordinated value.
  - The Total Project Budget showing total project cost as $55,036,000 was included as part of the PDP Supplement #1. The Total Project Budget for Preferred Solution scheme C-2 was refined at the PSR phase to be $54,563,819 and was confirmed by the City of Worcester in a letter dated 06/05/14, submitted with the PSR.

  - Estimated impact to local property tax, if applicable;
  - Not provided. Please address any anticipated impact.
  - City of Worcester response: There will be no local property tax increase as a result of this project. The Nelson Place School will be funded within the current City budget.

- Schedule - Provide an updated project schedule including the following projected dates
  - Summary of updated project schedule;
  - MSBA proposes a revision to the schedule to accommodate further development of the Preferred Schematic submittal. Include the additional milestones and activities as part of the Preferred Schematic Supplement:
    - Submittal of Preferred Schematic Supplement.
    - Potential MSBA FAS Meeting date of August 18, 2014 or September 10, 2014.
    - Potential MSBA Board of Directors presentation: September 24, 2014.
    - Schematic Design Submittal date.
    - MSBA Project Scope & Budget conference.
  - Please provide an updated project schedule and identify a proposed date for a Design Development document progress submittal to MSBA.
  - The proposed date for the Design Development submission is April 30, 2015. Please refer to the attached revised Project Schedule dated July 18, 2014.
Attachment “B” Module 3 Preferred Schematic Space Summary Review

The MSBA review comments are as follows:

- **Core Academic** – The District is proposing to provide a total of 21,900 net square feet (nsf) which is 4,050 nsf below the MSBA guidelines. The proposed area in this category has not changed since the Preliminary Design Program submittal. *The MSBA accepts this variation to the guidelines. No further action required.*
- **Noted**

- **Special Education** – The District is proposing to provide a total of 20,085 net square feet (nsf) which exceeds the MSBA guidelines by 13,545 nsf. The proposed area in this category has increased by 300 nsf since the Preliminary Design Program submittal *with the addition of a 300 nsf programmed office for a Board Certified Behavior Analyst associated with the Special Education program.* While the Special Education category increased, the total building area remains as per the Preliminary Design submittal. Please note that the Special Education program is subject to approval by the Department of Elementary and Secondary Education (DESE). The District should provide the information required with its Schematic Design submittal. Formal approval of the District’s proposed Special Education program by the DESE is a prerequisite for executing a Project Funding Agreement with the MSBA.
- **Noted**

- **Art and Music/ Voc-Tech** – The District is proposing to provide a combined total of 5,000 nsf which meets the MSBA guidelines. The proposed area in this category has not changed since the Preliminary Design Program submittal. *The MSBA accepts this variation to the guidelines. No further action required.*
- **Noted**

- **Health and Physical Education** – The District is proposing to provide a total of 6,300 nsf which meets the MSBA guidelines. The proposed area in this category has not changed since the Preliminary Design Program submittal. *The MSBA accepts this variation to the guidelines. No further action required.*
- **Noted**

- **Media Center** – The District is proposing to provide a total of 3,370 nsf which meets the MSBA guidelines. The proposed area in this category has not changed since the Preliminary Design Program submittal. *The MSBA accepts this variation to the guidelines. No further action required.*
- **Noted**

- **Dining and Food Service** – The District is proposing to provide a total of 8,950 nsf which exceeds the MSBA guidelines by 900 nsf. The proposed area in this category has not changed since the Preliminary Design Program submittal. *Please confirm proper accounting of net educational spaces and gross areas are consistent with MSBA policy and reduce the overall area to conform to MSBA guidelines.*
• This will be addressed in the Schematic Design submission.

• Medical – The District is proposing to provide a total of 840 nsf which exceeds the MSBA guidelines by 230 nsf. The proposed area in this category has not changed since the Preliminary Design Program submittal. MSBA will participate in the support of space as included within the guidelines in this category, all areas in excess of MSBA guidelines will be considered ineligible for reimbursement.
• This will be addressed in the Schematic Design submission.

• Administration and Guidance – The District is proposing to provide a total of 2,970 nsf which exceeds the MSBA guidelines by 385 nsf. The proposed area in this category has not changed since the Preliminary Design Program submittal. The variance narrative states there will be one administration area per each of the two programmed classroom clusters (Primary cluster grades Pre-K–2 and Intermediate cluster grades 3-6). The Preliminary Design Program review request of a description of how the administration areas will be programmed, designed and staffed to provide security and control of building access for each academic cluster, was not provided. Further development of the Preferred Schematic scheme should address these concerns in order for the MSBA to consider the variation to the overall area of the proposed space.
• This will be addressed in the September 11th PSR Supplement.
• Per the program requirements, the plan features and Main Administration area at the main entrance to the building and centrally located for the entire facility population. A satellite administration is located on the lower level of the Grade 3 – 6 wing to address the special requirements of the older student population including guidance and psychology functions. In addition, Teaching Planning areas are included to support the individual wings. In terms of security, the intent is that all visitors will enter the main entry vestibule once school is in session and access to the balance of the school will be through the main administration suite.

• Custodial and Maintenance – The District is proposing to provide a total of 2,200 nsf which meets the MSBA guidelines. The proposed area in this category has not changed since the Preliminary Design Program submittal. The MSBA accepts this variation to the guidelines. No further action required.
• Noted

• Other - The District is proposing to provide a total of 2,900 nsf which exceeds the MSBA guidelines by 2,900 nsf. The proposed area in this category has not changed since the Preliminary Design Program submittal.
  
  o The proposed program includes two Computer Labs each at 950 nsf. The MSBA does not object to two Computer Labs being included in the proposed project, but based on the review of the educational program, anticipated utilization rates and our experience with other elementary schools, MSBA will consider the space associated with the second Computer Lab as ineligible for reimbursement.
  
  o The City would like the opportunity to discuss the second computer lab reimbursement qualification further and plans to submit further information supporting the need for this second Computer Lab in the September 11 submission.
Refer to the attached memo.

The Space Summary identified inclusion of a 1,000 nsf Greenhouse to be included in the proposed project. The MSBA does not object to this space being included in the project but will consider this space ineligible for reimbursement. Note: the Greenhouse is not identified on the submitted Preferred Schematic submittal drawings and only noted on the submitted Space Summary.

The owner would like to maintain the Greenhouse in the program, but develop it as a freestanding building, and as a bid alternate within the project pending pursuit of grant funding.

Refer to the attached memo.

- **Total Building Net Floor Area** – The District is proposing to provide a total of 74,515 nsf which exceeds the MSBA guidelines by 13,910 nsf. The proposed area has increased by 300 nsf since the Preliminary Design Program submittal, refer to specific comments above.
  
  **Noted**

- **Total Building Gross Floor Area** – The District is proposing to provide a total of 110,000 gsf which exceeds the MSBA guidelines by 23,000 gsf. The proposed area has not changed since the Preliminary Design Program submittal. As noted in the categories above and within Attachment ‘A’, The District and design team must address the comments provided to facilitate a better understanding and allow for further review of the proposed project.
  
  **Noted**

Please note that upon moving forward into subsequent phases of the proposed project, the Designer will be required to confirm in writing, with each submission, that the design remains in accordance with the MSBA guidelines and that they have not deviated from the allowable gross square footage and educational program approved in the previous submittals.

**Noted**

If you have any questions or comments, please contact me.

Sincerely,

Robert Para, Jr., AIA

RP/aw

Enclosures: Memo from City of Worcester
Computer Schedules
Site and Building Plans

Copies: Tishman, OPM
City of Worcester
### MSBA Comment

- **Other** - The District is proposing to provide a total of 2,900 nsf which exceeds the MSBA guidelines by 2,900 nsf. The proposed area in this category has not changed since the Preliminary Design Program submittal.

### City of Worcester Response

**COMPUTER LABS**

- The proposed program includes two Computer Labs each at 950 nsf. The MSBA does not object to two Computer Labs being included in the proposed project, but based on the review of the educational program, anticipated utilization rates and our experience with other elementary schools, MSBA will consider the space associated with the second Computer Lab as ineligible for reimbursement.

- The City would like the opportunity to discuss the second computer lab reimbursement qualification further and plans to submit further information supporting the need for this second Computer Lab in the September 11 submission.

The Preliminary Design Program (PDP) Response Supplement 1, **Attachment “A” Module 3 Preliminary Design Program Review Comments**, submitted on May 16, 2014 to the MSBA stated in section, 3.1.2 that, “To thrive in today’s global economy, students need to develop technology skills to succeed in their adult lives. Technology skills will help students function effectively in the world where new technologies continue to emerge and enhance the grade level curriculum. Nelson Place teachers will follow the Massachusetts Technology Literacy standards and utilize the computer labs to teach these standards in kindergarten through grade 6. The skills students will learn begin with developing basic computer literacy skills and mastering these skills prior to beginning middle school. Students at each grade level will demonstrate proficiency in the use of computers and applications, be responsible with the use of technology, understand the ethics and safety issues, and basic keyboarding skills. Teachers will utilize the lab weekly to teach these vital skills. Teachers will receive professional development from our district technology coach to further develop their own technology skills.”

Simply put, if we as educators and policy makers are committed to providing students with the skills they need to compete in today’s economy, then we understand that students are required to develop learning habits that are integrated with and supported by technology. Worcester understands that the MSBA is proposing that ideally this need be performed with 1 to 1 technologies and that one computer lab suffice for student use. However, Worcester Public School District is comprised of 49 schools, including the new Nelson Place School, and has not adopted 1 to 1 technology for several reasons. In the event that budgetary constraints allowed the district to supply devices for every student, it would be unable to purchase replacement devices every 3 to 4 years, as would be required. In addition, a 1 to 1 initiative would require a significantly larger IT support staff than the district can afford. Moreover, 1 to 1 devices are generally under powered relative to desktop PCs, have a shorter life cycle than desktops, and are limited in the number and type of applications they can run. Additionally, the district has observed students using tablets and netbooks during the PARCC pilot struggled with the smaller screen size and worked much slower than students at regular desktops.
Implementation of technology carts have been proposed as a possible alternative to an additional computer lab, but realistically should not be considered as a workable solution in place of computer labs or a 1 to 1 initiative. A lockable cart usually stores 30 tablets or iPads. Staff would plug a cart into an outlet and all the devices recharge overnight. Staff would roll a cart from classroom to classroom as needed. The teacher then has the students each take a device and boot the device up and login as necessary. If the devices are new and have extended battery capacities, they don’t need to be plugged in during the school day. But overtime the battery life diminishes and they don’t make it through the end of the day. As a result, you now have 30 devices that need to be plugged in while in use in a space not designed with 30 plugs resulting in unwanted electrical wiring across the classroom. A final issue with mobile devices is they are self-contained. A desktop is comprised of a keyboard, mouse, monitor, and tower. If one part breaks, you swap it out. If a laptop keyboard breaks for instance, the laptop is down until it is fixed. So in this case, self-contained is a liability. Finally, carts require significant setup time, all day battery life becomes an issue, the devices are expensive to repair and are single points of failure, and use in regular classrooms provides a less than ideal testing and computer use environment. A school the size of the proposed Nelson Place requires a minimum of two computer labs if not three to meet the educational needs of all its students.

Due to these constraints and the fact that Worcester is striving to provide technology access to all students, many from families of limited means, as well as implement required testing in a manner that is the least disruptive to the learning schedule and environment, we are requesting that the MSBA consider our proposed second computer lab to be in the best interest of our students, and as an essential part of their education.

We have attached as well, updated schedules that reflect the Nelson Place School’s proposed use of these labs. Regarding these schedules, Principal Monica Poitras notes:

A block of time has been left open on these schedules for the following reasons:

1. Testing: by providing an open time block we do not have to interrupt the lab schedule or close the lab during district based assessments. The lab will be closed and utilized during state required assessments (MCAS or PARCC).

2. The open blocks also allow for classrooms to use the lab for additional time as required for example for research, or for unscheduled group use such as preschool. It also allows for the lab to be utilized for staff development by our instructional focus coach during the day.

3. The schedule additionally reflects times for each SAIL class.

GREENHOUSE

- The Space Summary identified inclusion of a 1,000 nsf Greenhouse to be included in the proposed project. The MSBA does not object to this space being included in the project but will consider this space ineligible for reimbursement. Note: the Greenhouse is not identified on the submitted Preferred Schematic submittal drawings and only noted on the submitted Space Summary.

- The owner would like to maintain the Greenhouse in the program, but develop it as a freestanding building and as alternate within the project pending pursuit of grant funding.

The Worcester Public School Wellness Program (see PDP Appendix D) and the Massachusetts Farm to School Project (see PDP Appendix F) are intended to support students in becoming independent and self-directed learners, responsible for meeting their own health and nutritional needs, with the belief
that healthy students make successful students. Worcester foresees the proposed greenhouse at the new Nelson Place School to be an opportunity for students, their families and the Nelson Place School staff to participate in the production of year round produce to be incorporated into the nutritional, academic, and after school programs, as well as to provide surplus produce for other schools or family and community consumption.

The growing rate of obesity and diabetes in school children and our society today is due in part to a lack of understanding of and exposure to fresh healthy foods. The Nelson Place School is ideally structured to support a greenhouse which could provide year round produce for Nelson Place School student meal program, as well as science based curriculum for all age groups. It is Worcester’s plan for this program that Nelson Place School students, a strong and active Parent Teacher Organization, dedicated NPS staff and administration, and Worcester Public Schools Nutritional Services facilitate the growth and production processes of the greenhouse, as well as provide financial support for supplies and operational costs.

The City is pursuing grants to contribute to the cost of construction of this proposed greenhouse which will provide support and structure to the existing and proposed programs supporting student health. Worcester is as well, once again requesting that the MSBA consider this space for partial reimbursement in light of the short and long term educational and health benefits it would offer students and the community.

**SCIENCE LAB**

- *The Space Summary identified inclusion of a 1,204 nsf Science Lab to be included in the proposed project.*

As districts plan and build new schools for the 21st Century, designers must take into consideration the expectations and requirements for College and Career Readiness of our students along with efficient use of resources. The WPS district recommends that students in grades 3 and 4 spend 2 hours per week while students in grades 5 and 6 are required to spend 3 hours per week “doing” science investigations and experiments, or actively working with the engineering design process. Active investigation, collaboration, testing, designing and redesigning requires space for students to collaborate at tables and benches and safely spread out for investigations, “testing” and evaluation of experiments and engineering designs. Often students create products (such as a balsa wood bridges) in one class period and then need to test and redesign in another period. Students need shelves and/or cabinets dedicated to the temporary storage of “projects” week to week, as well as work surfaces both durable and large enough to support a variety of activities.

Massachusetts Frameworks standards require that students use the “tools” of science as well as discipline-specific equipment when conducting standards based activities, investigations, and experiments. This equipment is costly and needs to be stored in safe, locked areas for use by all of the students no matter where their “classroom” is located. It is most efficient when buildings can consolidate resources and purchase, for example, a set of 25 microscopes to be used by all sixth graders instead of stocking every sixth grade classroom with microscopes.

*College and Career Readiness* begins in elementary school and is supported by students learning how to behave and function safely in a laboratory setting. Exposing students to both informal hands on investigations, as well as training them to develop their ideas and discoveries in a formal laboratory setting, encourages free thinking and exploration while disciplining and preparing students for the program specific challenges of middle and high school science programs.
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## COMPUTER SCHEDULE
### 2017-2018 Proposed
### 3-6

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### PSR SUPPLEMENT

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<td>.02</td>
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- **Potential construction fill storage & parking area**
- **Grading:** Extent TBD
- **Fence:** Option Shown: Road rises to minimize cut and slope to Assumption
- **Alternate:** Green House
- **Access Road 18’ wide; Detail to be reviewed w/DPW requirements**
- **Permanent R.O.W.**: Temporary grading easement
- **Radius as req’d for emergency vehicles**
- **Curb Cut**
- **Tiered retaining wall w/ planting**
- **4’1 Cut Slope**
- **Land transfer/acquisition Grading easement**

#### Project street improvements:
- Widen paved way
- Add new walk, remove & reinstall ex. wall

#### Off-site Bordering Vegetated Wetland (BVW)
- **Western Isolated Vegetated Wetland (No Setbacks Req’d)**
- **Temporary Grading Easement Land from abutter**
- **Delivers entry & exit**

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**SITE PLAN**

September 11, 2014

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**Worcester Public Schools**

Worcester, MA
PSR SUPPLEMENT

Site Grading

Site Cut/Fill
LETTER OF TRANSMITTAL

DATE: 9/11/14 JOB NUMBER: #1327
REGARDING: Nelson Place Elementary School – Worcester, MA

TO: Eugene Caruso, Project Director
Tishman Construction Corp.
66 Longwharf, 2nd Floor
Boston, MA 02110

WE ARE SENDING YOU attached, the following items:

- Shop Drawings
- Specifications
- Prints
- Diskettes
- Drawings
- Change Order
- Samples
- Other

<table>
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THESE ARE BEING TRANSMITTED as checked below:

- For approval
- Approved as submitted
- For your use
- Approved as noted
- Per your request
- Returned for correction
- For review and comment
- Other (refer to remarks)

REMARKS:

Eugene,

Please deliver this original document to MSBA.

Thank you.

COPY TO: Robert Para, Jr., AIA /aw

If enclosures are not as noted, kindly notify us at once.
June 3, 2014

Ms. Diane Sullivan
Senior Capital Program Manager
40 Broad Street
Boston, Massachusetts 02109

Dear Ms. Sullivan,

This letter serves to certify that the attached Nelson Place School Building Committee meeting minutes dated June 2, 2014, sign in sheet and roll call vote forms to approve the revised Preliminary Design Program and the Preferred Schematic Report at the School Building Committee meeting on June 2, 2014 are accurate to the best of my knowledge.

Sincerely,

[Signature]

Julie A. Lynch
City of Worcester, Architectural Services
Registered Architect, MCPPO Design and Construction

Dated: June 3, 2014
City of Worcester

Notary Seal

[Notary Seal]
PSR Review Responses

Nelson Place School
Building Committee Meeting Agenda

Meeting Date
Monday, June 2, 2014, 7:00pm – 8:30pm

1. WELCOME and INTRODUCTIONS
   Mayor Petty

2. PROJECT OVERVIEW
   Paul Moosey, Commissioner DPW+P

3. INTRODUCTIONS and MEETING AGENDA
   Julie Lynch, DPW+P, Architectural Services

   Objectives:
   - Review and Vote of Approval by the Nelson Place School Building Committee for a modified Preliminary Design Proposal (PDP)
   - Review and Vote of Approval by the Nelson Place School Building Committee for the Preferred Schematic Report (PSR); C-2 Option is the preferred solution.

4. PROJECT SCHEDULE
   Tishman Construction, Owner’s Project Manager

5. PRESENTATION of the modified PRELIMINARY DESIGN PROPOSAL (PDP) and the PREFERRED SCHEMATIC REPORT (PSR)
   Lamoureux Pagano Associates, Architects

6. QUESTION AND ANSWER
   Julie Lynch, Moderator

7. SCHOOL BUILDING COMMITTEE VOTES
   i. Vote on modified Preliminary Design Proposal (PDP)
   ii. Vote on Preferred Schematic Report (PSR)

UPCOMING MEETNG SCHEDULE:

   • Public Hearings will be scheduled during the next phase of the feasibility study, Schematic Design; dates to be announced.

   • Nelson Place School Building Committee Meeting; dates to be announced.

See: Worcester Public Schools, Nelson Place School Website for link to Feasibility Study
Documents: www.nelsonplace.worcesterschools.org

Refer comments to:
   Julie Lynch, Architect, City of Worcester
   lynchja@worcesterma.gov
City Of Worcester

NELSON PLACE SCHOOL BUILDING COMMITTEE - MEETING MINUTES

Nelson Place School Feasibility Study – June 2, 2014 - 7:00 PM

School Building Committee Members Present; (See attached Vote Registration Sheet)
Mayor Joseph Petty; DPW Commissioner, Paul Moosey; City Manager, Edward Augustus, Jr.; CoW CFO, Thomas Zidelis; City Councilor, Tony Economou; DPW Architect, Julie Lynch; Superintendent, Dr. Melinda Boone; WPS Chief Academic Officer, Dr. Marco Rodrigues; WPS Chief Financial Officer, Brian Allen; Acting Facilities Director, Jeff Martin; NPS Principal, Monica Poitras; SC Member, John Foley; Neighbor, Phil Giarusso; Parent, Pam Landry; VP Assumption College, Peter Wells; Neighbor, Jessica McGuire; NPS Staff, Elizabeth O’Connell; Parent, Alision Vigean; NPS Staff Bethany Emery; Parent, Palmira Padilha.

The following Agenda items were presented and discussed;

- **Introduction:** Mayor Petty welcomed all attendees and thanked everyone for coming and provided a brief summary of the status of the Project.

- **Project Overview:** Paul Moosey noted that the Mayor provided a good update and that he appreciated all the hard work by the WPS personnel. He stated that the purpose of the meeting tonight was to vote on the “revised” Preliminary Design Program (PDP) and the Preferred Schematic Report (PSR) being submitted to the MSBA on June 12, 2014 once the SBC votes to approve the scheme.

- **Project Activity:** Julie Lynch also stated that the School department worked hard and recognized several members of the School Department including the Superintendent Melinda Boone. She also noted that LPA would provide a brief presentation on the PSR scheme and emphasis on the scheme being recommended for approval. Ms. Lynch reviewed the concerns expressed by neighbors and parents at prior Public Hearings, including the last held on May 19th. These concerns included:
  
  - The designation of a neighborhood school, in this case meaning that the school is serving the Nelson Place neighborhood, as well as the Indian Hill community. The existing school is for 525 students and the new school is approved for 600 students, with the majority of the increase from Pre-K students.
  
  - Land takings: partial land takings for grading purposes and to widen the site at the existing “bottle neck” on the property, will include four properties along Hapgood Rd. to the east of the site, totaling approximately 1 acre. Additionally, a corner of the abutting property at 51 Nelson Place will be taken. Assumption College, with property to the south, will provide the City with an easement for grading, as well as an easement for an emergency access road to Romola Rd.
o Wetlands: Isolated lands subject to flooding and associated 15 and 30 foot setbacks are being maintained.

o Parking is being provided for 140 cars to accommodate full-time staff, itinerant staff, and visitors. Presently there are 40 spaces for the 65 staff. Event parking was being planned to accommodate up to 200 vehicles utilizing the new site roadways.

o Playground areas are also being included at the front and rear of the building.

o Emergency Access Road: an access road is being planned for emergency, pedestrian, and cycling use only. LPA and DPW will meet with CoW public safety officials to discuss the requirements and/or need for this roadway.

• Preliminary Design Program (PDP) and Preferred Schematic Report (PSR):
  Rob Para from Lamoureux Pagano Associates (LPA) presented the revised PDP as well as the PSR design options and floor plans of the preferred solution, C-2. The building is being designed to LEED Silver with basic and enhanced features. There will be separate parent and bus drop off/pick up. The options included:

  o A) Addition to and Renovation of the existing school
  o B) Existing Nelson Place site with no additional land and
  o C) Existing Nelson Place site with additional land includes three sub-options C1, C2 and C3:
    ▪ C1) Two adjacent classroom blocks with atrium divide and Administration block at the south end
    ▪ C2) Central Administration block with one classroom block on each side. This is the option that has been review and approved by WPS, the CoW and DPW and is being recommended to the School Building Committee, as it best satisfies the site and educational program requirements.
    ▪ C3) design similar to C1 with classroom wings at 90 degree to the Administration block. Mr. Para noted that all options had similar construction costs at approximately $40 million. A scoring matrix was used and established option C2 as receiving the most points. This proposed solution provides the most options for development in schematic design of site options including grading, parking, and parent drop off/pick up arrangements. Additionally, C2 provides the greatest buffer areas to abutters.

• Questions and Answers: Numerous questions were asked by both the SBC members and the general public attending as follows:

  o Verification that the footprint of the building was to be very similar as show in option C2.
  o Boundary setbacks at the Hapgood side were noted as 300 ft. from the rear of the house to the school building and approximately 90 ft. from the proposed property line to the house. At the abutting property on Redwing Drive the distance from the house to the proposed building is approximately 220 ft. and from the property line to the house 80 ft.
Following the eminent domain process where land is taken from abutters, the City will provide monetary compensation, as appraised, as well as appropriate landscaping where grading easements are utilized.

Concern was made that the parking shown at the wetlands near Redwing should not be constructed and the land should stay as green space.

Strong consideration will be given to appropriate landscape design option to minimize the visual site lines.

The use of grading easements rather than retaining walls was part of the reason for taking land.

The access road was strongly opposed by the neighborhood and concern over student safety, when utilized as a pedestrian way, and becoming a place to “party” were some main objections. The project team will confer with the public safety officials including the WFD to determine the best option for an emergency access road. The road is shown at approximately 550-600 ft. long.

Off-site parking for teachers was suggested. The cost of shuttling teachers was stated by others as a drawback. The corner lot at Nelson Place and route 122 was also suggested to accommodate parking. It was noted by Ms. Lynch, that although the detail on the cost to obtain this property are not yet know, it is suspect that the cost to obtain it would be substantial.

**CLOSING:**

Julie Lynch performed a role call vote for each SBC member present for the revised PDP, and followed with a role call vote for the PSR. All members present voted YES for both schemes (see attached Vote Registration sheets).

Ms. Lynch noted that Public Hearings would follow during the final phase of the feasibility study. The dates and times would be posted on the Nelson Place School website, as well as emailed to the Nelson Place Interest Group.
**School Building Committee Member Sign-In Sheet**

**Nelson Place School Project**

| Meeting Date: | Monday, June 02, 2014 | Time: | 7:00 PM |

**SCHOOL BUILDING COMMITTEE VOTE**

At the School Building Committee meeting held on Monday, June 2, 2014, at 7:00pm at the Nelson Place School, the committee members are asked to vote their approval of the Nelson Place Elementary School, Preferred Schematic Report (PSR) as presented at the meeting by the Project team. The approved PSR will be submitted to the Massachusetts School Building Authority (MSBA) on June 3, 2014. The School Building Committee votes are indicated below.

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<th>Name and Title</th>
<th>Attendance Signature</th>
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<td>Joseph Petty, MAYOR</td>
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<td>Paul Mooney, DPW + P Commissioner</td>
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<td>Julie Lynch, Architect, MCPPO, DPW+P</td>
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<td>Jeffrey Martin, WPS Acting Facilities Director</td>
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<td>Marco Rodrigues, WPS Chief Academic Officer</td>
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<td>Brian Allen, WPS Chief Financial Officer</td>
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### School Building Committee Member Sign-In Sheet

#### Nelson Place School Project

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<td>Thomas Zidelis, CFO, CoW</td>
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10 October 2014

Nicholas Milano
Project Coordinator
Massachusetts School Building Authority
40 Broad Street, 5th Floor
Boston, MA 02109

Re: City of Worcester, MA
Nelson Place Elementary School
Follow Up to Final PSR Supplement

Dear Mr. Milano:

Thank you for your review comments of September 25, 2014, telephone discussions and input. The following is our response, and response from the School to these comments.

Please note that the intent of the early submission was to provide further detail of the plan and program development from the PSR submission, to reinforce the selected scheme of the PSR, and to address the items noted in the PSR review.

**Existing Conditions** - The supplemental information provided indicates that several existing conditions analysis reports remain ongoing and will be incorporated in the Schematic Design submittal. Please confirm the following items will be addressed in the District's Schematic Design Submittal:

- Completed Site Analysis documents;
  
  *Noted. The full geotechnical report, soils testing and added survey/topo at the pedestrian access path are complete and will be submitted with the Schematic Design submission.*

- Documentation of Conservation Commission review and approval regarding Isolated Land Subject to Flooding (ILSF) boundaries along with wetland and border designations;
  
  *Noted, and will be submitted with the schematic design submission and also enclosed.*

- Submission of Conservation Commission approved ILSF protection procedures and Notice of Intent filings related to the Worcester Wetlands Protection Regulations;
  
  *NOI filing is scheduled for next spring, followed by Order of Conditions, meetings and review, The plans as developed will respect the Worcester guidelines/setbacks and regulations. LPA also met with all the City agencies and provided a project update, reviewed any questions.*

**Site Plans** - Please confirm if the entry off Romola Road will be restricted to pedestrian/bicycle and emergency vehicles access.

*Access path from Ramola/Hopgood Road is to be designed as a narrow pathway for pedestrian/Bicycle traffic, with reinforced subgrade on both sides of the path as required to support emergency vehicles. Details will be provided as part of the Schematic Design submission.*

**Building Plans** - The following discrepancies were found in the supplemental information provided: (Please note that all proposed spaces should be coordinated with the space summary and proposed floor plans prior to the submission of the Schematic Design.)

- Special Education Therapeutic Planning Rooms: Quantities differ on plan and in space summary. Please confirm these spaces are included within the floor area grossing factor;
  
  *Since the PSR submission, the owner and School District have indicated that it would be most beneficial to locate a Therapeutic Planning space directly adjacent to the SPED classroom for each grade level. The*
space summary template has been updated to reflect 8 smaller Therapeutic Planning spaces at 50 SF each. These spaces are included with in the grossing area factor.

- An Office adjacent to the Gymnasium assumed to be the Health Instructors Office is missing the programmed Toilet;

The school district has indicated that the gym teacher office does not require a bathroom. The space summary template will be adjusted accordingly and submitted with the Schematic Design submission.

The 375 nsf Custodian Storage and 375 nsf Custodian Workroom noted on the space summary are not indicated on the drawings;

Custodial Storage and Custodial workshop shall be at the Mechanical Room and the Receiving Area, as these are areas within the larger space, these spaces will be shown as “dashed line” on the Schematic Design submission floor plan.

- The 400 nsf Recycling/Trash Room identified within the space summary is not indicated on the plans;

Trash/ Recycling shall be at the Receiving area, as this area is within a larger space, it was not identified on the plans, however will be shown as “dashed line” area on the Schematic Design submission floor plan.

- Egress capacity and evacuation plans were not found;

LPA will submit the Egress/Evacuation plan as part of the DD/CD submission, based on codes anticipated to be in effect at the time of the permit application. Code reviews are to be filed as part of the schematic submission, based on current code. The stair widths, egress doors, etc. are in compliance with the current code, pertinent to the schematic drawing level.

General code reviews are completed as appropriate at each phase. It was reported that the BBRIS will be adopting the IBC 2015 with Massachusetts amendments. BFPR voted to adopt the revised 527 CMR with an effective date of January 1, 2015. The new code adopts the National Fire Protection Association Standard 1 (NFPA 1) with Massachusetts amendments (Not published as yet).

Refined Layout – The MSBA requests additional information related to the refined building layout:

- **Science Lab** – Please confirm the proposed net square footage of the Science Lab in the refined plans dated September 11, 2014 and indicate how the design team arrived at the size of this space with respect to square footage per student.

The area and layout of the Science Lab suite (including the associated Prep Room and Storage Room) were developed in support of the program requirements defined by the Worcester Public Schools’ Chief Academic Officer, Quadrant Manager, Principal, and Science Department Coordinator. The square footage is aligned with the MSBA’s Middle School Space Summary Template. It will include all of the safety features of a middle school science lab.

- **Window-less Interior Spaces** – A number of spaces initially presented in the PSR appeared to be proposed on the exterior periphery, such as Music, Art, Science Lab, and Learning Labs, allowing these spaces to receive natural light. Please provide a detailed rationale that supports the proposed location of these spaces in the refined plans, dated September 11, 2014, in lieu of locating along exterior walls.

The constraints of this site led to the selection of the option that fit a compact building onto the site while satisfying the extensive site program requirements. The building plans presented from the onset included rooms that would be located in the center core. These selected rooms are the more transient rooms that the students would be occupying for a shorter period of time. Therefore, the rooms’ focus was shorter, and required less daylight, such as noted by the author. The intent was that the spaces adjacent to the Common areas would have, as a minimum, overlights at wall facing the common room, which features a large glass wall to the exterior. For the larger central spaces at the upper level, the intent was to introduce skylights or monitors. The computer room and other central rooms would have overlights to the corridor. The Nelson Place School, School Department and Owner were made aware of the design intent for these spaces, and are in agreement with this configuration in comparison to the other PSR schemes.
Space Summary ‘Attachment B’ Related Items: The MSBA requests an updated Space Summary that addresses all MSBA comments to date including the following:

From the PSR to the schematic design, the spaces are being refined and developed. Filing an updated space summary template will be made as required at the Schematic Design Submission.

- **Dining and Food Service** – The District is proposing to provide a total of 8,950 nsf which exceeds the MSBA guidelines by 900 nsf. The supplemental information provided indicates that conclusion of the Dining and Food Service area will be addressed with the Schematic Design submission. As previously indicated, the proposed net square footage should be adjusted to conform with MSBA guidelines or provide additional information for review that supports the District’s need for square footage beyond the guidelines.

  
  **Noted.** As part of the schematic design, the Kitchen Consultant has met with the Nutrition Director for the Central Administration, and the plan is being developed based on District and Federal policies, as well as the overall MSBA guidelines. Should the program area as developing exceed the MSBA guidelines, the Administration/ LPA will provide a narrative outlining the District’s needs as part of the schematic design submission.

- **Other** - Please provide clarification that explains the proposed use of the Computer Lab to be located in the Media Center. The District has indicated that this Computer Lab will serve as a branch to the Worcester Public Library after school hours, but it is unclear how this space will be utilized by students and/or other groups including the public.

  Submitted in the September 11th PSR Supplement was a strategy and schedule for technology development and use in the K-6 student population at Nelson Place School. This information was provided by the Worcester Public School’s Information Technology Department, and WPS Administration. The following is a clarification of the necessity for a second computer lab for student and staff use only.

  It is in response to the academic program, which aims to accommodate the upper grade level students in coordination and development of research skills, that the second computer lab was located adjacent to the Media Center. The City of Worcester is anticipating that the Worcester Public Library will sponsor a branch library and related services at the Nelson Place School site. Consistent with other WPL school branches, this library would be open to the public only after school dismissal. If a partnership with Worcester Public Library at Nelson Place comes to fruition, computers dedicated for public use only would be provided by the Worcester Public Library, and located within the Media Center would not interfere with afterschool student use, programs and staff training in the second computer lab.

  The basis for proposing two computer labs for the Nelson Place School was twofold, firstly to provide reliable student use of technologies that are integrated in the learning process throughout the school year, as well as effective and efficient mandated testing within the financial constraints of the operating budget. The City of Worcester understands the MSBA’s concern regarding underutilized computer labs within a school. Furthermore, we agree that 1 to 1 technologies would be an effective solution to meet the day to day needs of student learning. Unfortunately, Worcester Public Schools does not have the financial ability to provide, maintain, and upgrade 1 to 1 technologies for each student in the school district. Additionally, due to socioeconomic circumstances, many of the children in our district do not have access to these technologies at home and it would therefore be unrealistic to ask families to provide devices to be utilized by students in school. Moreover, in a pilot study WPS found that students did not test as well on 1 to 1 devices, as they do on desktop computers. Two computer labs with desktop computers would enable the school to provide a reasonable testing schedule as well as a high level of learning, utilizing technology throughout the school year for the greatest number of students, while providing reliability and managing operating costs and maintenance.

- **Total Building Gross Floor Area** – Adjust to include all proposed square footage associated with the project. Identify the square footage of the proposed Greenhouse separately. As previously indicated, square footage associated with the proposed Greenhouse will be considered ineligible for reimbursement.

  **Noted.** The greenhouse will be developed separately by the City, should third party funding be made available. The base contract work will have utilities stubbed out to that location, and the sitework
set up for the building pad. The greenhouse will be eliminated from the Space Summary Template for the Schematic Design submission.

Energy Conservation – The District has identified several energy conserving materials/systems that could be incorporated into the project if additional grant funding is obtained from third party funding sources. The District should provide an anticipated timeline for obtaining such funding including specific dates and sources. Please note that the schematic design submitted to the MSBA must be complete and represent the anticipated scope, budget, and schedule in order for MSBA staff to consider making recommendation to the MSBA Board of Directors. Please confirm if or how the District/design team intends to incorporate the identified energy conserving materials/systems if additional third party grant funding is not obtained. Please refer to Advisory 16 for MSBA's policy regarding third party funding available at http://www.massschoolbuildings.org/building/advisories/16.

Noted. The City has reviewed MSBA advisory no. 16. The narratives of the systems and designs at the schematic level have been vetted with the School, City based on not having any grants.

If you have any questions or comments, please contact me.

Sincerely,

Robert Para, Jr., AIA

RP/aw

Enclosures: ORAD from Conservation Commission
MSBA Project Advisory #16

Copies: Tishman, OPM
City of Worcester
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands

WPA Form 4B – Order of Resource Area Delineation

Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. General Information

From: City of Worcester

1. Conservation Commission

2. This Issuance is for (check one):
   a. ☑ Order of Resource Area Delineation
   b. ☐ Amended Order of Resource Area Delineation

3. Applicant:
   Paul
   a. First Name
   b. Last Name
   Department of Public Works
   c. Organization
   20 East Worcester Street
   d. Mailing Address
   Worcester
   e. City/Town
   MA 01604
   f. State
   g. Zip Code

4. Property Owner (if different from applicant):
   Edward
   a. First Name
   b. Last Name
   City of Worcester, City Manager Office
   c. Organization
   455 Main Street, Room 100
   d. Mailing Address
   Worcester
   e. City/Town
   MA 01608
   f. State
   g. Zip Code

5. Project Location:
   35 & 0 Nelson Place, 500 Salisbury Street
   a. Street Address
   21
   b. City/Town
   002-00002
   c. Zip Code
   d. Assessors Map/Plat Number
   e. Parcel/Lot Number
   f. Latitude
   g. Longitude
   (in degrees, minutes, seconds):
   June 201, 2014
   f. Latitude
   g. Longitude
   July 14, 2014
   July 25, 2014
   c. Date of Issuance

6. Dates:
   a. Date ANRAD 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 for Nelson Place Elementary School
   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:

         a. Isolated Vegetated Wetlands (IVW). Eastern IVW is also considered Isolated Land Subject to Flooding (ILSF).

         Western IVW is not considered ILSF.

   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:

         a. 

   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. Findings

This Order of Resource Area Delineation determines that 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.

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).

D. 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 of Resource Area Delineation 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.
E. Signatures

Please indicate the number of members who will sign this form.

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.

If this Order constitutes an Amended Order of Resource Area Delineation, this Order does not extend the issuance date of the original Final Order, which expires on __________ unless extended in writing by the issuing authority.

This Order is issued to the applicant and the property owner (if different) as follows:

2. [☑] By hand delivery on __________

   a. Date __________

3. [□] By certified mail, return receipt requested on __________

   a. Date __________
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
Request for Departmental Action Fee Transmittal Form
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. Request Information

1. Person or party making request (if appropriate, name the citizen group's representative):

   Name

   Mailing Address

   City/Town ______ State ______ Zip Code ______

   Phone Number ______ Fax Number (if applicable) ______

Project Location

35 & 0 Nelson Place, 500 Salisbury Street

Mailing Address

Worcester ______ MA

City/Town ______ State ______ Zip Code ______

2. Applicant (as shown on Notice of Intent (Form 3), Abbreviated Notice of Resource Area Delineation (Form 4A); or Request for Determination of Applicability (Form 1)):

   Name

   Mailing Address

   City/Town ______ State ______ Zip Code ______

   Phone Number ______ Fax Number (if applicable) ______

3. DEP File Number:

   349-1090

B. Instructions

1. When the Departmental action request is for (check one):

   □ Superseding Order of Conditions

   □ Superseding Determination of Applicability

   □ Superseding Order of Resource Area Delineation

Send this form and check or money order for $100.00 (single family house projects) or $200 (all other projects), payable to the Commonwealth of Massachusetts to:

Department of Environmental Protection
Box 4062
Boston, MA 02211
B. Instructions (cont.)

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

3. Send a copy of this form and a copy of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see http://www.mass.gov/dep/about/region/findyour.htm).

4. 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.
Project Advisory 16, November 2011

PROJECT ADVISORY 16: MSBA POLICY ON THIRD PARTY FUNDING

The purpose of this Advisory is to summarize the MSBA’s policy on third party funding. This policy applies to all new program projects and is based, in part, on a recommendation from the State Auditor regarding sources of project income in its report dated August 23, 2004.

Third party funding includes insurance settlements, rebates, grants from other public entities or other parties, private donations, and other sources of project income. Per MSBA policy, third party funding is an ineligible cost.

<table>
<thead>
<tr>
<th>Types of Third Party Funding</th>
<th>Ineligible</th>
<th>Eligible</th>
</tr>
</thead>
<tbody>
<tr>
<td>Insurance settlements</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Rebates</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Grants from public entities or other parties</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Private donations</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

As a result, the MSBA and the District share in the savings that may result from third party funding. As illustrated in the example below, the third party funding reduces the MSBA’s and District’s share of the Project proportionally.

THIRD PARTY FUNDING EXAMPLE

<table>
<thead>
<tr>
<th>No Third Party Funding</th>
<th>Impact of Third Party Funding</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Project Costs</td>
<td>$1,000,000</td>
</tr>
<tr>
<td>Third Party Funding</td>
<td>$300,000</td>
</tr>
<tr>
<td>Eligible Project Costs*</td>
<td>$700,000</td>
</tr>
<tr>
<td>Grant Rate</td>
<td>50%</td>
</tr>
<tr>
<td>MSBA Final Total Facilities Grant</td>
<td>$350,000</td>
</tr>
<tr>
<td>District’s Share of Project**</td>
<td>$350,000</td>
</tr>
</tbody>
</table>

*There are no scope exclusions or other ineligible costs in this example.

**Note that the third party funding reduces the MSBA’s and District’s share of the Project proportionally.

Districts are required to disclose all third party funding in the MSBA Sources and Uses Form, which is required as part of the close-out audit.
4.1.2 SCHEMATIC DESIGN BINDER

B. Final Design Program
   1. Final Design Program
   2. Changes to Space Summary Template
   3. SD Space Summary Template
   4. Functional Relationships
   5. Security Report
   6. Land Acquisition Process & Schedule
ARCHITECTURAL CHARACTERISTICS

The design of the proposed Nelson Place Elementary School was developed according to criteria established early in the process, and was developed further during the Schematic Design process. The design team has participated in extensive programming meetings with various owner constituencies in the past months in order to fully understand the space requirements to efficiently and effectively deliver the educational, site and building program. Design team members from various disciplines have integrated programming feedback from the following entities:

- Nelson Place School teaching staff, all departments
- Nelson Place School Administration and Staff
- Worcester Public School (WPS) School Department; including Superintendent, Chief Academic Officer, Manager of Special Education-Intervention Services, Quadrant Manager, and Technology Officers.
- WPS Facilities & Transportation
- WPS Security Liaison and Security Consultant
- WPS Director of Food Services
- Worcester Public Library Community Outreach
- City of Worcester, Interdepartmental Review Team: Inspectional Services, Worcester Fire Department, Worcester Police Department, Planning and Regulatory Services and Department of Public Works and Parks

The Final Design Program includes the following:

- Two clearly distinguished academic wings for the Primary School (Pre-K through Grade 2) and the Intermediate School (Grades 3 – 6), with no more than one level above grade access. Each classroom wing integrates a “neighborhood” for each grade level. The Neighborhood will include three general classrooms, one Self-Contained SPED classroom with support spaces, a Learning lab and a Common area.
- An Art Classroom, Music Classroom, OT/PT Room, Speech Room, and Computer Lab will be included within the Primary Wing. The Intermediate classroom wing will require the same core spaces, with the addition of a Science Lab.
The proposed Nelson Place School enrollment includes a significant Special Education and Autistic population, therefore the building must support the integration of the district-wide SPED programs and associated SPED features within the general classroom arrangements, to foster an inclusion based program to the greatest extent possible.

- An integrated Early Childhood Assessment Center (a district-wide, federally-mandated service that evaluates students to determine eligibility for Special Education or related services) including required office and support spaces.
- Centralized core facilities for Administration, Media Center, Gymnasium, and Cafeteria program elements. The Gymnasium must be able to accommodate a full school assembly.
- Media Center positioned for after-hours public library functions.
- Dispersed parking areas with full perimeter vehicular access around the school to provide flexible options for site development and emergency access.
- Discreet age appropriate play areas that may be used by the community after hours.
- Interior/exterior materials that are durable, energy-efficient, require low maintenance, are aesthetically pleasing, and are conducive to and supportive of a learning environment for younger children.
- Flexible technology throughout the school, incorporating wireless technology and interactive white boards into all teaching spaces and select support spaces.
- Design to allow the building to function independently for academic and community uses.
- Building and site design that function together to maximize safety and efficiency during student arrival/departure times. Specifically, the proposed bus and parent vehicular traffic patterns will be separated, and will provide adequate queuing space for each, so that student arrival/dismissal can be achieved safely and efficiently.
- Super-insulated envelope and large expanses of flat roof for incorporation of photovoltaic array system, toward the Net Zero Energy target.
- Develop a building design appropriate for the Nelson Place neighborhood in terms of scale and materials, vehicular traffic control, encouragement of community use, and protection of the natural environment.

Architecturally, the proposed design is intended to convey a clean aesthetic approach to a building type, using a vocabulary of both traditional (masonry, metal windows and doors) and modern (glass, sun control,
skylight) materials. Materials have been selected for their longevity and ease of maintenance. The exterior/interior color palette will respond to the context of surrounding City landmarks, the natural landscape, and enhance the neighborhood organization of the academic wings.

SPACE SUMMARY
Two signed copies of the educational space summary, reflecting the current design, are included in this section. Designer certification and an outline of the main differences between the current space summary and the previously submitted Preferred Schematic Report space summary are outlined in the following document; B. Final Design Program - Narrative of Changes to the Space Summary Template.

DISTRICT EDUCATIONAL PROGRAM
The proposed design supports the District's Educational Program by providing two classroom clusters divided into the intermediate and primary wings, branching off of core spaces that serve the entire school and the community. Both clusters have access to an age-appropriate Art Classroom, Music Classroom, Computer lab, Speech Room and OT/PT. The intermediate wing also includes a Science Lab. Each grade level “neighborhood” includes three general classrooms and one SPED classroom, a Learning Lab, and a Common Room shared with an adjacent grade level. This arrangement allows for full inclusion of the significant Special Education program, and multiple opportunities for shared learning among classrooms and grade levels. The neighborhoods’ proximity to support spaces ensure that students are rarely required to leave their grade level neighborhood, minimizing transition time and maximizing learning opportunities.

Within the classroom, Nelson Place uses a small group, student centered instruction format. Students are rotated through stations in a classroom, allowing for differentiated instruction. The District and Nelson Place teaching staff also emphasized the importance of collaboration among classrooms and grade levels, which is not currently supported by the existing school layout. Building features within the proposed school such as the grade level “neighborhood” configuration, communicating doors between classrooms, and Common Rooms reinforce this value, and maximize collaborative teaching and learning opportunities.
INSTRUCTIONAL TECHNOLOGY

The existing instructional technology at Nelson Place School is outdated and is not able to support the proposed education delivery method. The proposed school will support wireless internet throughout the facility, with additional hard-wired access points in computer labs, classrooms, offices and assembly areas. Short throw projectors and wall-mounted interactive whiteboards and document readers will be provided for all classroom/meeting spaces. The front of each classroom will be the Classroom Technology Center (CTC). The CTC will include an Eno interactive whiteboard, short throw wall mounted projector, desktop computer, and document camera. The district prefers interactive whiteboards because they support non-verbal learners and they promote student engagement.

Using the portable Eno slate, the teacher can move throughout the classroom, controlling the mouse movements of the computer wirelessly, allowing them to open documents, web pages, and presentations. An advanced Eno board user will use the interactive lesson plan tool to design and save classroom lessons and present and interact with them while teaching the class. The document camera can be used to project any item onto the interactive whiteboard, whether it is a student writing sample, a frog dissection, or a model plane. Finally the CTC will include a teacher’s computer for attendance, communicating with parents, printing, and other technology needs. Each classroom will also be equipped with an integrated amplification system, which will allow the teachers to deliver amplified instruction to the whole class or to small groups through speaker pods distributed throughout the room. The pods are also equipped with microphones, so that teachers can assess student interaction and redirect from anywhere in the room without disrupting the other groups. Students may also use these microphones to communicate with the whole class and be heard by their peers.

Two computer labs are also included in the proposed building, for use during standardized assessments such as MAP and PARCC, as well as daily use for interactive classroom instruction, virtual field tours, and staff professional development. The district also intends to supplement the two computer labs with portable tech/laptop carts for use in standardized testing for SPED students, as well as within the Music, Art and Science classrooms.

FUNCTIONAL RELATIONSHIPS

Key functional relationships are described by the "bubble diagram" graphics included in this section.
SECURITY AND VISUAL ACCESS
As part of the Schematic Design, a security consultant was retained to review the present security programs for the City, interview staff and agencies, and work with the Central Administration’s School Safety Liaison Representative, with a goal to consolidate and update the recommended policies for the Nelson Place School. The Consultant, Strategic Design Services (SDS), conducted meetings and interviews, and reviewed the site and building plans for Nelson Place. SDS provided a report (included in this section) with recommendations for the proposed site, lighting, video surveillance, access control, intrusion detection, communication systems, and other issues pertaining to security and visual access. The SDS/District recommendations were considered and incorporated, where applicable, into the SD documents and Total Project Budget, with exception to the lighting foot candle recommendations. The referenced standard has other levels of recommended lighting, and in consideration of the school’s location within a residential neighborhood, recommendations for the lower light level standards are being followed. The referenced standard is IESNA RP-20-98, which calls for 0.2 fc for basic and 0.5 fc for enhanced security for parking lots. The project will also incorporate multi-level lighting.

SITE DEVELOPMENT
The site layout, in particular the reconfiguration of the bus drop-off and the second parent exit driveway to Nelson Place, evolved as the result of meetings with the District and City officials/committees. In addition, the District and SBC requested several site-related program features, including:

- Design and construction phasing to allow for the Existing school to remain in operation throughout construction.
- Respect of the required setbacks of the on-site Isolated Vegetated Wetland and Isolated Land Subject to Flooding.
- Separate fenced, age-appropriate play areas for primary and intermediate classroom wings.
- Basketball court
- Pedestrian/Bicycle access path to Romola Road to also be used for emergency vehicle access.
- Separation of SPED Buses, standard buses, Pre-K and parent pick-up/drop-off. Adequate queue length for parent pick-up to alleviate current traffic issues.
- Parking for both classroom wings, totaling no less than 140 spaces.
- Minimize the area of land taking from abutters through eminent domain.
See section 4.1.2 C. Site and Circulation Analysis for more information on the site requirements and development through Schematic Design.

VISUAL FOCAL POINTS

The intended primary visual focal point of the proposed building is the two-story entrance Lobby, proposed to be lit from above by a continuous translucent skylight system. The glazed wall between the Cafeteria and Lobby provides a continuous view through the school, allowing staff to visually monitor both the bus circulation and parent pick-up area. The Lobby and Cafeteria open to the exterior via canopied vestibules and provide a large open space where students and others can circulate freely. The Lobby provides direct access to the core spaces that are utilized by the entire school, staff and community, including the Cafeteria, Gym, Media Center and Administration Suite. This core space also serves as the connection between the primary and intermediate classroom wings. Secondary focal points are the glazed window walls at the Common rooms which are located at the ends of classroom wing corridors. These are intended as clear visual markers that locate the building occupants and reduce the overall scale of the building.
SPACE SUMMARY

Two signed copies of the educational space summary, reflecting the current design, are included in this section. Significant changes to the space summary template are highlighted in red font. The main differences between the current space summary and the previously submitted Preferred Schematic Report summary are as follows:

The proposed Total Building Gross Floor Area has been increased from 110,000 GSF to 111,700 GSF. This is due to the following factors:

General:
- Design modifications to exterior wall thickness for super insulation have increased the GSF of the building.
- The stair locations have been updated for maximum circulation efficiency, as well as to reduce disturbance to the common areas. The district and staff confirmed that the common areas are essential in facilitating the collaborative teaching approach that is central to the teaching philosophy at Nelson Place Elementary School.
- As the requirements for each space was more fully defined as the project progressed to Schematic Design, adjustments to the plan have slightly altered the NSF of many spaces. Minor changes are summarized in the chart below, significant program and NSF changes are outlined in the following narrative.

<table>
<thead>
<tr>
<th>Space Description</th>
<th>PSR Net SF</th>
<th>SD Net SF</th>
</tr>
</thead>
<tbody>
<tr>
<td>SPECIAL EDUCATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>SPED Conference room</td>
<td>250</td>
<td>255</td>
</tr>
<tr>
<td>Small Group/Learning Lab</td>
<td>450</td>
<td>455 or 485</td>
</tr>
<tr>
<td>ART &amp; MUSIC</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Art</td>
<td>1000</td>
<td>1012</td>
</tr>
<tr>
<td>Art Storage</td>
<td>150</td>
<td>100, 155</td>
</tr>
<tr>
<td>Music</td>
<td>1200</td>
<td>1200, 1040</td>
</tr>
<tr>
<td>Instrument Storage</td>
<td>300</td>
<td>223</td>
</tr>
<tr>
<td>HEALTH &amp; PHYSICAL EDUCATION</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gymnasium</td>
<td>6000</td>
<td>6050</td>
</tr>
<tr>
<td>DINING &amp; FOOD SERVICE</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### SCHEMATIC DESIGN

**Worcester Public Schools**
Worcester, MA

#### B. Final Design Program – Narrative of Changes to the Space Summary Template

<table>
<thead>
<tr>
<th>Space Type</th>
<th>New Area</th>
<th>Old Area</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cafeteria/Dining</td>
<td>4500</td>
<td>4353</td>
</tr>
<tr>
<td>Stage</td>
<td>100</td>
<td>960</td>
</tr>
<tr>
<td>Chair/Table/Equipment Storage</td>
<td>400</td>
<td>317</td>
</tr>
<tr>
<td>Kitchen</td>
<td>2800</td>
<td>2465</td>
</tr>
<tr>
<td>Staff Lunch Room</td>
<td>250</td>
<td>220</td>
</tr>
<tr>
<td><strong>MEDICAL</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical Suite toilet w/ shower</td>
<td>100</td>
<td>76</td>
</tr>
<tr>
<td><strong>ADMINISTRATION &amp; GUIDANCE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adjustment Counselor</td>
<td>225</td>
<td>250</td>
</tr>
<tr>
<td>Teacher’s Mail &amp; time</td>
<td>100</td>
<td>90</td>
</tr>
<tr>
<td>Duplicating/Copy</td>
<td>150</td>
<td>100</td>
</tr>
<tr>
<td>Records</td>
<td>110</td>
<td>146</td>
</tr>
<tr>
<td>Principal’s Office w/ Conference Area</td>
<td>250</td>
<td>326</td>
</tr>
<tr>
<td>Conference room</td>
<td>250</td>
<td>310, 255</td>
</tr>
<tr>
<td><strong>CUSTODIAL &amp; MAINTENANCE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Custodian’s Office</td>
<td>150</td>
<td>155</td>
</tr>
<tr>
<td>Receiving &amp; General Supply</td>
<td>300</td>
<td>484</td>
</tr>
<tr>
<td>Network/Telecom Room</td>
<td>200</td>
<td>250</td>
</tr>
<tr>
<td><strong>OTHER</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Computer Lab</td>
<td>950</td>
<td>900</td>
</tr>
</tbody>
</table>

#### Core Academic Spaces:
- Four (4) Common Rooms have been added to the space summary template, with an average area of 475 S.F. each. These spaces will be used as instructional spaces for team projects, team presentations, and tutorials, and will serve as a group instruction spaces for combined classrooms or grade levels.
- Through further development of the Schematic Design Floor plans, each of the Kindergarten classrooms are now 1100 S.F.

#### Special Education:
During Schematic Design programming discussions, the Owner and School District directed that a Therapeutic Planning space would be required directly adjacent to the Self Contained SPED Classroom at each grade level. The Space Summary Template now includes 8 Therapeutic Planning rooms at 50 S.F. each, increased from 3 rooms at 75 SF.

The School District advised that a Discrete Observation room is required adjacent to each Self-Contained SPED Classroom. The SD Space Summary template has been revised to include nine (9) Observation rooms at 75 S.F. each. Observation spaces are located with viewing window into each Self-Contained SPED Classroom, with access from the corridor to reduce disruption of the classroom and to allow for observation of the student in the authentic learning environment. Observation rooms are equipped with mirrored windows to allow for discrete observation by staff and parents into both the Self-Contained SPED Classroom and the general classroom. This proximity provides maximum flexibility if the future student population requires the adjacent general classroom to be used as a partial inclusion or substantially separate SPED classroom. The Observation room will also have a window into the adjacent Therapeutic Planning room, to facilitate safe monitoring of a de-escalating student.

The School District and OT/PT Director indicated that the OT/PT rooms may range from 800-950 SF. A larger OT/PT space is required within the primary wing to support the greater need to provide co-treatment, which may require additional staff and space. A smaller area is sufficient for the intermediate OT/PT space. The OT/PT spaces for the primary levels and intermediate levels are 1080 SF and 800 SF respectively.

The WPS Manager of Special Education-Intervention Services confirmed that each of the upper level dedicated SPED bathrooms requires space for Hoyer Lift operation along with a child in a wheel chair. Per OSHA standards, a Hoyer Lift is required to lift any child weighing more than 50 lbs., the dedicated SPED bathrooms for grades 3-6 have been increased in size from 60 SF to 116 SF.

The School District indicated that the area for the three Speech Rooms may range between 350 SF to 450 SF. The Speech rooms are within this range at 360 SF, 440 SF and 450 SF.

Through Schematic Design program development, the District established the space requirements for the District-Wide Early Childhood Assessment Center. The Assessment Center requires a classroom sized area for play-based assessment with a dedicated toilet room and changing area. The program also requires adjacent spaces for observation and interviews, evaluation team meetings, a small office space to compile reports, and a small equipment/work area, (shared with the adjacent
Health & Physical Education:

- The School district has indicated that additional storage for after school programs and activities is required at the gymnasium. It was also confirmed that a separate secure storage area for third party after school programs is required. The gym storage area has been increased from 150 S.F. to 335 S.F. on the SD Space Summary Template.
- The school district confirmed that a toilet is not required within the gym teacher’s office, student toilets are provided adjacent to the Gymnasium.

Media Center:

- The program for the Media Center was modified to include an office for library staff, an accessible bathroom and a small storage space, increasing the area on the Space Summary Template from 3370 S.F. to 3460 S.F.

Dining & Food Service

- As shown in the chart above, the dining and food service category has been reduced from 8950 S.F. at the PSR Submission, to 8315 S.F. in the Schematic Design Submission. Through several meetings with the WPS Food Services Director, the kitchen plan has been optimized to efficiently support the spatial and equipment needs of the proposed kitchen program.

Medical Suite:

- The program for the Medical Suite has been updated to include an Exam Room, a Rest Area, and a Quarantine room, as well as clearance for direct access to the exterior in case of emergencies. The net area for the MEDICAL category has been increased from 840 S.F. to 996 S.F. on the Schematic Design Space Summary Template.

Administration and Guidance:

- Through further program development with the Nelson Place School District and staff, the program for the Teacher Planning space was divided into a quiet work space that can be used for meetings and planning, and an active space for storage lockers and copying. The Teacher Planning net area was increased from 300 SF to 400 SF.

Custodial and Maintenance:
The Worcester Public Schools facilities department and custodial staff indicated that the trash and recycling are collected in large bins and deposited directly into the dumpsters. As no Trash & Recycle room is required, this 400 NSF space has been removed from the space summary template.

Custodial Storage and Storeroom spaces are located within the ground floor mechanical space, the receiving area, and dispersed throughout the school as labeled on the plans. The total area dedicated to custodial storage and storeroom is 775 NSF, consistent with the PSR Space Summary Template.

Other:

- The 1000 SF Greenhouse has been removed from the scope of this project, and has therefore been removed from the NSF of the space summary template.

This is an acknowledgement and certification that the sum of all programmed floor areas plus all other floor areas equal the gross floor area of the Final Design Program.

Robert Para Jr. AIA
Lamoureux Pagano Associates Architects
### Proposed Space Summary- Elementary Schools

**Nelson Place Elementary**

#### CORE ACADEMIC SPACES

<table>
<thead>
<tr>
<th>ROOM TYPE</th>
<th>ROOM NFA</th>
<th># OF RMS</th>
<th>area totals</th>
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<td>K Classroom 16</td>
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#### SPECIAL EDUCATION

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### Version 11.24.2010

**Elementary School Space Summary**
## Proposed Space Summary - Elementary Schools

### Nelson Place Elementary

#### Existing Conditions

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<tr>
<th>ROOM TYPE</th>
<th>ROOM AREA (NFA)</th>
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<tbody>
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<td>Family Learning Center</td>
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<td>SPED Conference room</td>
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<td>BCBA Office</td>
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<tr>
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<tr>
<td>Small Group Room / Learning Lab</td>
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#### ART & MUSIC

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<tbody>
<tr>
<td>Art Classroom - 25 seats</td>
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<tr>
<td>Art Workroom w/ Storage</td>
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<tr>
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<td>Music Classroom / Large Group - 25-50 seats</td>
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<tr>
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<tr>
<td>Music Practice / Ensemble</td>
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<tr>
<td>Instrument Storage</td>
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#### HEALTH & PHYSICAL EDUCATION

<table>
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#### MEDIA CENTER

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<td>Symp Blk Classroom</td>
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<tr>
<td>Symp Teacher Office w/ Toilet</td>
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#### DINING & FOOD SERVICE

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<tr>
<td>Chair / Table / Equipment Storage</td>
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</tr>
<tr>
<td>Kitchen</td>
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<tr>
<td>Staff Lunch Room</td>
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#### MEDICAL

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<td>Nurses' Office / Waiting Room</td>
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<tr>
<td>Examination Room / Resting</td>
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#### ADMINISTRATION & GUIDANCE

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<tr>
<td>Instructional Coach Office</td>
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</tr>
<tr>
<td>Principal's Office</td>
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<td></td>
<td></td>
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<tr>
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<tr>
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### Proposed

#### Existing to Remain/Renovated

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<th>area totals</th>
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<tbody>
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<td>SPED Conference room</td>
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</tr>
<tr>
<td>Small Group Room / Learning Lab</td>
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#### New

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<tbody>
<tr>
<td>Art Classroom - 25 seats</td>
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<tr>
<td>Art Workroom w/ Storage</td>
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<td></td>
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</tr>
<tr>
<td>Music Classroom / Large Group - 25-50 seats</td>
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<td>Music Classroom / Large Group - 25-50 seats</td>
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<tr>
<td>Gymnasium</td>
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<tr>
<td>Gym Teacher Office w/ Toilet</td>
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<tr>
<td>Instrument Storage</td>
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<tr>
<td>Symp Blk Classroom</td>
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<tr>
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<td>Stage</td>
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<tr>
<td>Chair / Table / Equipment Storage</td>
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<td>Staff Lunch Room</td>
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<tr>
<td>Medical Staff Toilet w/ Shower</td>
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<tr>
<td>Staff Toilet</td>
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<tr>
<td>Attendance Counselor</td>
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<td>Psychologist Office</td>
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<tr>
<td>Principal's Secretary / Waiting</td>
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### Total

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<th>ROOM AREA (NFA)</th>
<th># OF RMS</th>
<th>area totals</th>
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<tbody>
<tr>
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<td>Art Workroom w/ Storage</td>
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<tr>
<td>Music Classroom / Large Group - 25-50 seats</td>
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<td>Music Classroom / Large Group - 25-50 seats</td>
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<tr>
<td>Music Practice / Ensemble</td>
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<tr>
<td>Instrument Storage</td>
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<tr>
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<td>Library</td>
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<tr>
<td>Symp Blk Classroom</td>
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<tr>
<td>Cafeteria / Dining</td>
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<tr>
<td>Chair / Table / Equipment Storage</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kitchen</td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Staff Lunch Room</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medical Staff Toilet w/ Shower</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Nurses' Office / Waiting Room</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Examination Room / Resting</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Office / Waiting Room / Toilet</td>
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<td>General Office</td>
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<td>Staff Toilet</td>
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<td>Attendance Counselor</td>
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<tr>
<td>Psychologist Office</td>
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<tr>
<td>Instructional Coach Office</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>Principal's Office</td>
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<td></td>
<td></td>
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<tr>
<td>Principal's Secretary / Waiting</td>
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<tr>
<td>Assistant Principal's Office</td>
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</table>

#### Comments

- Proposed Planning: Refer to the MSBA Educational Program & Space Standard Guidelines for proposed planning guidelines.
- Existing to Remain/Renovated: Total existing to remain or renovate.
- New: Total new.
- Total: Sum of Existing to Remain/Renovated and New.

### MSBA Guidelines

<table>
<thead>
<tr>
<th>Refer to MSBA Educational Program &amp; Space Standard Guidelines</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elementary School Space Summary</td>
</tr>
</tbody>
</table>

Version: 11.24.2010
### Proposed Space Summary - Elementary Schools

<table>
<thead>
<tr>
<th>ROOM TYPE</th>
<th>Existing to Remain/Renovated</th>
<th>New</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conference Room</td>
<td>310 1</td>
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<tr>
<td>Guidance Office</td>
<td>150 2</td>
<td></td>
<td>150</td>
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<tr>
<td>Guidance Storeroom</td>
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<td>35</td>
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<tr>
<td>Teachers' Planning Room</td>
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<tr>
<td>Custodian's Office</td>
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<td>Custodian's Workshop</td>
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<td>Cust. Closet</td>
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<tr>
<td>Receiving and General Supply</td>
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<td>Network / Telecom Room</td>
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<tr>
<td>Other</td>
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<tr>
<td>Total Building Net Floor Area (NFA)</td>
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<tr>
<td>Proposed Student Capacity / Enrollment</td>
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<tr>
<td>Total Building Gross Floor Area (GFA)</td>
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<td>87,000</td>
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<tr>
<td>Grossing factor (GFA/NFA)</td>
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<td>1.44</td>
</tr>
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</table>

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.

### Notes
- **Version**: 11.24.2010
- **Elementary School Space Summary**
### Proposed Space Summary - Elementary Schools

<table>
<thead>
<tr>
<th>Nelson Place Elementary</th>
<th>Existing Conditions</th>
<th>Proposed</th>
<th>MSBA Guidelines</th>
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<tr>
<td><strong>ROOM TYPE</strong></td>
<td><strong>ROOM NFA</strong></td>
<td><strong># OF RMS</strong></td>
<td><strong>area totals</strong></td>
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<tr>
<td><strong>PROPOSED</strong></td>
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<tr>
<td><strong>Existing to Remain/Renovated</strong></td>
<td><strong>New</strong></td>
<td><strong>Total</strong></td>
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</tbody>
</table>

**Architect Certification**

I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and, except as agreed to in writing by the Massachusetts School Building Authority, in accordance with the guidelines, rules, regulations and policies of the Massachusetts School Building Authority to the best of my knowledge and belief. A true statement, made under the penalties of perjury.

- **Name of Architect Firm:** Lamoureux Pagano Associates
- **Name of Principal Architect:** Michael A. Pagano, AIA
- **Signature of Principal Architect:**
- **Date:** 11 December 2014

Version: 11.24.2010

Elementary School Space Summary
Proposed Conditions Diagram - Site
Proposed Conditions Diagram - Classroom Clusters

INTERMEDIATE CLASSROOM CLUSTER GRADRES 3 - 6

PRIMARY CLASSROOM CLUSTER PRE-K - GRADE 2

LEGEND

T.P.   THERAPEUTIC PLANNING
OBS.   OBSERVATION
TLT.   TOILET

Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605
PROJECT OVERVIEW

Strategic Design Services, LLC was retained to provide security Schematic Design phase services for the new Nelson Place Elementary School construction project. The overall objective of the project phase was to identify security needs, system requirements, and device application standards as well as prepare this security design narrative outlining the security recommendations to be included into the architect’s Schematic Design documents.

Officials from the City of Worcester and Lamoureux Pagano Architects provided available pertinent security documents for review and answered all questions posed by SDS. Meetings were held on July 29, 2014 and August 28, 2014 to review school requirements and these recommendations. Between the two meetings the following participated:

- Michael Pagano – LPA Architects
- Rob Para – LPA Architects
- Robert Pezzella – School Safety Liaison
- Julie Lynch – City of Worcester, Architectural Services
- Jeff Martin – WPS Facilities Director
- Monica Poitras – Nelson Place Principal
- Brian Gouin – Strategic Design Services

Based on all the information provided, the meeting discussions, and security best practices, this schematic design security design narrative was developed. It is separated into the major sections of Physical Security, Electronic Security, and Access Control with multiple sub-sections within each major section. Recommendations are embedded throughout the document and where appropriate a description of building or grounds decisions already made are described at the beginning of the sub-section.

PHYSICAL SECURITY

FENCING AND GATES

It is understood that the decision has been made to not install fencing around the perimeter of the property and to only install gates at the service road entrances. It is also understood that while fencing will be installed around the three playgrounds, the gates within that fencing will be unlocked as the playgrounds will be made available to the public. While SDS does not agree with these decisions from a security point of view, they are being accepted as fact.
While the playground gates will not be locked, they should have a self closing mechanical latch so the gates will not remain open at any time. As much as possible, vehicle access should be restricted around the playgrounds. Fencing with locked gates should be installed around all mechanical and electrical equipment on the grounds including the generator, transformer, and silo. Fencing should also be installed around the receiving area.

LIGHTING

Exterior lighting should meet the IESNA (Illuminating Engineering Society of North America) G-1-03 Guideline for Security Lighting. There should be 3fc of light in the parking lots, 1fc of light on the sidewalks and any patios or courtyards, and 5fc of light at all the entrance doors.

CPTED (Crime Prevention Through Environmental Design)

In accordance with the CPTED guideline of natural surveillance, all shrubs should be no more than 3’ high. There should be at least 4’ from the ground to the bottom of any tree foliage. Bicycle parking should be in full view from the office in the building.

In accordance with the CPTED guideline of natural access control, bus and parent pick-up and drop-off areas should be clearly marked. There should be clear signage directing visitors and staff to the proper parking area and the main entrance. Bollards should be placed where traffic is not desired and speed bumps and winding driveways should be utilized to statically enforce the idea that children are in the area.

The CPTED guideline of territorial reinforcement will be difficult to accomplish with the lack of fencing and the public access for the playgrounds and library. Signage and landscaping should be used to delineate where the school grounds begin.

EXTERIOR DOORS

All exterior doors should have non-removable hinges. Double exterior doors should have a center mullion. Non-entry exterior doors should not have any exterior door hardware. All exterior doors should be numbered on the inside and the outside. Exterior numbering should be able to be seen from the driveways. The numbers on the inside should be no more than 3’ off the floor.

INTERIOR

All interior doors should be numbered. All classroom doors should be able to be locked from the inside. All classroom windows should be able to be covered during a lockdown (shades, etc.). Window film should be installed on the exterior windows.
to prevent damage from non-lethal projectiles. Bathroom doors should not be able to be locked from the inside.

**ELECTRONIC SYSTEMS**

It is understood that no building electronic security systems will be monitored or accessed by City of Worcester personnel outside of the Nelson Elementary School. It is also understood that there will be no individual at the Nelson School whose sole job responsibility will be to monitor any security systems, however there will be a person assigned to periodically monitor such systems and use them when required.

**BURGLAR ALARM**

The building will require a burglar alarm system to protect the building after school hours. The system should include recessed door contacts, dual technology (passive infrared and microwave) motion detectors, internal and external sirens, and alpha numeric keypads. The burglar alarm system should include a minimum of six partitions to arm and disarm separate areas of the facility independently, including the main building, main office, cafeteria and kitchen delivery, gymnasium, and library. The system should include as many separate zones as are required to have every door and motion detector on its own separate zone.

Recessed door contacts should be installed in the following locations:

- All exterior doors
- Main office doors
- Interior vestibule doors
- Cafeteria doors
- Gymnasium doors
- Doors from library to rest of building

Dual technology motion detectors should be installed in the following locations:

- All major hallways
- Main office
- Cafeteria
- Gymnasium
- Library

Alpha numeric keypads should be installed in the following locations:

- Main entrance
- Custodial office
Nelson Place Elementary School  
Schematic Design Report

- Main office  
- Kitchen / cafeteria delivery door  
- Gymnasium  
- Exterior library entrance

Sirens should be installed in the following locations:

- In hall outside main office  
- Receiving area  
- Exterior of front entrance

The burglar alarm system should be monitored by a third party central monitoring facility responsible for notifying the police department and others in the event of an alarm.

VIDEO MANAGEMENT

The building should have an IP based video management system. Cameras should be monitored in real time and should be recorded for a minimum of 30 days using remote management software located on a workstation in the Nelson Place School, along with the option of being viewed remotely from any PC with access to the school network. In addition, specific camera images should be able to be sent to properly programmed smart phones. The system should consist of the video management software, a minimum of one workstation to include a PC and two 24” monitors, base and recording servers, fixed IP vandal-resistant dome cameras, required network wiring, and whatever network equipment is required to produce a sub-net within the Nelson Place School.

The recording servers should record all cameras based on motion or an input from an alarm from the electronic access control / alarm monitoring system at a rate of 15 frames per second using H.264 compression on a camera by camera basis, with 30 seconds of pre and post motion or alarm recorded. The video resolution of all the recorded images should be a minimum of HD 720p.

Because no one will be spending much time viewing the cameras live, only fixed cameras should be utilized, no PTZ cameras. The cameras should be vandal-resistant IP dome cameras with a minimum resolution of 720p and 1280 x 800 sensor pixels. The interior cameras and exterior cameras with narrow views should produce forensic quality images of a minimum of 40 pixels / ft. It is understood that the exterior cameras with wider fields of view such as for the parking lots may not produce that quality of an image, but they should be able to identify a person’s activity and clothing.

Interior IP fixed dome cameras should be installed in the following locations:
- Inside every exterior door looking at the door
- In all stairwells – one per floor per stairwell
- In all major hallways looking down hallway
- Main office general area
- Cafeteria general area – 2 required
- Gymnasium general area – 2 required
- Library general area – 2 or 3 required depending on library layout

Exterior IP fixed dome cameras should be installed on the building to look at the following areas. The number of cameras required will be dependent on the final grounds layout and the particular camera lens:

- Three main entrances
- Play areas
- Parking lots
- Bicycle parking
- Parent and bus pick-up and drop-off
- General grounds
- Patios and courtyards
- External electrical equipment

The recording servers, switches, patch panels, and other network equipment should be located in racks in the appropriate network closets based on overall IT network configuration and distance from cameras to network closets.

ELECTRONIC ACCESS CONTROL

The building should have an electronic access control / alarm monitoring system that is seamlessly integrated with the video management system. Proximity card readers and electronic door hardware should be installed at some doors in order to control access, and many doors with or without card readers should have door contacts to create alarms for door forced or door held open that can be associated with a camera view from the video management system for review either in real time or at a later date. Access can be allowed or denied based on card, time, and door, and individual doors such as the entrance doors can be unlocked and relocked at specific times without required operator interface. The software should be able to be accessed using any remote PC with access to the school network.

Photo ID Badges for staff can be processed and printed using the access control system, whether or not the individual card has the ability to unlock a door using a card reader. Optionally, the visitor badges can also be processed and printed using the access control system.

The system should consist of access control / alarm management software, a workstation (can be same as video management system), server, proximity card
readers, recessed door contacts, fail-secure electronic door hardware with built in REX device (electric locksets preferred), control panels, wiring, a badge printer, and access / Photo ID cards.

Readers, door contacts, and electronic door hardware at a minimum should be installed at the following doors:

- Rear entrance
- 2 wing entrances
- Kitchen delivery door
- Receiving door (if different)
- Main office door

Additional door contacts at a minimum should be installed at the following doors:

- All exterior doors
- Interior vestibule door
- All main office door exterior doors

VIDEO INTERCOMS

Video intercoms should be installed in the school as a tool to identify, vet, and allow access to visitors and deliveries at the following locations:

- Main office – interior station in main office
- Kitchen delivery door – interior station in kitchen and/or main office

COMMUNICATIONS SYSTEMS

The building will require an ‘overhead communication system’ to announce lockdowns, evacuations, and other security issues to every room in the building. This ‘public address system’ should also be able to make announcements to the exterior of the building. Both interior and exterior announcements should be able to be initiated both from the main office and at least one other location such as cafeteria or custodial office. In addition, telephones should be installed in every classroom for initiating communication to the main office. The telephones should be 911 identifiable by individual phone.

Also, the school should employ an Emergency Response Communication system whereby staff can individually and directly communicate security issues and updates with local law enforcement and fire protection professionals. This is a very new technology, so much so that it is not yet possible to evaluate the pros and cons of the varying types of systems, there are just too few actually installed and working. Even in six months the landscape should be clearer to evaluate individual
types of systems. In the meantime, the systems are relatively inexpensive and SDS recommends budgeting for such a system.

Radios should be utilized to keep staff manning entrances in constant contact with the main office and can be used for other functions within the building. The Motorola CP radios currently used are appropriate.

**ACCESS CONTROL**

It is understood that three entrances will be utilized during pick-up and drop-off times, one for pre-K through 2nd grade, one for 3rd through 6th grade, and one for special education children. There will be two separate pick-up times. SDS has no issue with three separate entrances as long as the protocols described below are implemented.

It is understood that the library within the school building will be open to the public so non-school personnel will have unfettered access to a small portion of the building during off school hours. While SDS does not agree with that decision from a security point of view, it is being accepted as fact.

**ACCESS**

In lieu of having card readers on all interior and exterior doors, keys should be used to lock and unlock doors without a reader. A key control system should be established and implemented to control keys. All unused keys should be kept in a key lockbox. All exterior doors should be locked at all times except the exterior library door during public hours and the three main entrances only during the pick-up and drop-off times (can be controlled via the access control system). The main entrances should be constantly manned by staff during the times the doors are unlocked.

**VISITORS**

During pick-up and drop-off times, visitors to the school (anyone not a student or staff member) should be directed to the main office by school personnel staffing one of the three entrances. Visitors to the school during non drop-off and pick-up times should be funneled into one entrance only and should use the main office video intercom to gain access to the building.

All visitors should be required to produce a picture ID and sign into a visitor log in addition to having a legitimate reason to be on site. They should be given a dated visitor badge that should be worn at all times when on site. The visitor ID badges can be created using the electronic access control system or manually. When the
visit is over they should return the visitor badge and sign out of the visitor log. Signs with the visitor policy should be posted at all entrances.

Visitors to the library after school hours will not be able to enter the remainder of the school without activating the burglar alarm system and won’t be subject to this visitor procedure.

ID BADGES

All staff members should be required to wear a Photo ID visible outside of their clothing at all times while at the school. These badges can be made through the electronic access control system and do not necessarily have to have the ability to unlock any doors using a card reader. The result will be that every adult in the building will either have a Photo ID badge or visitor badge visible to all others and anyone seen without one can be questioned and challenged.

CONFIDENTIALITY

Due to the sensitive nature of this project, all work performed for the Nelson Place School and any information provided will be held in strict confidence by SDS to the extent permitted by law.

Submitted August 29, 2014,

Brian Gouin, PSP, CSC
Strategic Design Services, LLC
The Nelson Place School Building Committee voted unanimously on June 2, 2014 to approve a revised Preliminary Design Program (PDP), as well as a preferred solution, as defined in the Preferred Schematic Report, for further development in the Schematic Design phase of the Nelson Place School Feasibility Study. The Nelson Place preferred solution: *New Construction on the Existing Nelson Place Site with Additional Land* incorporates parcels of privately held land that will be necessary to obtain in order to best meet the proposed site program.

To date, three Public Hearings and three School Building Committee meetings have been held and included discussion on the necessity of obtaining portions of abutting properties. These fee takings provide relief at a narrow segment of land on the existing Nelson Place property, and alleviate the need for excessive retaining walls. Additionally, Assumption College is donating an easement along the south property line, connecting to Romola Road for the purposes of emergency access, grading to avoid extensive retaining walls, and pedestrian and cyclist access to the new Nelson Place School. During the Schematic Design Phase the areas necessary for takings were surveyed; see attached plans, *P1* and *P2*.

The City has met with all affected abutters and is prepared to obtain the required property through the process of eminent domain. This process includes an appraisal which will be used as the basis for compensation to the impacted land owners, as depicted in the attached *site plans* and *Table A*. Upon approval of the project by the Massachusetts School Building Authority (MSBA), and completion of a project funding agreement contingent on these land acquisitions, the City of Worcester will commence with the process of eminent domain.
**Eminent Domain Schedule**

1. **March 2014- December 2014:** all affected property owners have been contacted via post and personally to discuss the eminent domain process. Public Hearings have been held to discuss the necessity of obtaining the properties by eminent domain.

2. **September – October 2014:** Survey of properties, and metes and bounds descriptions for future Registry of Deeds filing and to establish basis for appraisals.

3. **December 2014:** Parcel Appraisals

4. **January 14, 2015:** MSBA Board of Directors vote to approve Nelson Place School project.

5. **February 2015:** City Council vote to approve project funding.

6. **February 2015:** Funding agreement in place with the MSBA contingent upon land acquisition

7. **February 2015:** Plans and Orders of Taking recorded at the Registry of Deeds

8. **February 2015:** Title to the property transfers to the City of Worcester on the date of this recording.
   a. if the acquisition is a fee taking, the City becomes the owner of the property.
   b. Parcel 6 in Table A would be an easement taking and the title to the property remains with Assumption College, however, the City acquires a right of use.

9. **February 2015:** Owners will be notified that their property has been acquired by a “Notice of Taking”, which will be sent to them by the City of Worcester shortly after the recording of the “Orders of Taking”. This applies to both fee and easement acquisitions.

10. **February/March 2015:** Upon receipt of completed W-9 form and Protanto or Release of all Claims form, award payment will be tendered.
<table>
<thead>
<tr>
<th>Property Owner</th>
<th>Property Location</th>
<th>Type</th>
<th>Proposed Parcel Size</th>
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<tbody>
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<td></td>
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<td>Temporary Construction Easement</td>
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<td></td>
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<td>Parcel F: Land Giving</td>
<td>1,373 Sq. Ft.</td>
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<td>6. Assumption College</td>
<td>12 Romola Rd./0 Nelson Place</td>
<td>Access Easement</td>
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<td>Worcester, MA 01609</td>
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<td>Assumption College</td>
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<tr>
<td>Worcester, MA 01609</td>
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</tr>
</tbody>
</table>

- **Henry Gauthier** is recently deceased.
PARCEL A

A certain parcel of land located westerly of Hapgood Road in Worcester, Massachusetts, bounded and described as follows:

Beginning at the southeasterly corner of the herein described parcel, said corner being S 89° 25’ 22” W, a distance of 193.61 feet along the southerly line of land now or formerly of Joshua, Jr. and Michelle Bing from Hapgood Road;

Thence continuing S 89° 25’ 22” W, a distance of 151.58 feet by Parcel B;

Thence running N 05° 03’ 33” W, a distance of 76.00 feet by land now or formerly of the City of Worcester;

Thence running N 84° 53’ 02” E, a distance of 187.08 feet by said land now or formerly of the City of Worcester;

Thence running S 17° 09’ 55” W, a distance of 95.10 feet by land now or formerly of Joshua, Jr. and Michelle Bing to the Point of Beginning.

The above described Parcel A contains an area of 13,973 square feet, more or less, and is shown as Parcel A on a plan titled “Plan of Land, Nelson Place Elementary School, Worcester, Massachusetts” dated November 11, 2014, prepared by Nitsch Engineering.
PARCEL B

A certain parcel of land located westerly of Hapgood Road in Worcester, Massachusetts, bounded and described as follows:

Beginning at the southeasterly corner of the herein described parcel, said corner being N 89° 15’ 13” W, a distance of 211.24 feet along the southerly line of land now or formerly of Peter A. Papagni Irrevocable Trust from Hapgood Road;

Thence continuing N 89° 15’ 13” W, a distance of 120.06 feet by Parcel C;

Thence running N 05° 03’ 33” W, a distance of 77.22 feet by land now or formerly of the City of Worcester;

Thence running N 89° 25’ 22” E, a distance of 151.58 feet by Parcel A;

Thence running S 17° 09’ 55” W, a distance of 83.74 feet by aforesaid land now or formerly of Peter A. Papagni Irrevocable Trust to the Point of Beginning.

The above described parcel contains an area of 10,656 square feet, more or less, and is shown as Parcel B on a plan titled “Plan of Land, Nelson Place Elementary School, Worcester, Massachusetts” dated November 11, 2014, prepared by Nitsch Engineering.
PARCEL C

A certain parcel of land located westerly of Hapgood Road in Worcester, Massachusetts, bounded and described as follows:

Beginning at the southeasterly corner of the herein described parcel, said corner being N 83° 02′ 24″ W, a distance of 241.98 feet along the southerly line of land now or formerly of Maura Brennan from Hapgood Road;

Thence continuing N 83° 02′ 24″ W, a distance of 78.47 feet by Parcel D;

Thence running N 05° 03′ 33″ W, a distance of 60.00 feet by land now or formerly of the City of Worcester;

Thence running S 89° 15′ 13″ E, a distance of 120.06 feet by Parcel B;

Thence running S 28° 34′ 00″ W, a distance of 77.10 feet by aforesaid land now or formerly of Maura Brennan to the Point of Beginning.

The above described parcel contains an area of 6,395 square feet, more or less, and is shown as Parcel C on a plan titled “Plan of Land, Nelson Place Elementary School, Worcester, Massachusetts” dated November 11, 2014, prepared by Nitsch Engineering.
PARCEL D

A certain parcel of land located westerly of Hapgood Road in Worcester, Massachusetts, bounded and described as follows:

Beginning at the southeasterly corner of the herein described parcel, said corner being N 76° 27’ 11” W, a distance of 248.22 feet along the southerly line of land now or formerly of Joann P. Kelley from Hapgood Road;

Thence continuing N 76° 27’ 11” W, a distance of 65.00 feet by land now or formerly of the City of Worcester;

Thence running N 05° 03’ 33” W, a distance of 59.93 feet by land now or formerly of the City of Worcester;

Thence running S 83° 02’ 24” E, a distance of 78.47 feet by Parcel C;

Thence running S 08° 11’ 24” W, a distance of 66.09 feet by aforesaid land now or formerly of Joann P. Kelley to the Point of Beginning.

The above described parcel contains an area of 4,438 square feet, more or less, and is shown as Parcel D on a plan titled “Plan of Land, Nelson Place Elementary School, Worcester, Massachusetts” dated November 11, 2014, prepared by Nitsch Engineering.
PARCEL E

A certain parcel of land located southerly of Nelson Place in Worcester, Massachusetts, bounded and described as follows:

Beginning at the northerly corner of the herein described parcel, said corner being S 13° 24’ 51” E, a distance of 142.84 feet along the easterly line of land now or formerly of Henry C. and Ruth M. Gauthier from Nelson Place;

Thence continuing S 13° 24’ 51” E along land now or formerly of the City of Worcester, a distance of 62.27 feet along said easterly lot line of land now or formerly of Henry C. and Ruth M. Gauthier;

Thence running S 89° 37’ 09” W continuing along said land now or formerly of the City of Worcester, a distance of 25.00 feet by the southerly line of land now or formerly of Henry C. and Ruth M. Gauthier;

Thence running N 09° 51’ 35” E, a distance of 61.64 feet to the Point of Beginning.

The above described parcel contains an area of 756 square feet, more or less, and is shown as Parcel E on a plan titled “Plan of Land, Nelson Place Elementary School, Worcester, Massachusetts” dated November 11, 2014, prepared by Nitsch Engineering.
PARCEL F

A certain parcel of land located on the southerly side of Nelson Place in Worcester, Massachusetts, bounded and described as follows:

Beginning at a point on the southerly sideline of Nelson Place, said point being the northerly corner of the herein described parcel;

Thence running S 24° 30’ 00” E, a distance of 100.00 feet along land now or formerly of the City of Worcester;

Thence running S 09° 51’ 35” W continuing along said land now or formerly of the City of Worcester, a distance of 48.66 feet to a point on the easterly line of land now or formerly of Henry C. and Ruth M. Gauthier;

Thence running N 13° 24’ 51” W, a distance of 142.84 feet by said easterly line of land now or formerly of Henry C. and Ruth M. Gauthier to the Point of Beginning.

The above described parcel contains an area of 1,373 square feet, more or less, and is shown as Parcel F on a plan titled “Plan of Land, Nelson Place Elementary School, Worcester, Massachusetts” dated November 11, 2014, prepared by Nitsch Engineering.
20 FOOT WIDE ACCESS EASEMENT

A 20-foot wide easement located across land now or formerly of Assumption College on the westerly side of Romola Road in Worcester, Massachusetts bounded and described as follows:

Beginning at a point on the westerly sideline of Romola Road, said point being S 11° 28’ 35” W, a distance of 8.17 feet by said sideline of Romola Road from the southeast corner of land now or formerly of Assumption College;

Thence continuing S 11° 28’ 35” W, a distance of 20.00 feet by said westerly sideline of Romola Road;

Thence running N 78° 58’ 51”W, a distance of 92.06 feet to a point of curvature;

Thence running northwesterly by a curve to the right having a radius of 60.00 feet, an arc distance of 65.27 feet to a point of tangency;

Thence running N 16° 39’ 13” W, a distance of 9.72 feet to a point of curvature;

Thence running northerly by a curve to the right having a radius of 110.00 feet, an arc distance of 72.12 feet to a point of tangency;

Thence running N 20° 54’ 43” E, a distance of 36.44 feet to a point of curvature;

Thence running northerly by a curve to the left having a radius of 300.00 feet, an arc distance of 127.62 feet to a point of tangency;

Thence running N 03° 27’ 45” W, a distance of 153.98 feet to a point of curvature;

Thence running northwesterly by a curve to the left having a radius of 51.00 feet, an arc distance of 52.43 feet to a point on the southerly line of land now or formerly of the City of Worcester;

Thence running N 82° 50’ 31” E, a distance of 28.23 feet by said southerly line of land now or formerly of the City of Worcester;

Thence running southeasterly by a curve to the right having a radius of 71.00 feet, an arc distance of 49.38 feet to a point of tangency;

Thence running S 03° 27’ 45” E, a distance of 153.98 feet to a point of curvature;

Thence running southerly by a curve to the right having a radius of 320.00 feet, an arc distance of 136.13 feet to a point of tangency;

Thence running S 20° 54’ 43” W, a distance of 36.44 feet to a point of curvature;

Thence running southerly by a curve to the left having a radius of 90.00 feet, an arc distance of 59.01 feet to a point of tangency;

Thence running S 16° 39’ 13” E, a distance of 9.72 feet to a point of curvature;
Thence running southeasterly by a curve to the left having a radius of 40.00 feet, an arc distance of 43.51 feet to a point of tangency;

Thence running S 78° 58’ 51” E, a distance of 92.22 feet to the Point of Beginning.

The above described easement contains an area of 11,889 square feet, more or less, and is shown as 20’ Wide Access Easement on a plan titled “Plan of Land, Nelson Place Elementary School, Worcester, Massachusetts” dated November 11, 2014, prepared by Nitsch Engineering.
4.1.2 SCHEMATIC DESIGN BINDER

C. Site and Circulation Analysis
Following the submission of the PSR, and the PSR supplement, LPA further developed the preferred site option. The design team and the City representatives, including the DPW, Facilities, the Interdepartmental Review Team (IRT; joint meeting of the Planning, Conservation, Fire, Building and other departments), School Athletic Director, School and Central Administration representatives and security consultants have met to review the plan development and have integrated budgeting input regarding with the site work. Progress was presented at public meetings. The input was integrated into the schematic plans, with the overlying program and school requirements as a guiding principle.

Earlier developed site criteria is as follows, noting that the project as developed meets the program (refer also to the Final Design Program section).

- Building access and relationship with the site and services.
- Bus drop off /pick up areas; 8 Buses, staggered arrival and departure.
- Separate and adequate SPED bus drop off/pick up area; 6 Half-size buses, staggered arrival and departure.
- Van parking for after-school programs; 4 after-school vans.
- Integrated Autism and Special Education programs.
- Separate and adequate parent drop off and pick up area, rolling queue.
- Pedestrian and bike routing,
- Loading, delivery & service areas, no loading dock.
- Adequate Parking; 140 Daily parking spaces in required program.
- Separate Play areas for Kindergarten, primary and intermediate grades, fenced-in at play areas.
- Hard and soft surface play areas; Shading, and sun exposure.
- Secondary/Emergency access.
- Security Criteria.
- Consideration of neighborhood relationships.
- Appropriate landscaped buffer zone, with fence.
- Alleviate existing traffic issues, coordinate with utilities & site features.
- Appropriate site orientation for the sustainable design initiative/net zero goals.
- Fulfillment of the educational program.
- Project phasing considerations and potential implications for the existing school.
Nelson Place Elementary School  
35 Nelson Place, Worcester, MA 01605

4.1.2 SCHEMATIC DESIGN BINDER  
C. Site and Circulation Analysis

SCHEMATIC DESIGN

ZONING-BUILDING SETBACKS
Zoning requirements and setbacks were outlined in earlier submittals. City projects are exempt from zoning regulations, though the current scheme is in conformance with the setback requirements.

SITE ACREAGE
Eminent domain process and land taking plans are published under 4.1.2 B. Final Design Program, and the existing conditions plan published with the drawing set shows the existing and proposed site area.

WETLANDS INFORMATION
Detailed wetland analysis and reviews and the ANRAD filing were published as part of the PSR. The Conservation Commissions ruling, ORAD, is published in the SD submission under 4.1.2 D. Environmental Assessment. The wetland designations and setbacks are shown on the existing conditions plan, and are respected within the proposed scheme. Full Notice of Intent will be filed with the DEP/Worcester Conservation Commission as part of the DD phase, refer to the permitting matrix in section 4.1.2 F. Code Analysis.

SITE GRADING
Full topographic survey was conducted and published as part of the PSR, and updated to include topography along the access path, and the proposed land takings. Full geotechnical exploration and soils analyses were completed, and are included in this submission. As part of the site analysis, detailed cut and fill calculations were conducted, and determined that to meet the program requirements for area, slopes, seatbacks, there would need to be a considerable export of earthen material.
Worcester soils generally contain higher levels of arsenic; therefore the design team and owner have reviewed opportunities to reduce the projected expense of exporting excess soils. Refer to discussion narratives in sections 4.1.2 D. Environmental Assessment and 4.1.2 E. Geotechnical analysis.

SITE BUFFER
Site plans were developed to establish a tree buffer along the abutter’s property lines, and to install a 4’ vinyl chain link fence at the existing or proposed property lines. The fence will end at the east and west isolated wetlands. Sketches of this buffer zone were presented at public meetings.
FUTURE EXPANSION

This site is not considered for future expansion of building or site
D. Environmental Assessment
   1. Environmental Analysis
   2. ORAD Form
   3. Soil Sampling Summary & Analysis
The Phase 1 Environmental Site Assessment was conducted and filed as part of the PDP filing, which included confirmation that the previous fuel oil tank had been removed, and that no further analysis was required.

Assessment of the facilities for Hazardous materials was conducted and report was filed as part of the PDP. No additional testing was required for the schematic phase, and a budget for removal of the hazardous materials has been included in the Schematic Design estimate.

The DEP/Worcester Conservation Commission ANRAD had been filed and included in the PSR filing, subsequently the hearing was held and the ORAD was issued and is included within this section.

As part of the Geotechnical testing program, the soils on site were also analyzed for the presence of naturally occurring arsenic, which is typically found in soils in Worcester County. Initial soils testing were done, and one sample was found to have high concentrations of arsenic. Additional analysis of the soils was requested, and it was found that these higher levels were in a stratum of soils at a particular area of the site. The resultant report from UEC/Lord Associates is published as follows, as well as their recommendations for additional soils testing at the noted area, to be conducted in spring of 2015, with the goal of determining the limits of the higher naturally occurring concentrations. For Schematic Design budgeting, a quantity of this higher level soils was figured to be kept on site and buried at areas that would be under paved areas, or deeper than 4 feet, in accordance with regulations.

The site development plans will require that soils are removed from the site. In accordance with DEP regulations, and exceptions for Worcester County, these soils can be used at sites with an equal or higher concentration of naturally occurring arsenic. The City DPW is presently in agreement with the DEP on work at the Greenwood Street and former Ballard street landfill, and site of the proposed DPW facilities, and has confirmed that the excess material can be brought to these sites. The City will have full authorization from the DEP for the relocation of this excess fill, and from other overall City Projects.
Massachusetts Department of Environmental Protection
Bureau of Resource Protection - Wetlands
WPA Form 4B – Order of Resource Area Delineation
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

A. General Information

From:  City of Worcester
        1. Conservation Commission

2. This Issuance is for (check one):
   a.  [ ] Order of Resource Area Delineation
   b.  [ ] Amended Order of Resource Area Delineation

3. Applicant
   Paul Moosley
   a. First Name
   Department of Public Works
   b. Last Name
   c. Organization
   20 East Worcester Street
   d. Mailing Address
   Worcester
   e. City/Town
   MA 01604
   f. State
   g. Zip Code

4. Property Owner (if different from applicant):
   Edward Augustus, Jr.
   a. First Name
   City of Worcester, City Manager Office
   b. Last Name
   c. Organization
   455 Main Street, Room 100
   d. Mailing Address
   Worcester
   e. City/Town
   MA 01608
   f. State
   g. Zip Code

5. Project Location:
   35 & 0 Nelson Place, 500 Salisbury Street
   a. Street Address
   Worcester
   b. City/Town
   002-00002
   c. Zip Code
   d. Assessors Map/Plat Number
   e. Parcel/Lot Number
   Latitude and Longitude
   (in degrees, minutes, seconds):
   f. Latitude
   June 29, 2014
   g. Longitude
   July 14, 2014
   h. Date of Issuance

6. Dates:
   a. Date ANRAD filed
   b. Date Public Hearing Closed
   c. Date

7. Title and Date (or Revised Date if applicable) of Final Plans and Other Documents:
   Existing Conditions Plan for Nelson Place Elementary School
   a. Title
   b. Date
   April 20, 2014
   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:

         a. Isolated Vegetated Wetlands (IVW): Eastern IVW is also considered Isolated Land Subject to Flooding (ILSF)

            Western IVW is not considered ILSF

   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:

         a. 

   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. Findings

This Order of Resource Area Delineation determines that 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 1C.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.

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).

D. 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 of Resource Area Delineation 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
WPA Form 4B – Order of Resource Area Delineation
Massachusetts Wetlands Protection Act M.G.L. c. 131, §40

E. Signatures

Please indicate the number of members who will sign this form.

[Signatures]

This Order is valid for three years from the date of issuance.

If this Order constitutes an Amended Order of Resource Area Delineation, this Order does not extend the issuance date of the original Final Order, which expires on ___ unless extended in writing by the issuing authority.

This Order is issued to the applicant and the property owner (if different) as follows:

2. ☑ By hand delivery on July 29, 2017

3. ☐ By certified mail, return receipt requested on

a. Date
A. Request Information

1. Person or party making request (if appropriate, name the citizen group's representative):

   Name

   Mailing Address

   City/Town  State  Zip Code

   Phone Number  Fax Number (if applicable)

   Project Location
   35 & 0 Nelson Place, 500 Salisbury Street

   Mailing Address
   Worcester  MA  Zip Code

   City/Town  State

2. Applicant (as shown on Notice of Intent (Form 3), Abbreviated Notice of Resource Area Delineation (Form 4A), or Request for Determination of Applicability (Form 1)):

   Name

   Mailing Address

   City/Town  State  Zip Code

   Phone Number  Fax Number (if applicable)

3. DEP File Number:
   349-1090

B. Instructions

1. When the Departmental action request is for (check one):

   [ ] Superseding Order of Conditions

   [ ] Superseding Determination of Applicability

   [ ] Superseding Order of Resource Area Delineation

Send this form and check or money order for $100.00 (single family house projects) or $200 (all other projects), payable to the Commonwealth of Massachusetts to:

   Department of Environmental Protection
   Box 4062
   Boston, MA 02211
B. Instructions (cont.)

2. On a separate sheet attached to this form, state clearly and concisely the objections to the Determination or Order which is being appealed. To the extent that the Determination or Order is based on a municipal bylaw, and not on the Massachusetts Wetlands Protection Act or regulations, the Department has no appellate jurisdiction.

3. Send a copy of this form and a copy of the check or money order with the Request for a Superseding Determination or Order by certified mail or hand delivery to the appropriate DEP Regional Office (see http://www.mass.gov/dep/about/region/findyour.htm).

4. 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.
November 10, 2014

Mr. Robert Para
Lamoureaux Pagano Associates, Inc.
108 Grove Street, Suite 300
Worcester, MA. 01605

RE: Soil Sampling & Analyses for Arsenic
    Proposed Nelson Place
    Worcester, Massachusetts

Dear Mr. Para,

Pursuant to your request, Lord Associates, Inc. (LAI) has prepared the following summary of soil sampling and analyses that was performed in conjunction with geotechnical work at the Proposed Nelson Place Elementary School between August and September of 2014 by Lahlaf Geotechnical Consulting, Inc. (Lahlaf).

Samples collected by Lahlaf were delivered to LAI, and LAI selected a sub-set of samples believed to be representative of soil types across the Site for laboratory analyses of arsenic. As you know, the occurrence of naturally-occurring arsenic in relatively elevated concentrations has been well documented in Worcester County soils. As such, soil from these areas with arsenic concentrations may be considered to be “background” and exempt from Department of Environmental Protection (DEP) notification requirements pursuant to 310 CMR 40.0317(22).

Lahlaf completed sixteen test borings and eighteen test pits across the proposed design area (see attached Figure 4A). LAI selected 26 sub-samples from the geotechnical samples for laboratory analyses. An additional five samples were analyzed from one location (B-13) because a high concentration was measured at sample S-2 at a depth between 2-4 feet below surface grade (bsg). A summary of all test results is provided on Table 1, and copies of the original lab reports and site plan are appended.

**Discussion of Results**

As shown on Table 1, with two exceptions (both at B-6) arsenic was detected at each boring and test pit location at a concentration that exceeds the DEP cleanup standard of 20 milligrams per kilogram (mg/Kg). The range of arsenic concentrations detected was from 17.4 to 525 mg/Kg. Seven of the samples exceeded the 40 mg/Kg criteria for in-state landfill disposal and DEP “Imminent Hazard” condition.

The highest concentrations detected were at boring location B-13 at a depth of 2-4’ bsg. To confirm the initial analysis of 525 mg/Kg at boring B-13, S-2, a second sub-sample from this location and depth was sent to a different laboratory. The second analysis, while lower (270

mg/Kg) still indicated arsenic being present at a concentration one order of magnitude greater than the others. These concentrations appear to be an anomaly as they represent an order of magnitude greater than any other sample analyzed. The boring log prepared for this location describes the soil at this depth as being a bright-brown silt with gravel. Similar soil types were identified at other locations with lower arsenic concentrations. There was nothing unnatural looking in the sample.

To determine if the soil sample with the elevated arsenic results was leachable, a portion of the sample was subjected to the toxicity characteristic leaching program (TCLP) test. The results of that analyses was that no arsenic was detected in the leachate.

When the result of 525 mg/Kg in the initial analysis is not included, the average arsenic concentration of all samples analyzed across the site is 40.8 mg/Kg. When all of the data from location B-13, S-2, is not included, the result is 33 mg/Kg.

**Recommendations**

It is recommended that additional testing be done in the area of boring B-13, S-2 to delineate the extent of the elevated concentrations measured in this area. These findings may be used to exclude the soil from other soil excavated to ensure that it is managed with special consideration.

Soil from this area should be segregated from other soil excavated at the site and stockpiled separately. Based upon the proposed land use as school grounds, all soil identified with concentrations greater than the DEP S-1 standard of 20 mg/Kg should be buried at a depth at least three feet below surface grade with “clean” fill less than 20 mg/Kg, or permanent structures, to control the risk of exposure to humans. DEP guidance and regulation define soil less than three feet below surface grade to be “accessible”.

Please contact me if you have any questions.

Sincerely,

LORD ASSOCIATES, INC.

__________________________
Ralph J. Tella, LSP, CHMM
President and Senior Project Manager

Attached: Site Plan
Table of Analytical Results
Boring Logs – Prepared by Lahlaf
Laboratory Analytical Data
<table>
<thead>
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<th>Sample ID</th>
<th>Depth (feet)</th>
<th>Arsenic (mg/kg-dry)</th>
<th>DEP S-1 Stnd. (mg/kg)</th>
<th>Comm-97 (mg/kg)</th>
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</tr>
<tr>
<td>B-15, S-4</td>
<td>9-11</td>
<td>41.6</td>
<td>20</td>
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<td>B-16, S-3</td>
<td>4-6</td>
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<td>B-16, S-4</td>
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<tr>
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<td>4-5</td>
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<td>20</td>
<td>40</td>
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<td>4-5</td>
<td>25.3</td>
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<td>40</td>
<td>40</td>
</tr>
<tr>
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<td>4-5</td>
<td>63.3</td>
<td>20</td>
<td>40</td>
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<tr>
<td>TP-17</td>
<td>4-5</td>
<td>24.7</td>
<td>20</td>
<td>40</td>
<td>40</td>
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<tr>
<td>TP-2</td>
<td>2-3</td>
<td>24.7</td>
<td>20</td>
<td>40</td>
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</tr>
<tr>
<td>TP-1</td>
<td>4-5</td>
<td>21.5</td>
<td>20</td>
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</tr>
</tbody>
</table>

*re-analysis

Average of B-13: 132.8
Average of all w/o B-13, S-2 525ppm: 41
Approximate location of boring advanced by Northern Drill Service of Northborough, Massachusetts between August 26 and September 3, 2014 and observed by Lahlaf Geotechnical Consulting, Inc. (LGCI). “OW” denotes that a groundwater observation well was installed in the boring.

Test pit excavated by R. E. Barrows Construction of Worcester, Massachusetts between August 19 and 22, 2014 and observed by LGCI. “I” denotes that a double ring infiltrometer test was performed in the test pit.

Note
Figure based on progress grading plan provided to us by Lamoureux Pagano Associates on October 1, 2014.
### BORING LOG

**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts

**Client:** Lamourex Pagano Associates

**Drilling Subcontractor:** Northern Drill Service, Inc.

**Drilling Foreman:** Carl Beirhorn

**LGCI Engineer:** Geetha Mathiyalakan

**Ground Surface El:** 662.5 feet (see remark 1)

**Groundwater Depth:** 10.5 feet at end of drilling

**Hammer Weight:** 140 lbs

**Hammer Type:** Automatic

**Drop:** 30 inches

**Date Started:** 9/3/2014

**Date Completed:** 9/3/2014

**Location:** Proposed building - east side

**Total Depth:** 12.9 feet

**Drill Rig Type:** Mobile B-48 Rubber Tire ATV

**Drilling Method:** 4" casing to 7 ft / Button bit

**Split Spoon Diameter:** ID - 1.375", OD - 2"

**Rock Core Barrel Size:** N/A

---

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Sample No</th>
<th>Blows per 6 inches</th>
<th>Pen (in)</th>
<th>Rec (in)</th>
<th>Remarks</th>
</tr>
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<tbody>
<tr>
<td>0 - 2</td>
<td>S1</td>
<td>1-2-3-6</td>
<td>24-15</td>
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<tr>
<td>2 - 4</td>
<td>S2</td>
<td>8-16-24-50</td>
<td>24-8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 - 6</td>
<td>S3</td>
<td>25-19-19-14</td>
<td>24-10</td>
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<td></td>
</tr>
<tr>
<td>9 - 11</td>
<td>S4</td>
<td>32-33-37-28</td>
<td>24-15</td>
<td></td>
<td></td>
</tr>
<tr>
<td>11-12.9</td>
<td>S5</td>
<td>12-9-8-70/5&quot;</td>
<td>24-12</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Sample Description**

- **S1 - Top 11" : Topsoil**
  Bot. 4": SILT (ML), mostly non-plastic, ~5% coarse gravel, 5-10% organics, brown, moist (subsoil)

- **S2 - SILT with Gravel (ML), mostly non-plastic, thin (~2") layer of fine gravel at the bottom of the sample, bright brown, moist (subsoil/fill)**

- **S3 - Silty SAND with Gravel (SM), mostly fine to medium, 30-35% fines, 25-30% fine to coarse, subangular gravel, thin (~1/4") layer of weathered rock fragments at the tip of the spoon, gray-brown, wet**

- **S4 - Gravelly SILT with Sand (ML), mostly non-plastic, ~25% fine sand, 20-25% mostly fine, angular gravel, bright brown, wet**

- **S5 - Gravelly SILT (ML), mostly non-plastic, ~10% fine sand, 30-35% mostly weathered rock fragments, dark brown-gray, wet**

**Remarks:**

2. Based on drilling action possible boulder between 7 ft and 9 ft.
3. Based on drilling action possible top of bedrock at 12.9 ft.

End of boring at 12.9 feet. Backfilled with drill cuttings.
ANALYTICAL REPORT

Lab Number:   L1423859
Client:       Lord Associates, Inc.
              1506 Providence Highway - Suite 30
              Norwood, MA 02062
ATTN:         Ralph Tella
Phone:        (781) 255-5554
Project Name: WPLACE
Project Number: 2162
Report Date:  10/15/14

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals:  MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), USDA (Permit #P-330-11-00240), NC (666), TX (T104704476), DOD (L2217), US Army Corps of Engineers.

Eight Walkup Drive, Westborough, MA 01581-1019
508-898-9220 (Fax) 508-898-9193  800-624-9220 - www.alphalab.com
<table>
<thead>
<tr>
<th>Project Name:</th>
<th>WPLACE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Number:</td>
<td>2162</td>
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<tr>
<td>Report Date:</td>
<td>10/15/14</td>
</tr>
<tr>
<td>Alpha Sample ID</td>
<td>L1423859-01</td>
</tr>
<tr>
<td>Client ID</td>
<td>B-13, S-2</td>
</tr>
<tr>
<td>Matrix</td>
<td>SOIL</td>
</tr>
<tr>
<td>Sample Location</td>
<td>WORC</td>
</tr>
<tr>
<td>Collection Date/Time</td>
<td>09/14/14 00:00</td>
</tr>
<tr>
<td>Receive Date</td>
<td>10/09/14</td>
</tr>
</tbody>
</table>
Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: [Signature]

Title: Technical Director/Representative

Date: 10/15/14
METALS
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result</th>
<th>Qualifier</th>
<th>Units</th>
<th>RL</th>
<th>MDL</th>
<th>Dilution Factor</th>
<th>Date Prepared</th>
<th>Date Analyzed</th>
<th>Prep Method</th>
<th>Analytical Method</th>
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<td>1</td>
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<td>EPA 3050B</td>
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## Method Blank Analysis

### Batch Quality Control

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<th>MDL</th>
<th>Dilution Factor</th>
<th>Date Prepared</th>
<th>Date Analyzed</th>
<th>Analytical Method</th>
<th>Analyst</th>
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<td>Total Metals - Westborough Lab for sample(s): 01 Batch: WG730058-1</td>
<td>ND</td>
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### Prep Information

- Digestion Method: EPA 3050B
## Lab Control Sample Analysis

### Batch Quality Control

**Project Name:** WPLACE  
**Project Number:** 2162  
**Lab Number:** L1423859  
**Report Date:** 10/15/14

<table>
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<tr>
<th>Parameter</th>
<th>LCS %Recovery</th>
<th>Qual</th>
<th>LCSD %Recovery</th>
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<th>%Recovery Limits</th>
<th>RPD Qual</th>
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<td>Associated sample(s): 01</td>
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<td>Batch: WG730058-2</td>
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<td>MS Found</td>
<td>MS %Recovery</td>
<td>Qual</td>
<td>MSD Found</td>
<td>MSD %Recovery</td>
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<tr>
<td>-------------------------</td>
<td>----------------</td>
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<tr>
<td>Total Metals - Westborough Lab Associated sample(s): 01</td>
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<td>QC Sample: L1423874-02</td>
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<td>9.76</td>
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<td>Units</td>
<td>RPD</td>
<td>Qual</td>
<td>RPD Limits</td>
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<tr>
<td>-------------------------</td>
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</tr>
<tr>
<td>Total Metals - Westborough Lab</td>
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<td>QC Batch ID: WG730058-3</td>
<td>QC Sample: L1423874-02</td>
<td>Client ID: DUP Sample</td>
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<td>Arsenic, Total</td>
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<td>mg/kg</td>
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<td>Q</td>
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INORGANICS
&
MISCELLANEOUS
### SAMPLE RESULTS

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<td>%</td>
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**General Chemistry - Westborough Lab**

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<th>Date Analyzed</th>
<th>Analyst</th>
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<tr>
<td>10/13/14 13:59</td>
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<td>30.2540G</td>
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**Report Date:** 10/15/14

**Lab Number:** L1423859

**Lab ID:** L1423859-01

**Client ID:** B-13, S-2

**Sample Location:** WORC

**Matrix:** Soil
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Native Sample</th>
<th>Duplicate Sample</th>
<th>Units</th>
<th>RPD</th>
<th>Qual</th>
<th>RPD Limits</th>
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</thead>
<tbody>
<tr>
<td>General Chemistry - Westborough Lab</td>
<td>01</td>
<td>QC Batch ID: WG730515-1</td>
<td>QC Sample: L1423858-01</td>
<td>Solids, Total</td>
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</table>

Associated sample(s): 01  QC Batch ID: WG730515-1  QC Sample: L1423858-01  Client ID: DUP Sample
**Sample Receipt and Container Information**

Were project specific reporting limits specified? YES

| Reagent H2O Preserved Vials Frozen on: | NA |

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<thead>
<tr>
<th>Cooler Information</th>
<th>Custody Seal</th>
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<tr>
<td>Cooler</td>
<td>Absent</td>
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**Container Information**

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<th>Container ID</th>
<th>Container Type</th>
<th>Cooler</th>
<th>pH</th>
<th>Temp deg C</th>
<th>Pres</th>
<th>Seal</th>
<th>Analysis(*)</th>
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</thead>
<tbody>
<tr>
<td>L1423859-01A</td>
<td>Amber 250ml unpreserved</td>
<td>A</td>
<td>N/A</td>
<td>2.7</td>
<td>Y</td>
<td>Absent</td>
<td>AS-TI(180),TS(7)</td>
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</table>

*Values in parentheses indicate holding time in days*
Acronyms

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NI - Not Ignitable.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
The concentration may be biased high due to matrix interferences (i.e., co-elution) with non-target compound(s). The result should be considered estimated.

The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

The lower value for the two columns has been reported due to obvious interference.

Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

The RPD between the results for the two columns exceeds the method-specified criteria.

The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

Analytical results are from sample re-analysis.

Analytical results are from sample re-extraction.

Analytical results are from modified screening analysis.

Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

Not detected at the reporting limit (RL) for the sample.
REFERENCES


LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at its own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.
The following analytes are not included in our NELAP Scope of Accreditation:

**Westborough Facility**

**EPA 524.2**: Acetone, 2-Butanone (Methyl ethyl ketone (MEK)), Tert-butyl alcohol, 2-Hexanone, Tetrahydrofuran, 1,3,5-Trichlorobenzene, 4-Methyl-2-pentanone (MIBK), Carbon disulfide, Diethyl ether.

**EPA 8260C**: 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene, Iodomethane (methyl iodide), Methyl methacrylate, Azobenzene.

**EPA 8330A/B**: PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT.

**EPA 8270D**: 1-Methylnaphthalene, Dimethylnaphthalene, 1,4-Diphenylhydrazine.

**EPA 625**: 4-Chloroaniline, 4-Methylphenol.

**SM4500**: Soil: Total Phosphorus, TKN, NO2, NO3.

**EPA 9071**: Total Petroleum Hydrocarbons, Oil & Grease.

**Mansfield Facility**

**EPA 8270D**: Biphenyl.

**EPA 2540D**: TSS

**EPA TO-15**: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:

**Drinking Water**

**EPA 200.8**: Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, Ti;  **EPA 200.7**: Ba, Be, Ca, Cd, Cr, Cu, Na;  **EPA 245.1**: Mercury;


**EPA 332**: Perchlorate.

**Microbiology**: SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.

**Non-Potable Water**

**EPA 200.8**: Al, Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, Ti, Zn;

**EPA 200.7**: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, Ti, Tl, V, Zn;


**EPA 624**: Volatile Halocarbons & Aromatics,

**EPA 608**: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625**: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.

**Microbiology**: SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF.

For a complete listing of analytes and methods, please contact your Alpha Project Manager.
ANALYTICAL REPORT

Lab Number: L1425574
Client: Lord Associates, Inc.
        1506 Providence Highway - Suite 30
        Norwood, MA 02062
ATTN: Ralph Tella
Phone: (781) 255-5554
Project Name: N PLACE
Project Number: 2162
Report Date: 11/03/14

The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), USDA (Permit #P-330-11-00240), NC (666), TX (T104704476), DOD (L2217), US Army Corps of Engineers.
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<tr>
<th>Alpha Sample ID</th>
<th>Client ID</th>
<th>Matrix</th>
<th>Sample Location</th>
<th>Collection Date/Time</th>
<th>Receive Date</th>
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<tbody>
<tr>
<td>L1425574-01</td>
<td>B-13, S-3</td>
<td>SOIL</td>
<td>WORC</td>
<td>08/14/14 00:00</td>
<td>10/27/14</td>
</tr>
<tr>
<td>L1425574-02</td>
<td>B-13, S-4</td>
<td>SOIL</td>
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<td>10/27/14</td>
</tr>
<tr>
<td>L1425574-03</td>
<td>B-13, S-5</td>
<td>SOIL</td>
<td>WORC</td>
<td>08/14/14 00:00</td>
<td>10/27/14</td>
</tr>
<tr>
<td>L1425574-04</td>
<td>B-13, S-1</td>
<td>SOIL</td>
<td>WORC</td>
<td>08/14/14 00:00</td>
<td>10/27/14</td>
</tr>
</tbody>
</table>
MADEP MCP Response Action Analytical Report Certification

This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.

### An affirmative response to questions A through F is required for "Presumptive Certainty" status

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?</td>
</tr>
<tr>
<td>B</td>
<td>Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?</td>
</tr>
<tr>
<td>C</td>
<td>Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?</td>
</tr>
<tr>
<td>D</td>
<td>Does the laboratory report comply with all the reporting requirements specified in CAM VII A, &quot;Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?&quot;</td>
</tr>
<tr>
<td>E a. VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).</td>
<td>N/A</td>
</tr>
<tr>
<td>E b. APH and TO-15 Methods only: Was the complete analyte list reported for each method?</td>
<td>N/A</td>
</tr>
<tr>
<td>F</td>
<td>Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all &quot;No&quot; responses to Questions A through E)?</td>
</tr>
</tbody>
</table>

### A response to questions G, H and I is required for "Presumptive Certainty" status

<table>
<thead>
<tr>
<th>Question</th>
<th>Answer</th>
</tr>
</thead>
<tbody>
<tr>
<td>G</td>
<td>Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?</td>
</tr>
<tr>
<td>H</td>
<td>Were all QC performance standards specified in the CAM protocol(s) achieved?</td>
</tr>
<tr>
<td>I</td>
<td>Were results reported for the complete analyte list specified in the selected CAM protocol(s)?</td>
</tr>
</tbody>
</table>

For any questions answered "No", please refer to the case narrative section on the following page(s).

Please note that sample matrix information is located in the Sample Results section of this report.
Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha's policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.
MCP Related Narratives

Total Metals

In reference to question H:

The WG735327-4 MS recovery, performed on L1425574-01, is outside the acceptance criteria for arsenic (270%). Re-analysis of the MS yielded an unacceptable recovery for arsenic in the range of 30-74% or >125%. The LCS recovery was within acceptance criteria for this analyte; therefore, no further action was taken.

In reference to question I:

All samples were analyzed for a subset of MCP elements per the Chain of Custody.
METALS
### SAMPLE RESULTS

**Lab ID:** L1425574-01  
**Client ID:** B-13, S-3  
**Sample Location:** WORC  
**Matrix:** Soil  
**Percent Solids:** 89%  
**Date Collected:** 08/14/14 00:00  
**Date Received:** 10/27/14  
**Field Prep:** Not Specified

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result</th>
<th>Qualifier</th>
<th>Units</th>
<th>RL</th>
<th>MDL</th>
<th>Dilution Factor</th>
<th>Date Prepared</th>
<th>Date Analyzed</th>
<th>Prep Method</th>
<th>Analytical Method</th>
<th>Analyst</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic, Total</td>
<td>35</td>
<td>mg/kg</td>
<td>0.43</td>
<td>--</td>
<td>1</td>
<td>10/28/14 19:50 10/31/14 19:23</td>
<td>EPA 3050B</td>
<td>97.6010C</td>
<td>JH</td>
<td></td>
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</tbody>
</table>
**SAMPLE RESULTS**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result</th>
<th>Qualifier</th>
<th>Units</th>
<th>RL</th>
<th>MDL</th>
<th>Dilution Factor</th>
<th>Date Prepped</th>
<th>Date Analyzed</th>
<th>Prep Method</th>
<th>Analytical Method</th>
<th>Analyst</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arsenic, Total</td>
<td>32</td>
<td>mg/kg</td>
<td>0.41</td>
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<td>10/31/14</td>
<td>EPA 3050B</td>
<td>97.6010C</td>
<td>JH</td>
</tr>
</tbody>
</table>

**Matrix:** Soil

**Percent Solids:** 91%

**Date Collected:** 08/14/14 00:00

**Date Received:** 10/27/14

**Field Prep:** Not Specified
<table>
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<th>Units</th>
<th>RL</th>
<th>MDL</th>
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<th>Date Analyzed</th>
<th>Prep Method</th>
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<th>Analyst</th>
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<tbody>
<tr>
<td>Arsenic, Total</td>
<td>46</td>
<td>mg/kg</td>
<td>0.43</td>
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<td>1</td>
<td>10/28/14 19:50 10/31/14 19:39</td>
<td>EPA 3050B</td>
<td>97.6010C</td>
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<tr>
<td>Parameter</td>
<td>Result</td>
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<td>Units</td>
<td>RL</td>
<td>MDL</td>
<td>Dilution Factor</td>
<td>Date Prepared</td>
<td>Date Analyzed</td>
<td>Prep Method</td>
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<td>MCP Total Metals - Westborough Lab</td>
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<td>Arsenic, Total</td>
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<td>JH</td>
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</table>
Method Blank Analysis
Batch Quality Control

<table>
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<th>RL</th>
<th>MDL</th>
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<th>Date Prepared</th>
<th>Date Analyzed</th>
<th>Analytical Method</th>
<th>Analyst</th>
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</thead>
<tbody>
<tr>
<td>MCP Total Metals - Westborough Lab for sample(s): 01-04 Batch: WG735327-1</td>
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</tr>
<tr>
<td>Arsenic, Total</td>
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Prep Information

Digestion Method: EPA 3050B
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<th>%Recovery Limits</th>
<th>RPD</th>
<th>RPD Limits</th>
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<tbody>
<tr>
<td>Arsenic, Total</td>
<td>98</td>
<td>90</td>
<td>78-122</td>
<td>9</td>
<td>30</td>
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</table>

Lab Control Sample Analysis
Batch Quality Control

Project Name: N PLACE
Project Number: 2162

Lab Number: L1425574
Report Date: 11/03/14

MCP Total Metals - Westborough Lab  Associated sample(s): 01-04  Batch: WG735327-2  WG735327-3  SRM Lot Number: D083-540
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<th>MS %Recovery</th>
<th>Qual</th>
<th>MSD Found</th>
<th>MSD %Recovery</th>
<th>Qual</th>
<th>Recovery Limits</th>
<th>RPD</th>
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</thead>
<tbody>
<tr>
<td>Arsenic, Total</td>
<td>35</td>
<td>10.7</td>
<td>64</td>
<td>270</td>
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<td>-</td>
<td>75-125</td>
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INORGANICS
&
MISCELLANEOUS
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<th>Date Prepared</th>
<th>Date Analyzed</th>
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<tbody>
<tr>
<td>Solids, Total</td>
<td>88.5</td>
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## SAMPLE RESULTS

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<tr>
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<th>MDL</th>
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<th>Date Prepared</th>
<th>Date Analyzed</th>
<th>Analytical Method</th>
<th>Analyst</th>
</tr>
</thead>
<tbody>
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<td>General Chemistry - Westborough Lab</td>
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<td>Solids, Total</td>
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<td>30,2540G</td>
<td>RT</td>
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</table>
**Project Name:** N PLACE  
**Project Number:** 2162

**SAMPLE RESULTS**

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<thead>
<tr>
<th>Parameter</th>
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<th>MDL</th>
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<th>Date Prepared</th>
<th>Date Analyzed</th>
<th>Analytical Method</th>
<th>Analyst</th>
</tr>
</thead>
<tbody>
<tr>
<td>General Chemistry - Westborough Lab</td>
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<td>Solids, Total</td>
<td>87.7</td>
<td>%</td>
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<td>Qualifier</td>
<td>Units</td>
<td>RL</td>
<td>MDL</td>
<td>Dilution Factor</td>
<td>Date Prepared</td>
<td>Date Analyzed</td>
<td>Analytical Method</td>
<td>Analyst</td>
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<td>Solids, Total</td>
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<td>NA</td>
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<td>Native Sample</td>
<td>Duplicate Sample</td>
<td>Units</td>
<td>RPD</td>
<td>Qual</td>
<td>RPD Limits</td>
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<tr>
<td>General Chemistry - Westborough Lab  Associated sample(s): 01-04 QC Batch ID: WG734929-1 QC Sample: L1425532-01 Client ID: DUP Sample</td>
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</table>
Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information
Cooler
A Absent

Container Information

<table>
<thead>
<tr>
<th>Container ID</th>
<th>Container Type</th>
<th>Cooler</th>
<th>pH</th>
<th>Temp deg C</th>
<th>Pres</th>
<th>Seal</th>
<th>Analysis(*)</th>
</tr>
</thead>
<tbody>
<tr>
<td>L1425574-01A</td>
<td>Amber 250ml unpreserved</td>
<td>A</td>
<td>N/A</td>
<td>4.4</td>
<td>Y</td>
<td>Absent</td>
<td>MCP-AS-6010T-10(180),TS(7)</td>
</tr>
<tr>
<td>L1425574-02A</td>
<td>Amber 250ml unpreserved</td>
<td>A</td>
<td>N/A</td>
<td>4.4</td>
<td>Y</td>
<td>Absent</td>
<td>MCP-AS-6010T-10(180),TS(7)</td>
</tr>
<tr>
<td>L1425574-03A</td>
<td>Amber 250ml unpreserved</td>
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<td>Y</td>
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<tr>
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<td>Y</td>
<td>Absent</td>
<td>MCP-AS-6010T-10(180),TS(7)</td>
</tr>
</tbody>
</table>

*Values in parentheses indicate holding time in days
GLOSSARY

**Acronyms**

- **EDL**: Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).
- **EPA**: Environmental Protection Agency.
- **LCS**: Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
- **LCSD**: Laboratory Control Sample Duplicate: Refer to LCS.
- **LFB**: Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
- **MDL**: Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
- **MS**: Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
- **MSD**: Matrix Spike Sample Duplicate: Refer to MS.
- **NA**: Not Applicable.
- **NC**: Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
- **NI**: Not Ignitable.
- **RL**: Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
- **RPD**: Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
- **SRM**: Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

**Footnotes**

1. The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

**Terms**

- **Total**: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.
- **Analytical Method**: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

**Data Qualifiers**

- **A**: Spectra identified as "Aldol Condensation Product".
- **B**: The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding Air), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).
- **C**: Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
- **D**: Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
- **E**: Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
The concentration may be biased high due to matrix interferences (i.e., co-elution) with non-target compound(s). The result should be considered estimated.

The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

The lower value for the two columns has been reported due to obvious interference.

Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

The RPD between the results for the two columns exceeds the method-specified criteria.

The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

Analytical results are from sample re-analysis.

Analytical results are from sample re-extraction.

Analytical results are from modified screening analysis.

Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

Not detected at the reporting limit (RL) for the sample.
REFERENCES


97 EPA Test Methods (SW-846) with QC Requirements & Performance Standards for the Analysis of EPA SW-846 Methods under the Massachusetts Contingency Plan, WSC-CAM-IIA, IIB, IIIA, IIIB, IIC, IID, VA, VB, VC, VIA, VIB, VIIIA and VIIIB, July 2010.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at its own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.
The following analytes are not included in our NELAP Scope of Accreditation:

**Westborough Facility**

**EPA 524.2:** Acetone, 2-Butanone (Methyl ethyl ketone (MEK)), Tert-butyl alcohol, 2-Hexanone, Tetrahydrofuran, 1,3,5-Trichlorobenzene, 4-Methyl-2-pentanone (MIBK), Carbon disulfide, Diethyl ether.

**EPA 8260C:** 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene, Iodomethane (methyl iodide), Methyl methacrylate, Azobenzene.

**EPA 8330A/B:** PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT.

**EPA 8270D:** 1-Methylnaphthalene, Dimethylnaphthalene, 1,4-Diphenylhydrazine.

**EPA 625:** 4-Chloroaniline, 4-Methylphenol.

**SM4500:** Soil: Total Phosphorus, TKN, NO2, NO3.

**EPA 9071:** Total Petroleum Hydrocarbons, Oil & Grease.

**Mansfield Facility**

**EPA 8270D:** Biphenyl.

**EPA 2540D:** TSS

**EPA TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:

**Drinking Water**

**EPA 200.8:** Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, Ti;  
**EPA 200.7:** Ba, Be, Ca, Cd, Cr, Cu, Na;  
**EPA 245.1:** Mercury;

**EPA 300.0:** Nitrate-N, Fluoride, Sulfate;  
**EPA 353.2:** Nitrate-N, Nitrite-N;  
**SM4500NO3-F:** Nitrate-N, Nitrite-N;  
**SM4500C-CE:** EPA 180.1, SM2130B, SM4500Cl-D, SM2320B, SM2540C, SM4500H-B

**EPA 332:** Perchlorate.

**Microbiology:** SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.

**Non-Potable Water**

**EPA 200.8:** Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, Ti, Zn;  
**EPA 200.7:** Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, Ti, Ti, V, Zn;  

**EPA 624:** Volatile Halocarbons & Aromatics,

**EPA 608:** Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625:** SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045:** PCB-Oil.

**Microbiology:** SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF.

For a complete listing of analytes and methods, please contact your Alpha Project Manager.
### Chain of Custody

**Client Information**
- Client: LORD ASSOC.
- Address: 1506 PROVIDENCE, WORCESTER, MA
- Phone: 714-255-5545
- Fax: 714-255-5588
- Email: RTellaborders.com

**Project Information**
- Project Name: NPLACE
- Project Location: WORC
- Project #: 2162
- ALPHA Quote #: 11031416:27
- Turn-Around Time: Standard

**Report Information - Data Deliverables**

**Billing Information**
- Same as Client Info: Yes
- PO #: 

**Regulatory Requirements/Report Limits**

- MA MCP PRESUMPTIVE CERTainty — CT REASONABLE CONFIDENCE PROTO
  - Are MCP Analytical Methods Required? Yes
  - Is Matrix Spike (MS) Required on this SDG? (If yes see note in Comments) No
  - Are CT RCP (Reasonable Confidence Protocols) Required? Yes

**Sample Handling**
- Filtration: 
- Done: Yes
- Not needed: No
- Lab to do: Yes
- Preservation: 
- Lab to do: Yes
- Phone (specify below): 

**Sample Specific Comments**

<table>
<thead>
<tr>
<th>Sample ID</th>
<th>Collection Date</th>
<th>Collection Time</th>
<th>Sample Matrix</th>
<th>Sampler's Initials</th>
</tr>
</thead>
<tbody>
<tr>
<td>21574.01</td>
<td>4/14</td>
<td></td>
<td>S</td>
<td>G</td>
</tr>
<tr>
<td>02</td>
<td>4/13 _ S-4</td>
<td></td>
<td>S</td>
<td>X</td>
</tr>
<tr>
<td>03</td>
<td>4/13 _ S-5</td>
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<td>S</td>
<td>X</td>
</tr>
<tr>
<td>04</td>
<td>4/13 _ S-2</td>
<td></td>
<td>S</td>
<td>X</td>
</tr>
</tbody>
</table>

**Total # Bottles:**
- Sample Specific Comments

Please answer questions above!

**IS YOUR PROJECT MA MCP or CT RCP?**

- Relinquished By: [Signature]
- Date/Time: 11/3/14
- Received By: [Signature]
- Date/Time: 11/3/14

*Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.*
The original project report/data package is held by Alpha Analytical. This report/data package is paginated and should be reproduced only in its entirety. Alpha Analytical holds no responsibility for results and/or data that are not consistent with the original.

Certifications & Approvals: MA (M-MA086), NY (11148), CT (PH-0574), NH (2003), NJ NELAP (MA935), RI (LAO00065), ME (MA00086), PA (68-03671), USDA (Permit #P-330-11-00240), NC (666), TX (T104704476), DOD (L2217), US Army Corps of Engineers.
<table>
<thead>
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<th>Client ID</th>
<th>Matrix</th>
<th>Sample Location</th>
<th>Collection Date/Time</th>
<th>Receive Date</th>
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<tbody>
<tr>
<td>L1426491-01</td>
<td>B-13, S-2</td>
<td>SOIL</td>
<td>WORC</td>
<td>08/14/14 00:00</td>
<td>10/09/14</td>
</tr>
</tbody>
</table>

Project Name: WPLACE
Project Number: 2162
Lab Number: L1426491
Report Date: 11/07/14
Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an “R” or “RE”, respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. All specific QC information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY

For samples submitted on hold, Alpha’s policy is to hold samples (with the exception of Air canisters) free of charge for 21 calendar days from the date the project is completed. After 21 calendar days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples. Air canisters will be disposed after 3 business days from the date the project is completed.

Please contact Client Services at 800-624-9220 with any questions.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature:  Kelly Stenstrom

Title:  Technical Director/Representative  Date:  11/07/14
METALS
**Project Name:** WPLACE  
**Project Number:** 2162  
**Lab Number:** L1426491  
**Report Date:** 11/07/14

### SAMPLE RESULTS

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Result</th>
<th>Qualifier</th>
<th>Units</th>
<th>RL</th>
<th>MDL</th>
<th>Date Prepared</th>
<th>Date Analyzed</th>
<th>Prep Method</th>
<th>Analytical Method</th>
<th>Analyst</th>
</tr>
</thead>
<tbody>
<tr>
<td>TCLP Metals by EPA 1311 - Westborough Lab</td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<tr>
<td>Arsenic, TCLP</td>
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<td>mg/l</td>
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<td>11/06/14 10:14</td>
<td>11/06/14 20:20</td>
<td>EPA 3015</td>
<td>1,6010C</td>
<td>MG</td>
</tr>
</tbody>
</table>

**Date Collected:** 08/14/14 00:00  
**Date Received:** 10/09/14  
**Field Prep:** Not Specified  
**TCLP/SPLP Ext. Date:** 11/05/14 14:10
**Method Blank Analysis**  
**Batch Quality Control**

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<th>Parameter</th>
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<th>RL</th>
<th>MDL</th>
<th>Dilution Factor</th>
<th>Date Prepared</th>
<th>Date Analyzed</th>
<th>Analytical Method</th>
<th>Analyst</th>
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<td>ND</td>
<td>mg/l</td>
<td>1.0</td>
<td>--</td>
<td>1</td>
<td>11/06/14 10:14</td>
<td>11/06/14 16:25</td>
<td>1.6010C</td>
<td>MG</td>
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**Prep Information**

- Digestion Method: EPA 3015
- TCLP/SPLP Extraction Date: 11/05/14 14:10
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<tr>
<th>Parameter</th>
<th>LCS %Recovery</th>
<th>Qual</th>
<th>LCSD %Recovery</th>
<th>Qual</th>
<th>%Recovery Limits</th>
<th>RPD</th>
<th>Qual</th>
<th>RPD Limits</th>
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<tr>
<td>Associated sample(s): 01</td>
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<td></td>
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<td></td>
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<tr>
<td>Batch: WG738036-2</td>
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<tr>
<td>Arsenic, TCLP</td>
<td>100</td>
<td></td>
<td>-</td>
<td></td>
<td>75-125</td>
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## Matrix Spike Analysis
### Batch Quality Control

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<th>Parameter</th>
<th>Native Sample</th>
<th>MS Added</th>
<th>MS Found</th>
<th>MS %Recovery</th>
<th>MS Qual</th>
<th>MSD Found</th>
<th>MSD %Recovery</th>
<th>MSD Qual</th>
<th>Recovery Limits</th>
<th>RPD</th>
<th>RPD Limits</th>
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<tbody>
<tr>
<td>TCLP Metals by EPA 1311 - Westborough Lab</td>
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<td>-</td>
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<td>-</td>
<td>20</td>
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</tbody>
</table>
## Lab Duplicate Analysis
### Batch Quality Control

**Project Name:** WPLACE  
**Project Number:** 2162  
**Lab Number:** L1426491  
**Report Date:** 11/07/14

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Native Sample</th>
<th>Duplicate Sample</th>
<th>Units</th>
<th>RPD</th>
<th>Qual</th>
<th>RPD Limits</th>
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</thead>
<tbody>
<tr>
<td>TCLP Metals by EPA 1311 - Westborough Lab</td>
<td>ND</td>
<td>ND</td>
<td>mg/l</td>
<td>NC</td>
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<tr>
<td>Arsenic, TCLP</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

Associated sample(s): 01  
QC Batch ID: WG738036-3  
QC Sample: L1426407-29  
Client ID: DUP Sample
Sample Receipt and Container Information

Were project specific reporting limits specified? YES

| Reagent H2O Preserved Vials Frozen on: | NA |

### Cooler Information

<table>
<thead>
<tr>
<th>Cooler</th>
<th>Custody Seal</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Absent</td>
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</tbody>
</table>

### Container Information

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<th>Container Type</th>
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<th>pH</th>
<th>Temp deg C</th>
<th>Pres</th>
<th>Seal</th>
<th>Analysis(*)</th>
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<tbody>
<tr>
<td>L1426491-01A</td>
<td>Amber 250ml unpreserved</td>
<td>A</td>
<td>N/A</td>
<td>2.7</td>
<td>Y</td>
<td>Absent</td>
<td>-</td>
</tr>
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<td>L1426491-01X</td>
<td>Plastic 120ml HNO3 preserved spl</td>
<td>A</td>
<td>&lt;2</td>
<td>2.7</td>
<td>Y</td>
<td>Absent</td>
<td>AS-CI(180)</td>
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<tr>
<td>L1426491-01X9</td>
<td>Tumble Vessel</td>
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<td>N/A</td>
<td>2.7</td>
<td>Y</td>
<td>Absent</td>
<td>-</td>
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</tbody>
</table>

**Container Comments**

L1426491-01A

*Values in parentheses indicate holding time in days*
GLOSSARY

Acronyms

EDL  Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EPA Environmental Protection Agency.

LCS Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD Laboratory Control Sample Duplicate: Refer to LCS.

LFB Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

MDL Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

MSD Matrix Spike Sample Duplicate: Refer to MS.

NA Not Applicable.

NC Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NI Not Ignitable.

RL Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

1 The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Total: With respect to Organic analyses, a 'Total' result is defined as the summation of results for individual isomers or Aroclors. If a 'Total' result is requested, the results of its individual components will also be reported. This is applicable to 'Total' results for methods 8260, 8081 and 8082.

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data qualifiers

A Spectra identified as "Aldol Condensation Product".

B The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit. For NJ-related projects (excluding AIR), flag only applies to associated field samples that have detectable concentrations of the analyte, which was detected above the reporting limit in the associated method blank or above five times the reporting limit for common lab contaminants (Phthalates, Acetone, Methylene Chloride, 2-Butanone).

C Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

Report Format: Data Usability Report
The concentration may be biased high due to matrix interferences (i.e., co-elution) with non-target compound(s). The result should be considered estimated.

The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

The lower value for the two columns has been reported due to obvious interference.

Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

The RPD between the results for the two columns exceeds the method-specified criteria.

The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

Analytical results are from sample re-analysis.

Analytical results are from sample re-extraction.

Analytical results are from modified screening analysis.

Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

Not detected at the reporting limit (RL) for the sample.
REFERENCES


LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.
The following analytes are not included in our NELAP Scope of Accreditation:

**Westborough Facility**

**EPA 524.2**: Acetone, 2-Butanone (Methyl ethyl ketone (MEK)), Tert-butyl alcohol, 2-Hexanone, Tetrahydrofuran, 1,3,5-Trichlorobenzene, 4-Methyl-2-pentanone (MIBK), Carbon disulfide, Diethyl ether.

**EPA 8260C**: 1,2,4,5-Tetramethylbenzene, 4-Ethyltoluene, Iodomethane (methyl iodide), Methyl methacrylate, Azobenzene.

**EPA 8330A/B**: PETN, Picric Acid, Nitroglycerine, 2,6-DANT, 2,4-DANT.

**EPA 8270D**: 1-Methylnaphthalene, Dimethylnaphthalene, 1,4-Diphenylhydrazine.

**EPA 625**: 4-Chloroaniline, 4-Methylphenol.

**SM4500**: Soil: Total Phosphorus, TKN, NO2, NO3.

**EPA 9071**: Total Petroleum Hydrocarbons, Oil & Grease.

**Mansfield Facility**

**EPA 8270D**: Biphenyl.

**EPA 2540D**: TSS

**EPA TO-15**: Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 1-Methylnaphthalene.

The following analytes are included in our Massachusetts DEP Scope of Accreditation, Westborough Facility:

**Drinking Water**

**EPA 200.8**: Sb, As, Ba, Be, Cd, Cr, Cu, Pb, Ni, Se, Ti;  **EPA 200.7**: Ba, Be, Ca, Cd, Cr, Cu, Na;  **EPA 245.1**: Mercury;

**EPA 300.0**: Nitrate-N, Fluoride, Sulfate;  **EPA 353.2**: Nitrate-N, Nitrite-N;  **SM4500NO3-F**: Nitrate-N, Nitrite-N;  **SM4500F-C, SM4500CN-CE, EPA 180.1, SM2130B, SM4500CI-D, SM2320B, SM2540C, SM4500H-B**

**EPA 332**: Perchlorate.

**Microbiology**: SM9215B; SM9223-P/A, SM9223B-Colilert-QT, Enterolert-QT.

**Non-Potable Water**

**EPA 200.8**: Al, Sb, As, Be, Cd, Cr, Cu, Pb, Mn, Ni, Se, Ag, Ti, Zn;

**EPA 200.7**: Al, Sb, As, Be, Cd, Ca, Cr, Co, Cu, Fe, Pb, Mg, Mn, Mo, Ni, K, Se, Ag, Na, Sr, Ti, Ti, V, Zn;


**EPA 624**: Volatile Halocarbons & Aromatics,

**EPA 608**: Chlordane, Toxaphene, Aldrin, alpha-BHC, beta-BHC, gamma-BHC, delta-BHC, Dieldrin, DDD, DDE, DDT, Endosulfan I, Endosulfan II, Endosulfan sulfate, Endrin, Endrin Aldehyde, Heptachlor, Heptachlor Epoxide, PCBs

**EPA 625**: SVOC (Acid/Base/Neutral Extractables), **EPA 600/4-81-045**: PCB-Oil.

**Microbiology**: SM9223B-Colilert-QT; Enterolert-QT, SM9222D-MF.

For a complete listing of analytes and methods, please contact your Alpha Project Manager.
E. Geotechnical Analysis
   1. Geotechnical Analysis
   2. Geotechnical Report
The geotechnical investigation program conducted in the summer of 2014 consisted of a total of twenty two (22) test pits and sixteen (16) test borings in various locations on the Nelson Place Site. The test boring logs describe refusal, assumed to be bedrock, at various depths and locations. Analysis and testing of the soils obtained from the boring and test pit program were completed, and earthwork recommendations are included in the geotechnical report. Infiltration tests were also conducted as coordinated with the locations and requirements of the Civil Engineer, and loam tests were conducted as coordinated with the Landscape consultant. The Hazmat consultant also obtained samples of the soils for arsenic testing, which are reported on and published under section 4.1.2 D. Environmental Assessment.

Due to the site constraints and topography, there will be a considerable amount of cutting, filling and removal of soils required to meet the program. Effort was made to maintain as balanced a site as practical, however to be able to maintain street grading at 8% maximum and provide the play areas and parking as outlined in the program, a portion of the excavated fill must be removed from the site. Following is a schematic level cut/fill/export quantity. Rock excavation will also be required to achieve required subgrades for building foundations, and site utilities. Judging from the geotechnical investigation report and the site survey (which locates each test boring as well as exposed surface ledge), it seems that the majority of rock excavation will be required beneath the building (particularly at the crown of the hill) and at utility trenching. Generally the ledge depths encountered were deeper than what had earlier been assumed. The Geotechnical report outlines what would be required for ledge excavation, and the required monitoring. As discussed in previous submissions, the existing 1926 building has structural issues and is presently reinforced with columns and reinforcements. The City has advised that the Structural Engineer that has been monitoring the building will continue to monitor the building throughout construction, and will review the proposed work under this new construction project.

We have estimated excavation quantities, per cubic yard, for the following categories:

Soils Cuts/Fills/Export
Approximately 55,000 CY of CUT
Approximately 35,000 CY of FILL
Approximately 20,000 CY of EXPORT

A copy of the October 2014 Lahlaf Geotechnical Consulting, Inc. Geotechnical Investigation Summary is included on the following pages.
October 9, 2014

Robert Para Jr., AIA
Lamoureux Pagano & Associates, Inc.
108 Grove Street, Suite 300
Worcester, MA 01605
Tel:    (508) 752-2831
Fax:    (508) 757-7769
E-mail: rpara@lamoureuxpagano.com

Re:    Geotechnical Report
       Proposed Nelson Place Elementary School
       Worcester, Massachusetts
       LGCI Project No. 1402

Dear Mr. Para:

Lahlaf Geotechnical Consulting, Inc. (LGCI) has completed subsurface explorations at the site of the proposed Nelson Place Elementary School in Worcester, Massachusetts. This report contains the results of our subsurface and our foundation design and construction recommendations. We are submitting our report electronically. Please notify us if you require a hard copy.

The soil samples from our explorations are currently stored at LGCI for further analysis, if requested. Unless notified otherwise, we will dispose of the soil samples after three months. The rock cores were left at the City of Worcester DPW.

Thank you for choosing LGCI as your geotechnical engineer.

Very truly yours,

Lahlaf Geotechnical Consulting, Inc.

Abdelmadjid M. Lahlaf, Ph.D., P.E.
Principal Engineer
GEOTECHNICAL REPORT
PROPOSED NELSON PLACE ELEMENTARY SCHOOL
WORCESTER, MASSACHUSETTS
LGCI Project No. 1402
October 9, 2014

Prepared for:

LAMOUREUX PAGANO & ASSOCIATES, INC.
108 Grove Street, Suite 300
Worcester, MA 01605
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1. PROJECT INFORMATION

1.1 Project Authorization

This report presents the results of two phases of geotechnical services performed by Lahlaf Geotechnical Consulting, Inc. (LGCI) for the proposed Nelson Place Elementary School in Worcester, Massachusetts.

The first phase included a review of the available information at the site and was part of a feasibility study. It was performed in general accordance with our proposal No. 13087 dated January 7, 2014. The second phase of our services was performed in accordance with our proposal No. 14036 dated June 5, 2014 and signed by Mr. Michael A. Pagano of Lamoureux Pagano & Associates, Inc. (LPA) on July 29, 2014. We performed our services in accordance with the terms and conditions of the Standard Form of Agreement Between Architect and Consultant dated December 23, 2013 and signed by Mr. Michael A. Pagano of LPA.

1.2 Purpose and Scope of Services

The purpose of this study was to obtain subsurface information at the site and to provide recommendations for foundation design and construction. This report includes the results of both of our studies at the site and supersedes the previous letter report.

To date, LGCI performed the following services:

- Reviewed the existing information about the site.
- Coordinated our field explorations with LPA, Nitsch Engineering, the project civil engineer, and with the Nelson Place Elementary School staff.
- Engaged an excavation subcontractor to excavate twenty (20) test pits. Our proposal included twenty two (22) test pits. Two (2) test pits were converted into soil borings at the request of LPA.
- At the request of LPA, we had the excavation subcontractor provide a laborer to cut trees and move them off of dirt paths. This task was performed as an additional service.
• Engaged a drilling subcontractor to drill sixteen (16) borings, including fourteen (14) of the fifteen (15) borings in our scope, two borings that were performed at test pit locations, and one boring that was replaced with a test pit.

• Provided a geotechnical field engineer at the site to coordinate and observe the borings and test pits, describe the soil samples, and prepare field logs.

• Performed four (4) double-ring infiltrometer tests.

• Submitted five (5) soil samples for grain-size analysis.

• Submitted two (2) samples for loam analyses.

• Prepared this geotechnical report containing the results of our subsurface explorations and our recommendations for foundation design and construction.

LGCI did not perform environmental services for this project. LGCI did not perform an assessment to evaluate the presence or absence of hazardous or toxic materials above or below the ground surface at or around the site. Any statement about the color, odor, or the presence of suspicious materials included in our boring and test pit logs or report were made by LGCI for information only and to support our geotechnical services. No environmental recommendations and/or opinions are included in this report.

Our scope did not include preparing specifications, performing contract document review, or providing construction services. Recommendations for stormwater management, erosion control, pavement design, and detailed cost or quantity estimates are not included in our scope of work.

1.3 Site Description

Our understanding of the existing conditions is based on our field observations, our discussions with LPA, and on the following drawings:

• “Existing Nelson Place School,” prepared by LPA and provided to us on April 28, 2014.


• Memorandum dated November 10, 2004 in reference to “Nelson Place School – Condition of the 1927 Building and Recommendation for Repair or Replacement,” (Existing Condition Memorandum) provided to us by LPA on December 31, 2013.
The existing school is located on Nelson Place near the intersection with Grove Street in Worcester, Massachusetts as shown in Figure 1. The site is bordered by Nelson Place on the northern side, by residential properties and Hapgood Road on the eastern side, by wooded land on the western side, and by private properties, including the Assumption College parcel on the southern side.

The site is occupied by the existing school buildings, parking lots, driveway, and athletic fields as shown in Figure 2. The existing school consists of four buildings: a 1927 two-story structure which appears to have a partial basement, a 1954 one-story addition, and two 1967 additions, including a two-story building and a one-story gymnasium. Based on the Existing Condition Memorandum, the 1927 portion of the existing building showed signs of deterioration to the brick veneer and the steel lintels in 2003. We understand that subsequent to that date, barricades were installed around the building and a shoring and bracing system was installed in the building to allow for its continued use.

What appears to be a water stream with wetlands is located along the western boundary of the site. The rear (southern side) of the site is a wooded area that is higher in elevation than Nelson Place and the area surrounding the existing school.

Based on the Existing Conditions Plan, the ground surface elevation ranges in the lower areas, around the existing school, between about El. 614 feet and El. 628 feet. The ground surface rises steeply from the area of the existing school to the wooded portion of the site at the rear (southern side) of the school and reaches a local high at about El. 663 feet.

1.4 Project Description

Our understanding of the proposed construction is based on our discussions with LPA, and on the following drawings:

- “Nelson Place Elementary School, 35 Nelson Place, Worcester, MA 01605, Feasibility Study” (Feasibility Study Site Plan) prepared by LPA and provided to us on May 30, 3014.

- “Schematic Design – Site Plan, Main Floor Plan, Upper and Lower Floor Plans, and Section” (Schematic Design Plans) prepared by LPA and provided to us on October 1, 2014.

- Progress grading plan (Grading Plan) provided to us by LPA on October 1, 2014.

Based on the Schematic Design Plans, the proposed construction will consist of a two-story school building on a footprint of about 68,900 square feet. To accommodate the variable site topography, the proposed building will be stepped such that the ground floor on the northern side of the building, over approximately one third of the building, will have a finished floor elevation (FFE) of El. 637 feet. The remainder of the ground floor will have an FFE of El. 651 feet.
Construction will include parking lots and driveways, including a driveway on the southern side of the site that will connect to Romola Road, located south of Hapgood Road. The southern driveway extends through the eastern side of the Assumption College parcel. Construction will also include infiltration basins. The locations of the basins had not been established at the time of this report.

The proposed parking lot and driveway on the eastern side of the proposed school will extend into the rear of the private properties. Authorization to access these properties was not available at the time of our field services. Accordingly, our explorations were limited to within the City of Worcester property. Please note that our exploration locations were initially selected based on the proposed building footprint shown in Feasibility Study Site Plan prepared in May 2014. Since then, the proposed building layout has slightly changed. We understand that additional explorations will be performed at the site at a later date to explore the eastern side when authorization to access the adjacent properties is available and to explore the areas of the proposed building that were not explored as part of this study.

Information about building loads was not provided to us.

1.5 Elevation Datum

We understand that the elevations shown in the Existing Condition Plan and the Grading Plan, which we included in our borings and test pit logs, are referenced to the National Vertical Datum of 1988 (NAVD 1988).
2. SITE AND SUBSURFACE CONDITIONS

2.1 Surficial Geology


The surficial geologic map indicates that the natural soils at the site are mostly thin glacial till deposits consisting of non-sorted, non-stratified matrix of sand, some silt, and little clay, containing scattered gravel clasts and a few large boulders. The map also shows abundant rock outcrops or zones of shallow bedrock near the southern side of the site. Swamp deposits are present near the western boundary of the site. These deposits are generally less than 10 feet thick and overly glacial till deposits or bedrock. The surficial geologic map of the site is shown in Figure 3.

2.2 Previous Explorations

Six (6) borings were advanced on the western side of the existing school in 1967. The borings were advanced to depths of up to 10 feet beneath the original ground surface. The subsurface conditions encountered in the previous borings consisted of up to 2 feet of topsoil, overlying very dense glacial till with boulders. Refusal was encountered in two (2) of the previous borings at depths of 4.2 and 6.2 feet beneath the original ground surface. The logs of the previous borings and the boring locations are shown in Appendix A.

2.3 LGCI’s Explorations

2.3.1 General

Our explorations locations were staked in the field by Nitsch Engineering based on a plan prepared by LGCI and modified by LPA. LGCI notified Dig Safe Systems and the City of Worcester to assist with utility clearance.

2.3.2 Test Pits

LGCI engaged R. E. Barrows Construction of Worcester, Massachusetts to excavate twenty (20) test pits (TP-1 to TP-20) using a CAT 315BL track excavator between August 19 and 22, 2014.

The test pits were advanced to depths ranging between 5 and 12 feet beneath the existing ground surface. The test pits were backfilled with the excavated materials which were placed and tamped with the excavator bucket in 2- to 3-foot lifts.
The ground surface elevations shown in the test pit logs were taken from the Existing Conditions Plan based on elevations surveyed before the start of our explorations. Where a test pit was moved, such as TP-2, TP-3, TP-5, TP-6, and TP-16, the ground surface was interpolated from the Existing Conditions Plan and is approximate.

An LGCI engineer observed the excavations and logged the test pits in the field. Appendix B contains LGCI’s test pit logs, Table 1 contains the test pit summary, and Figures 4A and 4B show the test pit locations.

2.3.3 Soil Borings

LGCI engaged Northern Drill Service of Northborough, Massachusetts to advance sixteen (16) soil borings (B-1 to B-13 and B-15 to B-17) at the site between August 26 and September 3, 2014. Boring B-14 was not performed. The borings were advanced with an ATV-mounted drill rig using 3 ¼-inch and 4 ¼-inch hollow stem augers (HSA) and 3-inch and 4-inch cased wash boring techniques.

An LGCI engineer observed and logged the borings in the field.

The borings extended to depths ranging between 6.5 and 26 feet beneath the ground surface. The drillers performed Standard Penetration Tests (SPT) and obtained split spoon samples with an automatic hammer semi-continuously or at five-foot intervals as noted on the boring logs in general accordance with ASTM D-1586. Unless notified otherwise, we will dispose of the soil samples after three months.

Upon completion, the boreholes were backfilled with the soil cuttings. The drillers installed one (1) groundwater observation well in boring B-15-OW.

Appendix C contains LGCI’s boring logs and the groundwater observation well installation report, and Figures 4A and 4B show the boring locations. Table 2 contains a summary of the borings.

The ground surface elevations shown in the boring logs were taken from the Existing Conditions Plan based on elevations surveyed before the start of our explorations. Where a boring was moved, such as B-1, B13, and B-17, the ground surface was interpolated from the Existing Conditions Plan and is approximate.

2.4 Subsurface Conditions

The subsurface description in this report is based on a limited number of borings and test pit and is intended to highlight the major soil strata encountered during our borings and test pits. The subsurface conditions are known only at the actual boring and test pit locations. Variations may occur and should be expected between boring and test pit locations. Boring and test pit logs
represent conditions that we observed at the time of boring and test pit and are edited based on the results of the laboratory test data as appropriate. The strata boundaries shown in our boring and test pit logs are based on our interpretations and the actual transition may be gradual. Graphic soil symbols are for illustration only.

The soil strata encountered in our borings and test pits were as follows, starting from the ground surface.

**Topsoil/Subsoil** – A layer of surficial organic soil (topsoil/subsoil) was encountered in the test pits and borings except in borings B-1 to B-4, advanced in paved areas, and in boring B-8. This layer was 0.4 to 3.2 feet thick, but was in general between 1.5 and 2 feet thick in most explorations, and contained nested boulders up to 3 feet in size in a few locations.

**Asphalt** – Asphalt was encountered at the ground surface in borings B-1 to B-4. The asphalt was 2 to 4 inches thick.

**Fill** – A layer of fill was encountered in test pits TP-1, TP-12-I, TP-13-I, TP-16, and TP-20, and in borings B-1 to B-4, B-8, B-12, B-13, and B17. The fill extended to depths ranging between 1 and 6.8 feet beneath the ground surface. The fill consisted mostly of silty sand and silt with sand, and contained cobbles and boulders up to 2 feet in size. The fill contained traces of organics and bricks. In test pits TP-12-I and TP-20, and in boring B-2 buried topsoil and subsoil were encountered at the bottom of the fill. The Standard Penetration Test (SPT) N-values in this layer ranged between 6 and 38 blows per foot (bpf), indicating mostly loose to dense fill. The higher SPT N-values may be caused by obstructions in the fill and may not reflect the true density of the fill.

**Glacial Till** – A layer of glacial till consisting mostly of silty sand and gravelly silt was encountered beneath the topsoil/subsoil layer or beneath the fill in all test pits and borings except in boring B-1. This layer extended to the termination depths of the borings and test pits or to the top of rock. This layer contained cobbles and boulders up to 5 feet in size. The SPT N-values in this layer ranged between 8 and more than 100 bpf, with most values higher than 30 bpf, indicating mostly dense to very dense sand.

**Rock** – Refusal was encountered in all test pits and borings, except in test pits TP-3, TP-7, TP-12-I, TP-13-I, TP-15-I, TP-16, and TP-20, and in borings B-1, B-5, and B-17.

To confirm and characterize the rock, minimum 5-foot rock cores were obtained in borings B-6, B-7, B-9, B-10, B-11, B-15-OW, and B-16. The rock consisted of moderately hard to hard, moderately weathered to fresh, extremely fractured to sound, light to dark gray with white banding SCHIST with moderately close to close joints. The rock recoveries ranged between 63 and 100 percent and the rock quality designation (RQD) ranged between 18 and 75 percent.
2.5 Groundwater

Groundwater was not observed in the test pits. Groundwater was observed during or shortly after the end of drilling in all borings except in borings B-2, B-3, B-8, B-12, and B-16 at depths ranging between 3 and 11.8 feet beneath the ground surface.

A groundwater observation well was installed in boring B15-OW. The groundwater observation well installation report is included at the end of Appendix C. The groundwater level in the well four days after the well was installed was 9 feet beneath the ground surface corresponding to El. 648.1 feet.

The groundwater data reported in this report is based on observations made during or shortly after the completion of our explorations and may not represent the actual groundwater levels, as additional time may be required for the groundwater levels to stabilize. The groundwater levels presented in this report only represent the conditions encountered at the time and location of our explorations. Seasonal fluctuation should be anticipated.

2.6 Double Ring Infiltrometer Tests

LGCI performed four (4) double ring infiltrometer tests in test pits TP-9-I, TP-12-I, TP-13-I, and TP-15-I. The tests were conducted in general accordance with ASTM Standard D 3385.

The excavations were first advanced to the test depths where the test pit bottom was leveled using the excavator bucket. After the infiltrometer rings were driven into the ground, the tests were conducted by filling the rings with water. The test pits were advanced deeper after the completion of the tests.

The test results are included in Appendix D. The results include plots of the hydraulic conductivity for flow within the inner and outer rings. The stabilized portions of the plots for the inner ring indicate very low permeability values. The permeability values measured in the double ring infiltrometer tests are consistent with the high fines content of 20.3 to 38.5 percent as determined in laboratory tests on samples soil obtained from the test depths. The table below shows the measured permeability values and the fines content at each test location.

<table>
<thead>
<tr>
<th>Test Pit</th>
<th>Permeability (cm/sec)</th>
<th>Fine Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-9-I</td>
<td>&lt; 8 x 10^{-5}</td>
<td>38.5</td>
</tr>
<tr>
<td>TP-12-I</td>
<td>~ 10^{-4}</td>
<td>34.2</td>
</tr>
<tr>
<td>TP-13-I</td>
<td>~ 10^{-4}</td>
<td>27.7</td>
</tr>
<tr>
<td>TP-15-I</td>
<td>~ 10^{-4}</td>
<td>20.3</td>
</tr>
</tbody>
</table>
2.7 Laboratory Test Data

LGCI submitted five (5) soil samples obtained four (4) test pits and one (1) boring for grain-size analysis. The laboratory data sheets are included in Appendix E and the results are summarized below.

<table>
<thead>
<tr>
<th>Test Pit/ Boring</th>
<th>Sample ID</th>
<th>Sample Depth (ft)</th>
<th>Material</th>
<th>Percent Gravel</th>
<th>Percent Sand</th>
<th>Percent Fines</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-17</td>
<td>S3</td>
<td>4 – 6</td>
<td>Natural Soil</td>
<td>8.4</td>
<td>63.7</td>
<td>27.9</td>
</tr>
<tr>
<td>TP-9-I</td>
<td>Grab Sample</td>
<td>4</td>
<td>Natural Soil</td>
<td>49.3</td>
<td>12.2</td>
<td>38.5</td>
</tr>
<tr>
<td>TP-12-I</td>
<td>Grab Sample</td>
<td>5 – 6</td>
<td>Fill</td>
<td>24.9</td>
<td>40.9</td>
<td>34.2</td>
</tr>
<tr>
<td>TP-13-I</td>
<td>Grad Sample</td>
<td>4 – 5</td>
<td>Natural Soil</td>
<td>39.2</td>
<td>33.1</td>
<td>27.7</td>
</tr>
<tr>
<td>TP-15-I</td>
<td>Grab Sample</td>
<td>5 – 6</td>
<td>Natural Soil</td>
<td>30.1</td>
<td>49.6</td>
<td>20.3</td>
</tr>
</tbody>
</table>

LGCI also submitted two (2) samples for loam analyses. The results of these tests will be submitted separately.
3. EVALUATION AND RECOMMENDATIONS

3.1 Foundation Recommendations

3.1.1 General

The subsurface conditions encountered in the borings and test pits are suitable to support the proposed building after the subgrade is prepared in accordance with the recommendations in this Section and Section 4 of this report.

The topsoil, the subsoil, and the existing fill should be entirely removed from within the proposed building footprint. The topsoil and the subsoil should be removed from within the footprint of the paved areas. The topsoil/subsoil removal is anticipated to extend on average to about 2 feet. In a few locations, the removal of the subsoil will extend as deep as 3.2 feet.

The proposed building foundations should bear in the natural silt and sand (natural soil), on Structural Fill placed directly on the natural soil, or on Structural Fill placed on the bedrock.

The FFE of the proposed building begins at El. 637 feet and steps up to El. 651 feet. Competent rock was encountered near or above these elevations in the borings and test pits as shown in Tables 1 and 2 and in Figures 4A and 4B. We anticipate rock removal across a significant portion of the building footprint. Based on the borings and test pits, the extent of rock removal may range in excess of 14 feet to reach the proposed slab subgrade. The extent of rock removal may be larger for utilities. Based on the rock cores, rock removal will require rock blasting.

A few explorations within the proposed parking lots and driveway also indicated rock near the proposed finished grade; thus, requiring rock blasting.

We anticipate that the major consideration during construction will be the removal of the bedrock and the large boulders, and handling and stockpiling of the excavated materials, including the topsoil/subsoil.

3.1.2 Footing Design

- The topsoil/subsoil layer and the existing fill are not suitable to support the proposed footings and should be entirely removed under footings.

- We recommend supporting the proposed building on spread and continuous footings bearing in the natural soil, on Structural Fill placed directly over the natural soil, or on Structural Fill placed on top of the bedrock.
Rock should be cut at a minimum to 6 inches beneath the bottom of footings to allow for placement of Structural Fill to provide a level subgrade. The rock should be cut laterally at least one foot beyond each side of the footing. For retaining wall footings, the rock should be cut laterally at least 2 feet from the outside face of the wall to allow for placement of the formwork.

For footing design, we recommend using a net allowable bearing pressure of 6,000 pounds per square foot (psf).

The subgrade of footings should be prepared in accordance with the recommendations in Section 4.1.

All foundations should be designed in accordance with The Commonwealth of Massachusetts State Building Code 780 CMR, Eighth Edition (MSBC 8th Edition).

Exterior footings and footings in unheated areas that are placed on the natural soil should be placed at a minimum depth of 4 feet below the final exterior grade to provide adequate frost cover protection. Although footings on rock can be placed at shallower depths, we recommend cutting the rock beneath the proposed building to 4.5 feet beneath the proposed FFE to provide footings bearing at 4 feet. Interior footings in heated areas may be designed and constructed at a minimum depth of 2 feet below finished floor grades.

To reduce the potential for cracking of wall foundations due to differential settlement over short distances, footings should not bear partially on sound rock and partially on soil. In transition areas, the excavations should be performed so as to allow the footings to bear entirely on rock, or the rock should be over-excavated to allow placement of a minimum of 12 inches of crushed stone over a distance of about 10 feet to act as a cushion between the footings and rock.

We recommend that wall footings have a minimum width of 2 feet, and that column footings have a minimum width of 3 feet. For foundations with a least lateral dimension smaller than 3 feet, the allowable bearing pressure should be reduced to 1/3 of the recommended allowable bearing pressure times the least dimension in feet.

Wall footings should be designed and constructed with continuous, longitudinal steel reinforcement for greater bending strength to span across small areas of loose or soft soils that may go undetected during construction.

A representative of LGCI should observe the subgrade of footings to verify that the footing subgrade has been prepared in accordance with our recommendations.
3.1.3 Settlement

We estimate for foundations constructed in accordance with the recommendations contained in this report, that the total post-construction settlement will be less than about 1 inch and that the differential settlement will be 3/4 inch or less over a distance of 25 feet. Total and differential settlements of these magnitudes are usually considered tolerable for the anticipated construction. However, the tolerance of the proposed structure to the predicted total and differential settlements should be assessed by the structural engineer.

3.2 Concrete Slab Considerations

• The proposed floor slabs can be constructed as slabs-on-grade.

• The proposed floor slabs should be supported on a minimum of 12 inches of Structural Fill placed directly over the natural soil.

• Where rock is cut, and to facilitate the installation of utilities under the slab, the bedrock should be cut at least 4.5 feet beneath the top of the proposed slab and the slab should be placed on Structural Fill (or on crushed stone where an under-slab drainage system is required).

• Exposed boulders should be removed from the subgrade of the slab and the resulting excavation should be backfilled with Structural Fill.

• A vapor retarder membrane with a minimum thickness of 15 mils could be used beneath the slab. The need for such a membrane should be evaluated by the architect. The membrane should be protected from puncture during placement of the steel mesh and construction of the slabs.

• For the design of the floor slabs bearing on the materials described above, we recommend using a modulus of subgrade reaction, \( k_s \), of 150 tons per cubic foot (tcf) (170pci). Please note that the values of \( k_s \) are for a 1 x 1 square foot area. These values should be adjusted for larger areas using the following expression:

\[
Modulus \text{ of Subgrade Reaction} (k_s) = k_{s1} \cdot \left( \frac{B + 1}{2B} \right)^2
\]

where:

\( k_s \) = Coefficient of vertical subgrade reaction for loaded area,
\( k_{s1} \) = Coefficient of vertical subgrade reaction for 1 x 1 square foot area, and
\( B \) = Width of area loaded, in feet.
Please note that cracking of slabs-on-grade can occur as a result of heaving or compression of the underlying soil, but also as a result of concrete curing stresses. To reduce the potential for cracking, the precautions listed below should be closely followed for construction of all slabs-on-grade:

- Construction joints should be provided between the floor slab and the walls and columns in accordance with the American Concrete Institute (ACI) requirements, or other applicable code.

- Backfill in interior and exterior utility trenches should be properly compacted.

- In order for the movement of exterior slabs not to be transmitted to the building foundation or superstructure, exterior slabs such as approach slabs and sidewalks, should be isolated from the building superstructure.

### 3.3 Under-slab Drains

Based on the groundwater level measured in the groundwater observation well (B-15-OW), an under-slab drainage system is not required. However, because the well was monitored in the month of August, the measured groundwater level may not be representative of the highest groundwater table. We recommend engaging LGCI to monitor the groundwater observation well through the spring when the groundwater table is high. At this time, and since the groundwater levels measured in a few explorations during or shortly after the end of drilling are higher than the FFE, we believe that the design drawings should be prepared showing an under-slab drainage system under the entire building footprint. We understand that the building may be constructed with a radon mitigation system. The under-slab drainage system may be integrated with the radon mitigation system.

The under-slab drainage system should consist of: 1) a minimum of 9 inches of ¾-inch crushed stone placed below the entire concrete slab, and 2) 6-inch-diameter slotted PVC pipes installed with their inverts at least 12 inches below the bottom of the slab. The pipes should be installed in trenches with a maximum spacing of 20 feet. The trenches should be at least 12 inches wide and 12 inches deep (below the bottom of the 9 inches of crushed stone) to allow placing crushed stone around the PVC pipes.

A non-woven geotextile for separation should be installed between the crushed stone and the underlying soil. The slots on the PVC pipe should be placed facing downward to allow for entry of water at the bottom of the pipe. Clean-outs should be included at the end of each branch and at all changes in direction.

If possible, the water from the under-slab drain should be channeled to flow by gravity to a discharge area or to the City storm drainage system. If the water from the drainage system is
channeled to the City storm drainage system, the owner should apply for a discharge permit and should perform analytical tests as required by the permits.

3.4 Seismic Design Criteria

In accordance with Section 1613 of MSBC 8th Edition, the seismic criteria for the site are as follows:

- Site Class: C
- Spectral Response Acceleration at short period (Sₙ): 0.24 g
- Spectral Response Acceleration at 1 sec. (S₁): 0.067g
- Site Coefficient Fₐ (Table 9.4.1.2.4a): 1.2
- Site Coefficient Fᵥ (Table 9.4.1.2.4b): 1.7
- Adjusted spectral response Sₚₙ: 0.288 g
- Adjusted spectral responses Sₚ₁: 0.114 g

Based on our observations in the test pits and the results of the borings, the natural soil layer at the site is not susceptible to liquefaction during a seismic event.

3.5 Lateral Pressures for Wall Design and Perimeter Drains

3.5.1 Lateral Earth Pressures

We recommend using the following values for the design of retaining walls:

| Coefficient of Active Earth Pressure, Kₐ: | 0.31 |
| Coefficient of At-Rest Earth Pressure, Kₒ: | 0.5 |
| Coefficient of Passive Earth Pressure, Kₚ: | 3.3 |
| Total Unit Weight, γ: | 125 pounds per cubic foot |

Note: The values in the table are based on a friction angle for the backfill of 32 degrees and neglecting friction between the backfill and the wall. The design active and passive coefficients are based on horizontal surfaces (non-sloping backfill) on both the active and passive sides, and a vertical wall face.

- Exterior walls of below ground spaces and the wall separating the two slab levels should be designed using the “at-rest” pressure coefficient.

- Site retaining walls should be designed using the active earth pressure coefficient described above.

- Passive earth pressures should only be used at the toe of the wall where special measures or provisions are taken to prevent disturbance or future removal of the soil on the passive side of the wall, or in areas where the wall design includes a key.
• Where a permanent vertical uniform load will be applied on the active side immediately adjacent to the wall, a horizontal surcharge load equal to half of the uniform vertical load should be applied over the height of the wall. At a minimum, a temporary construction surcharge of 100 psf should be applied uniformly over the height of the wall.

• We recommend using an ultimate friction factor of 0.50 between the natural soil and the bottom of the retaining wall. Retaining walls should be designed for minimum factors of safety of 1.5 for sliding and 2.0 for overturning.

3.5.2 Seismic Pressure

• In accordance with the *Massachusetts State Building Code, 8th Edition*, Section 1610, a lateral earthquake force equal to \(0.100 \times (S_s) \times (F_a) \times \gamma \times H^2\) should be included in the design of the wall (for horizontal backfill), where \(S_s\) is the maximum considered earthquake spectral response acceleration (defined in Section 3.5.1), \(F_a\) is the site coefficient (defined in Section 3.5.1), \(\gamma\) is the total unit weight of the soil backfill, and \(H\) is the height of the wall.

The earthquake force should be distributed as an inverted triangle over the height of the wall. In accordance with MSBC 8th Edition, Section 1610.2, a load factor of 1.43 shall be applied to the earthquake force for wall strength design.

• Temporary surcharges should not be included when designing for earthquake loads. Surcharge loads applied for extended periods of time shall be included in the total static lateral soil pressure and their earthquake lateral force shall be computed and added to the force determined above.

3.5.3 Perimeter Drains

• We recommend that free-draining material be placed within 3 feet of the exterior of walls of below ground spaces. To reduce the potential for dampness in below ground spaces, proposed below ground walls should be damp-proofed.

• We recommend that drains be provided behind the exterior of walls of below ground spaces, behind the wall separating the two slab levels, and site retaining walls. The drains should consist of 6-inch perforated PVC pipes installed with the slots facing down. Perimeter drains should be installed at the bottom of the wall in 18 inches of crushed stone wrapped in a geotextile for separation and filtration.

• Groundwater collected by the wall drains could be discharged in a lower area if gravity flow is possible. Alternatively, it should be discharged into the street drains. A permit would be required for discharge into street drains. For site retaining walls, the water collected from the drains could be discharged through weep holes. If wetness on the face of the wall is not desirable, the wall drains should be connected to the street drains.
3.6 Parking Lots, Driveways, and Sidewalks

3.6.1 General

The subsurface conditions encountered at the site are generally suitable to support the proposed driveways and parking lots after preparation of the subgrade as described in Section 4.1.

- We recommend removing the topsoil and subsoil within the footprint of the proposed driveways and parking lots.
- Rock, cobbles, and boulders should be removed to at least 18 inches below the bottom of the pavement.

3.6.2 Sidewalks

- Sidewalks should be placed on a minimum of 12 inches of Structural Fill with less than 5 percent fines.

- To reduce the potential for heave caused by surface water penetrating under the sidewalk, the sidewalk concrete sections should be sealed with a waterproof compound. The sidewalks should be sloped away from the building or other vertical surfaces to promote flow of water. To the extent possible, roof leaders should not discharge onto sidewalk surfaces.

3.6.3 Typical Pavement Sections

A typical, minimum, standard-duty pavement section that could be used for parking areas is as follows:

- 1.5" Asphalt "Top Course"
- 2.0" Asphalt "Base Course"
- 8" Processed Gravel for Sub-Base (MassDOT M1.03.1)

A typical, minimum, heavy-duty pavement section that could be used for areas of heavy truck traffic is as follows:

- 2.0" Asphalt "Top Course"
- 2.5" Asphalt "Base Course"
- 12" Processed Gravel for Sub-Base (MassDOT M1.03.1)

The pavement sections shown above represent minimum thicknesses representative of typical local construction practices for similar use. Periodic maintenance should be anticipated.
Pavement material types and construction procedures should conform to specifications of the “Standard Specifications for Highways and Bridges,” prepared by the Commonwealth of Massachusetts Department of Public Works and dated 1988 (with latest Supplemental Specifications).

Areas to receive relatively highly concentrated, sustained loads such as dumpsters, loading areas, and storage bins are typically installed over a rigid pavement section to distribute concentrated loads and reduce the possibility of high stress concentrations on the subgrade. Typical rigid pavement sections consist of 6 inches of concrete placed over a minimum of 8 inches of subbase material.

3.7 Underground Utilities

Exposed competent rock and boulders at the bottom of utility trenches should be removed to at least 12 inches below the pipe invert and the resulting excavation should be backfilled with suitable backfill.

Utilities should be placed on suitable bedding material in accordance with the manufacturer’s recommendations. “Cushion” material should be placed, by hand, above the utility pipe in maximum 6-inch lifts. The lift should be compacted by hand to avoid damage to the utility. Where the bedding/cushion material consists of crushed stone, it should be wrapped in a geotextile fabric.

Compaction of fill in utility trenches should be in accordance with our recommendations in Section 4.4. To reduce the potential for damage to utilities, placement and compaction of fill immediately above the utilities should be performed in accordance with the manufacturer’s recommendations.
4. CONSTRUCTION CONSIDERATIONS

4.1 Subgrade Preparation

- The topsoil/subsoil layer, root balls, organic soil, the existing fill, and other deleterious matter should be entirely removed from within the proposed building footprint.

- Topsoil/subsoil, organic material, root balls, and other deleterious material should be entirely removed from within the paved areas.

- Cobbles, boulders, and rock should be removed at least 6 inches beneath footings, i.e., 4.5 feet beneath the proposed FFE within the entire building footprint, and 18 inches beneath the bottom of paved areas. The resulting excavations should be backfilled with compacted Structural Fill under the building and with Ordinary Fill under the subbase of paved areas.

- The base of the footing excavations in the natural soil should be compacted with a dynamic vibratory compactor weighing at least 200 pounds and imparting a minimum of 4 kips of force to the subgrade, before placing concrete.

- The subgrades of slabs and paved areas in the natural soil should be compacted with a heavy vibratory roller compactor imparting a dynamic effort of at least 40 kips.

- Where soft zones are revealed by the compaction effort and where organic soil is exposed, the soft materials or organic soil should be removed and replaced with Structural Fill within the building and with Ordinary Fill beneath the subbase of paved areas.

- In areas requiring rock excavations, disturbed rock material should be removed and replaced with Structural Fill within the footprint of the proposed building, and with Ordinary Fill beneath the pavement subbase of the proposed parking lots, and driveways.

- The bottom of footings bearing in bedrock should be prepared as level as possible and should not be sloped steeper than 12H:1V.

- Rock surfaces that heave due to blasting should be compacted with a vibratory roller compactor that imparts a minimum of 40 kips to the rock surface, prior to placing fill. Where the thickness of heaved rock is more than 2 feet, the heaved rock should be removed and replaced with suitable material.

- Granular fill should not be placed directly on rock surfaces containing voids. Suitably sized crushed stone or a geotextile for separation should be placed on the fractured surface prior to placing the fill to limit migration of smaller particles into the voids.
Due to the high susceptibility of the natural soil for disturbance under foot and vehicular traffic, we recommend placing a minimum of 6 inches of Structural Fill under footings on top of the natural soil to provide a firm working surface during placement of formwork and rebar.

Fill placed within the footprint of the proposed building should meet the gradation and compaction requirements of Structural Fill shown in Section 4.3.

Fill placed under the subbase of paved areas, should meet the gradation and compaction requirements of Ordinary Fill shown in Section 4.3.

Fill placed in the top 12 inches beneath sidewalks should consist of Structural Fill with less than 5 percent fines.

When crushed stone is required in the drawings or it is used for the convenience of the contractor, it should be wrapped in a geotextile fabric for separation.

An LGCI geotechnical engineer or his representative should observe the exposed subgrades prior to fill and concrete placement to verify that the exposed bearing materials are suitable for the design soil bearing pressure. If soft or loose pockets are encountered in the footing excavations, the soft or loose materials should be removed, and the bottom of the footing should be placed at a lower elevation on firm soil, or the resulting excavation should be backfilled with Structural Fill, or crushed stone wrapped in geotextile for separation.

4.2 Rock Blasting Consideration

4.2.1 Rock Removal

Rock cuts are anticipated within the proposed building footprint and paved areas. To better define the rock quantities, we recommend that additional borings be advanced at the site.

Minor rock cuts (less than one foot) over short distances may be achieved using hoe-rams or using other non-blasting techniques. However, based on the borings and test pits, we anticipate that rock blasting will be required.

- Rock should be cut at least 6 inches beneath the bottom of footings, 4.5 feet beneath the FFE, and 18 inches beneath the bottom of paved areas.

- Under utility pipes, manholes, and catch basins, rock should be cut a minimum of 12 inches beneath the pipe or structure.

- Laterally, the rock should be removed at least 1 foot beyond the limits of footings and 2 feet beyond the limits of walls. Rock should be cut a minimum of 12 inches outside utility structures and a minimum of 18 inches on each side of utility pipes.
• To reduce overblasting and the potential for heaved rock, drill holes for blasting should not extend more than 2 feet beneath the minimum depths shown above.

• Rock blasting should be controlled to reduce vibrations and airblast overpressure to below thresholds established in the contract documents.

• Pre-splitting or controlled blasting may be desirable to reduce the amount of overblast.

• To reduce the potential of blasted rock mixing with organic soil, we recommend that the topsoil, roots, tree stumps, and vegetation be removed before blasting. The remainder of the overburden soils and excavatable weathered rock should not be removed before blasting.

• To help obtain information about the top of the rock for rock quantity estimating purposes, we recommend that the Earth Moving Specifications include a requirement for the contractor to perform rock probes at the site in a grid pattern. The results of the probes should include at a minimum the ground surface elevation and the elevation of the top of the rock. The probes should extend at least 10 feet beyond the perceived top of rock to make sure that the perceived top of rock is not a boulder.

4.2.2 Ground Vibration Monitoring

Rock blasting operations will generate ground vibrations that may result in minor cracks and cosmetic damage to nearby structures. To protect the adjacent structures from potential damage, construction blasting should be carefully controlled and monitored. We recommend monitoring vibrations at the ground surface and at nearby structures before and during the rock blasting operations.

4.2.3 Public Notification

The human perception threshold to vibration is very low, i.e., people are far more sensitive to vibrations than are the structures they occupy. Various studies have indicated that the sound effects are noticeable at peak particle velocity (PPV) values of 0.02 inches per second (ips) and complaints and claims of damage are likely at PPV values of 0.2 to 0.3 ips. These vibration intensities are well below the intensities that would cause structural damage to buildings. For these reasons, we recommend that the owner implement a proactive program of public notification and education of neighbors on the physical characteristics of blasting effects before the start of blasting.

4.2.4 Pre-Construction Condition Survey

We recommend that the Owner perform a pre-construction condition survey of structures located within 250 feet of the nearest blasting operation to document the existing conditions
of the structures. The Owner may also consider using crack monitoring gauges to monitor large cracks identified during the pre-construction surveys.

4.3 Subgrade Protection

The on-site sand may be frost susceptible. If construction takes place during freezing weather, special measures should be taken to prevent the subgrade from freezing. Such measures should include the use of heat blankets, or excavating the final six inches of soil just before pouring concrete. Footings should be backfilled as soon as possible after footing construction. Soil used as backfill should be free of frozen material, as should the ground on which it is placed. Filling operation should be halted in freezing weather.

Materials with high fine contents are typically difficult to handle when wet as they are sensitive to moisture content variations. Subgrade support capacities may deteriorate when such soils become wet and/or disturbed. The contractor should keep exposed subgrades properly drained and free of ponded water. Subgrades should be protected from machine and foot traffic to reduce disturbance.

4.4 Fill Materials

Structural Fill and Ordinary Fill should consist of inert, hard, durable sand and gravel, free from organic matter, clay, surface coatings and deleterious materials, and should conform to the gradation requirements shown below.

4.4.1 Structural Fill

The Structural Fill should have a plasticity index of less than 6, and should meet the gradation requirements shown below. Structural Fill should be compacted in maximum 9-inch loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within ±2 percentage points of optimum moisture content.

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>3 inches</td>
<td>100</td>
</tr>
<tr>
<td>1 ½ inch</td>
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</tr>
<tr>
<td>½ inch</td>
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<tr>
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<td>No. 20</td>
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<td>No. 60</td>
<td>5 – 35</td>
</tr>
<tr>
<td>No. 200*</td>
<td>0 – 10</td>
</tr>
</tbody>
</table>

* 0 – 5 Under sidewalks
4.4.2 Ordinary Fill

Ordinary Fill should have a plasticity index of less than 6, and should meet the gradation requirements shown below. Ordinary Fill should be compacted in maximum 9-inch loose lifts to at least 95 percent of the Modified Proctor maximum dry density (ASTM D1557), with moisture contents within ±2 percentage points of optimum moisture content.

<table>
<thead>
<tr>
<th>Sieve Size</th>
<th>Percent Passing by Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 inches</td>
<td>100</td>
</tr>
<tr>
<td>1 inch</td>
<td>50 - 100</td>
</tr>
<tr>
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<tr>
<td>No. 20</td>
<td>10 - 70</td>
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<tr>
<td>No. 60</td>
<td>5 – 45</td>
</tr>
<tr>
<td>No. 200</td>
<td>0 – 20</td>
</tr>
</tbody>
</table>

4.5 Reuse of Onsite Materials

Based on the grain-size analyses, and our field observations, the existing fill and the natural soil at the site do not meet the gradation requirements for Structural Fill and/or Ordinary Fill.

Materials to be used as fill should first be tested for compliance with the applicable gradation specifications.

Soils with more than 20 percent fine contents are generally very sensitive to moisture content variations and are susceptible to frost. Such soils are very difficult to compact at moisture contents that are much higher or much lower than the optimum moisture content determined from the laboratory compaction test. Therefore, strict moisture control should be implemented during stockpiling, placement, and compaction of the onsite soils.

The contractor may consider mobilizing a rock crusher to the site. Blasted rock and boulders may be processed by blending them with the existing fill and natural soil and crushing them to produce a well graded material. Depending on blasted quantity of rock that needs to be processed, some of the subsoil could also be used in the blending and crushing process. Mixing of subsoil with the materials to be processed by crushing should be approved by LGCI. Processed blasted rock should meet the gradation requirements of Ordinary Fill and Structural Fill. Material produced by the crushing operation should be well graded so as to reduce the potential for formation of honeycombs during its placement and compaction.

Non-processed blasted rock should not be used as fill.

The reuse of the onsite materials as described in this section should be coordinated with the project environmental engineer.
4.6 Groundwater Control Procedures

Based on the groundwater levels encountered in our explorations, we anticipate that groundwater control procedures will be needed for footing and utility excavations. We expect that filtered sump pumps installed in pits located at least three feet below the bottom of the excavation may be sufficient to handle surface runoff that may enter the excavation. Where deep trenches are required for utilities, multiple sump pumps would be required to maintain a dry excavation subgrade.

The contractor should be permitted to employ whatever commonly accepted means and practices as necessary to maintain the groundwater level below the bottom of the excavation, and to maintain a dry excavation during wet weather. Groundwater levels should be maintained at a minimum of 1-foot below the bottom of excavations during construction. Placement of reinforcing steel or concrete in standing water should not be permitted.

Proper permits should be obtained from authorities having jurisdiction over the work. At a minimum, the water collected from excavations should be filtered for fines in sedimentation basins before being discharged. The sedimentation basins could be constructed of hay bales wrapped in a geotextile fabric.

To reduce the potential for sinkholes developing over sump pump pits after the sump pumps are removed, the crushed stone placed in the sump pump pits should be wrapped in a geotextile for separation. Alternatively, the crushed stone should be entirely removed after the sump pump is no longer in use and the sump pump pit should be restored with suitable backfill.
4.7 Temporary Excavations

All excavations to receive human traffic, including utility trenches, basement or footing excavations, or others (i.e. underground storage tanks, etc.), should be constructed in accordance with the OSHA guidelines.

The site soils should generally be considered Type “C” and should have a maximum allowable slope of 1.5 Horizontal to 1 Vertical (1.5H:1V) for excavations less than 20 feet deep. Deeper excavations, if needed, should have shoring designed by a professional engineer.

The contractor is solely responsible for designing and constructing stable, temporary excavations and should shore, slope, or bench the sides of the excavations as required to maintain stability of the excavation sides and bottom.

5. RECOMMENDATIONS FOR FUTURE WORK

We recommend engaging LGCI to perform the following services:

- Perform additional explorations on the eastern side of the site once authorization to access the properties is available.
- Perform additional soil borings to better define the rock surface.
- Monitor the groundwater observation well through the spring.
- Perform pre-construction condition surveys of adjacent structures.
- Review the geotechnical aspects of the contract drawings and specifications and provide comments in a letter.
- Review the geotechnical aspects of contractor submittals.
- Provide a field representative during construction to observe the subgrades for footings, floor slabs, paved areas, and submit daily field reports documenting our observations and field recommendations.
6. REPORT LIMITATIONS

Our analysis and recommendations are based on project information provided to us at the time of this report. If changes to the type, size, and location of the proposed structures or to the site grading are made, the recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions and recommendations modified in writing by LGCI. LGCI cannot accept responsibility for designs based on our recommendations unless we are engaged to review the final plans and specifications to determine whether any changes in the project affect the validity of our recommendations and whether our recommendations have been properly implemented in the design.

It is not part of our scope to perform a more detailed site history; therefore, we have not explored for or researched the locations of buried utilities or other structures in the area of the proposed construction. Our scope did not include environmental services or services related to moisture, mold, or other biological contaminate in or around the site.

The recommendations in this report are based in part on the data obtained from the subsurface explorations. The nature and extent of variations between explorations may not become evident until construction. If variations from anticipated conditions are encountered, it may be necessary to revise the recommendations in this report. We cannot accept responsibility for designs based on recommendations in this report unless we are engaged to 1) make site visits during construction to check that the subsurface conditions exposed during construction are in general conformance with our design assumptions and 2) ascertain that, in general, the work is being performed in compliance with the contract documents.

Our report has been prepared in accordance with generally accepted engineering practices and in accordance with the terms and conditions set forth in our agreement. No other warranty, expressed or implied, is made. This report has been prepared for the exclusive use of Lamoureux Pagano & Associates, Inc. for the specific application to the proposed Nelson Place Elementary School in Worcester, Massachusetts as conceived at this time.
7. REFERENCES


The Department of Labor, Occupational Safety and Health Administration (1989), “Occupational Safety and Health Standards - Excavations; Final Rule,” 20 CFR Part 1926, Subpart P.


# Summary of Test Pits

**Proposed Nelson Place Elementary School**

**Worcester, Massachusetts**

**LGCI Project No. 1402**

(“I” denotes that an infiltrometer test was performed in the test pit)

<table>
<thead>
<tr>
<th>Test Pit No.</th>
<th>Ground Surface Elevation (ft.)*</th>
<th>Groundwater Depth / El. (ft.)*</th>
<th>Bottom of Topsoil/Subsoil Depth / El. (ft.)*</th>
<th>Bottom Fill Depth / El. (ft.)*</th>
<th>Refusal Depth / El. (ft.)</th>
<th>Bottom of Test Pit Depth / El. (ft.)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>TP-1**</td>
<td>636.8</td>
<td>- / -</td>
<td>2.2 / 634.6</td>
<td>3 / 633.8</td>
<td>9.5 / 627.3</td>
<td>9.5 / 627.3</td>
</tr>
<tr>
<td>TP-2</td>
<td>650</td>
<td>- / -</td>
<td>1.3 / 648.7</td>
<td>- / -</td>
<td>5.5 / 644.5</td>
<td>5.5 / 644.5</td>
</tr>
<tr>
<td>TP-3</td>
<td>652.5</td>
<td>- / -</td>
<td>2 / 650.5</td>
<td>- / -</td>
<td>- / -</td>
<td>10 / 642.5</td>
</tr>
<tr>
<td>TP-4</td>
<td>656</td>
<td>- / -</td>
<td>1.7 / 654.3</td>
<td>- / -</td>
<td>5 / 651</td>
<td>5 / 651</td>
</tr>
<tr>
<td>TP-5**</td>
<td>650.5</td>
<td>- / -</td>
<td>3 / 647.5</td>
<td>- / -</td>
<td>9.5 / 641</td>
<td>9.5 / 641</td>
</tr>
<tr>
<td>TP-6**</td>
<td>655.5</td>
<td>- / -</td>
<td>2 / 653.5</td>
<td>- / -</td>
<td>9 / 646.5</td>
<td>9 / 646.5</td>
</tr>
<tr>
<td>TP-7</td>
<td>660.4</td>
<td>- / -</td>
<td>1.8 / 658.6</td>
<td>- / -</td>
<td>- / -</td>
<td>11 / 649.4</td>
</tr>
<tr>
<td>TP-8</td>
<td>663.2</td>
<td>- / -</td>
<td>2 / 661.2</td>
<td>- / -</td>
<td>8 / 655.2</td>
<td>8 / 655.2</td>
</tr>
<tr>
<td>TP-9-I</td>
<td>657.3</td>
<td>- / -</td>
<td>2 / 655.3</td>
<td>- / -</td>
<td>9 / 648.3</td>
<td>9 / 648.3</td>
</tr>
<tr>
<td>TP-10**</td>
<td>660.8</td>
<td>- / -</td>
<td>2 / 658.8</td>
<td>- / -</td>
<td>8.5 / 652.3</td>
<td>8.5 / 652.3</td>
</tr>
<tr>
<td>TP-11</td>
<td>664</td>
<td>- / -</td>
<td>1.5 / 662.5</td>
<td>- / -</td>
<td>8 / 656</td>
<td>8 / 656</td>
</tr>
<tr>
<td>TP-12-I</td>
<td>619.4</td>
<td>- / -</td>
<td>1.1 / 618.3</td>
<td>6.8 / 612.6</td>
<td>- / -</td>
<td>11 / 608.4</td>
</tr>
<tr>
<td>TP-14**</td>
<td>641.9</td>
<td>- / -</td>
<td>1.8 / 640.1</td>
<td>- / -</td>
<td>10 / 631.9</td>
<td>10 / 631.9</td>
</tr>
<tr>
<td>TP-15-I</td>
<td>651.2</td>
<td>- / -</td>
<td>1.7 / 649.5</td>
<td>- / -</td>
<td>- / -</td>
<td>11 / 640.2</td>
</tr>
<tr>
<td>TP-16</td>
<td>647</td>
<td>- / -</td>
<td>1.7 / 645.3</td>
<td>3 / 644</td>
<td>- / -</td>
<td>12 / 635</td>
</tr>
<tr>
<td>TP-17</td>
<td>660.1</td>
<td>- / -</td>
<td>1.7 / 658.4</td>
<td>- / -</td>
<td>9 / 651.1</td>
<td>9 / 651.1</td>
</tr>
<tr>
<td>TP-18**</td>
<td>666</td>
<td>- / -</td>
<td>2 / 664.0</td>
<td>- / -</td>
<td>10 / 656</td>
<td>10 / 656</td>
</tr>
<tr>
<td>TP-19**</td>
<td>679</td>
<td>- / -</td>
<td>1.8 / 677.2</td>
<td>- / -</td>
<td>10 / 669</td>
<td>10 / 669</td>
</tr>
<tr>
<td>TP-20</td>
<td>661</td>
<td>- / -</td>
<td>0.7 / 660.3</td>
<td>5.5 / 655.5</td>
<td>- / -</td>
<td>10 / 651</td>
</tr>
</tbody>
</table>

* Ground surface elevations from "Existing Conditions Plan," Sheets EX-1, EX-2, and EX-3 dated April 20, 2014, revised September 26, 2014 by Nitsch Engineering. Where the test pit was moved from the staked location, such as TP-2, TP-3, TP-5, TP-6, and TP-16, the ground surface was interpolated from the plan and is approximate.

** Test pit refusal on a boulder.
### Table 2 - Summary of Borings

**Proposed Nelson Place Elementary School**  
**Worcester, Massachusetts**  
**LGCI Project No. 1402**

<table>
<thead>
<tr>
<th>Boring No.</th>
<th>Ground Surface Elevation (ft.)*</th>
<th>Groundwater Depth / El. (ft.)**</th>
<th>Bottom of Topsoil/Subsoil Depth / El.(ft)*</th>
<th>Bottom of Fill Depth / El. (ft.)</th>
<th>Refusal Depth / El.(ft.)</th>
<th>Bottom of Boring Depth / El. (ft.)*</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-1</td>
<td>617.3</td>
<td>11.8 / 605.5</td>
<td>- / -</td>
<td>5 / 612.3</td>
<td>- / -</td>
<td>12 / 605.3</td>
</tr>
<tr>
<td>B-2</td>
<td>630.7</td>
<td>- / -</td>
<td>- / -</td>
<td>4.1 / 626.6</td>
<td>6.5 / 624.2</td>
<td>6.5 / 624.2</td>
</tr>
<tr>
<td>B-3</td>
<td>629.4</td>
<td>- / -</td>
<td>- / -</td>
<td>4 / 625.4</td>
<td>7.5 / 621.9</td>
<td>7.5 / 621.9</td>
</tr>
<tr>
<td>B-4</td>
<td>623.9</td>
<td>3 / 620.9</td>
<td>- / -</td>
<td>4 / 619.9</td>
<td>12 / 611.9</td>
<td>12 / 611.9</td>
</tr>
<tr>
<td>B-5</td>
<td>626.4</td>
<td>9.2 / 617.2</td>
<td>0.7 / 625.7</td>
<td>- / -</td>
<td>- / -</td>
<td>17 / 609.4</td>
</tr>
<tr>
<td>B-6</td>
<td>645.9</td>
<td>15 / 630.9</td>
<td>3.2 / 642.7</td>
<td>- / -</td>
<td>14 / 631.9</td>
<td>23 / 622.9</td>
</tr>
<tr>
<td>B-7</td>
<td>644.7</td>
<td>6 / 638.7</td>
<td>2.4 / 642.3</td>
<td>- / -</td>
<td>21 / 623.7</td>
<td>26 / 618.7</td>
</tr>
<tr>
<td>B-8</td>
<td>658.5</td>
<td>- / -</td>
<td>- / -</td>
<td>2.6 / 655.9</td>
<td>10.5 / 648.0</td>
<td>10.5 / 648.0</td>
</tr>
<tr>
<td>B-9</td>
<td>659.5</td>
<td>7 / 652.5</td>
<td>2 / 657.5</td>
<td>- / -</td>
<td>7.5 / 652.0</td>
<td>15 / 644.5</td>
</tr>
<tr>
<td>B-10</td>
<td>661.4</td>
<td>5.3 / 656.1</td>
<td>2 / 659.4</td>
<td>- / -</td>
<td>12 / 649.4</td>
<td>17 / 644.4</td>
</tr>
<tr>
<td>B-11</td>
<td>663.4</td>
<td>8.1 / 655.3</td>
<td>0.4 / 663.0</td>
<td>1 / 662.4</td>
<td>1 / 662.4</td>
<td>13 / 650.4</td>
</tr>
<tr>
<td>B-12</td>
<td>663</td>
<td>- / -</td>
<td>1 / 662.0</td>
<td>2.5 / 660.5</td>
<td>9.5 / 653.5</td>
<td>9.5 / 653.5</td>
</tr>
<tr>
<td>B-13</td>
<td>662.5</td>
<td>10.5 / 652.0</td>
<td>1.3 / 661.2</td>
<td>2.7 / 659.8</td>
<td>12.9 / 649.6</td>
<td>12.9 / 649.6</td>
</tr>
<tr>
<td>B-14</td>
<td>Not performed.  Test pit TP-20 was excavated at this location.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-15-OW**</td>
<td>657.1</td>
<td>5.5 / 651.6</td>
<td>2 / 655.1</td>
<td>- / -</td>
<td>14.9 / 642.2</td>
<td>20 / 637.1</td>
</tr>
<tr>
<td>B-16</td>
<td>658.4</td>
<td>- / -</td>
<td>2 / 656.4</td>
<td>- / -</td>
<td>11 / 647.4</td>
<td>16 / 642.4</td>
</tr>
<tr>
<td>B-17</td>
<td>636</td>
<td>5 / 631.0</td>
<td>0.4 / 635.6</td>
<td>3 / 633.0</td>
<td>- / -</td>
<td>12 / 624.0</td>
</tr>
</tbody>
</table>

* "OW" denotes that a groundwater observation well was installed in the boring.

---

* *Ground surface elevations from "Existing Conditions Plan," Sheets EX-1, EX-2, and EX-3 dated April 20, 2014, revised September 26, 2014 by Nitsch Engineering. Where the test boring was moved from the staked location, such as borings B-12, B-13, and B-17, the ground surface was interpolated from the plan and is approximate.*

**Groundwater level was measured in B-15-OW on 9/3/14, i.e., 5 days after the well was installed at 9 feet beneath the ground surface corresponding to El. 648.1 feet.*
Approximate Scale: 1:25000
Contour intervals: 3 meters

Note: Figure based on USGS topographic map of North Worcester, MA from http://mapserver.mytopo.com
<table>
<thead>
<tr>
<th>Client: Lamoureux Pagano &amp; Associates, Inc.</th>
<th>Project: Proposed Nelson Place Elementary School</th>
<th>Figure 2 – Existing School Site</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project Location: Worcester, MA</td>
<td>LGCI Project No.: 1402</td>
<td>Date: October 2014</td>
</tr>
<tr>
<td>Note - Figure based on “Existing Nelson Place School,” prepared by Lamoureux Pagano &amp; Associates, Inc. and provided to us on April 28, 2014.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Approximate Limits of Site

Post Glacial Deposits

Thin till—Nonsorted, nonstratified matrix of sand, silt, and little clay containing scattered gravel clasts and few large boulders; in areas where till is generally less than 10 to 15 ft thick and including areas of bedrock outcrop where till is absent. Predominantly upper till of the last glaciation; loose to moderately compact, generally sandy, commonly stony. Two facies are present in some places: a looser, coarser grained ablation facies, mélange out from supraglacial position, and an underlying more compact, finer grained lodgement facies deposited subglacially. In general, both ablation and lodgement facies of upper till derived from fine-grained bedrock are finer grained, more compact, less stony and have fewer surface boulders than upper till derived from coarse-grained crystalline rocks. Fine-grained bedrock sources include the red Mesozoic sedimentary rocks of the Connecticut River lowland, marble in the western river valleys, and fine-grained schists in upland areas.

Swamp deposits—Organic mud and peat that contain minor amounts of sand, silt, and clay, stratified and poorly sorted, in kettle depressions or poorly drained areas. Swamp deposits are shown only where they are estimated to be at least 3 ft thick. Most swamp deposits are less than about 10 ft thick. Swamp deposits overlie glacial deposits or bedrock. They locally overlie glacial till even where they occur within thin glacial midwater deposits.

Bedrock outcrops and areas of abundant outcrop or shallow bedrock—Solid color shows extent of individual bedrock outcrops; line pattern indicates areas of shallow bedrock or areas where small outcrops are too numerous to map individually; in areas of shallow bedrock, surficial materials are less than 5 to 10 ft thick. These units are not mapped consistently among all quadrangles; see Appendix for level of bedrock outcrop mapping in each quadrangle.


Project: Proposed Nelson Place Elementary School

Figure 3 - Surficial Geologic Map

Lahruf Geotechnical Consulting, Inc.

Project Location: Worcester, MA

LGCI Project No.: 1402

Date: October, 2014
Note
Figure based on progress grading plan provided to us by Lamoureux Pagano Associates on October 1, 2014.

Legend
- Approximate location of boring advanced by Northern Drill Service of Northborough, Massachusetts between August 26 and September 3, 2014 and observed by Lahlaf Geotechnical Consulting, Inc. (LGCI). “OW” denotes that a groundwater observation well was installed in the boring.
- Test pit excavated by R. E. Barrows Construction of Worcester, Massachusetts between August 19 and 22, 2014 and observed by LGCI. “I” denotes that a double ring infiltrometer test was performed in the test pit.


Project: Proposed Nelson Place Elementary School

Figure 4A – Boring Location Plan – Proposed Building and parking lots

Project Location: Worcester, MA

LGCI Project No.: 1402

Date: October 2014
Note
Figure based on progress grading plan provided to us by Lamoureux Pagano Associates on October 1, 2014.

<table>
<thead>
<tr>
<th>Client:</th>
<th>Project:</th>
<th>Figure 4B – Site Location Map – Proposed Southern Access Road</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lamoureux Pagano Associates, Inc.</td>
<td>Proposed Nelson Place Elementary School</td>
<td></td>
</tr>
<tr>
<td>Project Location:</td>
<td>Worcester, MA</td>
<td>LGCI Project No.: 1402</td>
</tr>
</tbody>
</table>

Legend

- Test pit excavated by R. E. Barrows Construction of Worcester, Massachusetts between August 19 and 22, 2014 and observed by LGCI.
APPENDIX A – Previous Borings
Appendix B – Test Pit Logs
Project: Proposed Nelson Place Elementary School, Worcester, MA
LGCI Project No.: 1402

Excavation Subcontractor: R. E. Barrows Const.  Date Started: 08/22/14
Excavation Foreman: Roland Barrows  Date Completed: 08/22/14
LGCI Engineer: Geetha Mathiyalakan  Location: Proposed access road - western side

Ground Surface El: 636.8 ft (see remark 1)  Total Depth: 9.5 feet (see remark 2)
Groundwater Depth: Not encountered  Excavator Type: CAT 315 BL Track Excavator
Test Pit Dimensions: 7' x 14'

<table>
<thead>
<tr>
<th>Depth</th>
<th>Exc. Effort</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12&quot;</td>
<td>E</td>
<td>Topsoil/Subsoil</td>
<td>12&quot; to 14&quot;: Topsoil, mostly non-plastic, 10-15% sand, ~10% subrounded cobbles up to 12 inches, ~5% roots, brown, moist (subsoil)</td>
</tr>
<tr>
<td>14&quot; - 2.2'</td>
<td>E - M</td>
<td>-</td>
<td>~2.2'</td>
</tr>
<tr>
<td>26&quot; - 3'</td>
<td>M</td>
<td>Fill</td>
<td>26&quot; - 3': SILT (ML), mostly non-plastic, 10-15% sand, ~5% sub-rounded cobbles, bright brown, moist (fill)</td>
</tr>
<tr>
<td>3'</td>
<td>M</td>
<td>Gravelly Silt with Gravel (SM)</td>
<td>3' - 5': Silty SAND with Gravel (SM), mostly fine, 30-35% fines, 30-35% mostly coarse, angular gravel, ~3-foot boulder at 3 feet, gray-tan, moist</td>
</tr>
<tr>
<td>5' - 9.5'</td>
<td>M - D</td>
<td>Gravelly Silt with Cobbles &amp; Boulders</td>
<td>5' - 9.5': Gravelly SILT with Cobbles and Boulders (ML), mostly non-plastic, 5-10% sand, ~35% mostly coarse, angular gravel, ~20% mostly angular cobbles up to 12 inches, 10-15% mostly angular boulders up to 3-foot, exposed a ~5-foot boulder on one side of the test pit from 5 ft to 9 ft, brown-tan, moist</td>
</tr>
</tbody>
</table>

Remarks:
2 - Difficult excavation and almost excavator refusal at bottom of test pit due to large boulders.
## Project: Proposed Nelson Place Elementary School, Worcester, MA

**Client:** Lamoureux Pagano & Associates, Inc.

<table>
<thead>
<tr>
<th>Excavation Subcontractor:</th>
<th>R. E. Barrows Const.</th>
<th>Date Started:</th>
<th>08/19/14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation Foreman:</td>
<td>Roland Barrows</td>
<td>Date Completed:</td>
<td>08/19/14</td>
</tr>
<tr>
<td>LGCI Engineer:</td>
<td>Geetha Mathiyalakan</td>
<td>Location:</td>
<td>Proposed access road - western side</td>
</tr>
<tr>
<td>Ground Surface El:</td>
<td>Est. 650 ft (see remark 1)</td>
<td>Total Depth:</td>
<td>5.5 feet (see remark 2)</td>
</tr>
<tr>
<td>Groundwater Depth:</td>
<td>Not encountered</td>
<td>Excavator Type:</td>
<td>CAT 315 BL Track Excavator</td>
</tr>
<tr>
<td>Test Pit Dimensions:</td>
<td>10’ x 15’</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Depth Scale and Strata

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Strata Description</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Topsoil/ Subsoil</td>
<td>8&quot;: Forest mat</td>
</tr>
<tr>
<td></td>
<td>~1.3’</td>
<td>8’ - 1.3’: Silt (ML), mostly non-plastic, 10-15% sand, ~25% small to medium size roots, brown, moist (subsoil)</td>
</tr>
<tr>
<td>M</td>
<td>Gravelly Silt with Cobble &amp; Boulders</td>
<td>1.3’ - 4’: Gravelly Silt with Cobble (ML), mostly non-plastic, 10-15% sand, ~30% mostly coarse, angular gravel, 20-25% mostly angular cobbles up to 12 inches, tan, moist</td>
</tr>
<tr>
<td>M - D</td>
<td></td>
<td>4’ - 5.5’: Mostly angular boulders up to 2.5 feet</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td>Excavator refusal at 5.5 feet.</td>
</tr>
<tr>
<td>V</td>
<td></td>
<td>Bottom of test pit at 5.5 feet. Backfilled with excavated material.</td>
</tr>
</tbody>
</table>

### Test Pit Dimensions

- **TP-2**
- **Page 1 of 1**

**Remarks:**

2. Excavator refusal and possible top of bedrock.
**Project:** Proposed Nelson Place Elementary School, Worcester, MA  
**Client:** Lamoureux Pagano & Associates, Inc.  
**LGCI Project No.:** 1402

<table>
<thead>
<tr>
<th>Excavation Subcontractor: R. E. Barrows Const.</th>
<th>Date Started:</th>
<th>08/19/14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation Foreman: Roland Barrows</td>
<td>Date Completed:</td>
<td>08/19/14</td>
</tr>
<tr>
<td>LGCI Engineer: Geetha Mathiyalakan</td>
<td>Location:</td>
<td>Proposed access road - western side</td>
</tr>
<tr>
<td>Ground Surface El: Est. 652.5 ft (see remark 1)</td>
<td>Total Depth:</td>
<td>10 feet</td>
</tr>
<tr>
<td>Groundwater Depth: Not encountered</td>
<td>Excavator Type:</td>
<td>CAT 315 BL Track Excavator</td>
</tr>
<tr>
<td></td>
<td>Test Pit Dimensions:</td>
<td>7' x 15'</td>
</tr>
</tbody>
</table>

**Ground Surface El:** Est. 652.5 ft (see remark 1)  
**Groundwater Depth:** Not encountered  
**Total Depth:** 10 feet  
**Excavator Type:** CAT 315 BL Track Excavator  
**Test Pit Dimensions:** 7' x 15'

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Topsoil/Subsoil</td>
<td>10’</td>
<td>Forest mat</td>
</tr>
<tr>
<td>E - M</td>
<td>10’ - 2’</td>
<td>SILT (ML), mostly non-plastic, 10-15% sand, ~5% boulders up to 2 feet, 10-15% small to medium size roots, brown, moist (subsoil)</td>
</tr>
<tr>
<td>M</td>
<td>2’ - 10’</td>
<td>Gravelly SILT with Sand and Cobbles (ML), mostly non-plastic, 15-20% sand to ~25% sand below 8 feet, ~35% mostly coarse, angular gravel, 15-20% mostly angular cobbles up to 12 inches, tan, moist</td>
</tr>
<tr>
<td>M - D</td>
<td>5’</td>
<td>Gravelly Silt with Sand &amp; Cobbles</td>
</tr>
<tr>
<td>D</td>
<td>Bottom of test pit at 10 feet. Backfilled with excavated material.</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**  
E = Easy, M = Moderate, D = Difficult, V = Very Difficult  
1 - Ground surface elevations interpolated from plan titled "Existing Conditions Plan," Sheets EX-1, EX-2, and EX-3 dated April 20, 2014, revised September 26, 2014 by Nitsch Engineering and is approximate.
**Project:** Proposed Nelson Place Elementary School, Worcester, MA  
**Client:** Lamoureux Pagano & Associates, Inc.  
**Location:** Proposed access road - SW corner  
**Excavation Subcontractor:** R. E. Barrows Const.  
**Excavation Foreman:** Roland Barrows  
**LGCI Engineer:** Geetha Mathiyalakan  
**Date Started:** 08/19/14  
**Date Completed:** 08/19/14  
**Ground Surface El:** 656 ft (see remark 1)  
**Groundwater Depth:** Not encountered  
**Total Depth:** 5 feet (see remark 2)  
**Excavator Type:** CAT 315 BL Track Excavator  
**Test Pit Dimensions:** 10' x 15'  

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Exc. Effort</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
</table>
| 10” Topsoil/Subsoil | E | ~1.7’ | Forest mat  
8” - 1.7’: SILT with Sand (ML), mostly non-plastic, ~20% sand, ~10% cobbles mostly up to 6 inches, ~10% small to medium size roots, brown, moist (subsoil) |
| 1.7’ - 5’: Gravelly SILT with Cobbles (ML), mostly non-plastic, ~15% sand, ~30% mostly coarse, angular gravel, 10-15% mostly angular cobbles up to 12 inches, tan, moist | M | D | D - V | V |
| 5 ft Excavator refusal at 5 feet. | |
| 10 ft Bottom of test pit at 5 feet. Backfilled with excavated material. |

**Remarks:**  
2 - Excavator refusal and possible top of bedrock.
Project: Proposed Nelson Place Elementary School, Worcester, MA

Excavation Subcontractor: R. E. Barrows Const.
Excavation Foreman: Roland Barrows
LGCI Engineer: Geetha Mathiyalakan
Location: Proposed access road - SW corner

Ground Surface El: Est. 650.5 ft (see remark 1)
Groundwater Depth: Not encountered

Total Depth: 9.5 feet (see remark 2)
Excavator Type: CAT 315 BL Track Excavator
Test Pit Dimensions: 7' x 15'

Depth Scale

<table>
<thead>
<tr>
<th>Depth</th>
<th>Effort</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
</table>
| 12"   | E      | Topsoil/ Subsoil with Boulders | 12": Forest mat
12" - 3": SILT with Boulders (ML), mostly non-plastic, 10-15% sand, ~50% nestled angular boulders up to 3 feet, brown, moist (subsoil) |
|       | M-D    | ~3'                             |                                                                                   |
| 3'    | M-D    | Gravelly Silt with Cobbles      | 3' - 9': Gravelly SILT with Cobbles (ML), mostly non-plastic, 10-15% sand, ~30% mostly coarse, angular gravel, 20-25% subrounded to angular cobbles up to 12 inches, tan, moist |
|       | M-D    | Gravelly Silt with Cobbles & Boulders |                                                                                   |
| 9'    | D      | -                               | 9' - 9.5': Mostly nestled angular boulders. Excavator refusal at 9.5 feet.                                                              |
| 10 ft | V      | -                               | Bottom of test pit at 9.5 feet. Backfilled with excavated material.                                                                  |
| 15 ft | V      | -                               |                                                                                   |

Remarks:

1 - Ground surface elevations interpolated from plan titled "Existing Conditions Plan," Sheets EX-1, EX-2, and EX-3 dated April 20, 2014, revised September 26, 2014 by Nitsch Engineering and is approximate.
2 - Difficult excavation and excavator refusal at bottom of test pit due to nestled angular boulders.
## Project Information

**Project:** Proposed Nelson Place Elementary School, Worcester, MA  
**Client:** Lamoureux Pagano & Associates, Inc.  
**LGCI Project No.:** 1402

<table>
<thead>
<tr>
<th>Excavation Subcontractor</th>
<th>Date Started</th>
<th>Date Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>R. E. Barrows Const.</td>
<td>08/19/14</td>
<td>08/19/14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Excavation Foreman</th>
<th>Date Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Roland Barrows</td>
<td>08/19/14</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LGCI Engineer</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>Geetha Mathiyalakan</td>
<td>Proposed access road - SW corner</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ground Surface El:</th>
<th>Total Depth:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Est. 655.5 ft (see remark 1)</td>
<td>9 feet (see remark 2)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Groundwater Depth:</th>
<th>Excavator Type:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not encountered</td>
<td>CAT 315 BL Track Excavator</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test Pit Dimensions:</th>
</tr>
</thead>
<tbody>
<tr>
<td>7' x 15'</td>
</tr>
</tbody>
</table>

## Depth Scale and Strata Description

<table>
<thead>
<tr>
<th>Depth</th>
<th>Exc. Effort</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 ft</td>
<td>D - V</td>
<td>Silty Sand with Gravel, Cobbles &amp; Boulders</td>
<td>(At 5 feet exposed a ~5-foot boulder and excavated around it to 9 feet)</td>
</tr>
<tr>
<td>10 ft</td>
<td>D - V</td>
<td></td>
<td>Bottom of test pit at 9 feet. Backfilled with excavated material.</td>
</tr>
<tr>
<td>15 ft</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**


2. Difficult excavation and almost excavator refusal at bottom of test pit due to a large boulder.
**Project:** Proposed Nelson Place Elementary School, Worcester, MA  
**Client:** Lamoureux Pagano & Associates, Inc.  
**Excavation Subcontractor:** R. E. Barrows Const.  
**Date Started:** 08/20/14  
**Excavation Foreman:** Roland Barrows  
**Date Completed:** 08/20/14  
**LGCI Engineer:** Geetha Mathiyalakan  
**Location:** Proposed access road - southern side  
**Ground Surface EL:** 660.4 ft (see remark 1)  
**Groundwater Depth:** Not encountered  
**Total Depth:** 11 feet  
**Excavator Type:** CAT 315 BL Track Excavator  
**Test Pit Dimensions:** 8' x 15'  

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Exc. Effort</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
</table>
| 5 ft        | E          | Topsoil/Subsoil with Cobbles (1.8') | 5': Forest mat  
5' - 1.8': SILT (ML), mostly non-plastic, 10-15% sand, 15-20% subrounded cobbles up to 12 inches, 15-20% small to medium size roots, brown, moist (subsoil) |
| 5'          | E - M      |        |                  |
| 5'          | M          |        | 1.8' - 4': Gravelly SILT (ML), mostly non-plastic, 10-15% sand, 25-30% mostly coarse, angular gravel, tan, moist |
| 4'          | M          |        |                  |
| 4' - 9'     | D          |        | 4' - 9': Gravelly SILT with Boulders (ML), mostly non-plastic, ~10% sand, ~40% mostly coarse, angular gravel, ~25% mostly angular boulders up to 2.5 feet, tan, moist |
| 9' - 11'    | M - D      |        | 9' - 11': Gravelly SILT (ML), mostly non-plastic, 10-15% sand, 25-30% mostly coarse, angular gravel, tan, moist |
| 10 ft       | M - D      |        | Bottom of test pit at 11 feet. Backfilled with excavated material. |
| 15 ft       |            |        |                  |

**Remarks:** E = Easy, M = Moderate, D = Difficult, V = Very Difficult  
**Project:** Proposed Nelson Place Elementary School, Worcester, MA  
**Client:** Lamoureux Pagano & Associates, Inc.

**Excavation Subcontractor:** R. E. Barrows Const.  
**Excavation Foreman:** Roland Barrows  
**LGCI Engineer:** Geetha Mathiyalakan

**Date Started:** 08/20/14  
**Date Completed:** 08/20/14  
**Location:** Proposed access road - southern side

| Ground Surface El: 663.2 ft (see remark 1) | Total Depth: 8 feet (see remark 2) |
| Groundwater Depth: Not encountered | Excavator Type: CAT 315 BL Track Excavator |
| Test Pit Dimensions: 8' x 20' |

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Exc. Effort</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
</table>
| E - M | 9": Forest mat  
9" - 2": SILT (ML), mostly non-plastic, ~10% sand, 20-25% subangular cobbles up to 12 inches, 10-15% boulders up to 2 feet, brown, moist (subsoil) |
| M | 2’ - 5’: Gravelly SILT with Cobbles (ML), mostly non-plastic, ~10% sand, ~30% mostly coarse, angular gravel, 20-25% subangular cobbles, tan, moist |
| M-D | 5’ - 8’: Gravelly SILT with Boulders (ML), mostly non-plastic, ~10% sand, ~35% mostly coarse, angular gravel, ~20% sub-angular boulders up to 2.5 feet, tan, moist |
| D | Excavator refusal at 8 feet. |
| V | Bottom of test pit at 8 feet. Backfilled with excavated material. |

**Remarks:**  
2 - Excavator refusal and possible top of bedrock.
### Project: Proposed Nelson Place Elementary School, Worcester, MA

**Client:** Lamoureux Pagano & Associates, Inc.  
**LGCI Project No.:** 1402

<table>
<thead>
<tr>
<th>Excavation Subcontractor: R. E. Barrows Const.</th>
<th>Date Started: 08/21/14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation Foreman: Roland Barrows</td>
<td>Date Completed: 08/21/14</td>
</tr>
<tr>
<td>LGCI Engineer: Geetha Mathiyalakan</td>
<td>Location: Proposed access road - southern side</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ground Surface El: 657.3 ft (see remark 1)</th>
<th>Total Depth: 9 feet (see remarks 2 and 3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Groundwater Depth: Not encountered</td>
<td>Excavator Type: CAT 315 BL Track Excavator</td>
</tr>
</tbody>
</table>

| Test Pit Dimensions: 7’ x 19’ |

### Depth Scale

<table>
<thead>
<tr>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>9’</td>
<td>Forest mat, 3 feet boulder</td>
</tr>
<tr>
<td>9’ - 2’</td>
<td>SILT (ML), mostly non-plastic, ~60% mostly nestled angular cobbles up to 12 inches, moist (subsoil)</td>
</tr>
<tr>
<td>2’ - 4’</td>
<td>Gravelly SILT with Cobbles (ML), mostly non-plastic, ~10% sand, ~30% mostly coarse, angular gravel, ~30% mostly angular cobbles up to 12 inches, tan, moist</td>
</tr>
<tr>
<td>4’ - 9’</td>
<td>Silty Gravel with Sand (GM), fine to coarse, angular, 35-40% non-plastic, fines, 10-15 % sand, ~30% mostly angular cobbles up to 12 inches, ~10% mostly angular boulders up to 2 feet, exposed a ~4.5-foot boulder at 4 feet on one side of the test pit, tan, moist</td>
</tr>
<tr>
<td>Bottom of test pit at 9 feet. Backfilled with excavated material.</td>
<td></td>
</tr>
</tbody>
</table>

### Test Pit Dimensions

**Remarks:**

2. Excavator refusal and possible top of bedrock.
3. A Double Ring Infiltrometer test was performed at 4 feet.
Project: Proposed Nelson Place Elementary School, Worcester, MA
LGCI Project No.: 1402

<table>
<thead>
<tr>
<th>Excavation Subcontractor: R. E. Barrows Const.</th>
<th>Date Started: 08/19/14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation Foreman: Roland Barrows</td>
<td>Date Completed: 08/19/14</td>
</tr>
<tr>
<td>LGCI Engineer: Geetha Mathiyalakan</td>
<td>Location: Proposed building - southern side</td>
</tr>
</tbody>
</table>

Ground Surface El: 660.8 ft (see remark 1)
Groundwater Depth: Not encountered

| Test Pit Dimensions: 7' x 15' | Total Depth: 8.5 feet (see remark 2) |

Excavator Type: CAT 315 BL Track Excavator

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Exc. Effort</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>10&quot;</td>
<td>E</td>
<td>Topsoil/Subsoil</td>
<td>10&quot;: Forest mat</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>10&quot; - 2&quot;: SILT (ML), mostly non-plastic, ~10% sand, ~15% small to medium size roots, bright brown, moist (subsoil)</td>
</tr>
<tr>
<td>2'</td>
<td>M</td>
<td></td>
<td>2' - 5&quot;: Gravelly SILT with Cobbles (ML), mostly non-plastic, 10-15% sand, ~35% mostly coarse, angular gravel, ~20% mostly angular cobbles up to 12 inches, tan, moist</td>
</tr>
<tr>
<td>5 ft</td>
<td>M</td>
<td>Gravelly Silt with Cobbles &amp; Boulders</td>
<td>5' - 8.5': Mostly nestled angular boulders up to 2.5 feet</td>
</tr>
<tr>
<td></td>
<td>M - D</td>
<td></td>
<td>Excavator refusal at 8.5 feet.</td>
</tr>
<tr>
<td></td>
<td>D</td>
<td></td>
<td>Bottom of test pit at 8.5 feet. Backfilled with excavated material.</td>
</tr>
</tbody>
</table>

Remarks:
2 - Difficult excavation and excavator refusal at bottom of test pit due to nestled angular boulders.
<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Exc. Effort</th>
<th>Strata Description</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td>Topsoil/Subsoil with Boulders ~1.5'</td>
<td>9&quot;: Forest mat</td>
<td>9&quot; - 1.5&quot;: SILT (ML), mostly non-plastic, 10-15% sand, ~10% cobbles up to 9 inches, 10-15% boulders up to 2.5 feet, brown, moist (subsoil)</td>
</tr>
<tr>
<td>E - M</td>
<td>Gravelly Silt with Cobbles &amp; Boulders</td>
<td>1.5&quot; - 4.5&quot;: Gravelly SILT with Cobbles (ML), mostly non-plastic, 10-15% sand, ~30% mostly coarse, angular gravel, 10-15% mostly angular cobbles up to 12 inches, tan, moist</td>
<td></td>
</tr>
<tr>
<td>M</td>
<td>Gravelly Silt with Sand and Boulders (ML), mostly non-plastic, 10-15% sand, 30-35% mostly coarse, angular gravel, 15-20% mostly angular cobbles, 10-15% angular boulders up to 2 feet, tan, moist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>M - D</td>
<td>Gravelly Silt with Sand and Boulders (ML), mostly non-plastic, 10-15% sand, 30-35% mostly coarse, angular gravel, 15-20% mostly angular cobbles, 10-15% angular boulders up to 2 feet, tan, moist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D</td>
<td>Gravelly Silt with Sand and Boulders (ML), mostly non-plastic, 20% sand, 30-35% mostly coarse, angular gravel, 15-20% mostly angular cobbles, 10-15% angular boulders up to 2 feet, tan, moist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>D - V</td>
<td>Gravelly Silt with Sand and Boulders (ML), mostly non-plastic, 20% sand, 30-35% mostly coarse, angular gravel, 15-20% mostly angular cobbles, 10-15% angular boulders up to 2 feet, tan, moist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Gravelly Silt with Sand and Boulders (ML), mostly non-plastic, 20% sand, 30-35% mostly coarse, angular gravel, 15-20% mostly angular cobbles, 10-15% angular boulders up to 2 feet, tan, moist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 ft</td>
<td>Gravelly Silt with Sand and Boulders (ML), mostly non-plastic, 20% sand, 30-35% mostly coarse, angular gravel, 15-20% mostly angular cobbles, 10-15% angular boulders up to 2 feet, tan, moist</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 ft</td>
<td>Gravelly Silt with Sand and Boulders (ML), mostly non-plastic, 20% sand, 30-35% mostly coarse, angular gravel, 15-20% mostly angular cobbles, 10-15% angular boulders up to 2 feet, tan, moist</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult


2 - Excavator refusal and possible top of bedrock.
### Test Pit Dimensions and Soil Description

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Exc. Effort</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 ft</td>
<td>E</td>
<td>Topsoil/ Subsoil</td>
<td>8&quot;: Topsoil</td>
</tr>
<tr>
<td></td>
<td>E - M</td>
<td></td>
<td>5&quot; - 1.1&quot;: Silty SAND (SM), mostly fine, ~30% fines, ~5% organics, dark brown, moist (subsoil)</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>Fill</td>
<td>1.1' - 3' to 4': Silty SAND (SM), mostly fine, 20-25% fines, 5-10% gravel, ~5% cobbles and boulders up to 2 feet, &lt;5% pieces of brick, ~5% organics, dark brown, moist (fill)</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td></td>
<td>(exposed top of crushed stone layer of existing storm drain at 4 feet, moved about 3 feet away and continued the excavation)</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td></td>
<td>3' - 6': Silty SAND (SM), mostly fine, 30-35% fines, ~25% fine to coarse gravel, gray-brown, moist (fill)</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td></td>
<td>6' - 6.8': ~10 inch buried Topsoil</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td>Silty Sand with Gravel</td>
<td>6.8' - 11&quot;: Silty SAND with Gravel (SM), fine to medium, 30-35% fines, ~15% mostly coarse gravel, ~3-foot boulder at 9 feet, gray-brown with thin (18&quot;) layer of gray-reddish-brown at 7 feet, moist</td>
</tr>
<tr>
<td>10 ft</td>
<td>M</td>
<td></td>
<td>Bottom of test pit at 11 feet. Backfilled with excavated material.</td>
</tr>
<tr>
<td>15 ft</td>
<td>M</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**

- E = Easy, M = Moderate, D = Difficult, V = Very Difficult
- 2 - A Double Ring Infilrometer test was performed at 5 feet.
**Project:** Proposed Nelson Place Elementary School, Worcester, MA  
**Client:** Lamoureux Pagano & Associates, Inc.  
**Excavation Subcontractor:** R. E. Barrows Const.  
**Excavation Foreman:** Roland Barrows  
**LGCI Engineer:** Geetha Mathiyalakan  
**Location:** Proposed access road - eastern side  
**Date Started:** 08/21/14  
**Date Completed:** 08/21/14  
**Ground Surface El:** 661.1 ft (see remark 1)  
**Groundwater Depth:** Not encountered  
**Total Depth:** 10 feet (see remark 2)  
**Excavator Type:** CAT 315 BL Track Excavator  
**Test Pit Dimensions:** 8’ x 16’

<table>
<thead>
<tr>
<th>Depth</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>12”</td>
<td>Topsoil/Subsoil</td>
<td>12” : Topsoil                      12” - 2”: SILT (ML), mostly non-plastic, ~10% sand, 10-15% cobbles, 5-10% boulders up to 2 feet, ~5% roots, bright brown, moist (subsoil)</td>
</tr>
<tr>
<td>2’</td>
<td>Fill</td>
<td>2’ - 3’: SILT with Boulders (ML), mostly non-plastic, 5-10% sand, 5-10% boulders up to 2 feet, brown, moist (fill)</td>
</tr>
<tr>
<td>3’ - 7’</td>
<td>Silty GRAVEL with Sand (GM), fine to coarse, angular, 25-30% mostly non-plastic fines, 30-35% sand, 10% mostly angular cobbles, gray-tan, moist</td>
<td></td>
</tr>
<tr>
<td>7’ - 10’</td>
<td>Silty SAND with Gravel and Cobbles (SM), mostly fine to medium, 30-35% fines, ~35% mostly coarse, angular gravel, ~20% mostly angular cobbles up to 12 inches, gray-tan, moist</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**  
2 - A Double Ring Infiltrometer test was performed at 4.5 feet.
# Proposed Nelson Place Elementary School, Worcester, MA

**Excavation Subcontractor:** R. E. Barrows Const.  
**Excavation Foreman:** Roland Barrows  
**LGCI Engineer:** Geetha Mathiyalakan  
**Location:** Proposed access road - NW corner

**Ground Surface El:** 641.9 ft (see remark 1)  
**Groundwater Depth:** Not encountered  
**Total Depth:** 10 feet (see remark 2)  
**Excavator Type:** CAT 315 BL Track Excavator  
**Test Pit Dimensions:** 9’ x 20’

## Depth Scale and Strata

<table>
<thead>
<tr>
<th>Depth</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td><strong>E</strong> Topsoil</td>
<td>9’: Forest mat 12” - 1.8’: Sandy SILT (ML), mostly non-plastic, 20-25% sand, ~15% small to medium size roots, brown, moist (subsoil)</td>
</tr>
<tr>
<td></td>
<td><strong>M</strong> ~1.8</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>M - D</strong></td>
<td>1.8’ - 10’: Gravelly SILT with Boulders (ML), mostly non-plastic, 10-15% sand, ~30% mostly coarse, angular gravel, ~30% mostly angular cobbles up to 12 inches, 10-15% angular boulders up to 4 feet at 8 feet, gray-tan, moist</td>
</tr>
<tr>
<td>5 ft</td>
<td><strong>D</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>D</strong> Gravelly Silt with</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Cobble &amp; Boulders</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>D</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>D</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>D</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>D - V</strong></td>
<td></td>
</tr>
<tr>
<td>10 ft</td>
<td><strong>V</strong></td>
<td>Excavator refusal at 10 feet. Bottom of test pit at 10 feet. Backfilled with excavated material.</td>
</tr>
<tr>
<td>15 ft</td>
<td>Search for Hard Boulders</td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**  
2 - Difficult excavation and excavator refusal at bottom of test pit due to nestled angular boulders and cobbles.
<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Exc. Effort</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 ft</td>
<td>M</td>
<td>Silty Sand with Gravel</td>
<td>1.7' - 6': Silty SAND with Gravel (SM), mostly fine to medium, ~20% fines, ~30% fine to coarse, angular gravel, 5-10% cobbles up to 6 inches, gray-tan, moist</td>
</tr>
<tr>
<td></td>
<td>M</td>
<td></td>
<td>6' - 11': Silty SAND with Gravel (SM), mostly fine to medium, 5-10% coarse, 20-25% fines, 25% mostly coarse, angular gravel, 10-15% sub-rounded cobbles up to 12 inches, ~5% angular boulders up to 2 feet, gray-tan, moist</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bottom of test pit at 11 feet. Backfilled with excavated material.</td>
<td></td>
</tr>
</tbody>
</table>

Remarks:
- E = Easy, M = Moderate, D = Difficult, V = Very Difficult
- 2 - A Double Ring Infiltrometer test was performed at 5 feet.
## Project: Proposed Nelson Place Elementary School, Worcester, MA

### Client: Lamoureux Pagano & Associates, Inc.

<table>
<thead>
<tr>
<th>Excavation Subcontractor: R. E. Barrows Const.</th>
<th>Date Started: 08/22/14</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excavation Foreman: Roland Barrows</td>
<td>Date Completed: 08/22/14</td>
</tr>
</tbody>
</table>

**LGCI Project No.: 1402**

**Excavation Foreman:** Roland Barrows
**Date Completed:** 08/22/14

**LGCI Engineer:** Geetha Mathiyalakan
**Location:** Proposed building - northern side

**Ground Surface El:** Est. 647 ft (see remark 1)
**Total Depth:** 12 feet

**Groundwater Depth:** Not encountered
**Excavator Type:** CAT 315 BL Track Excavator

**Test Pit Dimensions:** 7' x 14'

### Test Pit Dimensions and Soil Description

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 ft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E</td>
<td></td>
<td>10&quot; - Topsoil/ Subsoil</td>
</tr>
<tr>
<td>E - M</td>
<td></td>
<td>1.7&quot; - 2.3' to 3': Sandy SILT (ML), mostly non-plastic, 25-30% sand, 5-10% mostly angular cobbles, tan-bright brown, moist (fill)</td>
</tr>
<tr>
<td>E - M</td>
<td></td>
<td>3' - 6': Gravelly SILT with Sand (ML), mostly non-plastic, 20-25% sand, ~20% mostly coarse, angular gravel, 5-10% mostly angular cobbles up to 6 inches, brown-tan, moist</td>
</tr>
<tr>
<td>M</td>
<td></td>
<td>6' - 12': Silty SAND with Gravel (SM), mostly fine to medium, ~10% coarse, ~25% fines, 20-25% mostly coarse, angular gravel, ~10% mostly angular cobbles up to 12 inches, gray-tan, moist</td>
</tr>
<tr>
<td>M - D</td>
<td></td>
<td>Bottom of test pit at 12 feet. Backfilled with excavated material.</td>
</tr>
</tbody>
</table>

### Remarks:

- **E** = Easy, **M** = Moderate, **D** = Difficult, **V** = Very Difficult

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Effort</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>E</td>
<td></td>
<td>Topsoil/ Subsoil with Cobbles</td>
<td>9&quot;: Forest mat</td>
</tr>
<tr>
<td>E - M</td>
<td></td>
<td></td>
<td>9&quot; - 1.7&quot;: SILT (ML), mostly non-plastic, ~5% sand, 25-30% thin angular cobbles up to 12 inches, brown, moist (subsoil)</td>
</tr>
<tr>
<td>M</td>
<td></td>
<td>Gravelly Silt with Cobbles</td>
<td>1.7&quot; - 5&quot;: Gravelly Silt with Cobbles (ML), mostly non-plastic, 5-10% sand, ~35% mostly coarse, angular gravel, 15-20% thin angular cobbles up to 8 inches, tan, moist</td>
</tr>
<tr>
<td>5 ft M - D</td>
<td></td>
<td>Gravelly Silt with Cobbles and Boulders</td>
<td>5' - 9&quot;: Gravelly Silt with Cobbles and Boulders (ML), mostly non-plastic, 5-10% sand, 25-30% mostly coarse, angular gravel, 15-20% mostly angular cobbles, 10-15% mostly angular boulders up to 2 feet, tan, moist</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td>Excavator refusal at 9 feet.</td>
</tr>
<tr>
<td>D</td>
<td></td>
<td></td>
<td>Bottom of test pit at 9 feet. Backfilled with excavated material.</td>
</tr>
</tbody>
</table>

Remarks: E = Easy, M = Moderate, D = Difficult, V = Very Difficult

2 - Excavator refusal and possible top of bedrock.
**Project:** Proposed Nelson Place Elementary School, Worcester, MA  
**Client:** Lamoureux Pagano & Associates, Inc.  
**Excavation Subcontractor:** R. E. Barrows Const.  
**Excavation Foreman:** Roland Barrows  
**LGCI Engineer:** Geetha Mathiyalakan  
**Location:** Proposed southern access road

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Effort</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>8&quot;</td>
<td>E</td>
<td>Forest mat</td>
<td>8&quot; - 2&quot;: SILT (ML), mostly non-plastic, ~5% sand, 5-10% cobbles up to 12 inches, ~15% medium to large size roots, brown, moist (subsoil)</td>
</tr>
<tr>
<td>E - M</td>
<td>~2&quot;</td>
<td>Topsoil/Subsoil</td>
<td></td>
</tr>
<tr>
<td>2' - 5'</td>
<td>M</td>
<td>Gravelly SILT with Cobbles (ML), mostly non-plastic, ~30% mostly coarse, angular gravel, 15-20% subangular cobbles up to 12 inches, tan, moist</td>
<td></td>
</tr>
<tr>
<td>5 ft</td>
<td>M - D</td>
<td>Gravelly Silt with Cobbles &amp; Boulders</td>
<td>5' - 9': Gravelly SILT with Cobbles and Boulders (ML), mostly non-plastic, ~10% sand, 25-30% mostly coarse, angular gravel, 10-15% mostly angular cobbles, ~10% mostly angular boulders up to 2.5 feet, tan, moist</td>
</tr>
<tr>
<td>10 ft</td>
<td>D - V</td>
<td>Gravelly Silt with Cobbles &amp; Boulders</td>
<td>8' - 10': Mostly angular boulders up to 5 feet</td>
</tr>
<tr>
<td>15 ft</td>
<td>D - V</td>
<td>Topsoil/Subsoil</td>
<td>Bottom of test pit at 10 feet. Backfilled with excavated material.</td>
</tr>
</tbody>
</table>

**Remarks:**  
2. Difficult excavation and excavator refusal at bottom of test pit due to nested angular boulders.
### Project Details

**Proposed Nelson Place Elementary School, Worcester, MA**

**Client:** Lamoureux Pagano & Associates, Inc.

**Excavation Subcontractor:** R. E. Barrows Const.

**Excavation Foreman:** Roland Barrows

**LGCI Engineer:** Geetha Mathiyalakan

**Location:** Proposed southern access road

- **Date Started:** 08/21/14
- **Date Completed:** 08/21/14

**Ground Surface El:** 679 ft (see remark 1)

**Groundwater Depth:** Not encountered

**Total Depth:** 10 feet (see remark 2)

**Excavator Type:** CAT 315 BL Track Excavator

**Test Pit Dimensions:** 6' x 19'

### Test Pit Soil Description

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 1.8'</td>
<td>E</td>
<td>Topsoil/Subsoil 9&quot;: Forest mat</td>
</tr>
<tr>
<td>1.8' - 4'</td>
<td>M</td>
<td>Silt (ML), mostly non-plastic, ~10% cobbles and boulders up to 2.5 feet, ~15% medium size roots, brown, moist (subsoil)</td>
</tr>
<tr>
<td>4' - 10'</td>
<td>M-D</td>
<td>Gravelly Silt with Cobbles and Boulders (ML), mostly non-plastic, ~15% sand, ~40% mostly coarse, angular gravel, ~20% mostly angular cobbles, ~15% mostly angular boulders up to 2 feet, gray-tan, moist</td>
</tr>
<tr>
<td>10'</td>
<td>D-V</td>
<td>Excavator refusal at 10 feet. Bottom of test pit at 10 feet. Backfilled with excavated material.</td>
</tr>
</tbody>
</table>

### Remarks:


2. Difficult excavation and excavator refusal at bottom of test pit due to nestled angular boulders.
# Project:
Proposed Nelson Place Elementary School, Worcester, MA

## Client:
Lamoureux Pagano & Associates, Inc.

## LGCI Project No.:
1402

### Excavation Subcontractor:
R. E. Barrows Const.

### Date Started:
08/19/14

### Excavation Foreman:
Roland Barrows

### Date Completed:
08/19/14

### LGCI Engineer:
Geetha Mathiyalakan

### Location:
Proposed building - southern side

### Ground Surface El:
661 ft (see remark 1)

### Groundwater Depth:
Not encountered

### Total Depth:
10 feet

### Excavator Type:
CAT 315 BL Track Excavator

### Test Pit Dimensions:
6.5' x 15'

## Test Pit Dimensions

<table>
<thead>
<tr>
<th>Depth</th>
<th>Strata</th>
<th>Soil Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 ft</td>
<td>Topsoil</td>
<td>8&quot;: Topsoil</td>
</tr>
<tr>
<td>8&quot;</td>
<td></td>
<td>8&quot; - 3.4&quot;: SILT with Sand and Boulders (ML), mostly non-plastic, ~20% sand, 20-25% mostly coarse, angular gravel, 35-40% boulders up to 2 feet, ~5% organics, dark brown, moist (fill)</td>
</tr>
<tr>
<td>3.4'</td>
<td></td>
<td>4.5' - 5.5&quot;: SILT with Sand and Cobbles (ML), mostly non-plastic, ~20% sand, 30-35% mostly angular cobbles up to 12 inches, 5-10% roots, bright brown, moist (buried subsoil)</td>
</tr>
<tr>
<td>5.5'</td>
<td></td>
<td>5.5' - 10&quot;: Gravelly SILT with Sand and Cobbles (ML), mostly non-plastic, ~15% sand, 25-30% mostly coarse, angular gravel, 15-20% mostly angular cobbles up to 12 inches, tan, moist</td>
</tr>
<tr>
<td>10 ft</td>
<td></td>
<td></td>
</tr>
<tr>
<td>15 ft</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Remarks:
- E = Easy, M = Moderate, D = Difficult, V = Very Difficult

Appendix C – Boring Logs and Groundwater Observation Well Installation Report
### Project Details

**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts  
**Client:** Lamoureux Pagano & Associates, Inc.  
**Drilling Subcontractor:** Northern Drill Service, Inc.  
**Drilling Foreman:** Carl Beirhorn  
**LGCI Engineer:** Geetha Mathiyalakan  
**Location:** Proposed access road - NE corner  
**Date Started:** 8/26/2014  
**Date Completed:** 8/26/2014  
**Ground Surface El:** 617.3 feet (see remark 1)  
**Groundwater Depth:** 11.8 feet (wet at tip of the spoon S5)  
**Total Depth:** 12 feet (see remark 2)  
**Drill Rig Type:** Mobile Drill B-59 Truck Rig  
**Drilling Method:** 3-1/4" HSA  
**Hammer Weight:** 140 lbs  
**Hammer Type:** Automatic  
**Split Spoon Diameter:** ID - 1.375", OD - 2"  
**Rock Core Barrel Size:** N/A

### Boring Log

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Sample Depth (ft)</th>
<th>Sample No</th>
<th>Blows per 6 inches</th>
<th>Pen (in)</th>
<th>Rec (in)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5-2.5</td>
<td>S1</td>
<td>10</td>
<td>22</td>
<td>14</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>2 - 4</td>
<td>S2</td>
<td>11</td>
<td>15</td>
<td>18</td>
<td>16</td>
<td>24</td>
</tr>
<tr>
<td>5ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 - 7</td>
<td>S3</td>
<td>22</td>
<td>22</td>
<td>32</td>
<td>32</td>
<td>24</td>
</tr>
<tr>
<td>7 - 8.7</td>
<td>S4</td>
<td>32</td>
<td>31</td>
<td>36</td>
<td>50/2&quot;</td>
<td>20</td>
</tr>
<tr>
<td>10ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>10 - 12</td>
<td>S5</td>
<td>17</td>
<td>25</td>
<td>32</td>
<td>35</td>
<td>24</td>
</tr>
<tr>
<td>15ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**  
- First attempt auger refusal was at 8.5 ft. Second attempt, moved 3.5 ft south and drilled to 12 ft.  
- Estimated strata change based on observed drilling condition.

### Strata Description

- **Asphalt:** ~4" asphalt  
- **Fill:**  
  - S1 - Poorly Graded GRAVEL with Sand (GP), mostly coarse, angular gravel, ~5% fines, ~30% fine to medium sand, gray, moist (fill)  
  - S2 - Similar to S1, 10-15% fine to medium sand, gray, moist (fill)  
- **Silty Sand and Gravel:**  
  - S3 - Silty GRAVEL (GM), thin (~9") layer of mostly coarse, angular gravel in the middle of the sample, ~20% fines, 10-15% fine to medium sand, pink-brown, moist  
  - S4 - Gravelly SILT (ML), mostly non-plastic, 10-15% mostly fine sand, ~40% mostly coarse, angular gravel, gray-brown with reddish brown mottles, moist  
  - S5 - Silty SAND with Gravel (SM), mostly fine to medium, 35-40% fines, ~30% mostly coarse, angular gravel, gray-brown with dark brown mottles, moist to wet at the tip of the spoon

End of boring at 12 feet. Backfilled with drill cuttings.
### Boring Log

**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts  
**Client:** Lamoureux Pagano & Associates, Inc.  
**Drilling Subcontractor:** Northern Drill Service, Inc.  
**Drilling Foreman:** Carl Beirhorn  
**LGCI Engineer:** Geetha Mathiyalakan  
**Date Started:** 8/29/2014  
**Date Completed:** 8/29/2014  
**Location:** Proposed access road - eastern side

**Ground Surface El:** 630.7 feet (see remark 1)  
**Groundwater Depth:** Not encountered  
**Total Depth:** 6.5 feet (see remark 2)  
**Drill Rig Type:** Mobile B-48 Rubber Tire ATV  
**Drilling Method:** 4-1/4" HSA  
**Hammer Weight:** 140 lbs  
**Hammer Type:** Automatic  
**Split Spoon Diameter:** ID - 1.375", OD - 2"  
**Drop:** 30 inches  

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Depth (ft)</th>
<th>Sample No</th>
<th>Blows per 6 inches</th>
<th>Pen (in)</th>
<th>Rec (in)</th>
<th>Strata</th>
<th>Sample Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0-6</td>
<td>1 - 3</td>
<td>S1</td>
<td>6</td>
<td>15</td>
<td>20</td>
<td>40</td>
<td>24</td>
</tr>
<tr>
<td>6-12</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>12-18</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18-24</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>4 - 4.6</td>
<td>S2</td>
<td>19</td>
<td>50/2&quot;</td>
<td>8</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Remarks:**  
2 - Very hard augering below 4.5 ft, and auger refusal was at 6.5 ft.

End of boring at 6.5 feet. Backfilled with drill cuttings.
## BORE LOG

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Sample Depth (ft)</th>
<th>Sample No.</th>
<th>Blows per 6 inches</th>
<th>Pen (in)</th>
<th>Rec (in)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5-2.5 S1</td>
<td>2</td>
<td>8 13 20 24 14</td>
<td>~4&quot; asphalt</td>
<td>S1 - Top 3&quot;: Poorly Graded SAND (SP), mostly medium, ~5% fines, ~5% mostly fine gravel, brown, moist (fill)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.5-4.5 S2</td>
<td>12</td>
<td>26 32 60 24 19</td>
<td>~4&quot;</td>
<td>Bot. 11&quot;: Silty SAND with Gravel (SM), fine to medium, 20-25% fines, ~25% mostly coarse, angular gravel, tan, moist (fill)</td>
<td>S2 - Similar to bot. 11&quot; of S1, &quot;35-40% mostly thin (~1/16&quot;) fine, angular gravel, gray-tan, moist (fill) (trace of natural silty sand at tip of the spoon)</td>
<td></td>
</tr>
<tr>
<td>5 - 7 S3</td>
<td>17</td>
<td>36 39 62 24 12</td>
<td>Silty Sand with Gravel</td>
<td>S3 - Silty SAND with Gravel (SM), mostly fine to medium, ~35% fines, 25-30% mostly fine, angular gravel, tan, moist</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:

2 - A second attempt was made for this boring 4 ft south and auger refusal was at 4.5 ft.

End of boring at 7.5 feet. Backfilled with drill cuttings.
**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts

**Client:** Lamoureux Pagano & Associates, Inc.

**Drilling Subcontractor:** Northern Drill Service, Inc.
**Date Started:** 8/26/2014

**Drilling Foreman:** Carl Beirhorn
**Date Completed:** 8/26/2014

**LGCI Project No.:** 1402

**Location:** Proposed northern parking lot

**Ground Surface El:** 623.9 feet (see remark 1)
**Total Depth:** 12 feet (see remark 2)

**Groundwater Depth:** 3 feet at end of drilling
**Drill Rig Type:** Mobile Drill B-59 Truck Rig

**Drilling Foreman:** Carl Beirhorn
**Date Completed:** 8/26/2014

**Groundwater Depth:** 3 feet at end of drilling
**Drill Rig Type:** Mobile Drill B-59 Truck Rig

**Drilling Method:** 4" casing to 8 ft / Tri-cone roller bit

**Hammer Weight:** 140 lbs

**Hammer Type:** Automatic

**Drop:** 30 inches

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Sample Depth (ft)</th>
<th>Sample No</th>
<th>Blows per 6 inches</th>
<th>Penetration (in)</th>
<th>Rec Penetration (in)</th>
<th>Remarks</th>
<th>Strata Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.5-2.4</td>
<td>S1</td>
<td>10</td>
<td>14</td>
<td>18</td>
<td>73/5&quot;</td>
<td></td>
<td>&quot;2&quot; asphalt</td>
</tr>
<tr>
<td>4 - 6</td>
<td>S2</td>
<td>14</td>
<td>36</td>
<td>26</td>
<td>44</td>
<td></td>
<td>S1 - Top 4&quot;: Poorly Graded SAND with Gravel (SP), mostly fine to medium, &quot;5% fines, 10-15% fine to coarse gravel, brown, moist (fill) Bot. 13&quot;: Silty SAND with Gravel (SM), fine to medium, &quot;25% fines, 30-35% mostly coarse, angular gravel, gray-brown, moist (fill)</td>
</tr>
<tr>
<td>6 - 6.9</td>
<td>S3</td>
<td>37</td>
<td>60/5&quot;</td>
<td>11</td>
<td>1</td>
<td></td>
<td>S2 - Gravelly SILT with Sand (ML), traces of slightly plastic fines, 15-20% fine to medium sand, 30-35% mostly coarse, angular gravel, traces of weathered rock fragments, gray-brown with dark brown mottles, wet S3 - Similar to S2</td>
</tr>
<tr>
<td>9 - 9.1</td>
<td>S4</td>
<td>100/1&quot;</td>
<td>1</td>
<td>0.5</td>
<td>3</td>
<td></td>
<td>S4 - fine angular gravel pieces</td>
</tr>
<tr>
<td>10ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of boring at 12 feet. Backfilled with drill cuttings.</td>
</tr>
<tr>
<td>15ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Remarks:

2 - First attempt auger refusal was at 3 ft. Switched to 4" casing and tri-cone roller bit and drilled to 12 ft.
3 - Based on drilling action possible cobble between 3 ft and 4ft, a possible boulder between 9 ft and 12 ft, and almost roller bit refusal at 12 ft.
### Boring Log

**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts  
**Client:** Lamoureux Pagano & Associates, Inc.  
**Drilling Subcontractor:** Northern Drill Service, Inc.  
**Drilling Foreman:** Carl Beirhorn  
**LGCI Project No.:** 1402

<table>
<thead>
<tr>
<th>Date Started:</th>
<th>8/26/2014</th>
<th>Date Completed:</th>
<th>8/26/2014</th>
</tr>
</thead>
</table>

**Location:** Proposed access road - NW corner  
**Ground Surface El:** 626.4 feet (see remark 1)  
**Groundwater Depth:** 9.2 feet at end of drilling (wet samples below 10 feet)  
**Total Depth:** 17 feet  
**Drill Rig Type:** Mobile Drill B-59 Truck Rig  
**Drilling Method:** 3-1/4” HSA

**Hammer Type:** Automatic  
**Split Spoon Diameter:** ID - 1.375”, OD - 2”  
**Rock Core Barrel Size:** N/A

**Ground Surface Elevations:**
- S1: Topsoil, <5% fine gravel  
- S2: Silty SAND (SM), mostly fine, ~30% fines, 5-10% organics, dark brown, moist (subsoil)  
- S3: Silty SAND (SM), fine to medium, ~40% fines, 10-15% fine to coarse gravel, gray-reddish brown, moist  
- S4: Gravelly SILT with Sand (ML), mostly non-plastic, 15-20% fine to medium sand, 25-30% mostly coarse, angular gravel, gray-brown with dark brown mottles, moist  
- S5: Similar to S4, traces of slightly plastic fines, 35-40% mostly fine to coarse, angular gravel, gray-brown, wet  
- S6: Similar to S4, traces of slightly plastic fines, 35-40% mostly fine, angular gravel, gray-brown, wet

**Remarks:**
- S1 - Top 6": Topsoil, <5% fine gravel  
- Mid 2": Silty SAND (SM), mostly fine, ~30% fines, 5-10% organics, dark brown, moist (subsoil)  
- Bot. 6": Silty SAND (SM), mostly fine, ~35% fines, 5-10% mostly fine gravel, gray with reddish brown mottles, moist  
- S2 - Similar to bot. 6" of S1, 5-10% fine to coarse gravel, gray-brown, moist  
- S3 - Silty SAND (SM), fine to medium, ~40% fines, 10-15% fine to coarse gravel, gray-reddish brown, moist  
- S4 - Gravelly SILT with Sand (ML), mostly non-plastic, 15-20% fine to medium sand, 25-30% mostly coarse, angular gravel, gray-brown with dark brown mottles, moist  
- S5 - Similar to S4, traces of slightly plastic fines, 35-40% mostly fine to coarse, angular gravel, gray-brown, wet

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample Depth</th>
<th>Sample No</th>
<th>Blows per 6 inches</th>
<th>Pen (in)</th>
<th>Rec (in)</th>
<th>Remarks</th>
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<tbody>
<tr>
<td>0 - 2</td>
<td>S1</td>
<td>2</td>
<td>3</td>
<td>6</td>
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<td>24 14</td>
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<tr>
<td>2 - 4</td>
<td>S2</td>
<td>11</td>
<td>12</td>
<td>15</td>
<td>13</td>
<td>24 18</td>
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<tr>
<td>5 - 7</td>
<td>S3</td>
<td>8</td>
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<tr>
<td>7 - 8.4</td>
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<td>11</td>
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<td>10 - 12</td>
<td>S5</td>
<td>33</td>
<td>33</td>
<td>29</td>
<td>36</td>
<td>24 17</td>
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<td>15 - 17</td>
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Remarks:  
### BORING LOG

#### Project:
Proposed Nelson Place Elementary School, Worcester, Massachusetts

#### Client:
Lamoureux Pagano & Associates, Inc.

#### Drilling Subcontractor:
Northern Drill Service, Inc.

#### Drilling Foreman:
Tim Tucker

#### LGCI Engineer:
A. M. Lahlaf / GPM

#### Date Started:
9/3/2014

#### Date Completed:
9/3/2014

#### Location:
Proposed building - northern side

#### Ground Surface El: 645.9 feet (see remark 1)

#### Groundwater Depth: 15 feet at end of drilling

#### Total Depth: 23 feet

#### Hammer Weight:
140 lbs

#### Hammer Type:
Automatic

#### Drop:
30 inches

#### Drilling Method:
4" casing to 9 ft / 3" to 18 ft / Button bit

#### Hammer Type:
Automatic

#### Rock Core Barrel Size:
NX

#### Split Spoon Diameter:
ID - 1.375", OD - 2"

---

#### BORING LOG

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample No.</th>
<th>Blows per 6 inches</th>
<th>Penetrability</th>
<th>Recurrence</th>
<th>Remarks</th>
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<td>S1</td>
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<td>24/14</td>
</tr>
<tr>
<td>2 - 4</td>
<td>S2</td>
<td>5</td>
<td>28</td>
<td>34</td>
<td>22/24</td>
</tr>
<tr>
<td>4 - 5.6</td>
<td>S3</td>
<td>19</td>
<td>27</td>
<td>52/50</td>
<td>19/11</td>
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<td>9 - 10.6</td>
<td>S4</td>
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<td>31</td>
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<td>14-14.2</td>
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<td>18 - 23</td>
<td>C1</td>
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<td>57</td>
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#### Remarks:

2. Based on drilling action cobbles between 12 ft and 13 ft.
3. Estimated strata change based on drilling action. Roller bit from 14 ft to 18 ft and then cored from 18 ft to 23 ft.

---

S1 - Forest mat / Topsoil, ~5% coarse, angular gravel Bot. 4": Poorly Graded GRAVEL with Silt and Sand (GP-GM), fine angular gravel, ~30% fines, ~20% fine sand, ~5% roots, ~5% organics, brown, moist (subsoil)

S2 - Sandy SILT with Gravel (ML), mostly non-plastic, ~30% fine to medium sand, ~25% fine gravel, ~5% roots, tan-brown, moist (subsoil) (trace of natural sand at the tip of the spoon)

S3 - Silty SAND with Gravel (SM), mostly fine to medium, ~25% fines, ~20% mostly fine gravel, brown, wet

S4 - Similar to S3, slightly plastic fines, ~35% mostly fine gravel, brown, wet

S5 - Similar to S3, ~15% fine gravel, gray-brown, wet (trace of SILT with Sand at the tip of the spoon)

C1 - 5, 4, 5, 6, 7 min/ft Hard, fresh to slightly weathered, moderately fractured to sound, fine grained, dark gray with occasional thin (<1/2") white banding SCHIST, close to moderately close, fairly smooth, moderately dipping to high angle joints REC = 95%, RQD = 70% (lost drill water at 22.5 feet)

End of boring at 23 feet. Backfilled with drill cuttings.
**BORING LOG**

**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts  
**Client:** Lamoureux Pagano & Associates, Inc.  
**Drilling Subcontractor:** Northern Drill Service, Inc.  
**Drilling Foreman:** Tim Tucker  
**LGCI Engineer:** Geetha Mathiyalakan  
**Ground Surface El:** 644.7 feet (see remark 1)  
**Groundwater Depth:** 6 feet at end of drilling  
**Drilling Method:** 4" casing to 8 ft/ 3" to 21 ft/ Button bit  
**Hammer Weight:** 140 lbs  
**Hammer Type:** Automatic  
**Drop:** 30 inches

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<th>Sample No</th>
<th>Blows per 6 inches</th>
<th>Pen (in)</th>
<th>Rec (in)</th>
<th>Remarks</th>
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<tr>
<td>5ft</td>
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<td>43</td>
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<td>34</td>
</tr>
<tr>
<td>10ft</td>
<td>9 - 11</td>
<td>S4</td>
<td>40</td>
<td>62</td>
<td>50</td>
<td>65</td>
</tr>
<tr>
<td>15ft</td>
<td>14 - 16</td>
<td>S5</td>
<td>14</td>
<td>37</td>
<td>35</td>
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<td>19-20.8</td>
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<td>21 - 26</td>
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**Remarks:**

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<th>Sample No.</th>
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<th>Rec (in)</th>
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<td>50</td>
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</tr>
</tbody>
</table>

**Remarks:**

- Bedrock: REC = 90%, RQD = 60%
- End of boring at 26 feet. Backfilled with drill cuttings.
**BORING LOG**

**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts  
**Client:** Lamoureux Pagano & Associates, Inc.  
**Drilling Subcontractor:** Northern Drill Service, Inc.  
**Drilling Foreman:** Tim Tucker  
**LGCI Engineer:** Geetha Mathiyalakan  
**Location:** Near eastern side of proposed building  
**Ground Surface El:** 658.5 feet (see remark 1)  
**Groundwater Depth:** Not encountered  
**Total Depth:** 10.5 feet (see remark 2)  
**Drill Rig Type:** Mobile B-48 Rubber Tire ATV  
**Drilling Method:** 4-1/4" HSA  
**Hammer Weight:** 140 lbs  
**Hammer Type:** Automatic  
**Rock Core Barrel Size:** N/A  
**Split Spoon Diameter:** ID - 1.375", OD - 2"  
**Drop:** 30 inches

### Boring Log Table

<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Sample Depth (ft)</th>
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<th>Pen (in)</th>
<th>Rec (in)</th>
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<td>S2</td>
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<td>11</td>
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<tr>
<td>5 - 7</td>
<td>S3</td>
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<td>20</td>
<td>22</td>
<td>35</td>
</tr>
<tr>
<td>10ft</td>
<td>S4</td>
<td>100/4&quot;</td>
<td>4</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>15ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Strata:** Fill  
**Remarks:** End of boring at 10.5 feet. Backfilled with drill cuttings.

**Remarks:**  
2. A second attempt was made at this borings ~4 ft east and auger refusal was at 6 ft.
**BORING LOG**

**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts  
**Client:** Lamoureux Pagano & Associates, Inc.  
**Drilling Subcontractor:** Northern Drill Service, Inc.  
**Drilling Foreman:** Tim Tucker  
**LGCI Project No.: 1402**  
**Drilling Engineer:** Geetha Mathiyalakan  
**Location:** Near center of proposed building  
**Date Started:** 8/28/2014  
**Date Completed:** 8/28/2014

<table>
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<th>Depth (ft)</th>
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<th>Rec (in)</th>
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<tbody>
<tr>
<td>0 - 2</td>
<td>S1</td>
<td>4 7 6 7</td>
<td>24 16</td>
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</tr>
<tr>
<td>2 - 4</td>
<td>S2</td>
<td>7 9 22 65</td>
<td>24 12</td>
<td></td>
</tr>
<tr>
<td>4 - 6</td>
<td>S3</td>
<td>29 39 25 32</td>
<td>24 14</td>
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</tr>
<tr>
<td>10 - 15</td>
<td>C1</td>
<td>60 38</td>
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</tr>
</tbody>
</table>

**Remarks:**

2 - Estimated strata change based on drilling action. Roller bit from 7.5 ft to 10 ft and then cored from 10 ft to 15 ft.
**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts  
**Client:** Lamoureux Pagano & Associates, Inc.  
**Drilling Subcontractor:** Northern Drill Service, Inc.  
**Drilling Foreman:** Tim Tucker  
**LGCI Engineer:** Geetha Mathiyalakan  
**LGCI Project No.:** 1402  
**Date Started:** 8/29/2014  
**Date Completed:** 9/2/2014  
**Location:** Proposed access road - eastern side  
**Ground Surface El:** 661.4 feet (see remark 1)  
**Groundwater Depth:** 5.3 feet at end of drilling  
**Total Depth:** 17 feet  
**Drill Rig Type:** Mobile B-48 Rubber Tire ATV  
**Drilling Method:** 4" casing to 9 ft/ Button bit  
**Hammer Weight:** 140 lbs  
**Hammer Type:** Automatic  
**Rock Core Barrel Size:** NX  
**Drop:** 30 inches

<table>
<thead>
<tr>
<th>Depth Scale (ft)</th>
<th>Sample No</th>
<th>Blows per 6 inches 0-6</th>
<th>Blows per 6 inches 6-12</th>
<th>Blows per 6 inches 12-18</th>
<th>Blows per 6 inches 18-24</th>
<th>Pen (in)</th>
<th>Rec (in)</th>
<th>Remarks</th>
<th>Strata</th>
<th>Sample Description</th>
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<tr>
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<td>S1</td>
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<td>2</td>
<td>2</td>
<td>24</td>
<td>9</td>
<td></td>
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<td>Topsoil/ Subsoil</td>
</tr>
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<td>2 - 4</td>
<td>S2</td>
<td>2</td>
<td>7</td>
<td>13</td>
<td>14</td>
<td>24</td>
<td>11</td>
<td></td>
<td></td>
<td>Silty SAND with Gravel</td>
</tr>
<tr>
<td>4 - 6</td>
<td>S3</td>
<td>14</td>
<td>20</td>
<td>17</td>
<td>31</td>
<td>24</td>
<td>10</td>
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<td>Silty Sand with Gravel</td>
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<td>9 - 11</td>
<td>S4</td>
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<td>94</td>
<td>30</td>
<td>24</td>
<td>24</td>
<td>9</td>
<td></td>
<td></td>
<td>Top 7&quot;: Mostly fine to coarse, angular gravel, gray, wet Bot. 2&quot;: Gravelly SILT (ML), slightly plastic, 25-30% mostly fine, angular gravel, brown, wet</td>
</tr>
<tr>
<td>12 - 17</td>
<td>C1</td>
<td>60</td>
<td>54</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C1 - 4, 5, 6, 5, 3 min/ft</td>
<td>Hard, slightly weathered, moderately fractured to sound, fine grained, gray with occasional thin (~1/16&quot;) white banding SCHIST, close to moderately close, fairly smooth, moderately dipping joints</td>
<td>Bedrock</td>
</tr>
<tr>
<td>15ft</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
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**Remarks:**  
2 - Estimated strata change based on drilling action.
<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Sample Depth (ft)</th>
<th>Sample No.</th>
<th>Blows per 6 inches</th>
<th>Penetrability (in)</th>
<th>Rec. Penetrability (in)</th>
<th>Remarks</th>
<th>Strata</th>
<th>Sample Description</th>
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</thead>
<tbody>
<tr>
<td>0 - 1.2</td>
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<td>42</td>
<td>50/2&quot;</td>
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<td>9</td>
<td>Topsoil</td>
<td>S1 - Top 5&quot;; Topsoil Bot. 4&quot;: thin (~4&quot;) layer of fine, angular gravel pieces (fill)</td>
</tr>
<tr>
<td>5ft</td>
<td>C1</td>
<td>60</td>
<td>60</td>
<td>60</td>
<td></td>
<td></td>
<td>Bedrock</td>
<td>C1 - 4, 6, 8, 4, 5 min/ft Hard to moderately hard, moderately weathered, moderately to slightly fractured, fine grained, light gray with occasional thin (~1/8&quot;) white banding SCHIST, very close to close, fairly smooth, low angle to high angle joints REC = 100%, RQD = 27%</td>
</tr>
<tr>
<td>10ft</td>
<td>C2</td>
<td>48</td>
<td>48</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>C2 - 5, 5, 7, 7 min/ft Hard to moderately hard, moderately weathered, extremely to slightly fractured, fine grained, light gray with occasional thin (~1/8&quot;) white banding SCHIST, close, fairly smooth, low angle to high angle joints REC = 100%, RQD = 31% (lost drill water for the core run C2)</td>
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<tr>
<td>15ft</td>
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<td></td>
<td>End of boring at 13 feet. Backfilled with drill cuttings.</td>
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<td>20ft</td>
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</tbody>
</table>

Remarks:
2 - Estimated strata change based on drilling action. Roller bit from 1 ft to 4 ft and then cored from 4 ft to 13 ft.
3 - Core barrel jammed at 6.5 ft, pulled out and then continued coring.
**BORING LOG**

**Boring B-12**  
**Page 1 of 1**

**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts  
**Client:** Lamoureux Pagano & Associates, Inc.  
**LGCI Project No.:** 1402

<table>
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<tr>
<th>Drilling Subcontractor:</th>
<th>Northern Drill Service, Inc.</th>
<th>Date Started:</th>
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<td>Carl Beirhorn</td>
<td>Date Completed:</td>
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<td>LGCI Engineer:</td>
<td>Geetha Mathiyalakan</td>
<td>Location:</td>
<td>Near center of proposed building</td>
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**Ground Surface El:**  663 feet (see remark 1)  
**Groundwater Depth:** Not encountered  
**Total Depth:** 9.5 feet (see remark 2)  
**Drill Rig Type:** Mobile B-48 Rubber Tire ATV  
**Drilling Method:** 4-1/4" HSA  
**Hammer Weight:** 140 lbs  
**Hammer Type:** Automatic  
**Drop:** 30 inches  
**Split Spoon Diameter:** ID - 1.375", OD - 2"  
**Rock Core Barrel Size:** N/A

<table>
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<tr>
<th>Depth Scale</th>
<th>Sample No</th>
<th>Blows per 6 inches</th>
<th>Pen (in)</th>
<th>Rec (in)</th>
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<tr>
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</tr>
<tr>
<td>20ft</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

2 - A second attempt was made at this boring 5 ft south and auger refusal was at 7.5 ft.
**BORING LOG**

**Boring B-13**

**Page 1 of 1**

**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts

**Client:** Lamoureux Pagano & Associates, Inc.

**Drilling Subcontractor:** Northern Drill Service, Inc.
**Date Started:** 9/3/2014

**Drilling Foreman:** Carl Beirhorn
**Date Completed:** 9/3/2014

**LGCI Project No.:** 1402

**Ground Surface El:** 662.5 feet (see remark 1)
**Groundwater Depth:** 10.5 feet at end of drilling

**Location:** Near center of proposed building

**Drill Rig Type:** Mobile B-48 Rubber Tire ATV
**Drilling Method:** 4" casing to 7 ft/ Button bit

**Hammer Weight:** 140 lbs
**Hammer Type:** Automatic

**Drop:** 30 inches

<table>
<thead>
<tr>
<th>Depth (ft)</th>
<th>Sample No</th>
<th>Blows per 6 inches</th>
<th>Pen Rec (in)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 2</td>
<td>S1</td>
<td>1 2 3 6</td>
<td>24 15</td>
<td>S1 - Top 11&quot;: Topsoil Bot. 4&quot;: SILT (ML), mostly non-plastic, ~5% coarse gravel, 5-10% organics, brown, moist (subsoil)</td>
</tr>
<tr>
<td>2 - 4</td>
<td>S2</td>
<td>8 16 24 50</td>
<td>24 8</td>
<td>S2 - SILT with Gravel (ML), mostly non-plastic, thin (~2&quot;) layer of fine gravel at the bottom of the sample, bright brown, moist (subsoil/fill)</td>
</tr>
<tr>
<td>4 - 6</td>
<td>S3</td>
<td>25 19 19 14</td>
<td>24 10</td>
<td>S3 - Silty SAND with Gravel (SM), mostly fine to medium, 30-35% fines, 25-30% fine to coarse, subangular gravel, thin (~1/4&quot;) layer of weathered rock fragments at the tip of the spoon, gray-brown, wet</td>
</tr>
<tr>
<td>9 - 11</td>
<td>S4</td>
<td>32 33 37 28</td>
<td>24 15</td>
<td>S4 - Gravelly SILT with Sand (ML), mostly non-plastic, ~25% fine sand, 20-25% mostly fine, angular gravel, bright brown, wet</td>
</tr>
<tr>
<td>11-12.9</td>
<td>S5</td>
<td>12 9 8 70/5&quot;</td>
<td>24 12</td>
<td>S5 - Gravelly SILT (ML), mostly non-plastic, ~10% fine sand, 30-35% mostly weathered rock fragments, dark brown-gray, wet</td>
</tr>
</tbody>
</table>

**End of boring at 12.9 feet. Backfilled with drill cuttings.**

**Remarks:**


2 - Based on drilling action possible boulder between 7 ft and 9 ft.

3 - Based on drilling action possible top of bedrock at 12.9 ft.
### Boring Log

**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts  
**Client:** Lamoureux Pagano & Associates, Inc.  
**Drilling Subcontractor:**  
**Drilling Foreman:**  
**LGCI Engineer:**  
**Ground Surface El:**  
**Groundwater Depth:**  
**Hammer Weight:** 140 lbs  
**Hammer Type:** Automatic  
**Drop:** 30 inches  
**DRILLING METHOD:**  
**Hammer Type:** Automatic  
**Rock Core Barrel Size:** N/A  
**Split Spoon Diameter:** ID - 1.375", OD - 2"  
**Location:**  
**Total Depth:**  
**Drill Rig Type:**  

#### Depth Scale

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<th>Sample No</th>
<th>Blows per 6 inches</th>
<th>Pen (in)</th>
<th>Rec (in)</th>
<th>Remarks</th>
<th>Strata</th>
<th>Sample Description</th>
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<tbody>
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</table>

Remarks:


Boring B-14 was not performed. Test pit TP-20 was performed at its location.
**BORING LOG**  
Boring B-15-OW  
Page 1 of 1

**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts  
**Client:** Lamoureux Pagano & Associates, Inc.  
**LGCI Project No.:** 1402

<table>
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<th>Northern Drill Service, Inc.</th>
<th>Date Started:</th>
<th>8/29/2014</th>
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<tr>
<td>Drilling Foreman:</td>
<td>Carl Beirhorn</td>
<td>Date Completed:</td>
<td>8/29/2014</td>
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<td>LGCI Engineer:</td>
<td>Geetha Mathiyalakan</td>
<td>Location:</td>
<td>Near eastern side of proposed building</td>
</tr>
</tbody>
</table>

**Ground Surface El:** 657.1 feet (see remark 1)  
**Groundwater Depth:** 5.5 feet at end of drilling  
**Total Depth:** 20 feet  
**Drill Rig Type:** Mobile B-48 Rubber Tire ATV  
**Drilling Method:** 4" casing to 14 ft/ Button bit  
**Hammer Weight:** 140 lbs  
**Hammer Type:** Automatic  
**Drop:** 30 inches  
**Split Spoon Diameter:** ID - 1.375", OD - 2"  
**Rock Core Barrel Size:** NX

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<tr>
<th>Depth Scale</th>
<th>Sample Depth (ft)</th>
<th>Sample No</th>
<th>Blows per 6 inches</th>
<th>Pen (in)</th>
<th>Rec (in)</th>
<th>Remarks</th>
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<td>0 - 2</td>
<td>S1</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>8</td>
<td>24 9</td>
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<td>2 - 4</td>
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<td>18</td>
<td>24 8</td>
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<td>4 - 6</td>
<td>S3</td>
<td>25</td>
<td>27</td>
<td>45</td>
<td>24</td>
<td>14</td>
</tr>
<tr>
<td>9 - 11</td>
<td>S4</td>
<td>40</td>
<td>55</td>
<td>48</td>
<td>35</td>
<td>24 12</td>
</tr>
<tr>
<td>14-15.2</td>
<td>S5</td>
<td>24</td>
<td>55</td>
<td>50/2&quot;</td>
<td>14</td>
<td>10</td>
</tr>
<tr>
<td>15 - 20</td>
<td>C1</td>
<td></td>
<td></td>
<td>60</td>
<td>52</td>
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<tr>
<td>20ft</td>
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</table>

**Remarks:**

2. Estimated strata change based on drilling action.
**Project:** Proposed Nelson Place Elementary School, Worcester, Massachusetts  
**Client:** Lamoureux Pagano & Associates, Inc.

| Drilling Subcontractor: Northern Drill Service, Inc. | Date Started: 8/28/2014 |
| Drilling Foreman: Tim Tucker | Date Completed: 8/28/2014 |
| LGCI Project No.: 1402 | |
| Ground Surface El: 658.4 feet (see remark 1) | Total Depth: 16 feet |
| Groundwater Depth: No groundwater at end of drilling | Drill Rig Type: Mobile B-48 Rubber Tire ATV |
| Hammer Weight: 140 lbs | Drilling Method: 4" casing to 10 ft/ Button bit |
| Hammer Type: Automatic | Split Spoon Diameter: ID - 1.375", OD - 2" |
| Drop: 30 inches | Rock Core Barrel Size: NX |

**Depth** | **Sample No** | **Blows per 6 inches** | **Pen (in)** | **Rec (in)** | **Remarks** | **Strata** | **Sample Description** |
|---|---|---|---|---|---|---|---|
| 0 - 2 | S1 | 1 5 6 4 | 24 10 | | | | S1 - Top 3": Forest mat (previously cleared by excavator)  
Bot. 7": SILT (ML), mostly non-plastic, 10-15% mostly coarse, angular gravel, ~5% roots, brown, moist (subsoil) |
| 2 - 4 | S2 | 5 12 22 26 | 24 14 | | | | S2 - Gravelly SILT (ML), mostly non-plastic, ~10% sand, 35-40% coarse, angular gravel, tan, moist  
S3 - Top 11": Silty SAND with Gravel (SM), fine to medium, 
~35% fines, 35-40% mostly fine to coarse, angular gravel, brown-gray, wet  
Bot. 3": SILT (ML), mostly non-plastic, brown-tan, wet |
| 4 - 6 | S3 | 24 36 60 77 | 24 14 | | | | S4 - Gravelly SILT with Sand (ML), mostly non-plastic, 20-25% sand, 35-40% coarse, angular gravel, traces of weathered rock fragments, gray-brown, wet |
| 9 - 10.6 | S4 | 14 23 62 50/2" | 20 8 | | | | C1 - 8, 6, 5, 2, 5 min/ft  
Hard to moderately hard, slightly weathered, moderately fractured to sound, fine grained, light gray with occasional thin (1/16") white banding SCHIST, moderately close, fairly smooth, high angle joints  
REC = 83%, RQD = 72%  
(lost drill water at 14 feet) |
| 11 - 16 | C1 | | 60 50 | | | | |
| 0 - 15 | 15ft | | | | | | |
| 20ft | | | | | | | |

**Remarks:**  
1 - Ground surface elevations taken from plan titled "Existing Conditions Plan," Sheets EX-1, EX-2, and EX-3, dated April 20, 2014,  
Revised September 26, 2014, by Nitsch Engineering.  
2 - Estimated strata change based on drilling action.
<table>
<thead>
<tr>
<th>Depth Scale</th>
<th>Sample Depth (ft)</th>
<th>Sample No</th>
<th>Blows per 6 inches</th>
<th>Pen (in)</th>
<th>Rec (in)</th>
<th>Remarks</th>
<th>Strata</th>
<th>Sample Description</th>
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<td>7</td>
<td>24</td>
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<td>2-4</td>
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<td>4 - 6</td>
<td>4-6</td>
<td>S3</td>
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</tr>
<tr>
<td>10 - 12</td>
<td>10-12</td>
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<td>48</td>
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<td>75</td>
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Remarks:
# GROUNDWATER OBSERVATION WELL INSTALLATION REPORT

**Project Name:** Proposed Nelson Place Elementary School, Worcester, Massachusetts  
**LGCI Project Number:** 1402  
**Client:** Lamoureux Pagano & Associates, Inc.

<table>
<thead>
<tr>
<th>Drilling Subcontractor:</th>
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<th>Date Started:</th>
<th>8/29/14</th>
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<td>Carl Beirhorn</td>
<td>Date Completed:</td>
<td>8/29/14</td>
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<tr>
<td>LGCI Engineer:</td>
<td>Geetha Mathiyalakan</td>
<td>Location:</td>
<td>Near eastern side of proposed building</td>
<td></td>
</tr>
</tbody>
</table>

**Ground Surface Elevation:** 657.1 ft (see remark 1)  
**Ground Water Depth:** 9 ft below ground surface (9/3)  
5.5 ft below ground surface (8/29)

| Total Depth of Boring: | 20 ft  
| Drill Rig Type: | Mobile Drill B-48 Rubber Tire ATV  
| Drilling Method: | 4 in casing to 14 ft / Button bit  

---

**GENERAL SOIL CONDITIONS**  
(1½ ft)

| THICKNESS OF SURFACE SEAL | 1½ ft  
| TYPE OF SURFACE SEAL | concrete  

| TYPE OF SURFACE CASING | steel pipe  
| ID OF SURFACE CASING | 4"  
| DEPTH TO BOTTOM OF CASING | 2 ft  

| ID OF RISER PIPE | 2"  
| TYPE OF RISER PIPE | PVC  

| TYPE OF BACKFILL AROUND RISER PIPE | drill cuttings  

| DEPTH TO TOP OF SEAL | 4.5 ft  
| TYPE OF SEAL | bentonite  
| DEPTH TO BOTTOM OF SEAL | 7 ft  
| DEPTH TO TOP OF PERVERIOUS SECTION | 9 ft  

| TYPE OF PERVERIOUS SECTION | PVC  
| DESCRIBE OPENINGS | slotted  
| ID OF PERVERIOUS SECTION | 2"  

| TYPE OF BACKFILL AROUND PERVERIOUS SECTION | sand  

| DEPTH TO BOTTOM OF PERVERIOUS SECTION | 19 ft  
| DEPTH TO BOTTOM OF SAND COLUMN | 20 ft  

| TYPE OF BACKFILL BELOW PERVERIOUS SECTION | sand  
| DIAMETER OF BOREHOLE | 6"  
| DEPTH TO BOTTOM OF BOREHOLE | 20 ft  

---

**NOTES:**

Appendix D – Double Ring Infiltrometer Test Results
Double Ring Infiltrometer Test

**Project:**
- Name: Proposed Nelson Place Elementary School
- Location: Worcester, MA
- LGCI Project Number: 1402

**Test Location:** TP-9

**Test Procedure:** General accordance with ASTM D 3385 (see note 2)

**Test Date:** 8/21/2014

**LGCI Representative:** Geetha Mathiyalakan

**Weather Conditions:** Sunny, Upper 60s to lower 70s

**Test Depth:** 4 feet

**Groundwater Depth:** No groundwater encountered in test pit (terminated at 9 feet)

**Soil Stratum:** Silty Gravel with Sand (GM), fine to coarse, ~40% mostly non-plastic fines, 10-15 % sand, up to 12-inch cobbles, tan, moist

<table>
<thead>
<tr>
<th>Area (sq cm)</th>
<th>Inner Ring</th>
<th>Annular Space</th>
</tr>
</thead>
<tbody>
<tr>
<td>730</td>
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</tr>
</tbody>
</table>

| Depth Driven (in) | 3 | 5 |
| Water Depth (in)  | 2 | 1.5 |
| Mariotte tube (cc/div) | 53.52 | 167.53 |

<table>
<thead>
<tr>
<th>Elapsed Time (min)</th>
<th>Time Increment (min)</th>
<th>Inner Ring Reading (div)</th>
<th>Volume (cc)</th>
<th>Infiltration Rate (cm/hr)</th>
<th>Annular Space Reading (div)</th>
<th>Volume (cc)</th>
<th>Infiltration Rate (cm/hr)</th>
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<tbody>
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<td>34</td>
<td>0.1</td>
</tr>
</tbody>
</table>

Notes:
1 - Boulders up to 2 feet in size encountered beneath test depth of 4 feet.
2 - Water depth difference between inner ring and annular space was 0.5 inch.
TP-9, depth = 4 feet

Incremental Infiltration Rate in cm/hr vs. Elapsed Time, minutes

- Inner Ring
- Annular Space
**Double Ring Infiltrometer Test**

**Project:** Proposed Nelson Place Elementary School  
**Location:** Worcester, MA  
**LGCI Project Number:** 1402

**Test Location:** TP-12  
**Test Procedure:** General accordance with ASTM D 3385 (see note 2)  
**Test Date:** 8/22/2014  
**LGCI Representative:** Geetha Mathiyalakan  
**Weather Conditions:** Sunny, Upper 60s  
**Test Depth:** 5 feet  
**Groundwater Depth:** No groundwater encountered in test pit (terminated at 11 feet)  
**Soil Stratum:** Silty SAND with Gravel (SM), fine to medium, ~ 35% fines, ~ 25 % fine gravel, gray to brown, moist (fill)

<table>
<thead>
<tr>
<th>Inner Ring</th>
<th>Annular Space</th>
</tr>
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<tbody>
<tr>
<td>Area (sq cm)</td>
<td>730</td>
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<td>Depth Driven (in)</td>
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</tr>
<tr>
<td>Water Depth (in)</td>
<td>2</td>
</tr>
<tr>
<td>Mariotte tube (cc/div)</td>
<td>53.52</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Elapsed Time</th>
<th>Time Increment</th>
<th>Inner Ring</th>
<th>Annular Space</th>
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<tbody>
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<td>(min)</td>
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<tr>
<td>50</td>
<td>10</td>
<td>38.6</td>
<td>43</td>
</tr>
</tbody>
</table>

Notes:  
1 - From 6 to 6.8 feet beneath the ground surface encountered buried topsoil.  
2 - Water depth difference between inner ring and annular space was 0.5 inch.
TP-12, depth = 5 feet
Double Ring Infiltrometer Test

Project: Proposed Nelson Place Elementary School
Location: Worcester, MA
LGCI Project Number: 1402

Test Location: TP-13
Test Procedure: General accordance with ASTM D 3385 (see note 1)
Test Date: 8/21/2014
LGCI Representative: Geetha Mathiyalakan

Weather Conditions: Sunny, Upper 60s to lower 70s
Test Depth: 4.5 feet
Groundwater Depth: No groundwater encountered in test pit (terminated at 10 feet)
Soil Stratum: Silty Gravel with Sand (GM), fine to coarse, 25-30 % mostly non-plastic fines, 30-35 % sand, about 10% cobbles, gray to tan, moist

| Area (sq cm) | 730 | 2189 |
| Depth Driven (in) | 3 | 5 |
| Water Depth (in) | 2 | 1.5 |
| Mariotte tube (cc/div) | 53.52 | 167.53 |

<table>
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<tr>
<th>Elapsed Time (min)</th>
<th>Time Increment (min)</th>
<th>Reading (div)</th>
<th>Volume (cc)</th>
<th>Infiltration Rate (cm/hr)</th>
<th>Reading (div)</th>
<th>Volume (cc)</th>
<th>Infiltration Rate (cm/hr)</th>
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</tbody>
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Notes:
1 - Water depth difference between inner ring and annular space was 0.5 inch.
TP-13, depth = 4.5 feet

Incremental Infiltration Rate in cm/hr vs. Elapsed Time, minutes

- Inner Ring
- Annular Space
# Double Ring Infiltrometer Test

**Project:**  Proposed Nelson Place Elementary School  
**Location:**  Worcester, MA  
**LGCI Project Number:**  1402

**Test Location:**  TP-15  
**Test Procedure:**  General accordance with ASTM D 3385 (see note 1)  
**Test Date:**  8/22/2014  
**LGCI Representative:**  Geetha Mathiyalakan  
**Weather Conditions:**  Sunny, Upper 60s  
**Test Depth:**  5 feet  
**Groundwater Depth:**  No groundwater encountered in test pit (terminated at 11 feet)  
**Soil Stratum:**  Silty SAND with Gravel (SM), fine to medium, ~ 30% fines, ~ 20% mostly coarse gravel, 5-10% cobbles, gray to brown, moist

<table>
<thead>
<tr>
<th>Area (sq cm)</th>
<th>Inner Ring</th>
<th>Annular Space</th>
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<tbody>
<tr>
<td>730</td>
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| Depth Driven (in) | 3 | 5 |
| Water Depth (in)  | 2 | 1.5 |
| Mariotte tube (cc/div) | 53.52 | 167.53 |

<table>
<thead>
<tr>
<th>Elapsed Time (min)</th>
<th>Time Increment (min)</th>
<th>Inner Ring</th>
<th>Annular Space</th>
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**Notes:**
1 - Water depth difference between inner ring and annular space was 0.5 inch.
TP-15, depth = 5 feet

Incremental Infiltration Rate in cm/hr

Elapsed Time, minutes

Inner Ring
Annular Space
Appendix E – Laboratory Test Results
Client: Lahlaf Geotechnical Consulting  
Project: Proposed Nelson Place Elementary School  
Location: Worcester, MA  
Boring ID: B-17  
Sample ID: B-17-S3-4'-6'  
Depth: 4-6 ft  
Sample Type: jar  
Test Date: 09/11/14  
Tested By: jbr  
Checked By: jdt  
Test Comment: ---  
Sample Description: Moist, grayish brown silty sand  
Sample Comment: ---

Particle Size Analysis - ASTM D422

<table>
<thead>
<tr>
<th>Sieve Name</th>
<th>Sieve Size, mm</th>
<th>Percent Finer</th>
<th>Spec. Percent</th>
<th>Complies</th>
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<td></td>
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<td></td>
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<td>0.25</td>
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<tr>
<td>#100</td>
<td>0.15</td>
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<td>$C_{u}=N/A$</td>
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<td>$C_{c}=N/A$</td>
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<tr>
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<tr>
<td>AASHTO Silty Gravel and Sand (A-2-4 (0))</td>
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</table>

<table>
<thead>
<tr>
<th>Sample/Test Description</th>
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<tr>
<td>Sand/Gravel Particle Shape: ROUNDED</td>
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<tr>
<td>Sand/Gravel Hardness: HARD</td>
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</table>
Particle Size Analysis - ASTM D422

<table>
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<tr>
<th>Sieve Name</th>
<th>Sieve Size, mm</th>
<th>Percent Finer</th>
<th>Spec. Percent</th>
<th>Complies</th>
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<td></td>
<td></td>
</tr>
<tr>
<td>1 in</td>
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<tr>
<td>0.75 in</td>
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Coefficients

- $D_{50} = 48.1843 \text{ mm} \quad D_{30} = N/A$
- $D_{60} = 15.2263 \text{ mm} \quad D_{15} = N/A$
- $D_{50} = 3.9308 \text{ mm} \quad D_{10} = N/A$
- $C_u = N/A \quad C_c = N/A$

Classification

- ASTM N/A
- AASHTO Silty Soils (A-4 (0))

Sample/Test Description

- Sand/Gravel Particle Shape: ROUNDED
- Sand/Gravel Hardness: HARD
Sample ID: TP-12P-5'-6'
Depth: 5-6 ft
Sample Type: bag
Test Date: 09/11/14
Tested By: jbr
Checked By: jdt

Sample Description: Moist, olive silty sand with gravel
Sample Comment: ---

Particle Size Analysis - ASTM D422

<table>
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<td>0.75 in</td>
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<td>0.5 in</td>
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<td>0.375 in</td>
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</tr>
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</table>

% Cobble | % Gravel | % Sand | % Silt & Clay Size |
--- | --- | --- | --- |
24.9 | 40.9 | 34.2 |

Coefficients

\[ D_{50} = 17.6898 \text{ mm} \]
\[ D_{60} = 0.5792 \text{ mm} \]
\[ D_{50} = 0.2493 \text{ mm} \]
\[ C_u = N/A \]
\[ C_c = N/A \]

Classification

ASTM N/A
AASHTO Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description

Sand/Gravel Particle Shape: ROUNDED
Sand/Gravel Hardness: HARD
Particle Size Analysis - ASTM D422

Tested By: jbr
Checked By: jdt

Sample Type: bag
Test Date: 09/11/14
Test Id: 307890

Sample Description: Moist, olive silty gravel with sand

<table>
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<tr>
<th>Sieve Name</th>
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<th>Spec. Percent</th>
<th>Complies</th>
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% Cobble | % Gravel | % Sand | % Silt & Clay Size
--- | 39.2 | 33.1 | 27.7

Coefficients
D_{85} = 28.0551 mm  D_{30} = 0.0923 mm
D_{60} = 4.3789 mm  D_{15} = N/A
D_{50} = 1.4036 mm  D_{10} = N/A
C_{u} = N/A  C_{c} = N/A

Classification
ASTM  N/A
AASHTO  Silty Gravel and Sand (A-2-4 (0))

Sample/Test Description
Sand/Gravel Particle Shape: ROUNDED
Sand/Gravel Hardness: HARD

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Particle Size Analysis - ASTM D422

<table>
<thead>
<tr>
<th>Sieve Name</th>
<th>Sieve Size, mm</th>
<th>Percent Finer</th>
<th>Spec. Percent</th>
<th>Complies</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 in</td>
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<td></td>
<td></td>
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<td>0.75 in</td>
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<td>0.5 in</td>
<td>12.50</td>
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<tr>
<td>0.375 in</td>
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<td>0.075</td>
<td>20</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

% Cobble  % Gravel  % Sand  % Silt & Clay Size
---   30.1   49.6   20.3

Coefficients

- $D_{50} = 14.2358$ mm
- $D_{30} = 0.1537$ mm
- $D_{50} = 1.4273$ mm
- $D_{15} = N/A$
- $D_{10} = N/A$
- $C_{u} = N/A$
- $C_{c} = N/A$

Classification

- ASTM N/A
- AASHTO Stone Fragments, Gravel and Sand (A-1-b (0))

Sample/Test Description

- Sand/Gravel Particle Shape: ROUNDED
- Sand/Gravel Hardness: HARD
4.1.2 SCHEMATIC DESIGN BINDER

F. Code Analysis
   1. Code Analysis
   2. Permitting Requirements
   3. Egress Plans
Applicable Codes: Alters, renovations and additions to the existing Nelson Place Elementary School building are subject to the 8th Edition MA Building Code. The 8th Edition MA Building Code is comprised of the following:

- 780 CMR 8th Edition - MA Amendments to the IBC, IEBC
- 2009 International Building Code (IBC)
- Massachusetts Stretch Code amendments to the IECC2009 (and ASHRAE 90.1-2007)
- 2009 International Energy Conservation Code (IECC)
- 2009 International Mechanical Code (IMC)
- 2009 International Fire Code (IFC)
- 527 CMR - MA Fire Prevention and Electrical Regulations
- NFPA 1 adopted through 527 CMR (Awaiting Fire Marshalls Amendments), effective Jan, 2015
- 521 CMR - MA accessibility regulations
- 248 CMR – 10.00 Uniform State Plumbing Code
- 524 CMR - MA elevator regulations

1) It is reported that the adoption of the 9th edition by the BBRS will be made adopting the IBC 2015, and without certain knowledge of the MA amendments to the IBC will be though the 9th edition, code reviews will use the current edition, also, there is likely little overall difference between the 2009 IBC and the 2014 IBC. The newer version of the energy code IBC 2012 will be adopted in June 2012 and will be used for future phase reviews. (See Reference at end of this section)

1. Project Scope

Project consists of reviewing and reporting on the building code requirements for new construction. The proposed building would be designed to meet the code for new construction.

Code summary is a brief overview consistent with schematic design stage of this study, and covers the overall/broad issues. Code study will be refined and cover greater detail under subsequent phases of the project.

The Nelson Place Elementary School, as it exists today, was built as an elementary school in three phases; 1926, 1953, and 1967, and has continued to operate as a school.
In 1992, serious masonry deterioration required emergency repairs to the exterior of the 1926 building. The repairs, designed by the City’s architect, required replacement of masonry, windows and roofing, and complete reconstruction of the parapets. Later, in 2005, emergency temporary shoring was installed on the first and basement floors of the 1926 Building, and the City code department oversaw the repairs. LPA has heard, but not seen officially that ongoing monitoring or periodic reviews are required. It is reported that the existing structure will be monitored through the new construction during occupancy, and that the Code Department will be kept updated on any actions and/or requirements.

It is assumed that the school was designed and constructed to the code at the time, and any subsequent work met the code and standards in force at the time.

2. Chapter 34 Requirements (IEBC 2009)
NA- The school will maintain the existing building though the construction of the new school. During the Phased demolition of the Gym, precautions shall be made in accordance with the code as applicable to separation and protection, and demolition.

3. General Information

AREA AND USE GROUP SUMMARY
(Note- compliance is not required w/ height and area requirements as there is no change in use classification or additions, Information is included here for reference)

<table>
<thead>
<tr>
<th></th>
<th>Area Gross</th>
<th>Occupancy</th>
<th>Proposed Use Group/ 912.5 Hazard</th>
<th>Existing Use Group/ 912.5 Hazard</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEW CONSTRUCTION</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ground Level</td>
<td>22,166 sf (gross)</td>
<td>E-Educational -School</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Main Level</td>
<td>70,434 sf (gross)</td>
<td>E-Educational -School</td>
<td>E 3</td>
<td>E 3</td>
<td></td>
</tr>
<tr>
<td>Upper Level</td>
<td>19,100 sf (gross)</td>
<td>E-Educational -School</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total complex footprint area</td>
<td>111,700 sf (gross)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table 503

**Height and Area Limitations** (base table requirements shown)

<table>
<thead>
<tr>
<th>Use Group</th>
<th>Allowable Height and Area - Construction Type II(2)B unprotected steel (noncombustible)framed 602.2</th>
<th>Actual</th>
</tr>
</thead>
<tbody>
<tr>
<td>E-Educational w/ Sprinklers</td>
<td>2 stories 14,500 ft footprint base area 54,375 ft² w/ increase for accessible perimeter and sprinklers (1)</td>
<td>Building footprint = 74,434 ft² Fire wall required and is provided. (2)</td>
</tr>
</tbody>
</table>

**Notes**

1. Allowable building area increase in accordance w/ Section 506

   E Use Group Calculation-Sprinklered
   
   \[
   A_a = \{14,500 + [14,500 \times (1224/1224-0.25)(30/30)] + [14,500 \times 2]\} 
   \]
   
   \[
   = \{14,500 + [14,500 \times 0.75] + [29,000]\} 
   \]
   
   \[
   = 54,375 \text{ ft}^2 
   \]

2. Fire wall is required and is provided.

   Building Main Level gross area = 70,434 ft²
   Gross Area North of fire wall = 17,712 ft²
   Gross Area South of fire wall = 52,722 ft²
   52,722 ft² < 54,375 ft² - OK for type 2B construction

### Table 601

**Fire Resistant Rating Requirements for Building Elements**

*See above commentary on the construction classification of the existing building*

<table>
<thead>
<tr>
<th>Building Element</th>
<th>Type of Construction Type II (2) B required Ratings</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Structural Frame</td>
<td>0 (0 hour supporting roof)</td>
<td></td>
</tr>
<tr>
<td>Exterior bearing walls</td>
<td>0 hour</td>
<td></td>
</tr>
<tr>
<td>Interior bearing walls</td>
<td>0 (0 hour supporting roof)</td>
<td></td>
</tr>
<tr>
<td>Exterior nonbearing walls and partitions</td>
<td>See Table 602 below</td>
<td></td>
</tr>
<tr>
<td>Interior nonbearing walls and partitions</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Floor construction, inc beams and joists</td>
<td>0</td>
<td></td>
</tr>
<tr>
<td>Roof construction, inc beams and joists</td>
<td>0</td>
<td></td>
</tr>
</tbody>
</table>

### Table 602

**Fire Resistant Rating Requirements for Exterior Walls**

*Based on Fire Separation Distance*

<table>
<thead>
<tr>
<th>Fire Separation Distance, based on II (2)B</th>
<th>Type</th>
<th>Use Group E (most stringent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Less than 5</td>
<td>1</td>
<td>NA- no other structures w/in this distance</td>
</tr>
</tbody>
</table>
Table 508.2.5
Required Separation of Incidental Accessory Occupancies

<table>
<thead>
<tr>
<th>Distance</th>
<th>Required Separation</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Greater than 5 less than 10</td>
<td>1</td>
<td>NA - no other structures w/in this distance</td>
</tr>
<tr>
<td>Greater than 10 less than 30</td>
<td>0</td>
<td>NA - no other structures w/in this distance</td>
</tr>
<tr>
<td>Greater than 30 ft</td>
<td>0</td>
<td>Applicable - Street frontage, sides and rear</td>
</tr>
<tr>
<td></td>
<td></td>
<td>the building</td>
</tr>
</tbody>
</table>

Table 706.4 Fire Wall Fire Resistance Rating
A/E use Group
3hr (2 hr w/ type II construction)

Table 508.4
Required Separation of Occupancies
Use group A, E, N
N = No requirements

Table 803 Interior Wall and Ceiling Finish Requirements by Occupancy-Sprinklered Buildings

<table>
<thead>
<tr>
<th>Group</th>
<th>Exit Enclosures</th>
<th>Corridors</th>
<th>Rooms/Enclosed spaces</th>
</tr>
</thead>
<tbody>
<tr>
<td>A3</td>
<td>B</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>E</td>
<td>B</td>
<td>C</td>
<td>C</td>
</tr>
</tbody>
</table>

Table 1018.1 Corridor Fire-resistance Rating
Occupancy
With Sprinklers
A/E use group, greater than 30 occupants
0 hours

Shafts Section 708
Existing, to be reviewed under future phases

Exit Enclosure-rating section 1022

| Four (4) stories or less | 1 Hour (1) (2) (3) |
| Four (4) stories or more | 2 Hour NA           |

1. Or not less than the rating of the floor assembly penetrated, but not to exceed 2 hours
2. Story count to include basement, No stairs are proposed to be greater than 2 stories
3. Refer to section 1016.1 Exception 2, In E occupancies it is permitted for 50% of the exits to be un-enclosed if within the exit access travel is within 250 feet for stairs not requiring separation, when connecting not more than 2 stories. (travel from the most remote area to the exit stair enclosures is less than 250 ft, the open stairs are the second means, travel distance is not mandated)
**Building Occupancy and Egress**

**Per Table 1004.1.1**

**Assembly**
- Chairs: 7 N.S.F per Occupant
- Tables: 14 N.S.F per Occupant
- Platforms: 15 N.S.F per Occupant
- Business/Offices: 100 G.S.F per Occupant

**Educational**
- Classrooms: 20 N.S.F per Occupant
- Shops: 50 N.S.F per Occupant
- Gymnasium: 7 N.S.E (concentrated-chairs only-not fixed)
- Kitchen: 200 G.S.F per occupant
- Library
  - Reading Rooms: 50 N.S.F per Occupant
  - Stack Area: 100 G.S.F per Occupant
  - Mechanical Rooms: 300 G.S.F per occupant
  - Storage Rooms: 300 G.S.F per occupant

**Building Occupancy and Egress Capacity**

<table>
<thead>
<tr>
<th>Space</th>
<th>Use</th>
<th>Area sf</th>
<th>Table 1004.1.1 Factor (sq.ft. per occupant)</th>
<th>Occup't Load</th>
<th>Exit Capacity-occupants</th>
<th>Conform</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRE-K, Kindergarten Wing- Grade (Main) Level</td>
<td>P-K Classroom</td>
<td>680 sft</td>
<td>20</td>
<td></td>
<td></td>
<td>See plan</td>
</tr>
<tr>
<td></td>
<td>P-K Classroom</td>
<td>680 sft</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P-K Classroom</td>
<td>680 sft</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>K Classroom</td>
<td>680 sft</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>K Classroom</td>
<td>680 sft</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>K Classroom</td>
<td>680 sft</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>K Classroom</td>
<td>680 sft</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>K Classroom</td>
<td>680 sft</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>K Classroom</td>
<td>680 sft</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P-K/K Learning Lab</td>
<td>280 sft</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P-K/K Learning Lab</td>
<td>280 sft</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P-K/K Speech</td>
<td>310 sft</td>
<td>20</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>P-K/K OTPT</td>
<td>800</td>
<td>50</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Early Childhood</td>
<td>1800 sft</td>
<td>100</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### 4.1.2 SCHEMATIC DESIGN BINDER

**F. Code Analysis**

<table>
<thead>
<tr>
<th>Space</th>
<th>Use</th>
<th>Area sf</th>
<th>Table 1004.1.1 Factor (sq.ft. per occupant)</th>
<th>Occup’t Load</th>
<th>Exit Capacity-occupants</th>
<th>Conform See plan</th>
</tr>
</thead>
<tbody>
<tr>
<td>General suite</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-K/K</td>
<td>Elect /Toilets/Storage</td>
<td>NA</td>
<td>Non Simultaneous use(NSU)</td>
<td>0</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total P-K/K Wing</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**First and Second Grade Wing - Upper Level**

| 1st              | Classroom                  | 680 sfnet | 20                                           | 34           |                          |                  |
| 1st              | Classroom                  | 680 sfnet | 20                                           | 34           |                          |                  |
| 2nd              | Classroom                  | 680 sfnet | 20                                           | 34           |                          |                  |
| 2nd              | Classroom                  | 680 sfnet | 20                                           | 34           |                          |                  |
| 1 st-2nd         | Learning Lab               | 280 sfnet | 20                                           | 14           |                          |                  |
| 1 st-2nd         | Learning Lab               | 280 sfnet | 20                                           | 14           |                          |                  |
| 1 st-2nd         | Speech                     | 310 sfnet | 20                                           | 16           |                          |                  |
| 1 st-2nd         | Computer Lab               | 700 sfnet | 20                                           | 35           |                          |                  |
| 1 st-2nd         | Art                        | 800 sfnet | 20                                           | 40           |                          |                  |
| 1 st-2nd         | Music                      | 800 sfnet | 20                                           | 40           |                          |                  |
| 1 st-2nd         | Teacher Planning           | NA       | NSU                                          | 0            |                          |                  |
| 1 st-2nd         | Jan/Toilets/Storage        | NA       | NSU                                          | 0            |                          |                  |
| Total First and Second Grade Wing |         |         |                                             |              |                          |                  |

**Fifth and Sixth Grade Wing - Ground Level**

| 5 th             | Classroom                  | 680 sfnet | 20                                           | 34           |                          |                  |
| 5 th             | Classroom                  | 680 sfnet | 20                                           | 34           |                          |                  |
| 5 th             | Classroom                  | 680 sfnet | 20                                           | 34           |                          |                  |
| 5 th             | Classroom                  | 680 sfnet | 20                                           | 34           |                          |                  |
| 6 th             | Classroom                  | 680 sfnet | 20                                           | 34           |                          |                  |
| 6 th             | Classroom                  | 680 sfnet | 20                                           | 34           |                          |                  |
| 6 th             | Classroom                  | 680 sfnet | 20                                           | 34           |                          |                  |
| 6 th             | Classroom                  | 680 sfnet | 20                                           | 34           |                          |                  |
| 5 th-6 th        | Learning Lab               | 340 sfnet | 20                                           | 17           |                          |                  |
| 5 th-6 th        | Learning Lab               | 340 sfnet | 20                                           | 17           |                          |                  |
| 5 th-6 th        | Speech                     | 320 sfnet | 20                                           | 16           |                          |                  |
| 5 th-6 th        | Science Lab                | 700 sfnet | 20                                           | 35           |                          |                  |
| 5 th-6 th        | Conference                 | 240 sfnet | 15                                           | 16           |                          |                  |
| 5 th-6 th        | Adjust. Council seating    | 20       | 4                                            |              |                          |                  |
### Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

**SCHEMATIC DESIGN**

#### 4.1.2 SCHEMATIC DESIGN BINDER

**F. Code Analysis**

<table>
<thead>
<tr>
<th>Space</th>
<th>Use</th>
<th>Area sf</th>
<th>Table 1004.1.1 Factor (sq.ft. per occupant)</th>
<th>Occup't Load</th>
<th>Exit Capacity-occupants</th>
<th>Conform</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>See plan</td>
</tr>
<tr>
<td>5 th-6 th</td>
<td>Instructional coach seating</td>
<td>20</td>
<td></td>
<td>3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Mechanical Room</td>
<td>3000 sfgross</td>
<td></td>
<td>10</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 th-6 th</td>
<td>Teacher Planning</td>
<td>NA</td>
<td></td>
<td></td>
<td>NSU</td>
<td>0</td>
</tr>
<tr>
<td>5 th-6 th</td>
<td>Jan/Toilets/Storage</td>
<td>NA</td>
<td></td>
<td></td>
<td>NSU</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Total 5th and 6th</td>
<td></td>
<td>390</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

#### Third and Fourth Grade Wing- Main Level

| 3 rd Classroom | 680 sfmt | 20 | 34 |
| 3 rd Classroom | 680 sfmt | 20 | 34 |
| 3 rd Classroom | 680 sfmt | 20 | 34 |
| 4 th Classroom | 680 sfmt | 20 | 34 |
| 4 th Classroom | 680 sfmt | 20 | 34 |
| 4 th Classroom | 680 sfmt | 20 | 34 |
| 3 rd-4 th Learning Lab | 340 sfmt | 20 | 17 |
| 3 rd-4 th Learning Lab | 340 sfmt | 20 | 17 |
| 3 rd-4 th OT/PT | 600 sfmt | 50 | 12 |
| 3 rd-4 th Art | 780 sfmt | 20 | 40 |
| 3 rd-4 th Music | 900 sfmt | 20 | 45 |
| 3 rd-4 th Jan/Toilets/Storage | NA | NSU | 0 |
|             | Total 3rd & 4th |         | 403 |

#### Office-Gym- Cafeteria Wing

| Main Office | 4100 sfgross | 100 | 41 |
| Media Center Stack | 680 sfgross | 100 | 7 |
| Media Center Reading | 2000 sfgross | 50 | 40 |
| Computer Lab | 800 sfnet | 20 | 40 |
| Kitchen/Storage | 2000 sfgross | 200 | 11 |
| Platform | 900 sfnet | 15 | 60 |
| Cafeteria | 3700 sfnet | 7 | 528 |
| Staff Dining | 200 sfnet | 15 | 14 |
| Gym-Bleachers | - | | 300 |
| Gym Court area | 3840 sfnet | 7 | 548 |
| Gym office/strge | | | |
| Receiving | 572 sfmt | 300 | 2 |
Travel Distance

1. Maximum exit access travel distance must be less than 250 feet (Table 1016.1).
2. Maximum Dead End Corridor Length must be < 50 feet or 2.5 times the least width of space (1018.4 Exception 2).
3. All rooms or spaces with an occupant load greater than 50 people must be provided with two egress doors swinging in the direction of egress equipped with and illuminated exit signs at each exit (Sections 1015.1, 1008.1.2, & 1011.1).
4. Egress doors must swing in the direction of egress travel where serving an occupant load of 50 or more people (1008.1.2).
5. All rooms or spaces with a travel distance of over 75 feet must be provided with two egress doors and illuminated exit signs at each exit (Sections 1015.1 & 1011.1).
6. Remote means of egress must be separated by ⅓ of the diagonal dimension of the room or space they serve (780CMR 1015.2.1(3).

4. Requirements for Fire Protection System

There are two direct criteria for fire protection systems, MGL c 148, and the provisions of the State building code. The above summary covered other provisions of the building code, the remaining criteria is chapter 9 of the 2009 IBC Code as amended by the BBRS.
MGL c 148
Required of the General laws in buildings with major alterations or modifications containing more than 7,500 sf
(MGL c 148 s 26G effective 1/1/10) (The combined gross floor area is 48,000 sf, therefore sprinklers are
required under these provisions for any major renovation)

General Laws CHAPTER 148, Section 26G.

[First and second paragraphs applicable as provided by 2008, 508, Sec. 6.] Section 26G. Every building or
structure, including any additions or major alterations thereto, which totals, in the aggregate, more than
7,500 gross square feet in floor area shall be protected throughout with an adequate system of automatic
sprinklers in accordance with the provisions of the state building code. No such sprinkler system shall be
required unless sufficient water and water pressure exists. For purposes of this section, the gross square
footage of a building or structure shall include the sum total of the combined floor areas for all floor
levels, basements, sub-basements and additions, in the aggregate, measured from the outside walls, irrespective
of the existence of interior fire resistive walls, floors and ceilings. This section shall not apply to buildings used for
agricultural purposes as defined in section 1A of chapter 128.

In such buildings or structures, or in certain areas of such buildings or structures, where the discharge of water
would be an actual danger in the event of fire, the head of the fire department shall permit the installation of
such other fire suppressant systems as are prescribed by the state building code in lieu of automatic sprinklers.
Automatic suppressant or sprinkler systems shall not be required in rooms or areas of a telephone central office
equipment building when such rooms or areas are protected with an automatic fire alarm system. Sprinkler
systems shall not be required in open-air parking structures, defined as: buildings, structures, or portions thereof,
used for parking motor vehicles and having not less than twenty-five per cent of the total wall area open to
atmosphere at each level, utilizing at least two sides of the structure. This section shall not apply to buildings or
additions used for residential purposes.

The head of the fire department shall enforce the provisions of this section.

Major alterations are defined as including any work, (not repairs) that are major in scope or expenditure, and
which result in changes affecting a substantial portion of the building. The fire marshal’s office provided
guidelines that, when the work affects 33% of the building area or more, or the cost of the work is equal to or
more than 33% of the assessed value. The FY 2013 building assessed value is $4,240,000. 33% is $1,399,200.
Any cumulative work over a 5 year period over the 33% value would require that the building be fully sprinklered.

**Building Code Requirements**

The Building Code requirements for sprinklers required to height or area requirements were covered earlier in this summary, the requirements of chapter 9 of the IBC as amended by the BBRS are covered below.

Table 903 outlines thresholds for each use group as follows for the potential groups in this building 903.2.1 through 903.2.10. Replace these subsections with the Table 903.2 of the IBC:

<table>
<thead>
<tr>
<th>Table 903.2.1</th>
<th>OCCUPANCY AUTOMATIC SPRINKLER REQUIREMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>BBRS amendments</td>
</tr>
<tr>
<td></td>
<td>Provide automatic fire sprinklers throughout building if one of the following conditions will exist</td>
</tr>
<tr>
<td>Buildings having Occupancy</td>
<td>Building Aggregate area</td>
</tr>
<tr>
<td>E- Educational</td>
<td>&gt;12,000 sq. ft.</td>
</tr>
<tr>
<td>E-(below level of exit discharge)-see note d</td>
<td>NA this project</td>
</tr>
</tbody>
</table>

5. **Zoning and Parking Review**
Reference Development Restrictions report in section 3.1.4.C. City Buildings are exempt from Local Zoning requirements, However, non-binding presentations are made to the planning board, and other city agencies for review, any input is taken under consideration

6. **Access Code Review**
521 CMR

7. **Conclusion**
BUILDING BOARD OF REGULATIONS AND STANDARDS IS PREPARING FOR A 2015 PROMULGATION OF THE 9TH EDITION OF THE STATE BUILDING: At the May 2014 Building Board of Regulations and Standards (BBRS) meeting the Board began their review of a preliminary plan for the creation of Massachusetts specific amendments to the 2015 International Building Code (IBC) and International Residential Code (IRC). The 2015 IBC/IRC will be used as the base document for the upcoming 9th edition of the state building code (780 CMR). Department of Public Safety Chief of Inspections - Building Division and BBRS Administrator, Rob Anderson, advocated for as little Massachusetts amendments as possible. He noted that with the exception of Chapter 1 and any Massachusetts specific general law requirements, the Board had previously expressed a desire to adopt any new version of the IBC/IRC with as little Massachusetts amendments as possible, and further that all Massachusetts amendments should be submitted and adopted through the International Code Councils (ICC) nation wide, consensus, code development process. In using the ICC code development process for Massachusetts specific amendments, amendments would not only pass or fail on technical merits, but would become part of the base IBC/IRC that all states adopt. Agreeing with this notion, the Board then discussed the following proposed timeline for adoption:

• September BBRS meeting – Board to review BBRS staff recommendations (Chapters 1 through 35);
• September through December – BBRS Advisory Committees review and presents recommendations;
• February 2015 - BBRS public hearing for IBC and IRC

Lastly, for the proposed adoption of the 9th edition, AIA Massachusetts lead an industry supported request asking the BBRS to take a vote to require that the proposed 9th edition be promulgated as a “blended code,” whereby all Massachusetts-specific amendments are appropriately inserted into base ICC language (using a format that clearly distinguishes between base ICC language and Massachusetts specific amendments, such as the 6th Edition of the MA State Building Code) to produce a single “blended” code book. The request further specified that the “blending” shall occur for the promulgation of both the commercial code and the residential code. The Board voted to endorse the letter. BBRS staff are now in discussions with both ICC and Secretary of State William Galvin’s office to implement AIA’s request. and jurisdictional issues.

Follow-up Action: This study is being shared with both the BFPR and the Building Board of Regulations and Standards (BBRS – the state board charged with promulgating the state building code). The study will also be shared with other industry organizations representing the engineering, development, and contracting communities. AIA MA is committed to working with the BFPR and others to not only resolve the conflicts identified in the study, but to work with BFPR on a thorough review of the remaining chapters.

BOARD OF FIRE PREVENTION REGUALTIONS ADOPTS A NEW STATE FIRE CODE (527 CMR): The BFPR voted to adopt the revised 527 CMR with an effective date of January 1, 2015. The new code adopts the National Fire Protection Association Standard 1 (NFPA 1) with Massachusetts amendments. In discussion with the State fire inspector, the adopted regulations were reviewed as not to conflict with the building code, and sections of NFPA 1 that were building code related, were not adopted. They advised that 527CMR was intended for the fire department to oversee the maintenance of buildings after constructed, and not mandate construction requirements in conflict with the building code. Comprehensive review of NFPA 1 and the Massachusetts amendments was not done at this phase.
### SCHEMATIC DESIGN

**F. Code Analysis: Permitting Requirements**

<table>
<thead>
<tr>
<th>#</th>
<th>AGENCY</th>
<th>PERMIT/ISSUE</th>
<th>COMMENTS</th>
<th>STATUS</th>
<th>FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Massachusetts DEP/Worcester Conservation Commission</td>
<td>WPA Form 4A Abbreviated Notice of Resource Area Delineation</td>
<td>Wetlands have been flagged and located on the survey, Vernal pool reviews were conducted during the spring season, Preliminary reviews held with the Conservation Commission</td>
<td>Filed June 2014</td>
<td>NA</td>
</tr>
<tr>
<td>2</td>
<td>Massachusetts DEP/Worcester Conservation Commission</td>
<td>WPA form 4B Order of Resource Area Delineation</td>
<td></td>
<td>Issued July 29, 2014</td>
<td>NA</td>
</tr>
<tr>
<td>3</td>
<td>Massachusetts DEP Worcester Conservation Commission</td>
<td>WPA Form 3 (NOI) Notice of Intent</td>
<td>To be filed April 2015 during the development phase</td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>4</td>
<td>Massachusetts DEP Worcester Conservation Commission</td>
<td>WPA Form 5 Order of Conditions</td>
<td>Requested by Owner or Contractor at completion of project</td>
<td>Pending completion of work and as-built drawing</td>
<td>NA</td>
</tr>
<tr>
<td>5</td>
<td>Massachusetts DEP Worcester Conservation Commission</td>
<td>WPA Form 8A, 8B Request for &amp; Certificate of Compliance</td>
<td></td>
<td></td>
<td>NA</td>
</tr>
<tr>
<td>6</td>
<td>US EPA</td>
<td>Stormwater Pollution Protection Plan (SWPPP) approval</td>
<td>Required per Order of Conditions; required prior to NPDES NOI filing. Refer to Item #6 below.</td>
<td>Pending prior to beginning of construction</td>
<td>NA</td>
</tr>
<tr>
<td>7</td>
<td>US EPA</td>
<td>NPDES NOI for Discharge Associated with Construction Activity and Notice of Termination (NOT)</td>
<td>Filed by Contractor (NOI system) prior to construction and at project completion</td>
<td>Pending; NOI at least 14 days prior to beginning of construction</td>
<td>NA</td>
</tr>
<tr>
<td>8</td>
<td>Environmental Notification Form (ENF) 301cmr 11.00</td>
<td>Executive Office of Energy and Environmental Affairs MEPA</td>
<td>Section 11.03: Review Thresholds were reviewed an none of the thresholds are approached</td>
<td>Not required</td>
<td>NA</td>
</tr>
<tr>
<td>9</td>
<td>Environmental Impact Report (EIR) 301cmr 11.00</td>
<td>Executive Office of Energy and Environmental Affairs MEPA</td>
<td>Section 11.03: Review Thresholds were reviewed an none of the thresholds are approached</td>
<td>Not required</td>
<td>NA</td>
</tr>
<tr>
<td>10</td>
<td>Project Notification Form for Historic Buildings or Archeological MHC 950 CMR</td>
<td>Massachusetts Historical Commission MHD</td>
<td>No thresholds are approached</td>
<td>Not required</td>
<td>NA</td>
</tr>
<tr>
<td>11</td>
<td>City Of Worcester--Demolition Delay Ordinance</td>
<td>Historical Commission</td>
<td>Demolition delay waiver is required, and is valid for one year, extensions available</td>
<td>To be files at the schematic phase</td>
<td>NA</td>
</tr>
<tr>
<td>12</td>
<td>City of Worcester</td>
<td>Sewer Connection</td>
<td>Reviewed by DPW</td>
<td>Pending; prior to beginning of construction-Fees to be determined and included in the specifications</td>
<td>Significant fee-TBD based on design flow increase</td>
</tr>
</tbody>
</table>
## SCHEMATIC DESIGN

### F. Code Analysis: Permitting Requirements

<table>
<thead>
<tr>
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<th>STATUS</th>
<th>FEE</th>
</tr>
</thead>
<tbody>
<tr>
<td>13</td>
<td>Massachusetts DEP</td>
<td>Sewer Extension Permit</td>
<td>Not required</td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>14</td>
<td>City of Worcester</td>
<td>Water Connection</td>
<td></td>
<td>Was conducted and filed in the PSR w/ the Fire Protection Narrative</td>
<td>TBD</td>
</tr>
<tr>
<td>15</td>
<td>City of Worcester-Hydrant flow test</td>
<td>Water/Fire Department</td>
<td></td>
<td>Paid</td>
<td></td>
</tr>
<tr>
<td>16</td>
<td>City of Worcester</td>
<td>Development Review Board</td>
<td>Periodic reviews</td>
<td>NA</td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>National Grid</td>
<td>New electrical service for school</td>
<td>Work request to be submitted</td>
<td>Backcharge to be determined, if possible, and included in the specifications</td>
<td>TBD</td>
</tr>
<tr>
<td>18</td>
<td>National Grid</td>
<td>Temporary electric service for Modular Classrooms (if required)</td>
<td>No Modular Classrooms are planned</td>
<td>NA</td>
<td>NA</td>
</tr>
<tr>
<td>19</td>
<td>N-Star</td>
<td>Revised gas service and new meter for boilers</td>
<td>Projected gas / N-Grid representative</td>
<td>Review again at the DD/ CD phase</td>
<td>TBD</td>
</tr>
<tr>
<td>20</td>
<td>State Plumbing Board</td>
<td>Elevated pressure gas service</td>
<td>Not Required</td>
<td>Not required</td>
<td>TBD</td>
</tr>
<tr>
<td>21</td>
<td>National Grid</td>
<td>Comprehensive Design Approach rebate program</td>
<td>Independent energy modeling study must be performed</td>
<td>Review meeting w/ N star, N-grid held 11/13/14, process will be ongoing</td>
<td>TBD</td>
</tr>
<tr>
<td>22</td>
<td>Massachusetts DEP</td>
<td>Asbestos Removal Permit &amp; Notifications</td>
<td>Requirements outlined in Asbestos Report.</td>
<td>Pending; beginning of construction or demolition</td>
<td>TBD</td>
</tr>
<tr>
<td>23</td>
<td>Massachusetts DEP</td>
<td>BWP AQ06 Notification</td>
<td>Filed by Contractor prior to construction.</td>
<td>Pending; beginning of construction</td>
<td>TBD</td>
</tr>
<tr>
<td>24</td>
<td>Massachusetts AAB</td>
<td>Application for Variance (if required)</td>
<td>No Variance or relief from requirements are foreseen with a new building</td>
<td>Not required</td>
<td>$50</td>
</tr>
<tr>
<td>25</td>
<td>City of Worcester</td>
<td>Disabilities Board</td>
<td>General review</td>
<td>Typically done prior to bidding as a cursory review with new buildings</td>
<td>NA</td>
</tr>
<tr>
<td>26</td>
<td>City of Worcester</td>
<td>Building Department (including electrical and plumbing)</td>
<td>IRT meeting held 9/18/14</td>
<td>Additional meetings to be held at DD, CD phases</td>
<td>NA</td>
</tr>
<tr>
<td>27</td>
<td>City of Worcester</td>
<td>Fire Department</td>
<td>Initial review 3/18/14</td>
<td>DO</td>
<td>NA</td>
</tr>
<tr>
<td>28</td>
<td>City of Worcester</td>
<td>Fire, Police, School Security officer, DPW</td>
<td>Consultant retained, meetings were held during SD phase</td>
<td>DO</td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>City of Worcester</td>
<td>Historic Commission Demolition delay application</td>
<td>Initial discussions, anticipated to be a routine filing</td>
<td>During early Design Development Phase</td>
<td>NA</td>
</tr>
<tr>
<td>30</td>
<td>City of Worcester</td>
<td>Demolition Permit</td>
<td>Filed by Contractor prior to construction.</td>
<td></td>
<td>TBD</td>
</tr>
</tbody>
</table>
### 4.1.2 SCHEMATIC DESIGN BINDER
F. Code Analysis: Permitting Requirements

<table>
<thead>
<tr>
<th>#</th>
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</tr>
</thead>
<tbody>
<tr>
<td>31</td>
<td>City of Worcester</td>
<td>Building Permit, Certificate of Occupancy</td>
<td>Filed by Contractor prior to construction.</td>
<td>TBD</td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>ENERGY GRANTS</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>Massachusetts Department of Energy Resources</td>
<td>Biomass</td>
<td>Filed during PSR</td>
<td>Ongoing, Design is proceeding based on engineering analysis</td>
<td>NA</td>
</tr>
</tbody>
</table>
SCHEMATIC DESIGN

LEGEND
- 2 HOUR FIRE RATED WALL
- 1 HOUR FIRE RATED WALL
- PATH OF EGRESS
- CIRCULATION

NOTES
- Capacity:
  - Single 36" door=226 Exit Capacity
  - Double 36" door=466 Exit Capacity

- Second floor egress not added to first
  (non-converging defined in 1004.4)
- Hold open door

Main Level Egress Plan
1/32" = 1'-0"
Building diagonal=192’
Distance between
exits=120’ in compliance

Remote exit travel
distance=200’
≤ 250 in compliance

Second floor egress not added to first
(non-converging defined in 1004.4)

Hold open door

Capacity:
Single 36” door=226 Exit Capacity
Double 36” door=466 Exit Capacity

NOTES
LEGEND

1/32” = 1’-0”

2 HOUR FIRE RATED WALL
1 HOUR FIRE RATED WALL
PATH OF EGRESS

CIRCULATION

Stair 213 x .20” = 43” min

Stair 180 x .20” = 32” min

Door 180 x .15” = 27” min

Stair 210 x .20” = 32” min

Door 204 x .15” = 30.6” min

Stair 210 x .20” = 42” min

Remote exit travel
distance=238’
≤ 250 in compliance

Upper Level Egress Plan
1/32” = 1’-0”

Ground Level Egress Plan
1/32” = 1’-0”

Worcester Public Schools
4.1.2 SCHEMATIC DESIGN BINDER

G. Utility Analysis
   1. Utility Analysis
   2. Utility Narrative
This is an acknowledgement that the project design team has contacted all applicable utility companies/agencies and confirmed that building utilities are available in sufficient capacity to meet the needs of the proposed Nelson Place Elementary School. Required building utilities include the following:

- Domestic water
- Fire protection water
- Sanitary sewer
- Electrical power
- Data/Communications cabling

Flow tests were conducted as part of the earlier phases and the test results were published with the PSR filing, there is sufficient water pressure and volume to serve the site for fire protection, and no fire pump is required.

The gas service is relatively new to the existing school. The new school (while almost twice the size) will use approximately half the volume of gas, so sufficient gas available. Coordination will be required when the new gas service is installed while the existing service is in place, and if the gas can be used to some degree to temporarily heat the new facility. If gas is not available, propane or other sources can be used for temporary heating.

Based on DEP storm water policies, subsurface groundwater retention/recharge is proposed, and outflow to the existing system will not be greater than the existing flows. As part of the geotechnical investigation report, infiltration testing was conducted, and the soils are suitable for the proposed groundwater recharge systems.

Electric service to the existing site is insufficient in size to provide for the new building, The Utility Company is presently designing the location for the proposed service to the site. The schematic plans are reflective of what has been discussed with the Power Company to date.

Memos, relevant to utilities, are included in the section 4.1.2 I. Narratives of Building Systems.

Rob Para Jr., AIA
Lamoureaux Pagano Associates Architects
The City of Worcester is proposing to replace the existing Nelson Place School with a new building, parking and utility infrastructure on the same parcel as the existing Nelson Place School and adjacent Assumption College parcel for secondary access.

This narrative outlines the proposed utility items as Nitsch Engineering understands based on the 100% Schematic Design submitted to the City.

Utility Infrastructure:

The project surveyor will obtain existing as-built and record plan information from the City and Utility owners to aid the utility designer in determining the impact on existing utilities for the project.

Water:

A new 8" cement lined ductile iron pipe water line will connect with the existing 12" water main in Nelson Place at the main entrance. The proposed water line will loop around the new building and will re-connect with the water main in Nelson Place near the second entrance. An eight (8) inch fire protection water line will be installed with a six (6) inch domestic service off the water line. Three (3) new fire hydrants are proposed around the new school building as requested by the Worcester Fire Department.

There is adequate pressure in the existing water system based on testing performed by others, so that a fire pump does not appear to be required for the proposed building.

Sanitary Sewer:

There is an existing 8-inch diameter municipal sewer service in Nelson Place. The new school will connect to the municipal system with a new 8-inch PVC pipe from the new school building. The new sewer will exit the building at the loading dock and connect with the existing sewer system near the first entrance of the proposed school. It appears that there is adequate capacity in the City sewer system for this project based on preliminary discussion the Architect had with the City. A grease trap will be provided to collect effluent from the kitchen. The size of the grease trap will be determined based on Title 5 requirements. The grease trap is sized based on the number of seats in the cafeteria.

Storm Drain:

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 three (3) underground detention/infiltration systems (large diameter perforated pipe wrapped in stone and geotextile fabric). Drainage pipe will be corrugated polyethylene pipe (CPP) at least 12 to 15 inches in diameter. A portion of
the storm drainage system will discharge to the on-site isolated wetlands and a portion of the runoff will discharge into the municipal storm system. Storm runoff will be treated to meet the requirements of the Massachusetts Department of Environmental Protection (DEP) Stormwater Handbook and the City of Worcester Wetland Ordinance.

Gas:

A new gas line is proposed for the new Nelson Place School. The proposed gas line will connect to the existing 6-inch line in Nelson Place with a four (4) inch gas line to the new school building. Nitsch Engineering notes that a four (4) inch gas line is a preliminary size. The final gas line size will be provided by the mechanical engineer and utility company during the design process.

Electric:

The site is presently fed with an overhead distribution. The capacity for electrical utilities on the street side appears to be adequate. The appropriate utility company will provide the final distribution sizes for the project. The electric line and telecommunication line will be located underground within the site and connect to the new school building near the loading dock.

Fees:

The project will have to provide improvement fees for sewer, water and drainage connections. In addition, there may be an improvement fee for the Upper Blackstone River based on Title 5 flows. These fees will be discusses with the City of Worcester as the design progresses and further refined.
4.1.2 SCHEMATIC DESIGN BINDER

H. Massing Study
4.1.2 SCHEMATIC DESIGN BINDER

I. Narrative Building Systems
   1. Fire Protection
   2. Plumbing
   3. HVAC
   4. Electrical
   5. Sustainable Design
EXECUTIVE SUMMARY

This report summarizes the code required and recommended Fire Protection (FP) systems for an all-new elementary school at the existing Nelson Pl. site. It also includes several storage recommendations that will help minimize FP costs. The following work will be provided:

Installations:

- Provide a new, NFPA 13 wet system through-out, sized primarily for non-combustible, un-obstructed construction, with 2 risers and 2 floor-valve stations per riser for the split-level, 3-level building.

- Sprinkler system will be sized primarily for non-combustible, un-obstructed construction.

- Protect small isolated cold areas (i.e. walk-in coolers and receiving area) by “dry sprinklers” off of the wet system.

- In the current design, outside roof overhangs (canopies) will be of completely non-or-limited combustible construction, eliminating the need for canopy sprinklers (except in receiving area as noted above). The Owner is considering possibly adding a wood-deck to 1 or more canopies. If this occurs, sprinklers will be added under those canopies.

- The stage is under 1,000 sqft., so no stage-hose stations are planned. The highest floor level is approximately 15’ above adjacent grade, so no stairwell standpipes are planned.

- Keep all storage heights less than 12’, and top of storage a minimum of 18” below the sprinkler deflector level.

  Where large amounts of plastics or foam are stored (i.e. gym or furniture storage), avoid back-to-back shelving. Store materials in solid piles or single-row shelves, with top of storage under 5’ high for an OH2 hazard rating.

- Review available storage areas and storage needs. Re-organize storage to keep it confined to designated storage rooms, with appropriate FP coverage.

- Connect new FP system alarms to a new central Fire Alarm Control Panel (FACP), installed under Electrical.

- New Kitchen Exhaust Hood and Hood FP system under HVAC.

- Provide portable fire extinguishers, per NFPA 10.

Maintenance:
• Train in-house personnel, and provide required, regular, sprinkler system and fire extinguisher inspections using in-house inspectors

• Provide additional required maintenance and testing of FP and fire extinguisher systems, alarms and flow via maintenance contract.

1. BUILDING DESCRIPTION:

The new Nelson Place Elementary school (NES) will be a split-level, 3-story building with type 2B non-combustible construction - primarily steel, block, and brick. Total proposed building area is approximately 111,700 square feet. The North end will have a lower level (at grade) and a main level. The South end (built at a higher elevation) will have a main level (at grade) and an upper level.

The building is approximately 78% "light hazard" and 21% “ordinary hazard”.

“Ordinary hazard” areas would include (group 1) the main kitchen and kitchen service areas, and (group 2) boiler room, mechanical rooms, exterior loading docks, most storage-areas, and the stage. The gym storage rooms (approximately 1% of the building), will contain group A plastics, but we expect they will be stored at a height of 5’ or less - resulting in an ordinary-hazard-group-2 area. As the design progresses, we will check gym storage heights, and raise the hazard-level if required.

Areas requiring special types of protection include the:

• kitchen hood exhausts (dry-agent packaged hood suppression by HVAC)

• storage areas with shelves (aisle to aisle) over 30” deep would be considered “rack storage”. Hazard level would depend on what materials are stored in that manner, and could vary from OH2 to EH2. As the design develops, we will look for any such areas, so they can be appropriately protected.

• There will be no combustible concealed spaces in the all-new building except for the under bleacher area in the gym. Miscellaneous wood blocking used in general construction will specified to be Class A fire-retardant (NFPA 13 “limited combustible”). The under-bleacher area will be protected by extended coverage sidewalls spraying down the slope under the open-bleachers.

Any flammable liquids such as paints, thinners, and flammable science materials will be stored in listed flammable-cabinets. There are no other special hazards in the building,

2. DESIGN RESPONSIBILITY
The design engineer of record for the fire protection system is Lily Kara Barak – of Sensible Solutions – Hadley, Ma. The design engineer of record for the fire alarm system is Azim Rawji – of ART Engineering Inc. – Worcester, Ma.

3. APPLICABLE REGULATIONS

The Mass. Building Code and Fire Prevention regulations primarily define where fire protection systems are required and the required system components.

Massachusetts is currently governed by the 2009 International Building Code, with Mass. Amendments listed in 780 CMR 8th Edition. Current building code requires the following in a facility of this sort:

1. Per Mass Amendments Table 903.2, an Educational-use building over 12,000 square feet requires a sprinkler system “through-out” per NFPA 13. Per a 1-31-14 amendment to chapter 35, the system must be designed and installed per the 2013 edition of NFPA 13.

2. Per 903.5, water-sprinkler systems must be maintained per NFPA 25.

3. Per 905.3.1, Class III standpipes are required if a building’s top floor is more than 30’ above the lowest (adjacent) Fire Department vehicle access. Due to the sloping site, the top floor level in this building is well under 30’ above grade, so stairwell standpipes are not required.

   A. Per 905.3.4, stages over 1,000 square feet require fire-hose stations on both sides of the stage. This stage is 958 sqft, so no stage hose stations will be provided.

   B. Per 905.4, Class I standpipe hose stations are also required in the exit passageway of all areas containing “high-piled” (over 12’) combustible storage. There will be no high-piled storage areas in the building.

4. Per 913 – fire pumps (if required) must be installed in a dedicated 1-hour (2 hour if no sprinkler system) rated room, and the physical and environmental features required by NFPA 20. They also must be on an emergency power source in E-use with over 300 occupants.

   A 4-24-14 flow test performed by Cogswell Sprinkler at the existing school showed good flow and pressure. Based on this data, fire pumps will not be required. The FP contractor will be required to provide a new flow test at the time of construction, to confirm that adequate flow and pressure still remain.

Minor requirements include:

5. Per Mass Amendments 901.7, identification signs with specific text messages must be installed on all equipment, valves, etc. (See “Fire Protection Systems Provided”)
6. Per 903.4 and 4.1, all critical system components must be monitored by listed Fire alarm control units, and all alarms, trouble signals, and supervisory signals must be automatically transmitted to the local fire dept. via approved means. Water flow alarms must also activate local Audio / visual alarms to trigger evacuation.

7. Per 904.2.1, Kitchens with commercial cooking equipment under type 1 hood exhausts require fire suppression that also must be regularly tested and inspected.

8. Per 906, labeled, approved, and visible fire extinguishers are required in all E-use buildings. In buildings covered thru-out with quick response sprinklers, however, portable fire extinguishers are only required in the following locations:

   A. within 30’ of commercial cooking equipment (type K);
   B. areas with flammable or combustible liquids; (type B)
   C. on each floor of structures under construction;
   D. special hazard areas listed in the code (such as wood-working or auto repair areas - that do not apply to NES);
   E. as required by the local fire dept.

9. Per 908, areas where toxic gasses are used require gas leak detectors with distinct audio-visual emergency alarms, and automatic shut-down of gas supplies. Per the Nelson Place School custodian, there is no toxic gas storage in the building. Natural gas will be used to power HVAC and kitchen equipment, but there will be no class-room gas supplies.

10. Per 912, an unobstructed, readily accessible Fire Dept. Connection (FDC) that permits the Fire Dept. to pump extra water into the sprinkler system is required. The FDC must be located per the Fire Dept. direction, with threads compatible with the fire dept.’s pumping trucks.

The NFPA standards primarily define how the Fire Protection Systems must perform and how they will be installed. Requirements vary greatly by hazard type and building combustibility and are only briefly summarized here.

**NFPA 13 – Sprinkler Systems**

1. Sprinklers are required “through-out”, except where specifically permitted to be omitted. Throughout means not only occupied spaces, but in electrical / mechanical rooms, closets, walk-in-coolers, combustible concealed spaces, and several other spaces that the NES will not have such as attics and crawl-spaces.

2. Each Sprinkler “system” is limited to 52,000 sqft (light or ordinary hazard) or 40,000 sqft (extra hazard) on a single floor, per riser. This minimizes the area taken out of service in the event of an equipment failure, or fire. Areas on different floors are not added together – for example, up to 52,000 sqft on each of two floors can be served by a single riser. NES will have 2 risers, as it’s “footprint” is over 52,000 sqft.
3. The number and spacing of sprinklers in any room, and the minimum amount of water each sprinkler must discharge is defined based on the room’s “hazard group”. The basic hazard groups in NFPA 13 are

   a. “Light hazard (Light)”
   b. “Ordinary Hazard (OH1 or OH2) and
   c. “Extra Hazard (EH1 or EH2)”.
   d. Spaces used for storage have special classifications depending on what materials are stored and how they are stored.

4. Sprinkler piping may be sized based on hydraulic calculations or using pre-defined pipe schedules. All piping in this building is hydraulically designed.

5. In addition to the hazard rating of an area, the fire protection requirements also depend on whether the construction is

   a. “combustible” or “non-combustible”.
   b. “Obstructed” or “non-obstructed”.

   This sprinkler system is designed for predominately non-combustible, non-obstructed construction.

6. Sprinkler systems can be “wet” (piping always filled with water), “dry” (piping always filled with air, except in a fire), or one of several specialty types. NFPA recommends wet systems be used where-ever possible, as they provide the fastest response to a fire. A wet-system is provided.

   • Small isolated cold areas in NES will be sprinkled by “dry sprinklers” off of a wet system. This would apply to Walk-in freezers and coolers and the receiving area. (Note, though the receiving area and canopy will also be non-or-limited combustible construction, the amount of flammables temporarily stored there during a delivery warrants sprinkler protection.) Per the current design, all other canopies are non-or-limited-combustible construction, and Per NFPA 13, these canopies will not be sprinkled. The Owner is considering adding a wood-deck to 1 or more canopies. If this occurs, sprinklers will be added under those canopies.

**NFPA 14 – Standpipes**

1. The Class III standpipes (2-1/2” hose outlets plus 1-1/2” hose outlets located in all stairwells) are not required for this school, as the “top floor-level” is less than 30’ above (adjacent) grade.

2. The stage is less than 1,000 sqft in area, so no stage hose stations are required.
3.

**NFPA 10 – Fire Extinguishers**

1. Selection of fire extinguishers is based on the type and size of fires expected to occur.

2. Classes of fires:
   
   a. A – ordinary combustibles – wood, paper, cloth, rubber, many plastics
   b. B – Flammable liquids, greases, tar, oil, paints, solvents, alcohols, gasses.
   c. C - Energized electrical equipment
   d. D – combustible metals
   e. K - cooking oils

3. The size and quantity of extinguishers required is based on the room’s hazard level. Room hazards are defined as:
   
   a. Light hazard if has normal amounts of Class A materials, with less than 1 gallon/room class B
   b. Ordinary Hazard if occasionally has more than normal amounts of Class A, and < 5 gal/room class B
   c. High hazard – storage, manufacturing, or packaging of Class As, or class B over 5 gal./room

4. Building structure is be protected by Class A extinguishers. Specific occupancies are protected by extinguishers with an appropriate class. Extinguishers can be “multi-purpose, for example, type ABC is very widely used.

5. Class B fires must be protected with large (over 10 lb) dry chemical medium, with minimum discharge of 1 lb/second.

6. Class K (cooking oil) fires must be protected with class K extinguisher. ID all K extinguishers “Activate FP system prior to using extinguisher”

7. Extinguishers should be inspected monthly to ensure they are in place, are full (“hefting” test), with no visible damage. They require annual minor maintenance and 6 and 12-year interval major maintenance / testing.

**NFPA 25 – FP Maintenance**

Current NFPA maintenance requirements are summarized below:
1. Annual, visual inspection (from the floor) of all sprinklers for: leaks; “loading” (accumulation of foreign materials such as grease, lint, paint, etc); corrosion; physical damage;

2. Annual visual inspection of the spare sprinkler cabinet to ensure it contains the proper type and quantity of sprinklers and wrenches.

3. Annual visual inspection (from the floor) of pipe and hangers for: leaks, corrosion, extra weight, damage.

4. Annual inspection (just before cold weather) of building to ensure all areas with water-filled piping have heat, and dampers, windows, etc are all closed.

5. Monthly inspection of pressure gages for normal pressures, and damage.

6. Quarterly inspection and operational test of alarm devices (flow switches).

7. Quarterly inspection of the hydraulic name-plate to ensure it is in place.

8. Monthly inspection and annual test of control valves,

9. Monthly inspection and annual testing of the back-flow preventor

10. Quarterly inspection of fire dept connections.

11. Annual full-flow test out main drain.

12. Sprinkler testing – laboratory testing of a “representative sample (minimum 1% of total installed). Test after 20 years, then every 10 years there-after. If any tested samples fail – replace all sprinklers represented by that test sample.

Sprinkler system maintenance will increase the schools annual maintenance costs. This will be at least partially offset by the reduction in fire extinguisher maintenance, however, since far fewer extinguishers will be required once the sprinkler system is installed.

4. FIRE PROTECTION SERVICE AND FIRE-FIGHTING SUMMARY

Water to the new school will be fed from a new 8” site-main running from the Nelson Pl. main to within 100’ of the new FP service entrance. As shown by hydraulic calculations, the 100’ of FP service entrance main can (and will) be 6”.

There is currently 1 hydrant in front of the existing school, and a 3 site hydrants are planned. See site plans for exact location of new hydrants.
A April 24, 2014 flow test performed at the existing school showed good flow and pressure (81 psi static / 79 psi residual with 1340 gpm flowing) in the street. Due to the school site being elevated above the street level, pressure available at the upper level is more “moderate” – approximately 64 psi. This is still more than adequate for the sprinkler system, so based on this data, fire pumps will not be required.

A new flow test will be provided by the FP contractor as part of this project. Hydraulic calculations for this construction document design are based on the April-2014 flow test.

Emergency vehicle access is excellent, - with 100% of the building accessible to apparatus.

5. FIRE PROTECTION SYSTEMS TO BE INSTALLED

A new “wet-type” system will be installed through-out per NFPA 13.

Halls and stairs (with ceilings) will utilize ordinary temperature, fusible-link, quick response, K 5.6, concealed, pendants, which will minimize any vandalism potential.

Classrooms, offices, and other spaces with new hung ceilings will utilize ordinary temperature, fusible-link, quick response, K 5.6 semi-recessed pendants.

Areas with no ceilings will utilize exposed piping, with ordinary temperature, fusible link, upright sprinklers.

Mechanical and electrical spaces, walk-in coolers with auto-defrost, and cooking areas will be covered by high temperature uprights, to prevent false activation in the event of a pressure relief valve blowing, electrical over-heating condition, or defroster / cooking heat.

All sprinklers in the gymnasion, mechanical spaces and storage areas will have protective head-cages.

All above-ceiling spaces are non-or-limited-combustible, so no spaces require 2 levels of sprinklers. There is no accessible space under the stage, so no sprinklers there.

Walk-in coolers / freezers and the receiving area are protected by dry sprinklers piped from wet-piping in heated space. Receiving area uses special ordinary hazard-listed dry sidewalls – Tyco DS-3. Dry sprinklers will be ordinary temperature, pendant or sidewall, standard or extended coverage, as required by the area covered. Note: outside roof over-hangs extending 4’ or more from the building are often also protected by dry sidewalls, but in this case all outside canopies are completely non-or-limited combustible construction – including the roof covering. This permits sprinkler protection to be omitted from these canopies.

A new kitchen exhaust-hood will be provided, and a new, dry-agent, packaged fire suppression system provided as part of the HVAC / hood package.
Interior piping systems will be schedule 40 threaded or grooved, black steel for pipe 2” and under, and schedule 10, grooved steel for pipe 2-1/2” and over. All pipe has been sized for a maximum water velocity of 25 fps.

Seismic bracing to be provided will include riser-4-way bracing and main-longitudinal sway bracing thru-out. Where possible, sprinkler main hanger rods will be less than 6” long from point of attachment to top of pipe, eliminating the need for lateral bracing. Where this is not possible, all mains, cross mains, and branches over 2-1/2” will have both lateral and longitudinal seismic bracing.

**Fire Protection Equipment and Controls Locations:** The fire protection service entrance, backflow preventor, and risers are all located in the main boiler room on the west side of the lower level. Each of the 2, new wet-risers will have a riser valve, isolation valves, gages, alarms and supervisory devices per NFPA 13. Both risers will serve 2 floors, so 2 floor-control valve stations per riser will be provided.

Per the Worcester Fire Dept. (WFD) standards, a new, 4” Storz FDC will be provided to serve both sprinkler system. At the request of the local fire chief, a blue beacon and bell will be located above the FDC, with a red beacon (provided by Fire Alarm contractor) over the door to the main annunciator.

Cross-contamination will be prevented by a new, double check valve backflow preventer installed on the new FP service entrance.

There is no smoke control system or exhaust required for this building, and none is provided. The only alternative fire suppression system in the building is the kitchen hood dry-agent system, located in the main kitchen.

Identification signs per NFPA 13 and the 8th Edition Building Code will be provided on:

1. All control valves
2. All test and drain valves
3. connections
4. Fire Suppression Control Room

**Sequence of Operations:** All control valves will have continuously monitored tamper switches, and all risers and floor valve stations will have flow switches. Flow switch alarms will trigger all building notification devices and evacuation. Flow switches will also have tamper switches on their cover, to prevent disabling of any flow-switch device. Both tamper switch and flow switch activation will be communicated to the Worcester fire dept. See fire alarm narrative for details.

6. **ACCEPTANCE CRITERIA**

The following written certifications shall be provided (by the person noted) to all local AHJs.
The Fire Suppression Engineers of record will certify that the systems have been installed in compliance with the construction documents, and that submittal data was reviewed and is acceptable.

The owner will certify that as-built drawings have been received from the contractors, and that the engineer(s) have confirmed their reasonable accuracy.

The sprinkler contractor will provide a completed NFPA 13 test and acceptance report, including the name, address, and telephone number of a person to contact for any system failures or emergencies.

If any portion of their system fails to operate satisfactorily, each contractor must repair or replace the faulty components. They must then retest those components individually, as well as retest all related system functions in the presence of the engineer and all AHJs.

The sprinkler contractor will also provide a signed letter certifying the sprinkler system is installed in full compliance with all laws, regulations, and the pre-approved narrative, and shall obtain written approval from all AHJs certifying that they have witnessed the final acceptance testing.

The site contractor (responsible for underground FP piping) shall also provide NFPA test and acceptance reports, certifying that their piping has been installed, flushed, and pressure tested per NFPA.
Date: December 3, 2014  
To: Robert Para Jr., AIA  
Co: Lamoureux-Pagano Assoc. Architects, Inc. (via email)  
From: Christopher Robinson P.E.  
Re: Nelson Place School: Plumbing System Narrative – Schematic Design Submission

1. PLUMBING

Code Criteria Listing

Commonwealth of Massachusetts “Fuel Gas & Uniform State Plumbing Code”, 248 CMR

Fixtures and Fixture Count

Number of plumbing fixtures will distributed throughout the proposed facility to accommodate a population of 300 male students, 300 female students and 100 faculty/staff 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 per MA-CHPS WC 1.1)

Water Closets:  
- Manual Water Closet Flush Valve @ 1.28 GPF (Sloan #111-1.28)  
- Manual Dual Flush Valve @ 1.6/1.1 GPF (Sloan #WES-111)

Urinals:  
- Manual Urinal Flush Valve @ 0.125 GPF (Sloan #186-0.125)

Lavatories:  
- Metering Faucets, manual actuated with mixing tee, 0.5 GPM (Chicago #3300-ABCP)

Countertop Sinks:  
- Manual Faucets, 0.5 GPM aerator if preferred (Chicago #201-E2805XK)

Shower:  
- ADA Compliant Hand Shower with 30” Glide Rail, Single Handle Shower Valve, 1.5 GPM (Leonard #96-515P(G)-30)

Water closets and urinals will be commercial vitreous china, wall hung (ADA compliant where shown). Lavatories in restrooms will be commercial vitreous china, wall hung. Each floor includes a janitor’s closet with a floor mounted mop service basin. Toilet cores on
each floor will include alcove-recessed electric water cooler, in a high-low handicapped accessible configuration. Restrooms, kitchen and mechanical room will have floor drains with trap primer connections & valves.

The one shower stall shall be by the G.C., but the Plumbing Contractor shall provide a shower drain and shower valve with a hand shower on slide bar (ADA compliant)

All classrooms will have self-rimming stainless steel sink with gooseneck type mixing faucets (Elkay #LK2439) and a water bubbler (Elkay #LK1141A). Plumbing connections and faucets will provided to each kitchen appliances requiring plumbing work. Exterior non-freeze wall hydrants will be provided as requested by the owner as they are not required by code.

Science Classroom will be provided with gooseneck faucets for the classrooms sinks with integral vacuum breakers and serrated nozzles. The student and demonstration tables shall have mixing faucets (Chicago Faucets model #930-369XKCP). There shall be an emergency shower/eyewash station in the Science Classroom (Chicago Faucets model #9205-NF).

**Roof Storm Drainage System**

Roof is sloped to interior roof drains. The storm drain system will incorporate primary roof drains at low points and emergency overflow roof drains with 4” high water dams or internal standpipes in case the primary roof drain fails. The primary roof drains will be piped to internal rain leaders and combine below grade to several exit locations to connect to the site drainage system. The emergency roof drains will be piped to discharge independently from the primary building storm system and shall terminate a minimum of 18” above grade.

**Sanitary Systems**

The sanitary sewer system within the building envelope to 10’ beyond the building foundation wall shall be service weight cast iron and will drain by gravity. External to the building, underground PVC piping shall be used or other material as dictated by the site engineer.

All waste from the science labs generating acidic waste shall be run through a passive acid neutralizing tank at each individual sink. Acid resistant waste pipe and vent piping (CPVC or polypropylene) shall be used. The floor drain for the emergency shower shall not be piped with acid waste piping.

In addition to local grease traps at the dishwasher, pot sink and other fixtures requiring such, all waste from the kitchen shall be piped to a large (3,000 gallon+/−) exterior grease trap prior to discharge to the municipal sewer system.
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 service weight cast iron hub and spigot with rubber gaskets.

**Domestic Cold Water Service**

New main 4” domestic water supply in the mechanical room will enter from Nelson Place. 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-off’s will branch off through a reduced pressure-principle backflow preventer. The science lab cold and hot water feeds will need to be a protected water supply, therefore a reduced pressure backflow preventer will be installed in the mechanical room to service these fixtures.

The janitor’s sinks all have chemical feed cleaning supply systems. Per the MA Plumbing Board, each connection to the janitor sink faucet shall have the following:
1. All dispensers shall have an Air Gap or, an alternative Certification of Listing under the ASSE 1055B Standard.
2. Dispensers shall include a dual check valve with an atmospheric vent device installed at the water inlet as a secondary backflow protection. If an external and open to the environment air gas separation is provided, a dual check valve with intermediate atmospheric vent will not be required.
3. A pressure bleeder device shall be provided which will visually free flow water through the atmosphere from the faucet connection to a sink or drain. The purpose of the bleeder device is to indicate that the water is running and should be shut off to prevent hot water migration. The bleeder device shall connect to the water source utilizing a quick disconnect coupling.
4. All external components will be permanently installed on the dispenser by the manufacturer and be ready for installation and use. External components include the dual check valve with atmospheric vent, hose and the pressure bleeder device.
5. The Device that attaches to the Faucet shall be so arranged, so it is one piece that will not allow the removal of the bleeder from the Quick disconnect portion of this device.

There will be no site irrigation system installed. Exterior sillcocks can be provided around the building as requested, but are not required per code.

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. Piping installed can be joined by soldering or mechanical fittings.

**Domestic Hot Water Service**

Natural gas shall be the fuel source for a high efficiency (94%+) gas-fired condensing boiler coupled to two (2) 119 gallon storage tanks. This system shall be used to support the buildings domestic hot water needs. The domestic hot water distribution system will be
recirculated from the furthest points in the school back to the storage tanks. There will be one hot water piping system serving the entire building. It shall operate at 125°F and will serve the other kitchen, classrooms, restrooms and appliances, as well as the mop sinks. Each lavatory faucet will reduce the hot water temperature to 110°F and have temperature limit stops.

In addition, this domestic hot water system can be coupled to the geothermal heat pump and/or thermal solar panels for added efficiency if preferred.

The domestic hot water will be stored at 140°F. It will be reduced in temperature via a central thermostatic mixing valve in the mechanical room. A second mixing valve will be installed just for the emergency shower/eyewash unit in the science room. This mixing valve system will provide 80°F tempered water to that one fixture only.

The science lab hot water feed will need to be a protected water supply, therefore a reduced pressure backflow preventer will be installed in the Science Prep Room to service the faucets. Since the protected hot water cannot be recirculated to the domestic hot water system, electric temperature maintenance heat trace will be installed for the entire run serving the science room.

**Natural Gas System**

Natural gas system to the site shall be installed by the site contractor in conjunction with the natural gas supplier. The gas meter and initial gas pressure regulators shall be installed by the gas company. The Plumbers work will start at the outlet of the gas meter and be piping to the mechanical room, kitchen and ground floor science room to support various appliances and equipment.

The gas piping serving the kitchen hood will be connected to the hood dry chemical fire suppression system via a mechanical valve (i.e. valve with fusible link closure) and to a CO detection system in the kitchen. There will be a solenoid valve on the gas line that will keep the gas operational unless there is an elevated CO level detected. There can also be flammable gas sensors to ensure there is no build-up of flammable gas in the space (typically due to pilot light going out). The two CO detectors need to be mounted 15 feet away from the kitchen hood.

The science room will have a master emergency gas shut-off valve mounted near the corridor door. The valve shall be manually activated and shall be accessible through a clear-glass cover on the recessed valve box. The science room natural gas piping will serve individual gas turrets at the student tables and the demonstration table.

Natural gas piping shall be screwed schedule 40 black steel piping on sizes 2” and under and welded on 2-1/2” and over.

**Sustainable Opportunities:**
Many of the proposed fixtures and control sequences noted above minimize water usage and conserve energy however, further optimization may be obtained by investigating the use of storm water recovery systems. These systems collect, filter and utilize storm water to supply water to water closets and urinals throughout the building. In addition, vacuum tube thermal solar panels mounted on the roof can be considered to supplement the building domestic hot water needs. A life cycle evaluation must be performed to ascertain the initial first costs, annual operating costs and projected savings associated with such a system.

End of Plumbing Narrative
## Potential Conservation Opportunities

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<th>Annual Savings ($)</th>
<th>Payback Period* (yrs)</th>
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Total (excluding Landscape) $38,181 $12,571 $43,237 $1,400 0.68

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### Payback Periods and Net Worth of Each WCM

Including only Direct Energy and Water Savings

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### Annual Savings Estimate

Water and Energy Conservation

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*Includes Direct Energy Only*
HVAC Schematic

Basis of Design Narrative

For The

NELSON PLACE ELEMENTARY SCHOOL

IN

Worcester, MA

December 11, 2014

Prepared by:

SEAMAN ENGINEERING CORPORATION
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HVAC NARRATIVE

A. DESIGN INTENT

The heating medium is hot water generated by high efficiency condensing gas fired hot water boilers located in a ground level mechanical room. The boilers serve all areas of the building. In addition, as an add alternate and supplement to the boiler plant a geothermal chiller/heater system shall be provided coupled to a closed loop vertical bore hole well field. The heating water is distributed to the fin-tube radiation, air handler units, cabinet and unit heaters and fan coil units located throughout the building.

High efficiency air cooled packaged rooftop heat pump systems provide full cooling control and supplemental heating to most all areas of the building. The heat pump cycles of these systems are used to temper air when winter outdoor air temperatures are above approximately 20°F resulting in higher heat pump efficiency/coefficients of performance (COP). Otherwise the boiler plant provides the heating required via water coils in the units and/or radiation within the spaces.

Alternate: If selected as an alternate, a geothermal chiller/heater shall provide supplemental heating to the boiler plant as well as 45 tons of cooling to support chilled water for high efficiency full cooling control to the 1) Media Center, and 2) Gymnasium systems. The system shall also provide supplemental heat to the building hot water heating loop throughout much of the heating season. At peak heating design conditions the unit shall be capable of providing more than 500,000 BTUH of heating capacity to the building loop.

The distribution systems consist of the following:

a. All classrooms and many areas with exterior exposures incorporate fin-tube radiation as the primary form of heat.

b. Variable air volume (VAV) terminals serving displacement diffusers in most all areas of the building with the exception of the office spaces.

c. VAV terminals with reheat in administration areas.

d. Classroom ventilation is supported with central packaged VAV rooftop units complete with total energy recovery wheels, hot water coils and dehumidification cycles utilizing DX based system with hot gas reheat cycle. VAV terminals in these spaces control individual space temperature control.

e. Offices and Media spaces are supported by central packaged VAV rooftop units with total energy recovery wheels, hot water coils and dehumidification cycles utilizing DX based system with hot gas reheat cycle. VAV terminals in these spaces control individual space temperature control.

f. The Cafeteria & Gymnasium spaces are served by a central packaged rooftop unit with total energy recovery wheels, hot water coils and dehumidification cycles
utilizing DX based system with hot gas reheat cycle. The systems have the ability to vary total air volume and outdoor air volume in a single zone VAV application. 

g. Exhaust fans will vent specific areas such as bathrooms, storage areas and the kitchen. All exhaust fans shall have efficient ECM motors. Kitchen hood system shall have variable flow capabilities using smoke and/or heat sensors to vary exhaust airflow based on cooking demand.

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 media center is part of the city’s satellite library program and as such will be open weekdays till 9:00PM. In addition, the school will service the district’s autism program which may require specified occupancy programming for various areas.

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, eighth edition.

B. BASIS OF DESIGN

The HVAC systems and components are designed in accordance with the requirements of the Commonwealth of Massachusetts State Building Code - 8th Edition, 780 CMR, and conform to the energy conservation requirements of Chapter 13 of that code referencing IECC 2009 International Energy Conservation Code.

The Nelson Elementary School is located in Worcester, MA and the system design and loads complies with the criteria for Climate Zone 5A.

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.
Most all areas shall be designed to control maximum indoor humidity levels to no greater than 55% RH at design indoor space temperature.

Design occupant levels by space are contained within the architectural documents included as part of the schematic document submission.

C. HVAC SYSTEM CONTROLS

Heating and cooling systems of the Nelson Elementary 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 buildings heating requirements will be satisfied via a high efficiency (93%+) LP gas-fired fire tube style condensing hot water boiler plant with a maximum design hot water supply temperature of 140°F. Pending final load calculations and system design, initially the boiler plant shall consist of two (2) gas-fired boilers each with a gross output capacity of 1,380,000 BTUH (total 2,760,000 BTUH plant) similar to Lochinvar Crest or equal as manufactured by Aerco or Viessman. Note: Boiler sizing shall be adjusted down based on acceptance of geothermal system and finalization of building thermal envelope.
Provide 2-pipe hydronic hot water system complete with end-suction system pumps as manufactured by Taco, Armstrong or Grundfos rated for 300 GPM. Hydronic system shall connect to 2-pipe fan coil units, unit heaters, air handler coils, VAV coils and fin-tube radiation located throughout the building. All terminals connected to the new system shall be designed to operate with a maximum water temperature of 140°F. Pumps shall have premium efficient motors and be fitted with variable speed drives so that pump energy matches system flow demand.

Alternate: A geothermal field coupled with a chiller/heater for use in supplementing the building hot water loop heating shall be utilized if the Alternate is taken. The current design reflects a 56 nominal ton chiller/heater (45-ton at design condition) served by thirteen (13) 500 foot deep bore hole wells. The unit has the capacity to shed more than 500,000 BTUH per hour of heating load from the buildings boiler plant.

Air handlers serving classroom areas utilize total energy recovery energy exchange, hot water heating coils, DX coils and DX reheat coils to facilitate pretreating and dehumidification cycles.

The cooling system consists of multiple high efficiency packaged air cooled DX units with digital modulating scroll compressor technology and hot gas reheat dehumidification cycles. These units support all areas noted previously as being air conditioned as well as dehumidification for classroom spaces. Select areas that require full cooling capabilities shall be supported by the geothermal chiller for cooling.

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 – Air Handling Unit; RTU – Packaged Rooftop Unit with DX cooling and/or dehumidification

- MAU-1: Kitchen Make-up Air & Ventilation Unit, 3188 CFM, H&V.
- RTU-1 Classrooms, 10,000 CFM VAV, HVAC with ERV and Dehum. Control
- RTU-2 Classrooms, 13,000 CFM VAV, HVAC with ERV and Dehum. Control
- RTU-3 Offices, 5,500 CFM VAV, HVAC with ERV and Dehum. Control
- RTU-4 Gymnasium, 12,200 CFM VAV, HVAC with ERV and Dehum. Control
  (Alternate: AHU with geothermal option)
- RTU-5 Media, 5,500 CFM VAV, HVAC with ERV and Dehum. Control
  (Alternate: AHU with geothermal option)
- RTU-6 Cafeteria, 10,200 CFM VAV, HVAC with ERV and Dehum. Control
- RTU-7 Classrooms, 10,400 CFM VAV, HVAC with ERV and Dehum. Control
- RTU-8 Classrooms, 10,600 CFM VAV, HVAC with ERV and Dehum. Control

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 heat pump units.
c. **Alternate:** Geothermal bore field wells, pumps, heat exchanger, chiller/heater, etc…
d. All piped distribution systems are required to pass a hydrostatic test using water and 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.
e. 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.
f. Ductwork shall be tested for leak integrity and performed in accordance with SMACNA standards.
g. 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.
h. 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 HVAC systems and components are designed in accordance with the requirements of the Commonwealth of Massachusetts State Building Code - 8th Edition, 780 CMR, and conform to the energy conservation requirements of Chapter 13 of that code referencing IECC 2012 International Energy Conservation Code.
The Nelson Elementary School is located in Auburn, MA and the systems design and loads comply with the criteria for Climate Zone 5A. Outdoor design conditions utilized were:

- Heating Degrees Winter: 0°F
- Cooling Degrees (db) Summer: 87°F
- Cooling Degrees (wb) Summer: 71°F

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 60°F during the heating season and rise to 90°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.

Outside air ventilation requirements were based on the ICC International Mechanical Code 2012 as referenced by the building code as well as cross references to ASHRAE Ventilation Standard 62.1- current edition. Ventilation requirements are based on space use, room occupancy, square footage and ventilation effectiveness.

**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 Auburn, 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 the Life Cycle Report.

The building heating and cooling load requirements under peak design load conditions as indicated above are estimated as follows:

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<thead>
<tr>
<th></th>
<th>Heating Load</th>
<th>Cooling Load</th>
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<tr>
<td>Building Loads</td>
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<td>3,000,000 BTUH</td>
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The estimates do not include localized cooling loads for tel/data and MDF rooms and do not include dehumidification cooling loads.

**End of Schematic Basis of Design HVAC Narrative**
December 11, 2014

Basis of Design Narrative – Electrical Systems
New Building on Nelson Place Land
Nelson Street Elementary School
Worcester, MA

Prepared by: Azim Rawji, P.E.

1.1 Electrical Distribution

A. On September 10, preliminary information about this project (address, service size, customer) was provided to National Grid and a Work Request Number was issued.

B. On September 23, National Grid indicated that, once begun, their scope of work is likely to require 6 months to complete.

C. Site plan, distribution riser, and load information was submitted to National Grid October 30.

D. Proposed primary electrical conduit routes and property deed were submitted to National Grid November 3. On the same day, the customer representative at National Grid forwarded the project to Engineering and indicated a National Grid designer would contact ART within 11 business days.

E. Easement Application submitted to new National Grid customer rep November 11. On November 20, customer rep indicated that the National Grid designer intends to contact ART the week of November 24. ART will arrange a site visit with the National Grid designer, during which the extent of work to be completed by National Grid will be determined.

F. New primary distribution/telecommunications duct banks will be installed to bring power/telecommunications to the new building site.

G. Provide a 1600A, 480Y/277V 3-phase, 4-wire service entrance two-section distribution to be located in the main electrical room.

H. A Type I surge protective device (SPD) shall be installed at the service entrance.

I. A digital metering system shall be installed with software, capable of providing electrical consumption data of lighting, general purpose power and HVAC power.

J. The electrical service shall be underground and fed from a new utility company padmount transformer located on the exterior of the building.

K. A grounding electrode system shall be installed; the resistance to ground shall be 25 ohms or less.
L. Lighting and power panelboards shall be provided for building lighting, power and HVAC loads.

1.2 Net Zero Strategies

A. A roof-mounted, 318kW photovoltaic system will be utilized to offset the electrical power consumption from the utility company and contribute towards a net zero building.

1.3 General Purpose Power

A. A minimum of three general purpose duplex receptacles and one computer double duplex receptacle shall be provided in offices.

B. General purpose receptacle outlets shall be provided on 12-foot centers on wall exceeding 12 feet.

C. A minimum of one general purpose duplex receptacle shall be provided in utility and storage rooms.

D. Multiple service floor outlets or fire rated poke-thru devices shall be provided for equipment and appliances in the common areas when the equipment is to be placed on worktables, counters, systems furniture, or cabinets that are not against fixed walls.

E. All new feeders shall be installed in PVC conduits when installed underground or under slab; or in EMT when installed concealed or exposed inside the building. All new branch circuit wiring within the building shall be Type MC cable where installed concealed; and wire in EMT conduit where installed exposed. All telecommunications and low voltage wiring shall be installed in conduit stubs to accessible ceilings, ladder tray, wire basket and supported by j-hooks.

1.4 Emergency/Standby Power

A. Provide new emergency/standby generator, transfer and power equipment. Emergency equipment must be separated from normal and standby power equipment per the Massachusetts Electrical Code.

B. All emergency equipment and feeders must be installed in 2-hour rated rooms or must be 2-hour rated.

C. Provide emergency power to emergency egress and exit lighting, alarm and alerting systems, communication systems, automatic doors, generator set and transfer switches.

D. Provide standby power to boilers, hot water pumps, kitchen freezer/cooler, IT server equipment, radon fans, and other owner designated standby equipment.

1.5 Lighting System

A. A high efficiency lighting system shall be provided in all interior spaces as well as on the exterior of the building. The design aim is to deliver a lighting system with a light power density not exceeding 0.8W/sq. ft. All light fixtures shall be LED.
B. Interior lighting shall be controlled with an automatic control device to shut off building lighting in all spaces. This automatic control device shall function on either:

1. A scheduled basis using a time of day operated control device that turns lighting off at specific programmed times; or
2. An occupant sensor that shall turn lighting off within 30 minutes of an occupant leaving a space; or
3. An unscheduled basis by occupant intervention.

C. Each space enclosed by ceiling-height partitions shall have at least one control device to independently control the general lighting within the space. Each control device shall be activated either manually by an occupant or automatically by sensing an occupant.

D. Each perimeter office space enclosed by ceiling-height partitions shall have a manual control to allow the occupant to uniformly reduce the connected lighting load by at least 50% or shall be provided with automatic daylighting controls.

E. Each perimeter classroom space shall have a manual control to allow the occupant to uniformly reduce the connected lighting load by at least 50% and shall be provided with automatic daylighting controls. The classrooms shall have the ability to dim or switch off lights at the presentation/teaching front wall. The lighting controls shall be integrated with the HVAC controls to optimize energy performance of the building.

1.6 Exterior Lighting

A. Pedestrian walkways shall be designed for an average maintained illuminance value (Eavg) of 0.6 foot-candle horizontal, and 1.1 foot-candle vertical, as measured 6'-0" above ground, and shall maintain an avg/min illuminance uniformity ratio not to exceed 4:1. (This means that if the average illuminance at the ground plane is 0.6 foot-candles, the minimum illuminance shall not be lower than 0.15 foot-candles).

B. All parking lots shall be designed for a minimum level of 0.2 foot-candle at the ground plane, a minimum vertical illuminance of 0.1 foot-candle measured 5'-0" above the ground plane and a max/min uniformity ratio of 20:1 (this means that if the minimum is 0.2 foot-candle, the maximum foot-candle level shall not be higher than 4.0 foot-candles).

C. Roadways shall be designed for an average maintained illuminance value (Eavg) of 0.6 foot-candle and shall maintain an average/minimum uniformity ratio not exceeding 4:1 (this means that if the average number of foot-candles at the ground plane is 0.9, the minimum foot-candle level shall not be lower than 0.15 foot-candles).

D. Building security lighting shall be designed for an average illuminance value (Eavg) of 0.5 foot candle horizontal.

E. Pedestrian walkway lighting shall be LED bollard fixtures; parking and roadway lighting shall be wired or solar powered LED fixtures mounted on 20 ft. poles. Building security lighting shall be LED wall packs.

F. All exterior lighting shall be controlled by the BMS system.
1.7 Egress & Exit Lighting

A. Egress lighting shall be provided in egress pathways, classrooms, bathrooms, assembly areas and outside each egress door.

B. Exit lighting shall be provided in egress pathways and in assembly areas.

1.8 Fire Alarm

A. Provide a new addressable fire alarm system with voice evacuation and connection to the fire department.

B. The design of the fire alarm system shall be based on engineering criteria as defined by NFPA 72 and State Fire Safety Code. The system shall be supported by standby batteries. The batteries shall support 24-hours of full supervisory operation followed by 15 minutes of alarm.

C. Combination audible-visual signaling appliances as required per NFPA 72 shall be provided. The audible-visual notification devices shall be located in all egress pathways, classrooms, public and common areas. Visual notification devices shall be provided in all offices. The devices shall be in compliance with the Americans with Disabilities Act (ADA).

D. Manual pull stations shall 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 shall mechanically latch upon operation and remain so until manually reset by a key common to all system locks.

E. Photoelectric smoke detectors shall be located in egress pathways. Smoke detectors shall also be located at the top, bottom of each stairway; mechanical equipment; electrical; transformer; telephone equipment; elevator machine; or similar room. Sprinkler tamper and flow devices shall be wired for trouble and alarm indication respectively into the fire alarm control panel.

F. A Public Safety Radio Distributed Antenna System (DAS) for police and fire departments shall be provided.

1.9 Data Communications

A. A new telecommunications cabling infrastructure shall be installed in compliance with the latest EIA/TIA standards. The utility company services shall be terminated in the telecommunications equipment room (TER). Fire rated plywood backboards, grounding, equipment racks, 110-type punch down blocks, patch panels, conduit sleeves, and corridor cable tray system shall be provided in the TER and the telecommunications rooms (TR). The pathway system, racks and equipment shall be sized for complete utilization of the service entrance cables and all voice and data outlets plus room for future growth. Voice and data outlets shall be provided in all administration areas and in the classrooms. Voice and data horizontal cabling shall be Category 6, unshielded, twisted pair, 8 conductor copper cable from each jack to the nearest telecommunications closet. Each end of each cable shall be labeled, the cables shall be terminated in accordance with TIA-568-B configuration, and tested in accordance with ANSI/TIA standards.
B. On September 22, Verizon issued form ITT46 for completion by customer, as required by Commonwealth of Massachusetts Statewide Contract No. ITT46. The completed form, which records customer information and the details of the service change request, was returned October 22 and Verizon was informed that existing service must remain operational until summer 2017. A site visit with a Verizon Engineer will be coordinated to verify existing conditions and confirm that new service will tie into existing school system lit fiber network. This will take place during or after the site visit with National Grid.

C. ART conducted a site visit with Charter October 30. Existing Charter service is routed underground from Pole 8 on Nelson Pl. Routing of new service from the street will depend on the utility pole work National Grid proposes. A minimum of (1) 4” conduit will be required to carry new Charter service from a utility riser pole to the demarcation point in the ground level telecommunications room.

D. A minimum of one voice/data outlet shall be provided in each office. Two data outlets shall be provided in the ceiling in corridors and assembly areas on 40 ft. centers for wireless access points.

E. Backbone cables shall be provided between the TER and each TR. Copper backbone cables shall be voice grade Category 3 cable. The cables shall be tested in accordance with ANSI/TIA standards. Optical fiber cables shall be 24-strand (50/125µm) multimode laser optimized cable. The cables shall be terminated in fiber optic patch panels at both ends. The circuits shall be tested for insertion loss at both ends at 1310 and 1550nm. High-resolution Optical Time Domain Reflectivity (OTDR) tests shall be performed on each fiber at one end. Fiber optic connection shall be provided between the new school and the administration building on West Street to extend the town’s wide area network to the new school. Provisions shall be made so that there is minimal disruption to the service when the administration building is demolished.

F. Install telecommunications equipment in dedicated rooms.

G. Provide new wired and wireless data communications equipment.

H. Provide new VoIP telephone system with digital/analog handsets.

I. The VoIP telephone system shall be integrated with the public address system.

1.10 Audio-Video Systems

A. Provide new public address and clock systems.

B. Provide new media distribution system.

C. Provide new audio-video systems in classrooms and common areas.

D. Provide new local sound system in the gym/cafetorium. The sound system shall be integrated with the fire alarm system so that the system is muted when the fire alarm system is activated. The sound system shall incorporate speakers, wireless microphones, CD player, iPod dock and AM/FM tuner as well as two additional inputs.
1.11 Access Control, Intrusion Detection & Video Surveillance (CCTV) System

A. Provide new access control, intrusion detection and video surveillance systems. The system shall be a Unified Security Platform (USP) and shall support the seamless unification of IP video management system (VMS) with access control system (ACS) and Intrusion Detection System (IDS) under a single platform. The USP user interface applications shall present a unified security interface for the management, configuration, monitoring, and reporting of embedded ACS, IDS, VMS and associated edge devices.

B. The IP video surveillance system shall comprise of cameras, encoders, decoders, network video recorders, data transmission wiring, control station with its associated equipment and software, recording control devices and all related local area network server and switches. The video surveillance system shall monitor all entry/exits, building perimeter.

C. The access control system shall be hardwired for all exterior doors, utility and similar rooms. The intrusion detection system shall monitor all ground floor doors and windows.

D. Door contacts shall be provided on all exterior doors and motions sensors/glass break detectors shall monitor the ground floor for intrusion alerts.
Overview
On November 21st the design team had a follow-up meeting to take a more in-depth look at some of the LEED v4 credits. To achieve LEED v4 Silver certification with a 2% reimbursement, a project must earn a minimum of 50 points. Currently, it is the design team’s goal to achieve a point value of at least 55 points.

The project is currently tracking credit points as follows:
53 ‘Yes’, 49 ‘Maybe’, 8 ‘No’.

The project is tracking 53 ‘Yes’s, however with 49 more points still listed as ‘Maybe’, we will earn several additional points from this ‘Maybe’ column as the project progresses. It is still too early into design to determine whether or not a lot of these Maybes can be achieved.

We suggest projects carry a small point cushion to allow for unforeseen circumstances as the project moves forward. With this target in mind, we would ideally like to track a minimum of 54-56 points. The buffer credits are beneficial to the project as a safety net in unforeseen conditions where one or two credits might be denied by the review team.

It should be noted that while the project seeks to achieve certification under LEED for Schools v4, our approach is not one of “point chasing” to maximize a LEED score. Rather the project team will endeavor to design and construct a building which minimizes its impact on the environment as well as its life-cycle and long term operating costs, while managing and reducing the burden the building will place on the local infrastructure. We will use LEED primarily as a validation tool and to check the project against the sustainable design goals. In general, the project team will not base design decisions strictly on achieving LEED points.

Our current LEED project schedule is as follows:
Project Registration – by January 15, 2015
Next Project Team Meeting – end of January 2015
LEED Design Documentation Kickoff Meeting – August 2015
Design Phase Submission – February 2016
LEED Construction Kickoff Meeting – April 2016
Construction Phase Submission – December 2017

Please see attached LEED for Schools v4 Scorecard for a list of credits the project is targeting.

Approach
The City of Worcester has identified environmental sustainability as an important goal for this project. The design will include alternative energy systems, and a zero net energy building is
being considered. Sustainable features will be further reviewed and refined as the design develops.

Making sustainable choices for the built environment requires the intense collaboration of all design disciplines in an integrated process. This integrated process not only includes the architects and engineers, but also includes the City, contractor and the needs of the end users. We have held several meetings with the design team to date, focused on sustainability and a net zero building. The meetings have given the team the opportunity to brainstorm ideas, and to create a shared set of sustainable goals and expectations for the project that are in alignment with the LEED for Schools v4 rating system.

Site:
The project is located on the same property as the existing Nelson Place Elementary School, in an urban residential neighborhood. The new school will be located to the south of existing elementary school, and parking will be located on the site of the old school. The project will show a significant reduction in parking capacity, as required by the Reduced Parking Footprint credit. Preferred carpool parking will be provided for 5% of the total number of parking spaces. In addition, the school will share facilities with local community groups, as required by the Joint Use of Facilities credit. The project is not targeting the Bicycle Facilities credit due to the lack of dedicated bicycle lanes on school property.

Other sustainable site strategies that have been discussed are a school garden and approaches to reduce stormwater runoff, such as the use of porous pavement and capturing rainwater for irrigation. The project team will evaluate the project site and location to determine which LEED credits are feasible.

Water Efficiency:
The Nelson Place School will utilize low flow and low flush fixtures and will target at least a 35% water use reduction. The specifications will include the installation of permanent water meters and will include metering the following systems: indoor plumbing, boiler, and domestic hot water. High efficiency commercial kitchen equipment will be specified to minimize the demand for potable water for sewage conveyance and process uses. Outdoors, the school will not use permanent irrigation and drought tolerant plants will be selected.

Energy & Atmosphere:
The building systems have been extensively studied by the design team and have been selected to maximize energy efficiency while providing essential heating, cooling and ventilation needs. Currently, the project is targeting all 16 points for the Optimize Energy Use credit and 3 points for the Renewable Energy Production credit. A roof-mounted, 318kW photovoltaic system will be utilized to offset the electrical power consumption from the utility company and contribute towards a net zero building. As an add alternate, a geothermal chiller/heater system will be provided, coupled to a closed loop vertical borehole well field. The design will also include super insulation and triple glazed windows. The heating and cooling systems will be monitored and controlled by an Energy Management System (EMS) using Direct Digital Control (DDC) technology.
Nelson Place School will meet all EA prerequisites, including Building-level Energy Metering and Fundamental Refrigerant Management. In addition, Nelson Place School will target the Enhanced Commissioning credit and the Advanced Energy Metering credit. As the project enters Design Development, the team will evaluate the Energy and Atmosphere credits to determine which additional LEED credits are feasible.

The project will comply with the mandatory and prescriptive provisions of ANSI/ASHRAE/IESNA Standard 90.1-2010, with errata.

**Materials & Resources:**
The project will meet the MR prerequisites and will: 1) provide storage and collection for recyclables; and 2) implement a construction and demolition waste management plan.

The team plans to have a design team meeting in January, where we will focus on the materials credits, almost all of which are new to LEED version 4. New material strategies being considered include: conducting a life-cycle assessment of the project’s structure and enclosure; using permanently installed products that meet one of the disclosure criteria in the LEED Reference Guide; using products that meet at least one of the responsible extraction criteria in the LEED Reference Guide for at least 25% of permanently installed building products in the project; and using permanently installed products that use one of the required programs in the Reference Guide to demonstrate the chemical inventory of the product to at least 0.1% (1000 ppm).

**Indoor Environmental Quality:**
Nelson Place School will meet all IEQ prerequisites. The project team will meet the Enhanced IAQ Strategies credit which will include: walk-off mats at all major entryways; MERV 13 filtration; and using the calculation methodology selected for the IEQ Prerequisite to achieve a 30% increase. The contractor will develop and implement an indoor air quality (IAQ) management plan and a building flushout will be performed before occupancy.

The interior of the school will provide a highly collaborative learning environment while maximizing access to daylight and views. Interior finishes will be low VOC compliant to provide a healthy interior learning environment.

**Innovation:**
The project team will evaluate and determine the innovation credits that are the best fit for this project. Current innovation credit ideas include: Green Clean Policy, Integrated Pest Management, Low Mercury Lighting, and a School Garden.
**LEED for Schools v4**

**Project Scorecard**

Project Name: *Nelson Place Elementary School*

Project Address: 35 Nelson Place, Worcester, Massachusetts 01605

Date Updated: November 21, 2014

### Integrative Process

- **Targeted LEED Rating:** Silver
- **Yes:** 1
- **No:** 0

### Location & Transportation

- **LEED for Neighborhood Development Location:**
  - **Yes:** 0
  - **No:** 1

- **Sensitive Land Protection:**
  - **Yes:** 1

- **High Priority Site:**
  - **Yes:** 2

- **Surrounding Density and Diverse Uses:**
  - **Yes:** 5

- **Access to Quality Transit:**
  - **Yes:** 4

- **Bicycle Facilities:**
  - **Yes:** 1

- **Reduced Parking Footprint:**
  - **Yes:** 1

- **Green Vehicles:**
  - **Yes:** 1

### Sustainable Sites

- **Construction Activity Pollution Prevention:**
  - **Yes:** 1

- **Environmental Site Assessment:**
  - **Yes:** 1

- **Site Assessment:**
  - **Yes:** 2

- **Site Development - Protect or Restore Habitat:**
  - **Yes:** 1

- **Open Space:**
  - **Yes:** 1

- **Rainwater Management:**
  - **Yes:** 3

- **Heat Island Reduction:**
  - **Yes:** 2

- **Light Pollution Reduction:**
  - **Yes:** 1

- **Site Master Plan:**
  - **Yes:** 1

- **Joint Use of Facilities:**
  - **Yes:** 1

### Water Efficiency

- **Outdoor Water Use Reduction:**
  - **Yes:** 5

- **Indoor Water Use Reduction:**
  - **Yes:** 5

- **Building-level Water Metering:**
  - **Yes:** 2

- **Outdoor Water Use Reduction:**
  - **Yes:** 1

- **Indoor Water Use Reduction:**
  - **Yes:** 7

- **Cooling Tower Water Use:**
  - **Yes:** 2

- **Water Metering:**
  - **Yes:** 1
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<td>D</td>
<td>14</td>
<td>14</td>
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<tr>
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<td>16</td>
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<td>Advanced Energy Metering</td>
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<td>1</td>
<td>1</td>
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<tr>
<td>Demand Response</td>
<td>C</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Renewable Energy Production</td>
<td>D</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>1% Renewable Energy</td>
<td>D</td>
<td>1</td>
<td>1</td>
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<tr>
<td>5% Renewable Energy</td>
<td>D</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>10% Renewable Energy</td>
<td>D</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Enhanced Refrigerant Management</td>
<td>D</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Green Power and Carbon Offsets</td>
<td>C</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>50% Total Energy Addressed by Green Power, RECs and/or Offsets</td>
<td>C</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>100% Total Energy Addressed by Green Power, RECs and/or Offsets</td>
<td>C</td>
<td>2</td>
<td>2</td>
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<tr>
<td><strong>Materials &amp; Resources</strong></td>
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<tr>
<td>Storage &amp; Collection of Recyclables</td>
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<td>Y</td>
<td></td>
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<tr>
<td>Construction and Demolition Waste Management Planning</td>
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<td>Building Life-cycle Impact Reduction</td>
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<td>3</td>
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<td>Building Product Disclosure and Optimization-Environmental Product Declarations</td>
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<td>2</td>
<td>2</td>
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<td>Building Product Disclosure and Optimization-Sourcing of Raw Materials</td>
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<tr>
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<td>Construction and Demolition Waste Management</td>
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<td></td>
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<td><strong>Indoor Environmental Quality</strong></td>
<td></td>
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<td>Minimum IAQ Performance</td>
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<td></td>
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<td>Environmental Tobacco Smoke (ETS) Control</td>
<td>D</td>
<td>Y</td>
<td></td>
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<tr>
<td>Minimum Acoustical Performance</td>
<td>D</td>
<td>Y</td>
<td></td>
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<td>Enhanced IAQ Strategies</td>
<td>D</td>
<td>2</td>
<td>2</td>
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<tr>
<td>Low-Emitting Materials</td>
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<td>2</td>
<td>1</td>
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<tr>
<td>Three of seven compliant categories</td>
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<td>Five of seven compliant categories</td>
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<td>Six of seven compliant categories</td>
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<td>-------------</td>
<td>--------</td>
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<tr>
<td>C</td>
<td>1</td>
<td>Construction IAQ Management Plan</td>
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<td>C</td>
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<td>IAQ Assessment</td>
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<tr>
<td>D</td>
<td>1</td>
<td>Thermal Comfort</td>
<td>1</td>
</tr>
<tr>
<td>D</td>
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<td>Interior Lighting</td>
<td>2</td>
</tr>
<tr>
<td>D</td>
<td>3</td>
<td>Daylight</td>
<td>3</td>
</tr>
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<td>D</td>
<td>1</td>
<td>Quality Views</td>
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</tr>
<tr>
<td>D</td>
<td>1</td>
<td>Acoustic Performance</td>
<td>1</td>
</tr>
</tbody>
</table>

**Innovation**

- **6 points**
- **Innovation in Design: To be determined**
- **Innovation in Design: To be determined**
- **Innovation in Design: To be determined**
- **Innovation in Design: To be determined**
- **LEED Accredited Professional**

**Regional Priority Credits - earn up to 4 points**

- **4 points**
- **Area code: 01605**
- **Regional Priority Credit: Renewable Energy Production (threshold: 2 points)**
- **Regional Priority Credit: Optimize Energy Performance (threshold: 8 points)**
- **Regional Priority Credit: Building-Life Cycle Impact Reduction (threshold: 2 points)**
- **Regional Priority Credit: Rainwater Management (threshold: 2 points)**
- **Regional Priority Credit: Cooling tower water use (threshold: 2 points)**
- **Regional Priority Credit: Indoor water use reduction (threshold: 4 points)**

**Project Totals (Certification Estimates)**

- **110 points**
- **Certified: 40-49 points, Silver: 50-59 points, Gold: 60-79 points, Platinum: 80+ points**
Memorandum
To: Rob Para, Lamoureux Pagano Architects
From: Christopher Schaffner, PE, LEED Fellow
Date: December 10, 2014
Re: Life Cycle Cost Analysis of Sustainable Design Options
Project: Nelson Place School

Several systems options that will have energy consumption impacts have been analyzed for the project. These include building envelope improvements, biomass heating, ground coupled heat pumps, as well as a conceptual study of the feasibility of roof-mounted Solar Photo-Voltaics. Following is a summary of each item, including estimated energy savings and simple payback.

1. **Envelope Improvements**

This analysis looks at the costs and benefits of using a “super insulated” building envelope and triple glazed windows, instead of the proposed stretch code compliant envelope and glazing. We have also investigated a mid-range “well insulated” option.

**Concept**

The current building design calls for high performance double glazed fenestration, and roof and wall construction that meets the requirements of the Massachusetts Stretch Energy Code. The project team is interested in understanding the impact of radically improving the envelope with “super insulation” and triple glazed windows, or alternatively incorporating the triple glazing, but including only minor additional improvements in insulation, to make a “well insulated” building.

**Assumptions**

Detail of Options - Baseline case is the current proposed building envelope system. Super Insulated case assumes a large increase in insulation and triple glazing. The Well Insulated case assumes triple glazing and a minor increase in insulation levels. The table below outlines the details.

<table>
<thead>
<tr>
<th></th>
<th>Baseline</th>
<th>“Well Insulated”</th>
<th>“Super Insulated”</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wall</strong></td>
<td>Assembly R-24</td>
<td>Assembly R-30</td>
<td>Assembly R-45</td>
</tr>
<tr>
<td><strong>Roofs</strong></td>
<td>Assembly R-38</td>
<td>Assembly R-45</td>
<td>Assembly R-60</td>
</tr>
<tr>
<td><strong>Windows</strong></td>
<td>Assembly U-0.5 SHGC-0.4 WWR-18.1%</td>
<td>U-0.22 SHGC-0.4 WWR-18.1%</td>
<td>U-0.22 SHGC-0.4 WWR-18.1%</td>
</tr>
</tbody>
</table>
All other facets of design are assumed to be per current design, and held equal in both baseline and “super insulated” case. Assumed Utility Rates – Electricity $0.145/kWh, Gas $1.10/therm

**Analysis**

Calculation Methodology - Options were compared using an eQuest energy model from a recent similar project (Mountview Middle School). Analysis is based on a year-round usage schedule. Indoor Design Conditions 75°F/50% RH cooling, 70°F heating.

**Projected First Cost Impact**

According to the most recent cost estimate, the added costs of the improved envelope are as follows:

**Well Insulated**
- Triple Glazing $172,000
- Total Add $172,000

**Super Insulated**
- Triple glazing $172,000
- R-60 Roof $250,000
- R-45 Walls $115,000
- Total Add $507,000

**Model Results and Projected Energy Savings**

The model results indicate percent savings in each end use as follows:

<table>
<thead>
<tr>
<th>End Use</th>
<th>Percent Saving Well Insulated</th>
<th>Percent Savings Super Insulated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lighting, Plug Loads, DHW, Exterior Lighting</td>
<td>0%</td>
<td>0%</td>
</tr>
<tr>
<td>Heating</td>
<td>31.2%</td>
<td>37.6%</td>
</tr>
<tr>
<td>Pumps</td>
<td>9.1 %</td>
<td>14.2 %</td>
</tr>
<tr>
<td>Fans</td>
<td>13.3%</td>
<td>15.9%</td>
</tr>
<tr>
<td>Cooling</td>
<td>1.9%</td>
<td>5.4%</td>
</tr>
<tr>
<td>Total Gas</td>
<td>27.4%</td>
<td>33.1%</td>
</tr>
<tr>
<td>Total Electric</td>
<td>3.2%</td>
<td>4.5%</td>
</tr>
<tr>
<td>Total Site Energy</td>
<td>13.8%</td>
<td>17.0%</td>
</tr>
</tbody>
</table>

Total energy savings is as follows:
## Other benefits and concerns

The “super insulated” envelope also results in reduced peak loads, which means that equipment sizes could be reduced, resulting in first cost savings. The model results show that the peak heating load is reduced by 10%, while the peak cooling load is only reduced by about 1%. This suggests that cooling system sizing is unaffected by the improved envelope but that the boiler and associated pumps and piping could be reduced slightly in size. Additionally, space load reductions result in about a 1.5% reduction in fan sizing. We estimate the value of the reduction in boiler and fan systems to be worth about $60,000 with the super insulation option.

With the well insulated envelope the peak heating load is reduced by 9%, while the peak cooling load and fan sizing is basically unchanged. We estimate the value of the reduction in boiler systems to be worth about $45,000 with the well insulated option.

### Financial Analysis

#### Super Insulated

- **Net First Cost Add** - $447,000
- **Annual Savings** - $14,000
- **Simple Payback** 31.9 years

The 17% energy use reduction also reduces the amount of renewables needed to achieve net zero. Assuming an installed cost of $4 per peak Watt for Solar PV, the “super insulation” option reduces the cost of achieving net zero by about $872,000. If this savings is included, the net first cost is actually reduced by $425,000, and the payback is instant.

#### Well Insulated

- **Net First Cost Add** - $127,000
- **Annual Savings** - $11,000
- **Simple Payback** 11.6 years

The 17% energy use reduction also reduces the amount of renewables needed to achieve net zero. Assuming an installed cost of $4 per peak Watt for Solar PV, the
“well insulated” option reduces the cost of achieving net zero by about $708,000. If this savings is included, the net first cost is actually reduced by $581,000, and the payback is instant.

**Recommendations**

From a financial perspective the improving the envelope beyond baseline is difficult to justify. However, in the context of targeting net zero site energy, upgrading the envelope becomes a key strategy, with an immediate return on investment. The “Well Insulated” captures much of the benefit of the “Super Insulation” option, but with a significantly lower first cost and ROI.

**2. BIOMASS HEATING**

This analysis looks at the costs and benefits of using a wood pellet (biomass) boiler, for heating instead of the proposed gas-fired condensing boiler.

**Concept**

As part of the effort to achieve net zero site energy, the project is seeking alternatives to fossil fuels for building heating.

Under this scenario, a biomass boiler, fueled by wood pellets, is used to provide heating hot water for the building. In addition to the biomass boiler, fuel storage space, and a conventional boiler stack would be required. All other portions of the building design are as per the current proposed design.

Biomass is considered a renewable fuel (depending on the source of the wood), and thus would drive the site energy required for heating to zero.

**Assumptions**

Detail of Options - Baseline case is the current proposed building, with gas-fired condensing (95% efficiency) boiler for hydronic heating. Proposed case replaces the gas-fired boiler with an 85% efficiency pellet boiler. Assumed capacity is 2750 MBH for both.

All other facets of design are assumed to be per current design, and held equal in both baseline and proposed case. Assumed Utility Rates – Electricity $0.145/kWh, Gas $1.10/therm, wood pellets $260/ton ($1.90/therm).

Domestic Hot Water is assumed to be provided by a gas-fired water heater in both cases.
Analysis

Calculation Methodology - Options were compared using eQuest energy model results from a recent similar project. Analysis is based on a year-round usage schedule. Indoor Design Conditions 75°F/50% RH cooling, 70°F heating.

Projected First Cost Impact

According to the most recent cost estimate, the added cost of the biomass boiler and related modifications is $590,000.

Projected Energy Savings

Total energy savings is as follows:

<table>
<thead>
<tr>
<th>Case</th>
<th>Gas Consumption (Therms)</th>
<th>Wood Consumption (Therms)</th>
<th>Electric Consumption (kWh)</th>
<th>Annual cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baseline</td>
<td>25,400</td>
<td>0</td>
<td>803,000</td>
<td>$144,000</td>
</tr>
<tr>
<td>Biomass</td>
<td>850</td>
<td>27,400</td>
<td>803,000</td>
<td>$169,000</td>
</tr>
<tr>
<td>Delta</td>
<td></td>
<td></td>
<td></td>
<td>$25,000 increase</td>
</tr>
</tbody>
</table>

Other benefits and concerns

It may be possible to use waste wood from urban tree trimming as a fuel source. This could potentially reduce the cost of fuel, but would require modifications to the boiler system. If biomass is seen as a viable option this should be investigated further as the design progresses.

Financial Analysis

Net First Cost Add - $590,000
Annual Cost Add - $25,000

From a financial perspective the biomass option does not appear to be a wise investment.

Recommendations

The biomass option only makes sense as a net zero strategy, and still may not be an attractive option. If there is interest, the possibility of freely available waste wood for fuel should be investigated further.
3. Solar Photovoltaics

We have performed a conceptual study of the expected life-cycle costs of a roof mounted solar photovoltaic (PV) system for the Nelson Place School. Following are a summary of our study and results.

Summary

A rooftop mounted solar PV array is considered for the Nelson Place School. The design team has determined that a 30,000 sf array is feasible, located on the roof of school. The system would produce about 405,000 kWh annually at a value of $58,700. Additionally the school could sell the SRECs generated for another $101,200 annually. The installed cost of the system would be about $1,200,000, resulting in a simple payback of 7.5 years.

Methodology

Assumed PV performance - 10watts (peak)/sf
Estimated Installation cost - $4/watt (peak) (does not include any third-party incentives)
Estimated Utility Rate - $0.145/kWh (Based EIA numbers for September 2013)
Estimated SREC price – $0.25/kWh

SRECs – In Massachusetts, a system generating solar electricity is also credited with Solar Renewable Energy Credits, or SRECs. These credits are traded on an auction market created by the State, and are purchased by the utilities in the State. SRECs vary in price between about $0.50/kWh and $0.25/kWh. We have used the most conservative number in our study.

System will be self-ballasted type, mounted at 42 Degrees above horizontal.

Annual output was calculated using the PV Watts program. A DC to AC Derate factor of 0.85 was used.

Results

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>System Area (sf)</td>
<td>30,000 sf</td>
</tr>
<tr>
<td>Peak Capacity (kW)</td>
<td>300.0 kWp</td>
</tr>
<tr>
<td>Estimated Annual Production (kWh)</td>
<td>405,000</td>
</tr>
<tr>
<td>Energy Value Generated ($)</td>
<td>$58,700</td>
</tr>
<tr>
<td>SREC Value Generated ($)</td>
<td>$101,200</td>
</tr>
<tr>
<td>Estimated Installed Cost ($)</td>
<td>$1,200,000</td>
</tr>
<tr>
<td>Simple Payback (years)</td>
<td>7.5 years</td>
</tr>
</tbody>
</table>

Discussion
A Power-purchase option (PPA) should also be considered. Under a PPA a third party owns the solar installation, and sells the generated electricity back to the school at a reduced rate. This option is attractive because the third-party can take advantage of tax incentives, which the school is not eligible for.

4. **GROUND – COUPLED HEAT PUMPS**

This analysis looks at the costs and benefits of using a closed loop ground coupled heat pump system, instead of the proposed conventional system.

**Concept**

Heating and cooling for the school provided by a ground-coupled heat pump system, instead of the conventional heating (gas fired boiler) and cooling (air-cooled chiller) that has been proposed.

System is sized for 220 tons cooling capacity, and equivalent heating capacity. Closed loop system, with vertical bore hole field, requiring approximately 35,000 square feet of site area. Due to space constraints, a horizontal well field cannot be implemented, as about 3.5 acres would be required for the borehole field.

**Assumptions**

Detail of Options - Baseline case is the current proposed HVAC system with gas-fired condensing boilers (92% AFUE) and air-cooled chillers (average EER=10.8). ECM case is a closed loop water-to-water heat pump system serving rooftop mounted air handling units (COP= 3.1, EER=16.4). Approximate cooling capacity is 220 tons, approximate heating capacity is 2,750 MBH. Assumed Utility Rates – Electricity $0.145/kWh, Gas $1.10/therm

**Analysis**

Calculation Methodology - Options were compared using equivalent full load hours methodology. Load profiles for heating and cooling are based on modeling results from a similar school located in the same climate zone. Analysis based on year-round schedule. Indoor Design Conditions 75°F/50% RH cooling, 70°F heating.

**Projected First Cost Impact**

According to the most recent cost estimate, the added cost to replace the boilers and chiller with ground-coupled heat pumps, including the borehole field, is $1.3 million.

**Projected energy savings**
<table>
<thead>
<tr>
<th>System</th>
<th>Gas Consumption (Therms)</th>
<th>Electric Consumption (kWh)</th>
<th>Annual cost ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Base</td>
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<td>488,900</td>
<td>$110,300</td>
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<tr>
<td>Ground-coupled Heat Pumps</td>
<td>0</td>
<td>659,400</td>
<td>$95,600</td>
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<tr>
<td>Delta</td>
<td></td>
<td></td>
<td>$14,700</td>
</tr>
</tbody>
</table>

**Other benefits and concerns**

Ground-coupled Heat Pumps present a unique situation in terms of maintenance. Open loop systems are notoriously unreliable and maintenance intensive, but closed loop systems will typically compare to other HVAC systems of similar capacity in terms of maintenance.

When we convert to GCHP, the building becomes all-electric, which reduces our total energy consumption and PV needed meet Net Zero. However, because natural gas prices are low relative to electricity prices, the energy cost savings are not significant.

**Recommendations**

Due to the relatively low cost of natural gas, the savings shown by the GCHP system do not appear to be enough to justify the additional cost (Simple Payback is 90+ years).

However two factors suggest we should look a bit more closely.

1) The GCHP option allows a complete elimination of fossil fuel use, and reduces site (but not source) energy consumption significantly. As the project seeks to achieve net zero site energy, the GCHP option will allow a reduction in the necessary renewable energy generation required to achieve this goal.

2) In our experience the cost estimate for the GCHP system is very high. We typically see pricing in the $6000/borehole range, which would result in a cost delta close to $550,000, less than half of what is carried in the current estimate.
4.1.2 SCHEMATIC DESIGN BINDER

J. LEED-S
   1. LEED Certification
   2. LEED for Schools V4 Scorecard
This is an acknowledgement that the Worcester Public School District has identified a goal of 2% additional reimbursement from the MSBA High Efficiency Green School Program. As their Designer, I have submitted a completed LEED for Schools v4 scorecard showing a minimum of fifty (50) attempted points, which will meet that goal.

This is also to certify that the building specifications, drawings and cost estimates provided with this Schematic Design Submittal include systems described in the attached LEED v4 scorecard.

A completed LEED scorecard is included on the following pages, and a narrative of the sustainable design approach and LEED milestones can be found in section 4.1.2 I. Narrative Building Systems.

Rob R. Para Jr., AIA
Lamoureux Pagano Associates Architects
## LEED for Schools v4
### Project Scorecard

**Project Name:** Nelson Place Elementary School  
**Project Address:** 35 Nelson Place, Worcester, Massachusetts 01605  
**Date Updated:** November 21, 2014

<table>
<thead>
<tr>
<th>Phase</th>
<th>Yes</th>
<th>No</th>
<th><strong>Targeted LEED Rating:</strong> Silver</th>
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</thead>
<tbody>
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<td>0</td>
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</table>

### Integrative Process

<table>
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</tr>
</thead>
<tbody>
<tr>
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<td>1</td>
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</tbody>
</table>

### Location & Transportation

<table>
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<tr>
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<th>No</th>
<th><strong>Location &amp; Transportation</strong></th>
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</thead>
<tbody>
<tr>
<td></td>
<td>D</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

- LEED for Neighborhood Development Location: 15
- Sensitive Land Protection: 1
- High Priority Site: 2
- Surrounding Density and Diverse Uses: 5
- Access to Quality Transit: 4
- Bicycle Facilities: 1
- Reduced Parking Footprint: 1
- Green Vehicles: 1

### Sustainable Sites

<table>
<thead>
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<th>Phase</th>
<th>Yes</th>
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<th><strong>Sustainable Sites</strong></th>
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</thead>
<tbody>
<tr>
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<td>Y</td>
<td>8</td>
</tr>
</tbody>
</table>

- Construction Activity Pollution Prevention: Required
- Environmental Site Assessment: Required
- Site Assessment: 1
- Site Development - Protect or Restore Habitat: 2
- Open Space: 1
- Rainwater Management: 3
- Heat Island Reduction: 2
- Light Pollution Reduction: 1
- Site Master Plan: 1
- Joint Use of Facilities: 1

### Water Efficiency

<table>
<thead>
<tr>
<th>Phase</th>
<th>Yes</th>
<th>No</th>
<th><strong>Water Efficiency</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>D</td>
<td>5</td>
<td>2</td>
</tr>
</tbody>
</table>

- Outdoor Water Use Reduction: Required
- Indoor Water Use Reduction: Required
- Building-level Water Metering: Required
- Outdoor Water Use Reduction: 2
- Indoor Water Use Reduction: 7
- Cooling Tower Water Use: 2
- Water Metering: 1

---

*Phase:

*Date Updated:

*Project Address:

*Project Name:* Nelson Place Elementary School
### Energy & Atmosphere

<table>
<thead>
<tr>
<th>Yes</th>
<th>?</th>
<th>No</th>
<th><strong>152</strong></th>
</tr>
</thead>
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#### Fundamental Commissioning and Verification
- **Required**

#### Minimum Energy Performance
- **Required**

#### Building-level Energy Metering
- **Required**

#### Fundamental Refrigerant Management
- **Required**

<table>
<thead>
<tr>
<th>C</th>
<th>5</th>
<th>1</th>
<th>Enhanced Commissioning</th>
</tr>
</thead>
<tbody>
<tr>
<td>D</td>
<td>16</td>
<td></td>
<td><strong>Optimize Energy Performance</strong></td>
</tr>
<tr>
<td></td>
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<td>6% Improvement in Energy Performance</td>
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<td>12% Improvement in Energy Performance</td>
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<td>10% Renewable Energy</td>
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#### Materials & Resources

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#### Storage & Collection of Recyclables
- **Required**

#### Construction and Demolition Waste Management Planning
- **Required**

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<thead>
<tr>
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<th><strong>Building Life-cycle Impact Reduction</strong></th>
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<td></td>
<td><strong>Building Product Disclosure and Optimization - Environmental Product Declarations</strong></td>
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<tr>
<td>C</td>
<td>2</td>
<td></td>
<td><strong>Building Product Disclosure and Optimization - Sourcing of Raw Materials</strong></td>
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<tr>
<td>C</td>
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<td></td>
<td><strong>Building Product Disclosure and Optimization - Material Ingredients</strong></td>
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</table>

#### Construction and Demolition Waste Management
- **Required**

#### Indoor Environmental Quality

<table>
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<tr>
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<th>No</th>
<th><strong>19</strong></th>
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</table>

#### Minimum IAQ Performance
- **Required**

#### Environmental Tobacco Smoke (ETS) Control
- **Required**

#### Minimum Acoustical Performance
- **Required**

#### Enhanced IAQ Strategies
- **Required**

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<thead>
<tr>
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<th><strong>Low-Emitting Materials</strong></th>
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<td>Three of seven compliant categories</td>
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<td>Five of seven compliant categories</td>
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<tr>
<td></td>
<td></td>
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<tr>
<td>Level</td>
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<td>Score</td>
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<td>C 2</td>
<td>IAQ Assessment</td>
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<td>Thermal Comfort</td>
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<td>D 2</td>
<td>Interior Lighting</td>
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<td>D 1</td>
<td>Quality Views</td>
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<td>D 1</td>
<td>Acoustic Performance</td>
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<td><strong>Innovation</strong></td>
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<td>D 1</td>
<td>Innovation in Design: To be determined</td>
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<td>LEED Accredited Professional</td>
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<td><strong>Regional Priority Credits - earn up to 4 points</strong></td>
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<tr>
<td>1</td>
<td>Regional Priority Credit: Renewable Energy Production (threshold: 2 points)</td>
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</tr>
<tr>
<td>1</td>
<td>Regional Priority Credit: Optimize Energy Performance (threshold: 8 points)</td>
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<td></td>
</tr>
<tr>
<td>1</td>
<td>Regional Priority Credit: Building-Life Cycle Impact Reduction (threshold: 2 points)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Regional Priority Credit: Rainwater Management (threshold: 2 points)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Regional Priority Credit: Cooling tower water use (threshold: 2 points)</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Regional Priority Credit: Indoor water use reduction (threshold: 4 points)</td>
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<td></td>
</tr>
<tr>
<td></td>
<td><strong>Project Totals (Certification Estimates)</strong></td>
<td><strong>110</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Certified: 40-49 points, Silver: 50-59 points, Gold: 60-79 points, Platinum: 80+ points</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
4.1.2 SCHEMATIC DESIGN BINDER

K. ADA – AAB Compliance
The proposed Nelson Place Elementary School, as new construction, is required to comply fully with the Rules and Regulations of 521 CMR: Architectural Access Board. This is an acknowledgement that the proposed design is in accordance with those requirements; and also complies with ADA Standards for Accessibility (unless superseded by MA-AAB rules and regulations).

Also attached is a diagram of the proposed site, highlighting the accessible routes (with slope less than 5%).

Robert Para Jr., AIA
Lamoureux Pagano Associates Architects
4.1.2 SCHEMATIC DESIGN BINDER

L. Room Data Sheets
Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605
MSBA Schematic Design
Room Data Sheets
December 11, 2014

MSBA
Massachusetts School Building Authority
40 Broad Street, Suite 500, Boston, MA 02111

OWNER
City of Worcester, MA
Architectural Services Division
50 Skyline Drive, Worcester, MA 01605

OPM
Tishman Construction Corporation of Massachusetts
An AECOM Co.
66 Long Wharf, 2nd Floor, Boston, MA 02110

DESIGNER
Lamoureaux Pagano & Associates, Inc.
108 Grove Street, Suite 300, Worcester, MA 01605

Prepared by:

LAMOUREUX · PAGANO
ARCHITECTS  PROJECT MANAGERS
## Room Data Sheets

<table>
<thead>
<tr>
<th>Number</th>
<th>Room Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Millwork Key</td>
</tr>
<tr>
<td>1</td>
<td>General Classroom</td>
</tr>
<tr>
<td>a.</td>
<td>Grades 1-2</td>
</tr>
<tr>
<td>b.</td>
<td>Grades 3-6</td>
</tr>
<tr>
<td>2</td>
<td>Kindergarten Classroom</td>
</tr>
<tr>
<td>3</td>
<td>Self-Contained SPED Kindergarten Classroom Suite</td>
</tr>
<tr>
<td>4</td>
<td>Self-Contained SPED - Pre-Kindergarten Classroom Suite</td>
</tr>
<tr>
<td>5</td>
<td>Self-Contained SPED Classroom-Grades 1 to 6</td>
</tr>
<tr>
<td>6</td>
<td>Therapeutic Planning</td>
</tr>
<tr>
<td>7</td>
<td>OT/PT</td>
</tr>
<tr>
<td>8</td>
<td>Speech</td>
</tr>
<tr>
<td>9</td>
<td>Early Childhood Assessment Center</td>
</tr>
<tr>
<td>10</td>
<td>Small Group Room/Learning Lab</td>
</tr>
<tr>
<td>11</td>
<td>Teacher Planning</td>
</tr>
<tr>
<td>12</td>
<td>Computer Lab</td>
</tr>
<tr>
<td>13</td>
<td>Science Lab</td>
</tr>
<tr>
<td>14</td>
<td>Art Classroom</td>
</tr>
<tr>
<td>15</td>
<td>Art Storage Room</td>
</tr>
<tr>
<td>16</td>
<td>Music Classroom</td>
</tr>
<tr>
<td>17</td>
<td>Musical Instrument Storage</td>
</tr>
<tr>
<td>18</td>
<td>Gymnasium</td>
</tr>
<tr>
<td>19</td>
<td>Gym Teacher’s Office</td>
</tr>
<tr>
<td>20</td>
<td>Medical Suite</td>
</tr>
<tr>
<td>21</td>
<td>Media Center/Reading Room</td>
</tr>
<tr>
<td>22</td>
<td>Cafeteria</td>
</tr>
<tr>
<td>23</td>
<td>Stage</td>
</tr>
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<td>24</td>
<td>Staff Dining</td>
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<tr>
<td>25</td>
<td>Main Administration Suite</td>
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<tr>
<td>26</td>
<td>Satellite Administration Suite</td>
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<tr>
<td>27</td>
<td>Maintenance Suite</td>
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<tr>
<td>28</td>
<td>Janitor Closet</td>
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<tr>
<td>29</td>
<td>Observation</td>
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<tr>
<td>30</td>
<td>Common</td>
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</table>
Millwork Key

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 meetings with District staff/faculty and consultants to determine the most appropriate elements for the Pre-Kindergarten through Grade 6 educational program needs.

The following key describes typical millwork components shown within this document:

<table>
<thead>
<tr>
<th></th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>M1</td>
<td>48”w x 84”h lockable teacher wardrobe with clothes pole and 5 shelves for storage</td>
</tr>
<tr>
<td>M2</td>
<td>48”w x 84”h supply cabinet with lockable doors, center divider and 5 adjustable shelves</td>
</tr>
<tr>
<td>M3</td>
<td>36”h base cabinet with drawers and doors and plastic laminate counter top and backsplash</td>
</tr>
<tr>
<td>M3A</td>
<td>26”h base cabinet with drawers and doors and plastic laminate counter top and backsplash</td>
</tr>
<tr>
<td>M4</td>
<td>32” high open shelving unit with plastic laminate counter/backsplash, pencil grille at base and top</td>
</tr>
<tr>
<td>M4A</td>
<td>32” high shelving unit with doors, with plastic laminate counter/backsplash, pencil grille at base and top</td>
</tr>
<tr>
<td>M5</td>
<td>Plastic laminate adjustable shelving on heavy duty brackets and standards with vertical every 36”, 4” high base, and plastic laminate cap</td>
</tr>
<tr>
<td>M6</td>
<td>36”h base cabinet with doors and drawers and plastic laminate counter top and backsplash</td>
</tr>
<tr>
<td>M7</td>
<td>30”d x 48” w x 84” high open paper shelving unit with (8) adjustable shelves</td>
</tr>
<tr>
<td>M8</td>
<td>Not used</td>
</tr>
<tr>
<td>M9</td>
<td>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</td>
</tr>
<tr>
<td>M10</td>
<td>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</td>
</tr>
<tr>
<td>M11</td>
<td>36”h base cabinet with doors and drawers, epoxy counter and backsplash @ art rooms and solid surface counter and backsplash at administration areas</td>
</tr>
<tr>
<td>M12</td>
<td>36”h ADA compliant base cabinets and plastic laminate counter and backsplash</td>
</tr>
<tr>
<td>M13</td>
<td>Coat and backpack cubby units: 48”h x 18” d open storage unit with tiled bench at 18” high (open boot storage below bench) and 2 rows of heavy duty coat hooks above; vertical dividers at 36”; 4” h base. 36” high storage cabinets with tackboard doors above cubby units</td>
</tr>
</tbody>
</table>
1.A General Classroom: Grades 1 & 2

**GENERAL CRITERIA**
Description: Typical classroom intended to support variety of teaching methods for Grades 1 -2.
Provisions for a teacher and one aide per classroom.

Area: 950 sf
Quantity: 6
Users:
- 25 Students
- 1 Teacher
- 1 Aide
Adjacencies:
- Primary Classroom Cluster
- Learning Lab
- Central Storage
Near:
Primary support spaces
Toilet rooms

Orientation/Views:

**MILLWORK/CASEWORK**
Millwork:
- M1 – Teacher wardrobe
- M2 – Storage unit
- M3 – base/wall cab. Unit with sink
- M4 – under window shelving cabinet
- M13 - Built-in cubbies with storage cabinets above
- Standard height countertops.

**SPECIALTIES**
Visual Display boards/Accessories:
- (1) Eno short throw projector
- (1) Interactive Display Board
- (1) Elmo and tech cart
- (1) 8’ Magnetic markerboard
- (4) 4’ magnetic markerboards
- Maximize display space

Window Treatments:
- Woven fabric translucent shades

Miscellaneous:
Communicating doors
TECHNICAL CRITERIA

Finish Hardware:
- Classroom function
- Vision lite in door
- Screens at operable windows

Architectural Finishes:
- Floor: Linoleum
- Base: 4" resilient vinyl
- Walls: GWB; painted
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating between general classrooms and adjacent spaces: 50-52

Plumbing:
- Accessible sink with hot/cold water and integral drinking fountain

Mechanical:
- Air Conditioning

Lighting:
- (6) 8 ft. pendant mounted dimmable Dali controlled LED fixtures with (2) combination occupancy/daylight sensors
- ON/OFF controls at the door and multi-scene controls at the front of the classroom

Electrical:
- (4) general duplex receptacles
- (1) GFCI receptacle at counter sink area; (2) duplex receptacles at counters
- (1) quad receptacle for projector
- (2) quad receptacles, for teacher workstation
- (2) quad receptacles for student computers
- (1) single outlet for speech reinforcement amplifier

Data/Communication:
- (2) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstations
- (5) hardwired voice/data outlet (2 data ports) for student computer stations
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for wireless access point
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) speech reinforcement system
- (1) connection for speech reinforcement system

Public Address/Clock:
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speaker

Fire Alarm:
- 75 candela audiovisual device
Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

4.1.2 SCHEMATIC DESIGN BINDER

SCHEMATIC DESIGN
L. Room Data Sheets-General Classroom Grades 1&2

FIXTURES, FURNITURE & EQUIPMENT
(FF&E NOT IN G.C. CONTRACT)

Fixtures:
- Paper towel dispenser
- Soap dispenser

Furniture:
- (1) teacher desk and chair
- (1) Adjustable height table attachment to teacher desk
- (1) Aide chair
- (25) flat top student desks with storage and (25) chairs
- (1) Table and chairs to seat (6) students and teacher
- (1) Horseshoe table to seat (6) students and teacher
- (2) 6’ tables and (4) chairs for computer workstations.

Equipment:
- (1) Eno interactive short-throw projector
- (1) Interactive display board
- (1) Elmo and tech. cart
- (1) Teacher computer station
- (4) Student computer stations
- (1) Flexcat interactive audio system

OTHER INFORMATION

- Communicating doors between classrooms are beneficial
- Common areas or neighborhoods will connect each grade level. Each neighborhood may be equipped with white boards, projector, tables and chairs
- Centralized storage for each classroom wing

NOTES:

- Area rug provided by owner
- School administration and teachers expressed interest in sound system Flexcat manufactured by Lightspeed
  http://www.lightspeed-tek.com/products/flexcat/

Worcester Public Schools
Worcester, MA

LAMoureux-Pagano
Architects Project Managers
1.B General Classroom: Grades 3-6

**GENERAL CRITERIA**
Description: Typical classroom intended to support variety of teaching methods for Grades 3-6. Provisions for a teacher and one aide per classroom.

Area: 950 sf  
Quantity: 12  
Users:  
- 25 Students  
- 1 Teacher  
- 1 Aide  
Adjacencies:  
- Intermediate Classroom Cluster  
- Learning Labs  
- Central Storage  
- Half-height lockers located in adjacent corridor. Will have hasp if locks are desired in future.

**MILLWORK/CASEWORK**
Millwork:  
- M1 – Teacher wardrobe  
- M2 – Storage unit  
- M3 – Base/wall cab. Unit  
- M4 – under window shelving cabinet  
- Countertops at standard height.

**SPECIALTIES**
Visual Display boards/Accessories:  
- (1) Eno short throw projector  
- (1) Interactive Display Board  
- (1) Elmo and tech cart  
- (1) 8’ Magnetic markerboard  
- (4) 4’ Magnetic markerboards  
- Maximize display space  
Window Treatments:  
- Woven fabric translucent shades  
Miscellaneous:  
- Communicating doors
TECHNICAL CRITERIA

Finish Hardware:
- Classroom function
- Side lite or vision lite in door
- Screens at operable windows

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient Vinyl
- Walls: GWB; Painted
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating between general classrooms and adjacent spaces: 50-52

Plumbing:
- Accessible sink with hot/cold water with integral drinking fountain

Mechanical:
- Air Conditioning

Lighting:
- (6) 8 ft. pendant mounted dimmable Dali controlled LED fixtures with (2) combination occupancy/daylight sensors
- ON/OFF controls at the door and multi-scene controls at the front of the classroom

Electrical:
- (4) general duplex receptacles
- (1) GFCI receptacle at counter sink area; (2) duplex receptacles at counters
- (1) quad receptacle for projector
- (2) quad receptacles for teacher workstation
- (2) quad receptacles for student computers
- (1) single outlet for speech reinforcement amplifier

Data/Communication:
- (2) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstations
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for wireless access point
- (2) hardwired data outlet (2 data ports) for student computers
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) speech reinforcement system
- (1) connection for speech reinforcement system

Public Address/Clock:
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speaker

Fire Alarm:
- 75 candela audiovisual device
SCHEMATIC DESIGN

L. Room Data Sheets-General Classroom: Grades 3-6

FIXTURES, FURNITURE & EQUIPMENT:
(FF&E NOT IN G.C. CONTRACT)

Fixtures:
- Paper towel dispenser
- Soap dispenser

Furniture:
- (1) Teacher desk and chair
- (1) Adjustable height table attachment to teacher desk
- (25) Individual flat top student desks (with storage) and chairs. Beneficial if desks can hook together to make larger tables.
- (3) tables; one each: 3’ round, 3’ horseshoe, 3’ square and (16) chairs
- (2) 6’ tables and (4) chairs for student computer workstations.
- Furniture on wheels wherever possible

OTHER INFORMATION

- Communicating doors between classrooms are preferred. Grades 4-6 change classrooms, communicating doors will help facilitate this.

- Common areas or neighborhoods will connect each grade level. Each neighborhood may be equipped with white boards, projector, tables and chairs

- Centralized storage for each classroom wing

Equipment:
- (1) Eno interactive short-throw projector
- (1) Interactive display board
- (1) Elmo and tech. cart
- (1) Teacher computer station
- (4) Student computer stations
- (1) Flexcat interactive audio system

NOTES:

- School administration and teachers expressed interest in sound system Flexcat manufactured by Lightspeed
  http://www.lightspeed-tek.com/products/flexcat/

Worcester Public Schools
Worcester, MA
2. Kindergarten Classroom Suite

**GENERAL CRITERIA**
Description: Early Childhood Education classroom intended to support variety of teaching methods for Kindergarten.
Three of the Kindergarten classes will serve as partial-inclusion general classrooms.

Area: 1,200 sf
Quantity: 3

Users:
- 25 Students
- 1 Teacher
- 1 Aide

Adjacencies:
- Primary classroom cluster
- Direct adjacency to toilet rooms

Orientation/Views:

**MILLWORK/CASEWORK**
Millwork:
- M1 – Teacher wardrobe
- M2 – Storage unit
- M3 – base/wall cab. Unit
- M3A – low base/wall cab. Unit
- M4A – under window shelving cabinet
- M13 – Cubbies
- Countertops at child height

**SPECIALTIES**
Visual Display boards/Accessories:
- (1) Eno short throw projector
- (1) Interactive Display Board
- (1) Elmo and tech cart
- (3) 8’ Magnetic markerboards
- (1) 4’ Magnetic markerboard
- Maximize display space

Window Treatments:
- Woven fabric translucent shades

Miscellaneous:
SCHEMATIC DESIGN

TECHNICAL CRITERIA

Finish Hardware:
- Classroom lockset
- Door closer
- Screens at operable windows

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient Vinyl
- Walls: GWB; Painted
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Kindergarten classrooms and adjacent spaces: 50-52

Plumbing:
- (1) Accessible sink with hot/cold water and integral drinking fountain at child height. Push control faucet for ease of use
- (1) Standard height sink for teacher

Mechanical:
- Air Conditioning

Lighting:
- (6) 8 ft. pendant mounted dimmable Dali controlled LED fixtures with (2) combination occupancy/daylight sensors
- ON/OFF controls at the door and multi-scene controls at the front of the classroom

Electrical:
- (4) general duplex receptacles
- (1) GFCI receptacle at counter sink area; (2) duplex receptacles at counters
- (1) quad receptacle for projector
- (1) quad receptacles for teacher workstation
- (2) quad receptacles for student computers
- (1) single outlet for speech reinforcement amplifier

Data/Communication:
- (1) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstation
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for wireless access point
- (2) hardwired data outlet (2 data ports) for student computers
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) speech reinforcement system
- (1) connection for speech reinforcement system

Public Address/Clock:
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speaker

Fire Alarm:
- 75 candela audiovisual device
Nelson Place Elementary School  
35 Nelson Place, Worcester, MA 01605

SCHMATIC DESIGN  
L. Room Data Sheets- Kindergarten Classrooms

FIXTURES, FURNITURE & EQUIPMENT:  
(FF&E NOT IN G.C. CONTRACT)

Fixtures:
- (4) Paper towel dispensers
- (4) Soap dispensers
- (1) Changing station with storage

Furniture:
- (1) teacher desk and chair
- (1) Adjustable height table attachment for teacher desk
- (1) Aide Chair
- (6) Rectangular or square tables to seat (4-5) students each
- (1) Activity table with chairs for (5) students and teacher
- (1) Horseshoe table with chairs for (5) students and teacher
- (2) 6’ tables and (4) chairs for computer workstations.
- (3) Rolling carts for storage of manipulatives

Equipment:
- (1) Eno interactive short-throw projector
- (1) Interactive Display board
- (1) Elmo and tech cart
- (1) Flexcat interactive audio system
- (4) Student computer stations
- (1) Teacher computer station

OTHER INFORMATION
- Common areas or neighborhoods will connect each grade level. Each neighborhood might have white boards, tables and chairs an Elmo.
- Teachers prefer “centers” for specific activities, i.e. House Center” “Block Area” around the perimeter of the classroom

NOTES:
- Area rug provided by owner
- School administration and teachers expressed Interest in sound system Flexcat manufactured by Lightspeed  
  http://www.lightspeed-tek.com/products/flexcat/
3. Self-Contained SPED Kindergarten Classroom Suite

**GENERAL CRITERIA**

Description:
Early Childhood Education classroom intended to support variety of teaching methods for Kindergarten.

One Kindergarten classroom will serve as a substantially separate SPED classroom.

Direct adjacency to toilet rooms with changing area, therapeutic planning and discrete observation space. Observation space requires discrete observation window to adjacent classroom(s), with furniture to support parent meetings and observation note taking. Corridor access beneficial.

Area: 1,200 sf  
Quantity: 1

Users:
- 15-16 Students  
- 1 Teacher

**MILLWORK/CASEWORK**

Millwork:
- M1 – Teacher wardrobe  
- M2 – Storage unit  
- M3 – base/wall cab. Unit  
- M3A – low base/wall cab. Unit  
- M4A – low under window shelving cabinet with doors  
- M13 – cubbies with cabinets above  
- Countertops at child height

**SPECIALTIES**

Visual Display boards/Accessories:
- (1) En o short throw projector  
- (1) Interactive Display Board  
- (1) Elmo and tech cart  
- (2) 8’ Magnetic markerboards  
- (2) 4’ Magnetic markerboards

Window Treatments:
- Woven fabric translucent shades

Miscellaneous:
SCHEMATIC DESIGN

- 2-4 Aides

Adjacencies:
- Primary Classroom Cluster
- Therapeutic Planning
- Discrete observation area

Orientation/Views:
- 

TECHNICAL CRITERIA

Finish Hardware:
- Classroom lockset
- Door closer
- Screens at operable windows
- Dutch doors at all student toilet rooms

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient Vinyl
- Walls: GWB; Painted
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between SPED Kindergarten classroom and adjacent spaces: 50-52

Plumbing:
- (1) Accessible sink with hot/cold water and integral drinking fountain at child height. Push control faucet for ease of use
- (1) Standard height sink for teacher

Mechanical:
- Air Conditioning

Lighting:
- (6) 8 ft. pendant mounted dimmable Dali controlled LED fixtures with (2) combination occupancy/daylight sensors
- ON/OFF controls at the door and multi-scene controls at the front of the classroom

Electrical:
- (4) general duplex receptacles
- (1) GFCI receptacle at counter sink area; (2) duplex receptacles at counters
- (1) quad receptacle for projector
- (1) quad receptacles for teacher workstation
- (2) quad receptacles for student computers
- (1) single outlet for speech reinforcement amplifier

Data/Communication:
- (1) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstation
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for wireless access point
- (2) hardwired data outlet (2 data ports) for student computers
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) speech reinforcement system
- (1) connection for speech reinforcement system

Public Address/Clock:
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speaker

Fire Alarm:
- 75 candela audiovisual device
FIXTURES, FURNITURE & EQUIPMENT: (FF&E NOT IN G.C. CONTRACT)

Fixtures:
- (4) Paper towel dispensers
- (4) Soap dispensers
- (1) Changing station with storage

Furniture:
- (1) teacher desk and chair
- (1) Adjustable height table attachment for teacher desk
- (2-4) Rolling chairs for Aides
- (1) Adjustable height table attachment for teacher desk
- (4) Rectangular or square tables to seat (4-5) students each
- (1) Activity table with chairs for (5) students and teacher
- (1) Horseshoe table with chairs for (5) students and teacher
- (3) Modular cubbies with 6’ partitions for discrete trials, with table for (1) student chair and (1) teacher chair
- (2) 6’ tables and (4) chairs for student computer workstations.
- (1) 30” dia. table and (3) chairs for observation room.
- (3) Rolling carts for storage of manipulatives

OTHER INFORMATION
- Common areas or neighborhoods will connect each grade level. Each neighborhood might have white boards, tables, chairs and Elmo
- Teachers prefer “centers” for specific activities, i.e. House Center “Block Area” around the perimeter of the classroom

NOTES:
- Area rug provided by owner
- School administration and teachers expressed Interest in sound system Flexcat manufactured by Lightspeed
  http://www.lightspeed-tek.com/products/flexcat/
4. Self-Contained SPED Pre-K Classroom Suite

**GENERAL CRITERIA**

Description:
Early Childhood Education classroom intended to support variety of teaching methods for Pre-Kindergarten and Kindergarten.

All three Pre-K classrooms will serve as a Self-Contained SPED classroom.

Direct adjacency to toilet rooms with changing area, therapeutic planning and discrete observation space. Observation space requires discrete observation window to adjacent classroom(s), with furniture to support parent meetings and observation note taking. Corridor access beneficial.

Area: 1,200 sf
Quantity: 3

**MILLWORK/CASEWORK**

Millwork:
- M1 – Teacher wardrobe
- M2 – Storage unit
- M3 – base/wall cab. Unit
- M3A – low base/wall cab. Unit
- M4 – under window shelving cabinet with doors
- M13 – cubbies with cabinets above
- Countertops at child height

**SPECIALTIES**

Visual Display boards/Accessories:
- (1) Eno short throw projector
- (1) Interactive Display Board
- (1) Elmo and tech cart
- (2) 8’ Magnetic markerboards
- (2) 4’ Magnetic markerboards

Window Treatments:

Pre-K Classroom with individual toilet and observation room.
SCHEMATIC DESIGN

Users:
- 15-16 Students
- 1 Teacher
- 2-4 Aides

Adjacencies:
- Primary Classroom Cluster
- Pre-K drop off/Pick-up area
- Therapeutic Planning
- Discrete observation area

Orientation/Views:

Miscellaneous:
- Woven fabric translucent shades
**TECHNICAL CRITERIA**

**Finish Hardware:**
- Classroom lockset
- Door closer
- Screens at operable windows
- Dutch doors at all student toilet rooms

**Architectural Finishes:**
- Floor: Linoleum
- Base: 4” Vinyl
- Walls: GWB, Painted
- Ceiling: ACT

**Acoustical Requirements:**
- Sound Transmission Coefficient (STC) rating at partitions between SPED Pre-K classroom and adjacent spaces: 50-52

**Plumbing:**
- (1) Accessible sink with hot/cold water and integral drinking fountain at child height. Push control faucet for ease of use
- (1) Standard height sink for teacher

**Mechanical:**
- Air Conditioning

**Lighting:**
- (6) 8 ft. pendant mounted dimmable Dali controlled LED fixtures with (2) combination occupancy/daylight sensors
- ON/OFF controls at the door and multi-scene controls at the front of the classroom

**Electrical:**
- (4) general duplex receptacles
- (1) GFCI receptacle at counter sink area; (2) duplex receptacles at counters
- (1) quad receptacle for projector
- (1) quad receptacles for teacher workstation
- (2) quad receptacles for student computers
- (1) single outlet for speech reinforcement amplifier

**Data/Communication:**
- (1) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstation
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for wireless access point
- (2) hardwired data outlet (2 data ports) for student computers
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) speech reinforcement system
- (1) connection for speech reinforcement system

**Public Address/Clock:**
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speaker

**Fire Alarm:**
- 75 candela audiovisual device
Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

4.1.2 SCHEMATIC DESIGN BINDER
L. Room Data Sheets-Self Contained SPED Pre-K Classroom Suite

FIXTURES, FURNITURE & EQUIPMENT:
(FF&E NOT IN G.C. CONTRACT)

Fixtures:
- (4) Paper towel dispensers
- (4) Soap dispensers
- (1) Changing table with storage

Furniture:
- (1) teacher desk and chair
- (1) Adjustable height table attachment for teacher desk
- (2-4) Rolling chairs for Aides
- (4) Rectangular or square tables to seat 4-6 students
- (1) 3’ round table to seat (4-6) students and teacher
- (1) horseshoe table to seat (4-6) students and teacher
- (3) Modular cubbies with 6’ partitions for discrete trials, with table for (1) student chair and (1) teacher chair
- (2) 6’ tables and (4) chairs for student computer workstations.
- (1) 30” dia. table and 3 chairs for observation room.
- (3) Rolling carts for manipulatives

Equipment:
- (1) Eno interactive short-throw projector
- (1) Interactive Display board
- (1) Elmo and tech cart
- (1) Flexcat interactive audio system
- (4) Student computer stations
- (1) teacher computer station

OTHER INFORMATION
- Common areas or neighborhoods will connect each grade level. Each neighborhood might have white boards, tables, chairs and Elmo
- Teachers prefer “centers” for specific activities, i.e. House Center “Block Area” around the perimeter of the classroom

NOTES:
- Area rug provided by owner
- School administration and teachers expressed Interest in sound system Flexcat manufactured by Lightspeed
  http://www.lightspeed-tek.com/products/flexcat/
5. Self-Contained SPED Classroom

**GENERAL CRITERIA**
Description:
Each grade level “neighborhood” includes one self-contained SPED classroom, which will be equipped to serve students enrolled in the substantially separate SAIL program.

Direct adjacency to toilet rooms with changing area, Therapeutic Planning and discrete observation space. Observation space requires discrete observation window to adjacent classroom(s), with furniture to support parent meetings and observation note taking. Corridor access beneficial.

Grades 3-6 dedicated SPED toilets require adequate space for wheelchair accessibility, (1) 25” x 72” adjustable height changing table, and space for a

**MILLWORK/CASEWORK**
Millwork:
- M1 – Teacher wardrobe
- M1 – Wardrobe for aides
- M2 – Storage unit
- M3 – base/wall cab. Unit
- M4 – Under window cabinets with doors
- M13 – Cubbies for grades 1 & 2, lockers in corridors for grades 3-6

**SPECIALTIES**
Visual Display boards/Accessories:
- (1) Interactive Display Board
- (1) Eno short throw projector
- (1) Elmo and tech cart
- (2) 8’ Magnetic markerboards
- (2) 4’ Magnetic markerboards
mechanical lift to operate. Per OSHA guidelines a lift
must be used to lift any child over 50 lbs.

Area: 1,200 SF
Quantity: 6

Users:
• 15-16 Students
• 1 Teacher
• 3-5 Aides

Adjacencies:
• Direct access to Therapeutic Planning,
  Discrete observation space, and dedicated
  toilet with changing area.
• Close to emergency exit

Orientation/Views:

Window Treatments:
• Woven fabric translucent shades

Miscellaneous:
TECHNICAL CRITERIA

Finish Hardware:
- Classroom lockset
- Door closer
- Screens at operable windows

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient Vinyl
- Walls: Abuse resistant with acoustical panels
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Self Contained SPED classrooms and adjacent spaces: 50-52
- Sound absorbing panels on walls

Plumbing:
- Accessible sink with hot/cold water and integral drinking fountain. Push control faucet for ease of use
- Adjacent to one dedicated SAIL toilet room with space for diaper changing and storage as required

Mechanical:
- Air Conditioning

Lighting:
- (6) 8 ft. pendant mounted dimmable Dali controlled LED fixtures with (2) combination occupancy/daylight sensors
- ON/OFF controls at the door and multi-scene controls at the front of the classroom

Electrical:
- (4) general duplex receptacles
- (1) GFCI receptacle at counter sink area; (2) duplex receptacles at counters
- (1) quad receptacle for projector
- (1) quad receptacles for teacher workstation
- (2) quad receptacles for student computers
- (1) single outlet for speech reinforcement amplifier
- Electrical requirements for Hoyer Lift

Data/Communication:
- (1) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstation
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for wireless access point
- (2) hardwired data outlet (2 data ports) for student computers
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) speech reinforcement system
- (1) connection for speech reinforcement system

Public Address/Clock:
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speaker

Fire Alarm:
- 75 candela audiovisual device
FIXTURES, FURNITURE & EQUIPMENT:
(FF&E NOT IN G.C. CONTRACT)

**Fixtures:**
- (3) Paper towel dispensers
- (3) Soap dispenser
- (1) Changing station with storage
- Storage for data binders

**Furniture:**
- (1) teacher desk teacher chair
- (1) Adjustable height table attachment for teacher desk
- (2-6) wheeled chairs for aides
- (16) flat top student desks and chairs
- (1) Horseshoe reading table with chairs for (5) students and teacher
- (1) Activity table with chairs for (5) students and teacher
- (3) Modular cubbies with 6’ partitions for discrete trials, with table for (1) student chair and (1) teacher chair
- (2) 6’ tables and (4) chairs for student computer workstations.
- (1) 30” dia. table and (3) chairs for observation room.

**Equipment:**
- (1) *Eno* interactive short-throw projector
- (1) Interactive Display board
- (1) *Elmo* and tech cart
- (1) *Flexcat* interactive audio system
- (4) Student computer stations
- (1) Teacher computer station
- Hoyer Deluxe Power Lifter, (1) per floor level (40.5” x 43.5”)
- (1) Adjustable height changing table (25” x 72”)

**OTHER INFORMATION**
- Common areas or neighborhoods will connect each grade level. Each neighborhood might have white boards, tables, chairs, and *Elmo*
- Substantially Separate classrooms serve students that spend more than 60% of their time in a special education. The number of aids may vary depending on the enrolled students’ IEP’s requirements.

**NOTES:**
- Area rug provided by owner
- School administration and teachers expressed interest in sound system Flexcat manufactured by Lightspeed
  http://www.lightspeed-tek.com/products/flexcat/
6. Therapeutic Planning

GENERAL CRITERIA
Description: A safe, stimulant free space for students with limited emotional and social self-regulation capacity. May contain manipulatives. Located within Self-Contained SPED classroom support space to ensure efficiency of de-escalation of target behaviors based on explicit interventions to address the therapeutic rehabilitation of students to facilitate a timely re-entry into the classroom.

Quantity: (8), one per grade level
Area: 45-50 SF

Users:
- 1 Student
- 1 Teacher or Aide

Adjacencies:
- Directly adjacency to Self-Contained SPED classrooms, access via communicating corridor between classrooms

Orientation/Views:

MILLWORK/CASEWORK
Millwork (in GC contract):
- NA

SPECIALTIES
Visual Display Boards/Accessories:
- NA
Window Treatments:
- NA
Miscellaneous:
- NA
TECHNICAL CRITERIA

Finish Hardware:
- Door hardware requirements to be determined in DD.
- Door closers
- Vision lite in door

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient vinyl
- Walls: Padded wall panels secured to walls
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Therapeutic Planning and adjacent spaces: 57

Plumbing:
- NA

Mechanical:
- Air Conditioned

Lighting:
- (1) 2x4 recessed LED fixture
- ON/OFF controls outside the door

FIXTURES, FURNITURE & EQUIPMENT:
(FF&E NOT IN G.C. CONTRACT)

Fixtures:
Furniture:

Electrical:
- N/A

Data/Communications:
- Security/Communication requirements as required.

Public Address/Clock:
- (2) call assurance buttons, at adult height, one inside and one outside the room

Fire Alarm:
- 15 candela visual device

Equipment:
- Secure floor mats

OTHER INFORMATION

Room for ball or manipulative for student is preferred.

NOTES:
GENERAL CRITERIA
Description: Special Education space to teach students manual and physical dexterity. Students rotate into this space during the day. Both primary and intermediate OT/PT rooms will be located in close proximity to the elevator to service both levels of the classroom wings; to minimize transition time and maximize therapy. The primary level OT/PT room may be larger than the intermediate level OT/PT room due to greater need to support co-treatment services, which may require additional staff and space.

Quantity: 2
Area: 800-950 SF

Users:
- (6) Students maximum
- (1-2) OT/PT staff
- Aides as required

Adjacencies:
- Elevator

Orientation/Views:
- Could be an interior space (no windows).

MILLWORK/CASEWORK
Millwork (In GC contract):
- M1 Teacher Wardrobe
- M2 Supply cabinet
- M3 – base cabinets with wall cabinets above
- M4 under window shelving cabinet

SPECIALTIES
Visual Display Boards/Accessories:
- (1) Interactive display board
- (1) Eno Short throw projector
- (2) 4’ magnetic markerboards

Window Treatments:
- Woven fabric translucent shades

Miscellaneous:
- Wall mounted mirrors on one wall.
TECHNICAL CRITERIA

Finish Hardware:
- Classroom lockset
- Door closer
- Screens at operable windows

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient vinyl
- Walls: Abuse resistant panels
- Ceiling: exposed structure with ability to hang swing, etc.

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating of partitions between OT/PT and adjacent spaces: 50-52

Plumbing:
- Accessible sink with hot/cold water and integral drinking fountain

Mechanical:
- Air Conditioning

Lighting:
- (4) 8 ft. pendant mounted dimmable Dali controlled LED fixtures with (2) combination occupancy/daylight sensors
- ON/OFF controls at the door

Fixtures, Furniture & Equipment:

Fixtures:
- (1) Teacher desk with adjustable height attachment and (1) chair
- Calming area furniture

Furniture:
- (1) Teacher desk with adjustable height attachment and (1) chair
- Calming area furniture

Electrical:
- (6) general duplex receptacles
- (1) quad receptacles for teacher workstation
- (1) quad receptacle for projector

Data/Communications:
- (1) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstation
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) hardwired data outlet (2 data ports) for projector
- (1) interactive short-throw projector connections

Public Address/Clock:
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speaker

Fire Alarm:
- 75 candela audiovisual device

Equipment:
- (1) Eno short throw projector
- (1) Interactive display board
- (1) OT computer station
- (1) Ceiling mounted swing (structure required)
- Manipulatives
- Floor mats

OTHER INFORMATION

NOTES:
8. Speech

**GENERAL CRITERIA**
Description: Space used for the specialized instruction of Speech for students with 504 Accommodation Plans and students with disabilities. A speech room is located on each floor level of the school with specialized support materials appropriate for grades serviced, located to maximize student development by minimizing transition time and maximizing therapy.

Quantity: 3
Area: 350-450 SF

Users:
- (5) Students
- (1) Teacher
- (1) Aide as required

Adjacencies:
- Classroom clusters
- Learning labs

Orientation/Views:
Could be an interior space (no windows).

**MILLWORK/CASEWORK**
Millwork (In GC contract):
- M6 - base/wall cabinet with open shelving above
- M1 – Teacher wardrobe
- M2 – Storage unit
- M3 – base/wall cab. Unit

**SPECIALTIES**
Visual Display Boards/Accessories:
- (1) 8’ magnetic marker board
- (1) Eno short throw projector
- (1) Interactive smart board

Window Treatments:
- Woven fabric translucent shades

Miscellaneous:

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Worcester Public Schools
Worcester, MA
SCHEMATIC DESIGN

TECHNICAL CRITERIA

Finish Hardware:
- Classroom lockset
- Door closer
- Screens at operable windows

Architectural Finishes:
- Floor: Carpet
- Base: 4” Vinyl
- Walls: GWB; Painted, with acoustic panels
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Speech and adjacent spaces: 55-57

Plumbing:
- NA

Mechanical:
- Air Conditioning

Lighting:
- (2) 8 ft. pendant mounted dimmable Dali controlled LED fixtures with (1) combination occupancy/daylight sensor
- ON/OFF controls at the door

Data/Communications:
- (1) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstations
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) interactive short-throw projector connections
- (1) hardwired data outlet (2 data ports) for projector

Public Address/Clock:
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speaker

Fire Alarm:
- 15 candela audiovisual device

Equipment
- (1) Teacher Computer Workstation
- (1) Eno short throw projector
- (1) Interactive display board

FIXTURES, FURNITURE & EQUIPMENT:
(FF&E NOT IN G.C. CONTRACT)

Fixtures:
- (1) Teacher desk with adjustable attachment
- and (1) chair
- (1) 6’ table and (6) student chairs

OTHER INFORMATION

NOTES:
9. Early Childhood Assessment Center & BCBA Office

**GENERAL CRITERIA**

Description: The Early Childhood Assessment Center is a district-wide service that supports the federal “Child Find” mandate. It is the responsibility of the Worcester Public Schools to identify any child who is a resident of Worcester, who may have a disability, and evaluate those students to determine if they are eligible for special education or related services.

Worcester Public Schools is committed to identifying children before their third birthday in order to provide early intervention services for three and four year olds.

The Assessment Center requires a large activity room for play-based assessment with a dedicated toilet room as well as adjacent spaces for discrete observation and interviews, team meetings, and office work.

The Assessment Center is located near the Main Administration Suite so that access to assessments (scheduled during school hours) does not disrupt the instructional spaces. The proximity to the Pre-K wing also allows students being assessed to integrate into small group play as needed.

The proposed Nelson Place Elementary School will also host three full time BCBA's (Board Certified Behavior Analysts), who serve Students with Autism/Social emotional behavior. The BCBA Office has an observation window into the Early Childhood Assessment Center to assist with eligibility determination. The BCBA Office also shares a work area and office equipment with the Assessment center.
Nelson Place Elementary School  
35 Nelson Place, Worcester, MA 01605

4.1.2 SCHEMATIC DESIGN BINDER  
L. Room Data Sheets-Early Childhood Assessment Center  
& BCBA Office

SCHEMATIC DESIGN

Quantity: 1  
Area:  
BCBA Office (300 SF)  
Early Childhood Assessment Center (1200 SF)

Users:  
- (1-2) Students  
- (3) BCBA office  
- (2-4) Parents/Visitors  
- Main Admin  
- Lobby  
- Primary Classroom Cluster  
- (4-9) Teachers or specialists

Adjacencies:  
- Main Admin  
- Lobby  
- Primary Classroom Cluster  
- (4-9) Teachers or specialists

Orientation/Views:  
- Discrete Observation Area

MILLWORK/CASEWORK

Millwork (In GC contract):  
- M6-Base cabinets with open shelving above  
- 10 lf 36" counter at observation window  
- 15 lf workstation counter

SPECIALTIES

Visual Display Boards/Accessories:  
- (3) 8' Magnetic markerboards

Window Treatments:  
- 

Miscellaneous:

TECHNICAL CRITERIA

Finish Hardware:  
- Exit devices  
- Door closers

Architectural Finishes:  
- Floor: Carpet in offices, Linoleum all other spaces  
- Base: 4" Vinyl  
- Walls: GWB; Painted  
- Ceiling: ACT

Acoustical Requirements:  
- Sound Transmission Coefficient (STC) rating at partitions between the Early Childhood Assessment Center and adjacent spaces: 50-52

Electrical:  
- (12) general duplex receptacles  
- (7) quad receptacle outlets for work stations  
- (1) GFCI receptacle at counter bathroom area  
- (1) duplex receptacle for copier/printer

Data/Communications:  
- (12) general duplex receptacles  
- (7) quad receptacle outlets for work stations  
- (1) GFCI receptacle at counter bathroom area  
- (1) duplex receptacle for copier/printer  
- (5) wall phone outlets (1 data port ea.) and (5) telephone handsets (at work stations & team meeting room)
SCHEMATIC DESIGN

Plumbing:
- Accessible toilet room

Mechanical:
- Air Conditioning

Lighting:
- (12) 2x4 recessed LED fixtures with (6) combination occupancy/daylight sensors
- ON/OFF controls at the doors

Public Address/Clock:
- (4) analog clock
- (6) PA ceiling speaker
- (2) Call assurance buttons

Fire Alarm:
- (1) 15 candela audiovisual device
- (5) 15 candela visual devices

FIXTURES, FURNITURE & EQUIPMENT:
(FF&E NOT IN G.C. CONTRACT)

Fixtures:
- (3) Desks
- (7) Office chairs
- (1) 4’ table with (4) chairs
- (1) 10’ conference room table with (10) chairs
- (6) 42” Lockable file cabinets
- (3) 48” x 12” Shelving units
- (1) Changing table in toilet room.

Equipment:
- Floor mats
- Play equipment and testing materials
- Swing
- (3) Office computer stations
- (1) Copy/Printer

OTHER INFORMATION

- The assessment center is required to operate year-round to evaluate any child approaching 3 years of age in a timely manner.
- The Assessment center is operated by the district’s BCBA staff
- Observation area with a two way mirror is required adjacent to the assessment center, with accessed from corridor. This space may be dually utilized for a BCBA meeting space.

NOTES:

- Once a guardian has consented to assessment, an evaluation of the student must take place within 45 days, and a team to develop the student’s IEP must be established within 15 days of the evaluation.
10. Small Group Learning Lab

**GENERAL CRITERIA**
Description: Each grade level "neighborhood" includes one Learning Lab, a flexible space that supports student IEPs requiring specialized instruction outside the general education setting in a distraction free environment, including E.L.L., Reading Specialists, individualized or read-aloud testing, part-time tutors or above grade-level enrichment. The Learning Labs are integrated within the general classroom wings to support a culture of access and inclusion, and to minimize transition time and maximize instructional time.

Area: 450 SF  
Quantity: 8 (one per grade level)

Users:
- 8-10 Students
- 1 Teacher/Specialist
- 1 Aide

Adjacencies:
- Classroom wing
- Access to the “neighborhood” of each grade level

**MILLWORK/CASEWORK**
Millwork (in GC contract):
- M1 – Teacher wardrobe
- M2 – Storage unit
- M3 – base/wall cab. Unit
- M9 – base cabinets with student “mailboxes” above for unfinished work

**SPECIALTIES**
Visual Display boards/Accessories:
- (1) Interactive Display Board
- (1) Eno short throw projector
- (1) 8’ magnetic markerboard
- (2) 4’ magnetic markerboards

Window Treatments:
- Woven fabric translucent shades

Miscellaneous: NA
TECHNICAL CRITERIA

Finish Hardware:
- Typical classroom function.
- Screens at operable windows

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient Vinyl
- Walls: GWB; painted
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Small Group/Learning Labs and adjacent spaces: 50-52

Plumbing:
- Accessible sink

Mechanical:
- Air Conditioning

Lighting:
- (2) 8 ft. pendant mounted dimmable Dali controlled LED fixtures with (1) combination occupancy/daylight sensor
- ON/OFF controls at the door

Electrical:
- (4) general duplex receptacles
- (1) GFCI receptacle at counter sink area; (2) duplex receptacles at counters
- (1) quad receptacle for projector
- (1) quad receptacle for teacher workstation
- (1) quad receptacle for student computers
- (1) single outlet for speech reinforcement amplifier

Data/Communication:
- (1) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstation
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for student computers
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) speech reinforcement system
- (1) connection for speech reinforcement system

Public Address/Clock:
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speaker

Fire Alarm:
- 75 candela audiovisual device

Equipment:
- (1) Interactive Display Board
- (1) Eno short throw projector
- (2) student computer stations
- (1) Flexcat interactive audio system
- (1) Teacher computer station

FIXTURES, FURNITURE & EQUIPMENT:
(FF&E NOT IN G.C. CONTRACT)

Fixtures:
- (1) teacher desk with adjustable height attachment and chair
- (8) Individual flat top desks with storage
- (1) 4’ horseshoe table to seat (4) students and teacher
- (1) 6’ computer station table with (2) chairs
NOTES:
- School administration and teachers expressed interest in sound system Flexcat manufactured by Lightspeed
  http://www.lightspeedtek.com/products/flexcat/
11. Teacher Planning

**GENERAL CRITERIA**
Description: Area used by teachers to meet with colleagues, plan curriculum, and print and prepare teaching materials. Space is separated into an active work area, and a quiet meeting space.

Quantity: 2; 1 centralized on upper floor, 1 centralized on lower flow

Area: 300 SF

Users:
- 6-10 Teachers or Aides

Adjacencies:
- Adult Toilet rooms
- Classroom clusters

Orientation/Views: can be an interior space

**MILLWORK/CASEWORK**
Millwork (In GC contract):
- M3 - base/wall cabinet unit

**SPECIALTIES**
Visual Display Boards/Accessories:
- (1) Interactive smart board with (1) Eno short throw projector
- (1) 8’ Magnetic Markerboard
- (2) 4’ Magnetic Markerboards

Window Treatments:

Miscellaneous:

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Worcester Public Schools
Worcester, MA
TECHNICAL CRITERIA

Finish Hardware:
- Exit devices
- Door closers

Architectural Finishes:
- Floor: Carpet
- Base: 4” Resilient vinyl
- Walls: GWB, Painted
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Teacher Planning and adjacent spaces: 50-52

Plumbing:
- NA
- Accessible Sink

Mechanical:
- Air Conditioning

Lighting:
- (2) 2x4 recessed LED fixtures with (2) combination occupancy/daylight sensor
- ON/OFF controls at doors

Electrical:
- (4) general duplex receptacles
- (1) GFCI receptacle at counter sink area; (2) duplex receptacles at counters
- (1) duplex receptacle for refrigerator
- (1) quad receptacle for projector
- (1) quad receptacle for computer workstations
- (1) duplex receptacle for copier/printer

Data/Communications:
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for workstations
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) hardwired data outlet (2 data ports) for copier/printer

Public Address/Clock:
- (1) analog clock
- (1) PA ceiling speaker

Fire Alarm:
- 15 candela audiovisual device

FIXTURES, FURNITURE & EQUIPMENT

Fixtures:

Furniture:
- (1) 8’ Table with 8 chairs
- (1) 6’ table and (2) chairs for computer workstations.
- (8) Lockers
- (1) 42” File cabinet

Equipment:
- (1) Printer/Copier
- (1) Laminator
- (1) Refrigerator
- (2) Teacher computer stations
- (1) Eno short throw projector
- (1) Interactive display board

OTHER INFORMATION

NOTES:
12. Computer Lab

**GENERAL CRITERIA**
Description: A multi-purpose space to be used for technology instruction and project based curriculum for the entire school. The computers will also be used for standardized testing and the extended day program for all grade levels.

Quantity: 2
Area: 950

Users:
- 30 Students
- 1 Teacher
- Aides as required

Adjacencies:
- Media Center with direct connection to provide future flexibility for the suite

Orientation/Views:

**MILLWORK/CASEWORK**
Millwork (In GC contract):
- M1 – Teacher Wardrobe
- M2 – Supply Cabinet
- M3 – Storage Unit

**SPECIALTIES**
Visual Display boards/Accessories:
- (1) Eno short throw projector
- (1) Interactive Display Board
- (2) 8’ magnetic markerboards
- (2) 4’ magnetic markerboards

Window Treatments:
- Woven fabric translucent shades at interior and exterior windows

Miscellaneous: NA
**TECHNICAL CRITERIA**

**Finish Hardware:**
- Classroom lockset
- Door closer
- Screens at operable windows

**Architectural Finishes:**
- Floor: Linoleum
- Base: 4” Vinyl base
- Walls: GWB; painted
- Ceiling: GWB; painted

**Acoustical Requirements:**
- Sound Transmission Coefficient (STC) rating at partitions between Computer Lab and adjacent spaces: 50-52

**Plumbing:**
- Accessible sink with integral drinking fountain

**Mechanical:**
- Air Conditioning

**Lighting:**
- (4) 16 ft. pendant mounted dimmable Dali controlled LED fixtures with (2) combination occupancy/daylight sensors
- ON/OFF controls at the door and multi-scene controls at the front of the classroom

**Data/Communication:**
- (1) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstation
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for wireless access point
- (15) hardwired data outlet (2 data ports) for student computers
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) speech reinforcement system
- (1) connection for speech reinforcement system

**Fixtures, Furniture & Equipment:**

**Fixtures:**

**Furniture:**
- (15) 4’ tables for student computer stations
- (30) Student chairs
- (1) Teacher Desk and adjustable height attachment
- (2) Teacher chairs
- (1) 3’x4’ Table

**Equipment:**
- (1) Eno interactive short-throw projector
- (1) Interactive Display board
- (1) Flexcat interactive audio system
- (30) Student Computers
- (1) Teacher computer
- (1) Copyprinter

**Public Address/Clock:**
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speaker

**Fire Alarm:**
- 75 candela audiovisual device
OTHER INFORMATION

(2) iPad storage and charging carts required for the entire school (25 iPad/cart): must be located in secure area/areas with adequate ventilation and power.

NOTES:
13. Science Lab

**GENERAL CRITERIA**

Description: Science instructional classroom lab for intermediate grades with flexible curriculum space to support the instruction in Earth and Space Sciences, Physical Sciences, Life Sciences and Engineering.

Quantity: 1  
Area: 1,200 SF

Users:
- 30 Students  
- 1 Teacher  
- Aides as required

Adjacencies:
- Intermediate Classroom Cluster  
- Computer lab

Orientation/Views:
- View-to-exterior if possible

**MILLWORK/CASEWORK**

Casework (In GC contract):
- M1-Teacher wardrobe  
- M3 - Accessible height base cabinets (36" high; typical) with solid surface or epoxy resin countertops/sinks and 30" wall cabinets (some with shelving; some with glass doors)  
- M2 - Tall storage cabinets with shelving; some with glass doors; some with removable trays, one safety goggle cabinet.  
- Mobile student tables with solid surface or epoxy resin tops  
- Teacher workstation with solid surface or epoxy resin top and sink  
- Safety cabinet with fire blanket and fire extinguisher
Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

SCHEMATIC DESIGN

TECHNICAL CRITERIA

Finish Hardware:
- Classroom Lockset
- Door closer
- Screens at operable windows

Architectural Finishes:
- Floor: Resilient flooring
- Base: 4” resilient vinyl
- Walls: GWB; painted
- Ceilings: 2’x2’ ACT
- Solid surface countertops

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Science Lab and adjacent spaces 50-52

Plumbing:
- (4) Student lab sinks with two lab faucets, one accessible.
- (1) Demo table sink with one lab faucet
- (1) accessible sink in prep area
- Protected water supply to sinks
- Tempered water supply to emergency shower/eyewash station
- Floor drain located under shower head
- Point of use acid neutralizer at each sink

Mechanical:
- Air Conditioning

Lighting:
- (4) 16 ft. pendant mounted dimmable Dali controlled LED fixtures with (2) combination occupancy/daylight sensors
- ON/OFF controls at the door and multi-scene controls at the front of the classroom

Electrical:
- (6) tombstone duplex receptacles for science tables
- Electrical accommodations for (1) computer station at each science table
- (4) counter duplex GFCI receptacles
- (1) double duplex GFCI receptacle for the teacher station
- (2) general purpose duplex receptacles
- (1) quad receptacle for projector
- (1) single outlet for speech reinforcement amplifier

Data/Communication:
- (1) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstation
- Data accommodations for (1) computer station at each science table
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for wireless access point
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) speech reinforcement system
- (1) connection for speech reinforcement system

Public Address/Clock:
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speakers

Fire Alarm:
- (1) 75 candela audiovisual device

FIXTURES, FURNITURE & EQUIPMENT:
(FF&E NOT IN CONTRACT)

Fixtures:
- (2) Soap Dispensers
- (2) Paper towel dispensers
- Pencil sharpener
- First Aid kit at each exit

Furniture:
- (1) Teacher’s desk
- (2) Task chairs
- (30) Stools

Equipment:
- (1) Teacher computer station
- (1) Interactive display board
- (1) Eno short throw projector
- (1) Flexcat interactive audio system
- (1) Small refrigerator with freezer, located in Prep room
OTHER INFORMATION

- Grades 5 and 6 are scheduled for science class twice per week, and the 3rd and 4th grades have alternating schedules, once per week.

NOTES:
14. Art Classroom

**GENERAL CRITERIA**
Description: Art curriculum is delivered to all students of the school (PreK-6). The program does not include ceramics, but does include two and three dimensional paper, paint, drawing, etc. Occasionally an aide is the room, but a separate aide desk station is not required.

Area: 1,000 SF
Quantity: 2; one for primary classroom cluster, one for intermediate classroom cluster

Users:
- 25-30 Students
- 1 Teacher
- 1 Aide as needed

Adjacencies:
- Connecting door to Music Classroom
- Computer Lab
- Classroom “Neighborhood”

Orientation/Views:
- Northern light

**MILLWORK/CASEWORK**
Millwork (in GC contract):
- M1 - Teacher wardrobe
- M2 - Supply Cabinet
- M4 - Open shelving units under windows
- M7 - Open paper shelving unit with adjustable shelves
- M-11 36” Base cabinet with epoxy counter and backsplash

**SPECIALTIES**
Visual Display boards/Accessories:
- (3) 8’ Magnetic markerboards
- (3) 4’ magnetic markerboards
- (1) Eno short throw projector
- (1) Interactive display board
- Maximize display opportunities

Window Treatments:
- Woven fabric translucent shades

Miscellaneous:
4.1.2 SCHEMATIC DESIGN BINDER
J. Room Data Sheets – Art Classroom

TECHNICAL CRITERIA

Finish Hardware:
- Classroom lockset
- Door closer
- Screens at operable windows

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient vinyl
- Walls: GWB; Painted
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Art Room and adjacent spaces: 50-52

Plumbing:
- (1) Deep sink with solids interceptors and spray hose
- (1) Accessible student sink with hot/cold water, integral drinking fountain (maximize student hand washing capabilities), and solids interceptor. (lower height at primary art classroom)

Mechanical:
- Air Conditioning

Lighting:
- Maximize Natural lighting
- (3) 20 ft. pendant mounted dimmable Dali controlled LED fixtures with (2) combination occupancy/daylight sensors
- ON/OFF controls at the door and multi-scene controls at the front of the classroom

Electrical:
- (2) counter duplex GFCI receptacles
- (2) counter duplex receptacles
- (4) general purpose duplex receptacles
- (1) quad receptacle for projector
- (2) quad receptacle for teacher workstations
- (1) single receptacle for speech reinforcement system

Data/Communication:
- (2) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstations
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for wireless access point
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) speech reinforcement system
- (1) connection for speech reinforcement system

Public Address/Clock:
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speakers

Fire Alarm:
- (1) 75 candela audiovisual device
Lincoln Street Elementary School
76 Lincoln Street, Northborough, MA 01532

4.1.2 SCHEMATIC DESIGN BINDER

J. Room Data Sheets – Art Classroom

SCHEMATIC DESIGN

FIXTURES, FURNITURE & EQUIPMENT:
(FF&E NOT IN GC CONTRACT)

Fixtures:
- (2) Paper towel dispensers
- (2) Soap dispensers

Furniture:
- 1 teacher desk with chair
- (5) 6’ tables with (6) chairs each,
- (10) Portable slanted surface stations
- (1) Drying racks

Equipment:
- (1) Eno interactive short-throw projector
- (1) Interactive display board
- (1) Elmo & tech cart
- (1) Flexcat interactive sound system

OTHER INFORMATION

- Art classrooms will utilize the Net Carts for computers in class, or will use adjacent computer lab, no permanent computers.
- Connecting door to music classroom will aid music and art integration.

NOTES:

- Gates Lane and Roosevelt schools have art rooms with appropriate lighting and ample storage.
15. Art Storage

**GENERAL CRITERIA**
Description: Unified Arts instructional program that all students participate in. Curriculum includes general art instruction including drawing, painting, ceramics, etc.

Quantity: 2
Area: 150 SF

Users:
- 1 Teacher

Adjacencies:
- Direct access to Art Room

Orientation/Views:

**MILLWORK/CASEWORK**
Millwork (In GC contract):
- M7- Open paper shelving unit with adjustable shelves
- M3- Base cabinets with drawers and wall cabinets above

**SPECIALTIES**
Visual Display Boards/Accessories: NA

Window Treatments: NA

Miscellaneous:
TECHNICAL CRITERIA

Finish Hardware:
- Storeroom lockset
- Door closer
- Vision lite in door

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient Vinyl
- Walls: GWB; Painted
- Ceilings ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Art Storage and adjacent spaces: 50-52

Plumbing:
- NA

Mechanical:
- Air Conditioned

Lighting:
- (3) 2x4 recessed LED fixture with (1) combination occupancy/daylight sensor
- ON/OFF controls at the door

Electrical:
- (3) general purpose duplex receptacles

Data/Communications:
- N/A

Fire Alarm:
- (1) 15 candela visual device

FIXTURES, FURNITURE & EQUIPMENT:

(FF&E NOT IN G.C. CONTRACT)

Fixtures:
- (1) Drying Rack

Furniture:

Equipment:

OTHER INFORMATION:

NOTES:
16. Music Classroom

**GENERAL CRITERIA**

Description: All students in the school attend general music. Curriculum includes small instruments, singing, dancing, etc.

Area: 1,200 SF
Quantity: 2; one for primary level, one for intermediate level

Users:
- 25-30 Students
- 1 Teacher

Adjacencies:
- Connecting door to Art Classroom
- Computer lab

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**MILLWORK/CASEWORK**

Millwork:
- M1 Teacher Wardrobe
- M4- Open Shelving under windows
- M2 – Storage Units
- M3 – base/wall cab. unit

**SPECIALTIES**

Visual Display boards/Accessories:
- (1) 8’ Magnetic markerboard with staff lines
- (3) 8’ Magnetic markerboards
- (3) 4’ Magnetic markerboards
- (1) Interactive display board
- (1) Eno short throw projector

Window Treatments:
- Woven fabric translucent shades

Miscellaneous:
TECHNICAL CRITERIA

Finish Hardware:
- Classroom lockset
- Door closer
- Screens at operable windows

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient Vinyl
- Walls: GWB, Painted & acoustical panels
- Ceiling: ACT; alternating absorbent and hard tiles

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Music and adjacent spaces: 50-52

Plumbing:
- Accessible sink with hot/cold water and integral drinking fountain

Mechanical:
- Air Conditioned

Lighting:
- (3) 20 ft. pendant mounted dimmable Dali controlled LED fixtures with (2) combination occupancy/daylight sensors
- ON/OFF controls at the door and multi-scene controls at the front of the classroom

FIXTURES, FURNITURE & EQUIPMENT:

Electrical:
- (4) general duplex receptacles
- (1) GFCI receptacle at counter sink area; (2) duplex receptacles at counters
- (1) quad receptacle for projector
- (1) quad receptacles, for teacher workstation
- (1) single outlet for speech reinforcement amplifier

Data/Communication:
- (1) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstations
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for wireless access point
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) speech reinforcement system
- (1) connection for speech reinforcement system

Public Address/Clock:
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speaker

Fire Alarm:
- (1) 75 candela audiovisual device

Equipment:
- (1) Eno interactive short-throw projector
- (1) Interactive Display Board
- (1) Acoustic Piano
- (1) Flexcat interactive audio system
- (1) Portable secure tech cabinet w/ stereo controls
- (1) Teacher computer station

Fixtures:
- Portable set of risers for 30 students, retractable

Furniture:
- (1) Teacher Desk with adjustable height attachment and (1) teacher chair
- (30) stackable student chairs
- (15) music stands
- (1) 4-dwr file cabinet for sheet music storage
- (5) 4’ foldable square tables w/ wheels

Worcester Public Schools
Worcester, MA
SCHEMATIC DESIGN

L. Room Data Sheets – Music Classroom

OTHER INFORMATION

Space for instruction and storage required for various musical instruments:

- Bongos, tambourines, hand drums, cowbell finger cymbals, rhythm sticks
- Orff Instruments
  - 30 sets of mallets
  - Xylophones (2) Alto (1) Bass (2) Soprano
  - Glockenspiels (2) Alto (2) Soprano
  - Metallophones (2) Alto (2) Soprano

NOTES:

- Area rug provided by owner
17. Musical Instrument Storage

**GENERAL CRITERIA**
Description: Storage for musical instruments, currently including trumpets, saxophones, oboes, clarinets.

Area: 300 SF
Quantity: 1

Users:
- (45) Students in instrument program
- (1) Teacher

Adjacencies:
- Stage

**MILLWORK/CASEWORK**
Millwork:
- M2-Lockable supply closet

**SPECIALTIES**
Visual Display boards/Accessories: N/A
Window Treatments: N/A
Miscellaneous:
Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

4.1.2 SCHEMATIC DESIGN BINDER

SCHEMATIC DESIGN
L. Room Data Sheets – Musical Instrument Storage

TECHNICAL CRITERIA

Finish Hardware:
- Storeroom lockset
- Door closer

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient Vinyl
- Walls: GWB; Painted
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Musical Instrument Storage and adjacent spaces: 50-52

Plumbing: N/A

Mechanical:
- Air Conditioned

Lighting:
- (3) 2x4 recessed LED fixture with (1) combination occupancy/daylight sensor
- ON/OFF controls at the door

Electrical:
- (1) general purpose duplex receptacle

Data/Communication: N/A

Public Address/Clock: N/A

Fire Alarm: N/A

FIXTURES, FURNITURE & EQUIPMENT:
(FF&E NOT IN GC CONTRACT)

Fixtures:
- (6) 3’ deep x 7’ high instrument storage system
- (3) 42” file cabs for sheet music storage

Equipment:

OTHER INFORMATION

- The musical instrument program includes 45 students, and is scheduled separately from the general music class. Since both classes may take place simultaneously, the instrument program rehearses on the Stage.

NOTES:
18. Gymnasium

**GENERAL CRITERIA**
Description: Multipurpose space for Physical Education program, adaptive physical education, community use.

Quantity: 1
Area: 6,000 SF

Users:
- (550) Students at full school assembly
- (100) Faculty at full school assembly
- (25-30) Students per gym class
- (1-2) Teachers
- Aides as required

Adjacencies:
- Exterior easily accessible
- Cafeteria
- Student Toilet rooms & drinking fountain
- Medical Suite
- Gym Office and Gym Storage require windows into gymnasium.

Orientation/Views:

**MILLWORK/CASEWORK**
Millwork (In GC contract):
- Cubbies for 2 classes (60 students) in corridor access to gym

**SPECIALTIES**
Visual Display Boards/Accessories:
- (1) Portable interactive display board
- (1) Motorized retractable projector screen
- (1) Interactive projector with wire guards

Window Treatments:

Miscellaneous:
SCHEMATIC DESIGN

TECHNICAL CRITERIA

Finish Hardware:
- Exit devices
- Door closers

Architectural Finishes:
- Floor: Hardwood with resilient sub-floor
- Base: 4” Resilient Vinyl
- Walls: 4’ h. abuse resistant acoustical panels full perimeter.
- Ceiling: Exposed structure; painted

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Gymnasium and adjacent spaces: 55-57

Plumbing:
- Accessible drinking fountain in corridor

Mechanical:
- Air Conditioning
- Adequate ventilation for full school assembly (approx. 550 Students (excluding Pre-K) and 100 faculty)

Lighting:
- (24) highbay dimmable LED fixtures with (9) combination occupancy/daylight sensors
- ON/OFF multi-scene controls at the door

Electrical:
- (10) general duplex receptacles
- Power connections for the motorized projector screen, projector, score board, bleachers and backstops as required.
- Floor outlets near scorer’s table, proposed in front of bleachers.

Data/Communications:
- (2) hardwired data outlets (2 data ports) for wireless access point
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- Connections for portable interactive smart board.
- Connections for interactive projector

Public Address/Clock:
- (4) paging speakers
- (8) local sound speakers with (2) microphone jacks at opposite sides of gym
- (2) analog clocks with wire guards
- Assisted listening system
- Local sound system
- Exterior speakers at outdoor play areas for emergencies
- (4) Call assurance buttons

Fire Alarm:
- (15) audiovisual fire alarm devices with a candela rating of 110cd
- (2) fire alarm pull stations
- (6) beam detectors

FIXTURES, FURNITURE & EQUIPMENT:
(FF&E NOT INCLUDED IN G.C. CONTRACT)

Fixtures:
- Flag
- Scoreboard and remote control panel

Equipment:
- Full perimeter 7’ high wall pads
- (6) height-adjustable folding basketball backstops
- Manual vinyl room divider, ceiling mounted
- (1) Interactive projector with wire guards
- (1) Motorized retractable projection screen
- (1) portable interactive smart board

Furniture:
- Telescopic bleachers to seat (300)
- Portable podium
OTHER INFORMATION

- Separate storage space would be preferred for third party after school programs
- Gym teacher must have view of gym from inside office and storage area.
19. Gym Teacher’s Office

**GENERAL CRITERIA**
Description: Administrative office for Gym teacher as defined by the program.

Quantity: 1  
Area: 150 SF

Users:  
- (1) Teacher

Adjacencies:  
- Gym
- Requires an adjacent toilet

Orientation/Views:  
- Gym office and gym storage rooms require windows into Gymnasium space for supervision of students.

**MILLWORK/CASEWORK**
Millwork (In GC contract):
- N/A

**SPECIALTIES**
Visual Display Boards/Accessories:  
- (1) 8’ Magnetic markerboard

Window Treatments:
- Shades at windows

Miscellaneous:
TECHNICAL CRITERIA

Finish Hardware:
- Exit devices
- Door closers
- Screens at operable windows

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient vinyl
- Walls: GWB, Painted
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between office and adjacent spaces: 50-52

Plumbing:
- Adjacent toilet room

Mechanical:
- Air Conditioning

Lighting:
- (2) 2x4 recessed LED fixtures with (1) combination occupancy/daylight sensor

Electrical:
- (2) General duplex receptacles
- (1) quad receptacles, for teacher workstation

Data/Communications:
- (1) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstation

Public Address/Clock:
- (1) analog clock
- (1) call assurance button
- (1) PA ceiling speaker

Fire Alarm:
- (1) 15 candela visual device

FIXTURES, FURNITURE & EQUIPMENT

Fixtures:
- Equipment:
  - (1) Teacher computer station

Furniture:
- (1) Teacher Desk and chair
- (1) Adjustable height attachment for teacher desk
- (2) Side chairs
- (2) 42” File cabinets

OTHER INFORMATION

NOTES:
20. Medical 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 enclosed office for Nurse with visibility to waiting area, Exam Room, Toilet Room with shower, (2) Rest bed areas, a quarantine space, and a nurse’s office with securable medicine/supply closet. The Medical Suite also requires an exit door to the exterior, for emergency use only.

Quantity: 1  
Area: 840 SF

Users:  
- 1-4 Students  
- 1 Nurse

Adjacencies:  
- Main Administration Suite  
- Gym

Orientation/Views:  
- Within sight of gym

**MILLWORK/CASEWORK**
Millwork (in GC contract):  
- M2 – Lockable storage cabinet  
- M3 - base/wall cab  

**SPECIALTIES**
Visual Display Boards/Accessories:  
- (3) 4’ Magnetic markerboards  
- (2) 8’ magnetic markerboards

Window Treatments:  
- Vertical blinds at interior and exterior windows

Miscellaneous:  
- Ceiling mounted cubicle curtain track at rest areas
Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

4.1.2 SCHEMATIC DESIGN BINDER
L. Room Data Sheets-Medical Suite

TECHNICAL CRITERIA

Finish Hardware:
- Exit devices
- Door closers
- Screens at operable windows
- Lockable door at closet

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient Vinyl
- Walls: GWB, Painted
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between the Medical Suite and adjacent spaces: 50-52

Plumbing:
- Accessible toilet room with shower
- Accessible sink in waiting room

Mechanical:
- Air Conditioning

Lighting:
- (8) 2x2 recessed LED fixtures with (2) combination occupancy/daylight sensors
- (3) wall mounted LED bed lights with ON/OFF controls
- ON/OFF controls at the door

Electrical:
- (10) general duplex receptacles
- (2) GFCI receptacles at counter sink area
- (1) GFCI receptacle at bathroom area
- (2) quad receptacles, for nurse workstations
- (1) receptacle for refrigerator

Data/Communications:
- (2) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstations
- (1) hardwired data outlet (2 data ports) for wireless access point (for nurse’s mobile computer station)

Public Address/Clock:
- (2) analog clocks
- (2) Call assurance buttons
- (4) PA ceiling speakers

Fire Alarm:
- (1) 75 candela audiovisual device
- (3) 15 candela visual devices

FIXTURES, FURNITURE & EQUIPMENT

Fixtures:
- (1) Office desk & chair
- (6) Waiting room chairs
- (1) Exam Room bed
- (3) Rest beds
- (1) Wheeled table for mobile computer station

Equipment
- (2) Wheeled carts for eye exam equipment, etc.
- (1) Nurse’s desktop Computer Station
- (1) Mobile computer station
- Small refrigerator for medication storage.

OTHER INFORMATION

NOTES:
21. Media Center

GENERAL CRITERIA
Description: As a resource center for the entire school population, and the public, after hours, the Media Center is a repository for books and other media, and a meeting space with instructional capabilities. The Media Center also contains a computer lab area with 30 student computer stations that will be used for instruction and testing for the intermediate classroom cluster. The Media Center will be open to the community after school hours, and will be staffed by the Worcester Public Library (WPL) as part of the One City/One Library project. The Media Center requires an office for library staff, and one accessible unisex toilet room.

Quantity: 1
Area: 3,370 SF

Users:
- 25-30 Students per class
- 1 Teacher
- 1 WPL Staff or Volunteer

Adjacencies:
- Separate accessible entrance from exterior, close to accessible visitor parking.
- Computer lab

Orientation/Views:

MILLWORK/CASEWORK
Millwork (In GC contract):
- M3 -base/wall cab. Unit
- M10 -custom desk unit

SPECIALTIES
Visual Display Boards/Accessories:
- (1) Interactive smart board
- (1) Eno short throw projector

Window Treatments:
- Vertical blinds at exterior windows

Miscellaneous:
- Exterior signage to be provided by WPL
- Separate alarm system may be considered by WPL
SCHEMATIC DESIGN

TECHNICAL CRITERIA

Finish Hardware:
- Exit devices
- Door closers
- Screens at operable windows

Architectural Finishes:
- Floor: Carpet
- Base: 4" Resilient vinyl
- Walls: GWB, Painted
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Media Center and adjacent spaces: 47-49

Plumbing:
- Accessible drinking fountain

Mechanical:
- Air Conditioned

Lighting:
- (30) pendant mount LED fixtures with (5) combination occupancy/daylight sensors
- ON/OFF multi-scene controls at the door

FIXTURES, FURNITURE & EQUIPMENT:
(FF&E NOT IN G.C. CONTRACT)

Fixtures:
- (80) 36"wx42"h double sided shelving units
- (55) 36"wx42"h single sided shelving units
- (4) Adult computer desks and chairs
- (8) Student computer desks and chairs
- (1) Desk or office area for WPL staff
- (6) 36" x 72" tables with (36) Chairs
- (1) Teacher desk with adjustable height attachment and (1) chair.
- Area rug for story time
- (3-4) Story time couches

Electrical:
- (10) general duplex receptacles
- (1) quad receptacle for projector
- (10) quad receptacles for computer stations
- (1) duplex receptacle for copier/printer
- Connections for circulation desk equipment
- (1) Single outlet for speech reinforcement

Data/Communications:
- (1) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstation
- (6) hardwired data outlet (2 data ports) for computer stations
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for wireless access point
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) speech reinforcement system
- (1) connection for speech reinforcement system

Public Address/Clock:
- (4) paging speakers
- (6) local sound speakers
- (2) analog clocks
- Assisted listening system
- Local sound system

Fire Alarm:
- (2) audiovisual fire alarm devices with a candela rating of 110cd

Equipment
- (1) Eno short throw projector
- (1) Interactive display board
- (1) Printer/copier
- (6) Content-filtered computers for students
- (4) Open-content computers for public use with covers during school hours (Provided by WPL)
- (1) Flexcat interactive audio system
- (2) Literacy station computers
- (1) Librarian computer station
- (1) Teacher computer station
- Book scanning system
- Access control system at exterior doors
OTHER INFORMATION

NOTES:
From Public Library Program meeting minutes 7.2.14:

Public Library requirements (WPL to confirm all):

- Up to 25,000 books/media for all age groups; WPL to confirm
- 4 dedicated staff parking spaces
- Storage for craft/activity materials; WPL to provide list
- 2 literacy stations with specialized computer programs
- 3-4 storytime couches
- Smartboard/Interactive white board
- Meeting area for training, community, etc.; WPL to confirm # seats required
- Office area for staff
GENERAL CRITERIA
Description: Multipurpose assembly space used for (3) lunch servings each day, extended day and summer programs, faculty and community meetings

Quantity: 1
Area: 4,500 SF

Users:
- Approx. (200) Students at each lunch period (3 lunches)
- (350-400 maximum) Assembly in chairs

Adjacencies:
- Recess area
- Kitchen
- Main entrance for community access
- Storage for chairs, extended day materials

Orientation/Views:

MILLWORK/CASEWORK
Millwork (In GC contract):
- Specialty paneling and Stage opening surround
- Stage stair risers/treads

SPECIALTIES
Visual Display Boards/Accessories:
- (1) Motorized projection screen
- (1) Ceiling mounted projector
- Half height lockers for 60 in corridor near Gym and Cafeteria for extended day provisions

Window Treatments:
- Room Darkening window treatment.

Miscellaneous:
-
Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

SCHEMATIC DESIGN

4.1.2 SCHEMATIC DESIGN BINDER
L. Room Data Sheets- Cafeteria

TECHNICAL CRITERIA

Finish Hardware:
- Exit devices
- Door closers
- Screens at operable windows

Architectural Finishes:
- Floor: Linoleum
- Base: 4" resilient vinyl
- Walls: 4’ h ceramic tile, 6’ h. acoustic wall panels, painted GWB above
- Ceiling: 2’ x 2’ ACT with GWB soffits

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between the Cafeteria and adjacent spaces: 50-52

Plumbing:
- Drinking fountain with water bottle refill feature
- Accessible handwash sink

Mechanical:
- Air Conditioned

Lighting:
- (12) 12 ft. pendant mount LED fixtures with (3) combination occupancy/daylight sensors
- ON/OFF multi-scene controls at the door

Electrical:
- (10) general duplex receptacles
- (1) quad receptacle for projector
- Power for POS/Cashier

Data/Communications:
- (1) hardwired data outlet (2 data ports) for projector
- (2) hardwired data outlets (2 data ports) for wireless access point
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)

Public Address/Clock:
- (4) paging speakers
- (8) local sound speakers
- (2) analog clocks
- Assisted listening system
- Local sound system

Fire Alarm:
- (4) audiovisual fire alarm devices with a candela rating of 110cd

FIXTURES, FURNITURE & EQUIPMENT
(NOT INCLUDED IN G.C. CONTRACT)

Fixtures:
- (17) Bench style student tables to seat (200) students @ tables to seat 12 max.
- (200) stackable chairs for assembly

Equipment:
- (1) Motorized projection screen
- (1) Ceiling-mounted projector
OTHER INFORMATION
Two lunch serving lines required

NOTES:
Review Roosevelt elementary school for cafeteria & kitchen
23. Stage

**GENERAL CRITERIA**
Description: Multi-use space for special assembly/production use and, on a day-to-day basis, as classroom/rehearsal space for the musical instrument program.

Area: 1,000 SF
Quantity: 1

Users:
- (45) Students currently enrolled in musical instrument program, grades 3-6
- (7-8) Kids private instruction
- (1) Teacher

Adjacencies:
- Cafeteria
- Music & Musical Instrument Storage
- Main entrance for community access

**MILLWORK/CASEWORK**
Millwork (In GC contract):

**SPECIALTIES**
Visual Display Boards/Accessories:
- (1) Interactive Display Board
- (1) Eno short throw projector

Window Treatments:
- Room Darkening window treatment.

Miscellaneous:
- Motorized acoustical folding partition to isolate Stage from Cafeteria
- Stage curtains
**Nelson Place Elementary School**  
35 Nelson Place, Worcester, MA 01605

**SCHEMATIC DESIGN**

**TECHNICAL CRITERIA**

**Finish Hardware:**
- Exit devices
- Door closers

**Architectural Finishes:**
- Floor: resilient or hardwood (non-skid surface at edge of platform)
- Base: 4" resilient vinyl
- Walls: painted GWB
- Ceiling: Suspended Acoustical Panels

**Acoustical Requirements:**
- Sound Transmission Coefficient (STC) rating at partitions between Stage and adjacent spaces: 55-57

**Plumbing:**
- NA

**Mechanical:**
- Air Conditioning

**Lighting:**
- (12) recessed LED downlights dimmable Dali controlled LED fixtures with (2) combination occupancy/daylight sensors
- (12) monopoint spot/flood lights
- ON/OFF and multi-scene controls

**Electrical:**
- (4) general duplex receptacles
- (1) quad receptacle for projector
- (1) quad receptacles, for teacher workstation
- (1) single outlet for speech reinforcement amplifier

**Data/Communications:**
- (1) hardwired voice/data outlet (1 voice/2 data ports) for teacher workstation
- (1) hardwired data outlet (2 data ports) for projector
- (1) hardwired data outlet (2 data ports) for wireless access point
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)
- (1) speech reinforcement system
- (1) connection for speech reinforcement system

**Public Address/Clock:**
- (1) analog clock
- (2) call assurance buttons
- (1) PA ceiling speaker
- (1) Connections to Cafeteria sound system

**Fire Alarm:**
- 75 candela audiovisual device

**FIXTURES, FURNITURE & EQUIPMENT:**
**NOT INCLUDED IN G.C. CONTRACT**

**Fixtures:**
- (30) Music Stands
- (45-55) Stackable chairs
- (1) Teacher desk
- Retractable risers (for 60) students

**Equipment:**
- (1) Acoustical piano
- (1) Eno short throw projector
- (1) Interactive display board
- Portable secure tech cabinet with stereo controls
OTHER INFORMATION

- The musical instrument program includes 45 students, and is operated separately from the general music class. The instrument program rehearses on the stage.

- Storage required for trumpets, saxophones, oboes, clarinets.

NOTES:

- School expressed interest in flexibility to accommodate a future theater program. Possible to project background scenes on the back wall of the stage.
25. Staff Dining

**GENERAL CRITERIA**
Description: Multipurpose Room used for Faculty Dining at lunch time, meetings

Quantity: 1  
Area: 250 SF

Users:  
- (12) Staff

Adjacencies:  
- Directly adjacent to cafeteria

Orientation/Views:

**MILLWORK/CASEWORK**
Millwork (In GC contract):
- M3- base and wall cabinet unit

**SPECIALTIES**
Visual Display Boards/Accessories:
- 
Window Treatments:
- Window shades at exterior,
Miscellaneous:
- 

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Worcester Public Schools  
Worcester, MA  

LAMOUREUX·PAGANO  
ARCHITECTS PROJECT MANAGERS
TECHNICAL CRITERIA

Finish Hardware:
- Exit devices
- Door closers

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient vinyl
- Walls: GWB, Painted
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Staff Dining and adjacent spaces: 50-52

Plumbing:
- Accessible sink

Mechanical:
- Air Conditioning

Lighting:
- (6) recessed LED fixtures with (1) combination occupancy/daylight sensor
- ON/OFF controls at the door

Electrical:
- (4) general duplex receptacles
- (2) GFCI receptacle at counter sink area
- (2) duplex receptacles for refrigerator and microwave

Data/Communications:
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted near door)

Public Address/Clock:
- (1) analog clock
- (1) PA ceiling speaker

Fire Alarm:
- 75 candela audiovisual device

Equipment
- Full height refrigerator
- Microwave oven
- Coffee Maker

FIXTURES, FURNITURE & EQUIPMENT

Fixtures:

Furniture:
- (1) 12’ x 4’ table with (12) chairs

OTHER INFORMATION

NOTES:
25. 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. Rooms included in the Main Administration Suite room data are:

- Waiting Area & Reception (400 SF)
- Principal’s Office (250 SF)
- Principal’s Secretary/Waiting (included in Reception)
- Vice Principal’s office (200 SF)
- Psychologist office (225 SF)
- SPED Director Office (150 SF)
- Teacher mail & time (100 SF)
- Duplicating Room (150 SF)
- Records Room (110 SF)
- Staff Toilet (60 SF)
- Conference room (250 SF)

Quantity: 1
Area: 2,395 SF
Users:
- (1) Principal Office
- (1) Vice Principal Office
- (1) Psychologist Office
- (1) SPED director Office
- (2) Administrative stations
- (24) Conference rooms
- (12) Family Learning Center
- (6-8) Teachers
- (8-10) Visitors

Adjacencies:
- Main Entrance/Lobby
- Early Childhood assessment
- Exterior, after school pick up areas

Orientation/Views:

1 Refer to minutes 1327WP- Worksheet Program Central Administration 1.10.14 for requirements
SPED Conference Room (250 SF)
Family Learning Center (250 SF)
Medical Suite (area not included, see separate Room Data Sheet)

Room data for administrative spaces not listed above are included in the Satellite Administration room data sheet.

MILLWORK/CASEWORK
Millwork (In GC contract):
- M3 - Base/wall kitchen cabinet unit
- M6 – base cabinet with open shelving above
- M9 - base cabinet with mail cubbie units above
- M12- base/wall supply cabinet unit

SPECIALTIES
Visual Display Boards/Accessories:
- (3) Interactive display board & Eno short throw projector (Conference Room)
- (10) 8’ Magnetic Markerboards

Window Treatments:
- Blinds at interior and exterior windows

Miscellaneous:
Nelson Place Elementary School  
35 Nelson Place, Worcester, MA 01605  

4.1.2 SCHEMATIC DESIGN BINDER  
L. Room Data Sheets-Main Administration Suite  

TECHNICAL CRITERIA  

Finish Hardware:  
- Exit devices  
- Door closers  
- Screens at operable windows  

Architectural Finishes:  
- Floor:  Carpet  
- Base:  4” Resilient Vinyl  
- Walls:  GWB, Painted  
- Ceiling:  ACT  

Acoustical Requirements:  
- Sound Transmission Coefficient (STC) rating at partitions between the Main Administrative Suite and adjacent spaces: 50-52  

Plumbing:  
- Accessible sink  (in Teacher Mail & Time)  
- Accessible staff toilet room  

Mechanical:  
- Air Conditioning  

Lighting:  
- (14) 2x4 recessed LED fixtures with (5) combination occupancy/daylight sensors  
- ON/OFF controls at the door  

FIXTURES, FURNITURE & EQUIPMENT  

Fixtures:  
- (6) General office chairs  
- (14) Waiting area lounge chairs and (1) 36” table  
- (3) 12’ x 4’ conference tables with (52) Conference room chairs  
- (9) 42” wide lateral file units  
- (4) 48” Shelving units  
- (4) Desks with adjustable height side table  
- (2) L-Shaped reception work stations  
- (1) 36” dia. Table and (4) guest chairs  
- (1) 30” dia. Table and (3) guest chairs.  

Electrical:  
- (20) general duplex receptacles  
- (6) quad receptacles for workstations  
- (1) duplex receptacle for copier/printer  
- (3) quad receptacles for projectors  
- (1) Duplex receptacle for refrigerator and microwave  
- (2) GFCI receptacle at counter sink area  

Data/Communications:  
- (6) hardwired voice/data outlet (1 voice/2 data ports) for workstations  
- (1) hardwired data outlet (2 data ports) for wireless access point  
- (3) interactive short-throw projector connections  
- Access control system  

Public Address/Clock:  
- (4) analog clocks  
- (5) PA ceiling speakers  
- Microphone jacks for PA system interface  
- (3) Local sound systems (Conference Rooms & Family Learning Center)  

Fire Alarm:  
- (1) 75 candela audiovisual device  
- (4) 15 candela visual devices  

Equipment  
- Copier/Printer  
- Under counter refrigerator  
- Microwave oven  
- Coffee maker  
- (3) Interactive white boards and (4) Eno short throw projectors (Conference Rooms)  
- (3) Local sound systems (Conference rooms & Family learning center)  
- (6) Office computer stations
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35 Nelson Place, Worcester, MA 01605

4.1.2 SCHEMATIC DESIGN BINDER

SCHEMATIC DESIGN
L. Room Data Sheets-Main Administration Suite

OTHER INFORMATION

NOTES:
Refer to program meeting minutes from 01.10.14
GENERAL CRITERIA
Description: The satellite Administration Suite functions to support the classroom clusters separated on different floor from the Main Administration Suite.
Room data included in the Satellite Administration Suite are:
- Instructional Coach Office (150 SF)
- Adjustment Counselor Office (225 SF)
- Conference Room (250 SF)

Quantity: 1
Area: 625 SF

Users:
- (1) Instructional Coach
- (1) Adjustment Counselor office
- (12) Conference Room
- (4-6) Teachers/Visitors

Adjacencies:
- Teacher Planning
- Computer Lab
- Intermediate Classroom cluster

Orientation/Views:

MILLWORK/CASEWORK
Millwork (In GC contract):
- M12- base/wall supply cabinet unit, lockable
- M2 Lockable storage cabinet

SPECIALTIES
Visual Display Boards/Accessories:
- (1) Interactive display board & Eno short throw projector (Conference Room)
- (3) 8’ Magnetic Markerboards

Window Treatments:
- Blinds at interior and exterior windows

Miscellaneous:
**TECHNICAL CRITERIA**

**Finish Hardware:**
- Exit devices
- Door closers
- Screens at operable windows

**Architectural Finishes:**
- Floor: Carpet
- Base: 4” Resilient Vinyl
- Walls: GWB, Painted
- Ceiling: ACT

**Acoustical Requirements:**
- Sound Transmission Coefficient (STC) rating at partitions between Satellite Administration Suite and adjacent spaces: 50-52

**Plumbing:** NA

**Mechanical:**
- Air Conditioning

**Lighting:**
- (8) 2x4 recessed LED fixtures with (5) combination occupancy/daylight sensors
- ON/OFF controls at the door

**Electrical:**
- (16) general duplex receptacles
- (4) quad receptacles for workstations
- (1) quad receptacle for projector

**Data/Communications:**
- (4) hardwired voice/data outlet (1 voice/2 data ports) for workstations
- (1) hardwired data outlet (2 data ports) for wireless access point
- (1) interactive short-throw projector connection

**Public Address/Clock:**
- (4) analog clocks
- (5) PA ceiling speaker
- Local sound system (Conference room)

**Fire Alarm:**
- 75 candela audiovisual device
- (4) 15 candela visual devices

**FIXTURES, FURNITURE & EQUIPMENT**

**Fixtures:**
- (2) Office desks and chairs
- (4) Guest chairs
- (3) 42” wide lateral file units
- (1) 12’ x 4’ conference table and (12) chairs
- (1) 30” dia. table and (3) chairs

**Equipment**
- (1) Interactive Smart board and (1) Eno short throw projector (Conference room)
- Local sound system (Conference room)
- (2) Office computer stations
SCHEMATIC DESIGN  L. Room Data Sheets-Satellite Administration Suite

OTHER INFORMATION

NOTES:

- Refer to Programming meeting minutes from 01.10.14
- Instructional Coach will use adjacent conference room for larger teacher meetings
- Conference room in Satellite Admin is intended for teachers only, and may contain an interactive data program for use with the interactive white board.
# 27. Maintenance Suite

**GENERAL CRITERIA**

Description: Building Facilities maintenance requirements including: maintenance office, outdoor equipment storage, and workshop/supplies.

**Quantity:** 1

**Area:**
- General Storage (375 SF)
- Custodian Office (150 SF)
- Receiving (400 SF)
- Custodian’s Workshop (345 SF)

**Users:**
- (1-2) Custodians

**Adjacencies:**
- Exterior
- Receiving area
- Mechanical room
- Kitchen
- Toilet for custodian use
- Close to outdoor storage building

**Orientation/Views:**

---

**MILLWORK/CASEWORK**

Millwork (In GC contract):

- 

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**SPECIALTIES**

Visual Display Boards/Accessories:
- (1) 8’ magnetic markerboard

Window Treatments:
- Shades at exterior windows

Miscellaneous:
- Overhead door to mechanical room
TECHNICAL CRITERIA

Finish Hardware:
- Exit devices
- Door closers
- Storeroom lockset at storage doors
- Exterior hardware at exterior doors
- Office lockset at office
- Overhead door at mechanical room

Architectural Finishes:
- Floor: Sealed Concrete
- Base: Impact resistant at service areas, 4” resilient vinyl at office
- Walls: CMU
- Ceiling: Exposed structure; painted

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Maintenance Suite and adjacent spaces: TBD

Plumbing:
- Water wall hydrant for cleaning
- Exterior water hydrant near entrance

Mechanical:
- Exhaust as required

FIXTURES, FURNITURE & EQUIPMENT
(NOT INCLUDED IN G.C. CONTRACT)

Fixtures:
- (1) Desk and chair for office
- (1) Workbench
- (2) 42” Filing cabinets
- (16) 48” Storage shelving units

Furniture:
- (10) 1x4 utility LED fixtures
- ON/OFF controls at the door

Electrical:
- (8) general duplex receptacles
- (1) quad receptacles for workstation
- Exterior power receptacle near entrance

Data/Communications:
- (1) hardwired voice/data outlet (1 voice/2 data ports) for workstations
- (2) hardwired data ports at office
- Connections for access control at maintenance entrance

Public Address/Clock:
- (2) analog clocks
- (5) PA ceiling speaker

Fire Alarm:
- audiovisual devices as appropriate
  - (2) 75 candela audiovisual device
  - (4) 15 candela visual devices

Equipment:
- Computer equipment for systems control & alarm system in office.
- Access control system at exterior doors.

OTHER INFORMATION

- Separate outdoor storage building is preferred for equipment storage, such as riding lawn mower, snow blower, power tools, backpack leaf blower, weed whacker & fuel.

NOTES:
Refer to facilities program meeting minutes from 6.20.14
28. Janitor Closet

**GENERAL CRITERIA**

Description: Janitor closets for maintenance supplies, dispersed throughout school.

Quantity: 4 (One per floor per wing)
Area: 375 SF

Users:
- (1-2) Custodians

Adjacencies:
- Toilet rooms
- Kitchen
- Gym

Orientation/Views:

**MILLWORK/CASEWORK**

Millwork (in GC contract):

**SPECIALTIES**

Visual Display Boards/Accessories:
- NA

Window Treatments:
- NA

Miscellaneous:
- Wall mounted mop/broom holder
TECHNICAL CRITERIA

Finish Hardware:
- Door louver
- Door closers
- Storeroom lockset with tactical warning

Architectural Finishes:
- Floor: Ceramic tile or seamless epoxy
- Base: Ceramic tile or seamless epoxy
- Walls: Moisture resistant GWB with FRP sheet facing, or ceramic tile
- Ceiling: Exposed structure; painted

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Janitor Closet and adjacent spaces: TBD

Plumbing:
- Janitor Sink
- Water connection for cleaning solution distribution

Mechanical:
- Exhaust as appropriate

Lighting:
- (1) 1x4 utility LED fixtures
- ON/OFF controls at the door

Electrical:
- (1) general duplex GFCI receptacle

Data/Communications: N/A

Public Address/Clock: N/A

Fire Alarm: N/A

FIXTURES, FURNITURE & EQUIPMENT

Fixtures:

Furniture:
- Adjustable shelving units

Equipment
- Mops/brooms, brushes, pans and other cleaning items.
- Wheeled mop bucket
- Vacuums
- Cleaning supply dial system
- Chariot floor cleaning equipment

OTHER INFORMATION

NOTES:
Refer to facilities program meeting minutes from 06.20.14
29. Observation

**GENERAL CRITERIA**
Description: Observation spaces are located directly adjacent to Self-Contained SPED Classrooms, with access from the corridor to reduce disruption of the classroom and to allow for observation of the student in the authentic learning environment.

Observation rooms are equipped with mirrored windows to allow for discrete observation by staff and parents into both the Self-Contained SPED Classroom and the general classroom. This proximity provides maximum flexibility if the future student population requires the adjacent general classroom to be used as a partial inclusion or substantially separate SPED classroom. The Observation room will also have a window into the adjacent Therapeutic Planning room, to facilitate safe monitoring of a de-escalating student.

Quantity: (9), one per SPED Classroom
Area: 75 SF

**Users:**
- 1-3 Staff members

**Adjacencies:**
- Directly adjacency to Self-Contained SPED classrooms, access from main corridor.

**Orientation/Views:**

**MILLWORK/CASEWORK**
Millwork (in GC contract):
- NA

**SPECIALTIES**
Visual Display Boards/Accessories:
- NA

Window Treatments:
- Mirrored “one way” window into each classroom and into Therapeutic Planning when possible.

Miscellaneous:
TECHNICAL CRITERIA

Finish Hardware:
- Door closers
- Vision lite in door

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient vinyl
- Walls: Painted GWB
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Observation and adjacent spaces: 52

Plumbing:
- NA

Mechanical:
- Air Conditioned

Lighting:
- (1) 2x4 recessed LED fixture
- ON/OFF controls inside the door

FIXTURES, FURNITURE & EQUIPMENT: (FF&E NOT IN G.C. CONTRACT)

Fixtures:
- (1) 30” Table and (3) Chairs

Equipment

OTHER INFORMATION

NOTES:
30. Common

**GENERAL CRITERIA**
Description: Multipurpose spaces centrally located in within each classroom wing, used for team projects, team presentations, tutorials etc. Also may serves as a group instruction space for combined classrooms or grade levels.

Quantity: 4; one per floor in both classroom wings.

Area: 475 SF

Users:
- 4-30 Students

Adjacencies:
- Classroom clusters
- Learning Labs

Orientation/Views:

**MILLWORK/CASEWORK**
Millwork (in GC contract):
- NA

**SPECIALTIES**
Visual Display Boards/Accessories:
- (1) Interactive smart board with (1) Eno short throw projector
- (2) 8’ Magnetic Markerboards

Window Treatments:

Miscellaneous:
TECHNICAL CRITERIA

Finish Hardware:

Architectural Finishes:
- Floor: Linoleum
- Base: 4” Resilient vinyl
- Walls: GWB, Painted
- Ceiling: ACT

Acoustical Requirements:
- Sound Transmission Coefficient (STC) rating at partitions between Common and adjacent spaces: 50-52

Plumbing:
- NA

Mechanical:
- Air Conditioning

Lighting:
- (4) 2x4 recessed LED fixtures with (2) combination occupancy/daylight sensors

Electrical:
- (4) general duplex receptacles
- (1) quad receptacle for projector
- (2) quad receptacle for computer workstations

Data/Communications:
- (2) hardwired data outlets (2 data ports) for workstations
- (1) interactive short-throw projector connections
- (1) wall phone outlet (1 data port) and (1) telephone handset (wall-mounted)

Public Address/Clock:
- (1) analog clock
- (1) PA ceiling speaker

Fire Alarm:
- 15 candela audiovisual device

Equipment
- (4) Student computer stations
- (1) Eno short throw projector
- (1) Interactive display board

FIXTURES, FURNITURE & EQUIPMENT

Fixtures:

Furniture:
- (2) 4’ mobile tables
- (8) Student chairs
- (2) 6’ Computer tables with (4) chairs

OTHER INFORMATION

NOTES:
4.1.2 SCHEMATIC DESIGN BINDER

M. Reimbursement Rate
## Anticipated Reimbursement Rate with Incentive Points

<table>
<thead>
<tr>
<th>Category</th>
<th>Reimbursement Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reimbursement Rate before Incentives</td>
<td>78.95%</td>
</tr>
<tr>
<td>(0-2) Maintenance</td>
<td>1.48</td>
</tr>
<tr>
<td>(0-1) CM @ Risk</td>
<td>1.00</td>
</tr>
<tr>
<td>(0-6) Newly Formed Regional School District</td>
<td>0</td>
</tr>
<tr>
<td>(0-5) Major Reconstruction or Reno/Reuse</td>
<td>0</td>
</tr>
<tr>
<td>(0-1) Overlay Zoning District – c. 40R or c. 40S</td>
<td>0</td>
</tr>
<tr>
<td>(0-0.50) Overlay Zoning 100 Units or 50% units for 1, 2, 3 family units</td>
<td>0</td>
</tr>
<tr>
<td>(0-2) Energy Efficiency – &quot;Green Schools&quot;</td>
<td>2.00</td>
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<tr>
<td>(5) Model Schools</td>
<td>0</td>
</tr>
<tr>
<td>Total Incentive Points</td>
<td>4.48</td>
</tr>
</tbody>
</table>

Anticipated MSBA Reimbursement Rate with Incentives: 83.43%

Reimbursement rate is capped at **80%**, the MSBA maximum reimbursement rate.
4.1.2 SCHEMATIC DESIGN BINDER

Q. Design Work Plan
Nelson Place Elementary School  
35 Nelson Place, Worcester, MA 01605

4.1.2 SCHEMATIC DESIGN BINDER
Q. Design Work Plan

- School Building Committee Vote on Schematic Design Submission: December 8, 2014
- Schematic Design MSBA Submission: December 11, 2014
- Design Development Phase and MSBA Submission: December 2014 - April 2015
- Project Scope and Budget conference with MSBA: January 12, 2015
- MSBA Board Meeting and Vote to approve Schematic Design: January 14, 2015
- City Council vote for Funding the Project: February 24, 2015
- 60% CD Phase and MSBA Submission: April 2015 – July 2015
- 90% CD Phase and MSBA Submission: July 2015 – October 2015
- 100% CD's complete: December 2015
4.1.2 SCHEMATIC DESIGN BINDER

R. Project Schedule
<table>
<thead>
<tr>
<th>ID</th>
<th>Task Name</th>
<th>Duration</th>
<th>Start</th>
<th>Finish</th>
<th>1st Quarter</th>
<th>2nd Quarter</th>
<th>3rd Quarter</th>
<th>4th Quarter</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Worcester/Nelson Place School Summary Schedule</td>
<td>240 days</td>
<td>Tue 11/15/13</td>
<td>Mon 10/6/14</td>
<td></td>
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<tr>
<td>2</td>
<td>Designer Selection</td>
<td>6 days</td>
<td>Tue 11/16/13</td>
<td>Tue 11/15/13</td>
<td>11/16/13</td>
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<tr>
<td>3</td>
<td>Designer Selection Panel Meeting - Interview Top Three Applicants, Rank Top Applicant</td>
<td>9 days</td>
<td>Tue 11/15/13</td>
<td>Tue 11/13/13</td>
<td>11/15/13</td>
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<tr>
<td>4</td>
<td>Feasibility Study</td>
<td>13 days</td>
<td>Tue 12/3/13</td>
<td>Wed 12/4/14</td>
<td>12/3/13</td>
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<tr>
<td>5</td>
<td>Negotiate Contract Fee with Architect</td>
<td>13 days</td>
<td>Wed 1/20/13</td>
<td>Fri 1/24/13</td>
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<tr>
<td>6</td>
<td>Project team meeting with School representatives</td>
<td>2 days</td>
<td>Tue 12/10/13</td>
<td>Wed 12/11/13</td>
<td>12/10/13</td>
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<tr>
<td>7</td>
<td>Project team meeting with Building Committee and Community</td>
<td>1 day</td>
<td>Mon 12/9/13</td>
<td>Mon 12/10/13</td>
<td>12/9/13</td>
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<tr>
<td>8</td>
<td>Commence activities with Architect for Preliminary Design Program (PDP)</td>
<td>60 days</td>
<td>Mon 12/13/13</td>
<td>Mon 2/18/14</td>
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<tr>
<td>9</td>
<td>Site review meeting</td>
<td>1 day</td>
<td>Mon 12/10/13</td>
<td>Mon 12/10/13</td>
<td>12/10/13</td>
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<td>10</td>
<td>Educational Meeting for PDP</td>
<td>1 day</td>
<td>Wed 12/11/13</td>
<td>Wed 12/11/13</td>
<td>12/11/13</td>
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<td>11</td>
<td>Kick off meeting with MSBA</td>
<td>1 day</td>
<td>Wed 1/6/14</td>
<td>Wed 1/6/14</td>
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<tr>
<td>12</td>
<td>School Building Committee meeting - Approval vote for PDP</td>
<td>1 day</td>
<td>Mon 2/24/14</td>
<td>Mon 2/24/14</td>
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<tr>
<td>13</td>
<td>Submit PDP to MSBA for comment and input</td>
<td>1 day</td>
<td>Mon 3/3/14</td>
<td>Mon 3/3/14</td>
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<tr>
<td>14</td>
<td>Public Information meeting</td>
<td>1 day</td>
<td>Mon 3/3/14</td>
<td>Mon 3/3/14</td>
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<tr>
<td>15</td>
<td>MSBA review, comment and input for PDP submission</td>
<td>20 days</td>
<td>Mon 3/1/14</td>
<td>Mon 3/21/14</td>
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<tr>
<td>16</td>
<td>City to establish site constraints for Design scheme</td>
<td>18 days</td>
<td>Wed 3/26/14</td>
<td>Fri 4/1/14</td>
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<td>17</td>
<td>Project team response to MSBA PDP comments</td>
<td>4 days</td>
<td>Fri 3/28/14</td>
<td>Wed 4/4/14</td>
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<tr>
<td>18</td>
<td>Commence activities with Architect for PREFERRED SCHEMATIC REPORT (PSR)</td>
<td>46 days</td>
<td>Fri 3/9/14</td>
<td>Fri 5/1/14</td>
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<td>19</td>
<td>Review PSR with VIPS personnel</td>
<td>1 day</td>
<td>Mon 4/28/14</td>
<td>Mon 4/29/14</td>
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<td>20</td>
<td>PSR Option estimates</td>
<td>11 days</td>
<td>Fri 5/2/14</td>
<td>Fri 5/18/14</td>
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<td>21</td>
<td>Public information meeting for PSR</td>
<td>1 day</td>
<td>Mon 5/19/14</td>
<td>Mon 5/19/14</td>
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<tr>
<td>22</td>
<td>School Building Committee presentation and Vote for PSR</td>
<td>1 day</td>
<td>Mon 6/2/14</td>
<td>Mon 6/2/14</td>
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<td>23</td>
<td>Submit PSR to MSBA for review</td>
<td>1 day</td>
<td>Thu 6/3/14</td>
<td>Thu 6/3/14</td>
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<td>24</td>
<td>MSBA Subcommittee review of PSR</td>
<td>19 days</td>
<td>Fri 6/4/14</td>
<td>Wed 6/14/14</td>
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<td>25</td>
<td>LPA Provide updated PSR plans for submission to MSBA</td>
<td>1 day</td>
<td>Thu 7/10/14</td>
<td>Thu 7/10/14</td>
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<tr>
<td>26</td>
<td>MSBA review meeting with Project team for FAS</td>
<td>1 month</td>
<td>Wed 7/9/14</td>
<td>Wed 7/9/14</td>
<td></td>
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<tr>
<td>27</td>
<td>MSBA Board Approval of Fee, Study for SD</td>
<td>1 day</td>
<td>Mon 7/13/14</td>
<td>Mon 7/13/14</td>
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<td>28</td>
<td>PSR COMMENTS RETURNED TO MSBA</td>
<td>1 day</td>
<td>Thu 7/24/14</td>
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<td>29</td>
<td>Submit FS Completion Checklist</td>
<td>16 days</td>
<td>Thu 8/25/14</td>
<td>Mon 9/1/14</td>
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<td>30</td>
<td>Schematic Design</td>
<td>279 days</td>
<td>Mon 9/22/15</td>
<td>Thu 7/16/15</td>
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<td>31</td>
<td>User needs meeting and assessments</td>
<td>11 days</td>
<td>Mon 9/23/15</td>
<td>Mon 7/17/15</td>
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<tr>
<td>32</td>
<td>LPA prepare SD Building and Site layout for review</td>
<td>22 days</td>
<td>Thu 7/9/14</td>
<td>Wed 8/6/14</td>
<td></td>
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<tr>
<td>33</td>
<td>Project team review Building and Site layout for comment</td>
<td>4 days</td>
<td>Thu 8/7/14</td>
<td>Thu 8/12/14</td>
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<tr>
<td>34</td>
<td>LPA revise Building and Site layout per comments from Project team</td>
<td>3 days</td>
<td>Fri 8/13/14</td>
<td>Fri 8/15/14</td>
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<tr>
<td>35</td>
<td>LPA prepare SD BUILDING ENVELOPE for review</td>
<td>45 days</td>
<td>Mon 9/8/14</td>
<td>Mon 9/8/14</td>
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<td>36</td>
<td>NetZero criteria required by LPA</td>
<td>1 day</td>
<td>Thu 7/8/14</td>
<td>Thu 7/8/14</td>
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<tr>
<td>37</td>
<td>Project team review BUILDING ENVELOPE for comment from Project team</td>
<td>3 days</td>
<td>Thu 9/11/14</td>
<td>Thu 9/11/14</td>
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<tr>
<td>38</td>
<td>LPA revise BUILDING ENVELOPE per comments from Project team</td>
<td>4 days</td>
<td>Fri 9/12/14</td>
<td>Wed 9/17/14</td>
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<tr>
<td>39</td>
<td>LPA prepare ARCH, MEP and SITE SD Drawings for review</td>
<td>58 days</td>
<td>Thu 7/8/14</td>
<td>Thu 9/29/14</td>
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<td>40</td>
<td>Project team review ARCH, MEP and SITE SD Drawings for review</td>
<td>6 days</td>
<td>Fri 9/20/14</td>
<td>Fri 10/3/14</td>
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<tr>
<td>41</td>
<td>LPA revise ARCH, MEP and SITE SD Drawings for comment</td>
<td>18 days</td>
<td>Mon 10/6/14</td>
<td>Wed 10/29/14</td>
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<tr>
<td>42</td>
<td>Submit SD Drawings to COST ESTIMATORS LPA/OPM</td>
<td>5 days</td>
<td>Thu 10/25/14</td>
<td>Wed 11/5/14</td>
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<tr>
<td>43</td>
<td>Prepare Cost Estimates as needed LPA/OPM</td>
<td>11 days</td>
<td>Thu 11/16/14</td>
<td>Thu 11/12/14</td>
<td></td>
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<td>44</td>
<td>Designer fee proposal negotiation for CD &amp; CA</td>
<td>10 days</td>
<td>Thu 11/16/14</td>
<td>Wed 11/19/14</td>
<td></td>
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<tr>
<td>45</td>
<td>OPM fee proposal negotiation for CD &amp; CA</td>
<td>10 days</td>
<td>Thu 11/16/14</td>
<td>Thu 11/19/14</td>
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<tr>
<td>46</td>
<td>Recalculate Cost Estimates Between TOCCM and LPA</td>
<td>3 days</td>
<td>Fri 11/22/14</td>
<td>Tue 11/29/14</td>
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<tr>
<td>47</td>
<td>Formal Submission of Appendix 4C to MSBA</td>
<td>1 day</td>
<td>Wed 11/25/14</td>
<td>Wed 11/25/14</td>
<td></td>
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<tr>
<td>48</td>
<td>Prepare DESE by CoW</td>
<td>15 days</td>
<td>Tue 10/30/14</td>
<td>Wed 11/16/14</td>
<td></td>
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<td>49</td>
<td>Provide Formal DESE Submission to MSBA</td>
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<td>Thu 11/20/14</td>
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<td></td>
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<tr>
<td>50</td>
<td>Completion of Schematic Design Package - Part Module 4.1</td>
<td>27 days</td>
<td>Fri 12/25/14</td>
<td>Thu 1/26/15</td>
<td></td>
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<tr>
<td>51</td>
<td>Project Team Review of Schematic Design Package</td>
<td>3 days</td>
<td>Mon 12/8/14</td>
<td>Wed 12/10/14</td>
<td></td>
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</tr>
</tbody>
</table>

Tishman Construction Corp. of MA
An AECOM Co.
4.1.2 SCHEMATIC DESIGN BINDER

S. Value Engineering Analysis
The Schematic budget pricing contained three “Schematic Add Alternates” and the estimators were asked to isolate a number of items as potential value items. The initial schematic estimated numbers by both estimators were roughly the same, however were higher than the City’s construction budget. First the Estimates were reconciled to be in agreement for scope. Then a list of potential VE items was formulated, and the estimators together established reasonable values for each of these items. The Owner then selected which items were to be omitted from the schematic project scope. Also the owner directed that the “schematic add alternates” will also not be included in the scope.

The Owner requested that the budget estimate and design documents be updated to reflect the omission of the precast cornice banding, as this would have an effect on the aesthetic of the building, and assure that what was presented was approved by them without the precast band. This was done and the drawings in the Schematic Design set have been updated with this item.

(1) The other “VE” items will be implemented into the drawings and specifications during the future DD phase.

Follow is a matrix outlining the items discussed, their associated round estimated value, and noting which items were accepted. The Designer’s estimator, A.M. Fogarty, then re-estimated these discussed items, based on actual quantities, and updated their estimate with these items; therefore figures will not be the same as the originally estimated numbers.

<table>
<thead>
<tr>
<th>COST SAVINGS DEDUCTUIONS:</th>
<th>Accepted Value (Deduct)</th>
<th>Declined Value Add (Deduct)</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bathroom Wall Tile height from 7’ to 4’ at Non-wet walls (excl. gang bathrooms)</td>
<td>($32,000)</td>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Lower Corridor Ceramic wall tile from 7’ down to 6’</td>
<td>($40,000)</td>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Substitute Rubber Tread ILO Terrazzo</td>
<td>($20,000)</td>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Reduce Area of Corridor Transom by 1/3</td>
<td>($35,000)</td>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Delete Repaving of Nelson Place (performed by DPW&amp;P out of contract)</td>
<td>($120,000)</td>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Substitute Aluminum Feeder for Electrical distribution</td>
<td>($45,000)</td>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Reduce Planting by 30%</td>
<td>($40,000)</td>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Change 30% of concrete walkway to bituminous pavement</td>
<td>($45,000)</td>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>Delete 8’ Water Main Loop (stop Main at Fire Hydrant)</td>
<td>($70,000)</td>
<td></td>
<td>(1)</td>
</tr>
<tr>
<td>In lieu of Precast Cornice, substitute brick veneer</td>
<td>($75,000)</td>
<td></td>
<td>SD Drawings updated to reflect</td>
</tr>
<tr>
<td>Delete Metal Backer panel and substitute</td>
<td>($366,000)</td>
<td></td>
<td>(1)</td>
</tr>
</tbody>
</table>
### Nelson Place Elementary School
35 Nelson Place, Worcester, MA 01605

#### SCHEMATIC DESIGN

4.1.2 SCHEMATIC DESIGN BINDER

S. Value Engineering Analysis

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Cost</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional 4’ Insulated/sheathing and A&amp;V</td>
<td></td>
<td></td>
</tr>
<tr>
<td>In lieu of Precast Parapet Cap, Substitute Aluminum coping</td>
<td>($138,000)</td>
<td>SD Drawings updated to reflect</td>
</tr>
<tr>
<td>Delete Canopy soffit cladding (assume painted/galvanized decking/exposed structure)</td>
<td>($188,000)</td>
<td></td>
</tr>
<tr>
<td>Delete Masonry Column Enclosure (precast or natural fieldstone base to remain)</td>
<td>($98,000)</td>
<td>(1)</td>
</tr>
<tr>
<td>Bituminous concrete curbs ILO 1/2 of granite curbs at driveway</td>
<td>($85,000)</td>
<td>(1)</td>
</tr>
<tr>
<td>Delete stud cavity Mineral wool insulation</td>
<td>($115,000)</td>
<td>(1)</td>
</tr>
<tr>
<td>Revise part of site retaining wall from concrete to modular block wall</td>
<td>($80,000)</td>
<td>(1)</td>
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</tbody>
</table>

**TOTAL OF ITEMS NOT TO BE INCLUDED IN THE PROJECT**

($1,592,000)

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<thead>
<tr>
<th>Item Description</th>
<th>Cost</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Delete rear canopy</td>
<td>($60,000)</td>
<td></td>
</tr>
<tr>
<td>Delete Precast Watertable</td>
<td>($62,000)</td>
<td></td>
</tr>
<tr>
<td>Delete M1 and M2 Casework, purchase as part of FF&amp;E</td>
<td>($90,000)</td>
<td>Cost adjustment savings</td>
</tr>
<tr>
<td>Reduce scope of exterior aluminum sun shade</td>
<td>($37,964)</td>
<td></td>
</tr>
<tr>
<td>Reduction of 8” floor to floor height change</td>
<td>($100,000)</td>
<td>Review - clearances req’d, not recommended</td>
</tr>
<tr>
<td>Poured rubber floor ILO Wood floor at Gym</td>
<td>($48,000)</td>
<td></td>
</tr>
<tr>
<td>Linoleum floor tile ILO VCT Tile</td>
<td>($195,000)</td>
<td></td>
</tr>
<tr>
<td>Reduce Kitchen Equipment scope - Blast Chiller</td>
<td>($35,000)</td>
<td></td>
</tr>
<tr>
<td>Bar Joists at roof of classrooms wings ILO steel</td>
<td>($100,000)</td>
<td>Structural Eng. advised, not acceptable</td>
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</table>

**TOTAL OF ITEMS REVIEWED, TO REMAIN IN PROJECT**

$690,000

#### SCHEMATIC ALTERNATES

<table>
<thead>
<tr>
<th>Item Description</th>
<th>Cost</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Add skylights</td>
<td>$51,022</td>
<td>Add not accepted</td>
</tr>
<tr>
<td>BB resilient glass: use laminated glass as the outer pane</td>
<td>$130,447</td>
<td>Add not accepted</td>
</tr>
<tr>
<td>Add geothermal wells/system</td>
<td>$1,072,414</td>
<td>Add not accepted</td>
</tr>
</tbody>
</table>

**TOTAL OF SCHEMATIC ALTERNATES NOT TO BE INCLUDED IN THE PROJECT**

$1,253,883
4.1.2 SCHEMATIC DESIGN BINDER

T. Local Actions and Approvals
   1. Local Actions & Approvals
   2. Meeting Minutes
December 8, 2014

Ms. Diane Sullivan
Senior Capital Program Manager
40 Broad Street, Suite 500
Boston, Massachusetts 02109

Dear Ms. Sullivan:

The City of Worcester, School Building Committee ("SBC") has completed review of the Schematic Design Submittal for the Nelson Place Elementary School project and voted to approve and authorize the OPM to submit the Schematic Design related submittals to the MSBA for consideration on Monday, December 8, 2014. A certified copy of the SBC meeting minutes, which includes the specific language of the vote and the number of votes in favor, opposed and abstained, are attached.

The SBC held two (2) meetings regarding the Nelson Place Elementary School project since the MSBA Board of Directors approved the District to proceed into Schematic Design on Wednesday, July 30, 2014.

- October 27, 2014. 35 Nelson Place, Worcester, MA 01605 at 7:00 PM. Department of Public Works & Parks presenting. See attached meeting information.
- December 8, 2014. 35 Nelson Place, Worcester, MA 01605 at 7:00 PM. Department of Public Works & Parks presenting. See attached meeting information.

In summary these meetings included:
- Project Team Introductions
- Meeting Agenda and Project Summary
- Proposed Project Schedule summarized by the Owner’s Project Manager, Tishman Construction.
- Presentation of the Schematic Design by the Architect, Lamoureaux Pagano Associates.
- SBC Roll-Call Vote to approve the Schematic Design Submittal for submission to the MSBA.

In addition to the SBC meetings listed above, the District held one (1) public hearing, which was posted in compliance with the Open Meeting Law, at which the Nelson Place Elementary School project was discussed.

- September 15, 2014. 35 Nelson Place, Worcester, MA 01605 at 7:00 PM. Department of Public Works & Parks presenting. See attached meeting information.
The meeting presentation materials, meeting minutes and summary materials as they relate to the Nelson Place Elementary School project are available for public review at the Worcester Public Schools, Nelson Place School Website: www.nelsonplace.worcesterschools.org.

Additionally, hardcopies of the Preliminary Design Program (PDP), Preferred Schematic Report (PSR) and Schematic Design Submittal (SDS) are available for public review at Mayor Petty’s Office at Worcester City Hall, Main Street, Worcester.

To the best of my knowledge the meetings listed above comply with the requirements of the Open Meeting Law, M.G.L. c. 30A, §§18-25 and 940 CMR 29.00: Open Meetings.

The District has named Julie Lynch, Architect as the local point of contact to receive questions.

By signing this Local Action Certification, I hereby certify that, to the best of my knowledge and belief, that the information supplied by the District is true, complete and accurate.

By: Edward M. Augustus, Jr.  
Title: Chief Executive Officer  
Date: 12-8-14

By signing this Local Action Certification, I hereby certify that, to the best of my knowledge and belief, that the information supplied by the District is true, complete and accurate.

By: Dr. Melinda Boone  
Title: Superintendent of Schools  
Date: 12-8-14

By signing this Local Action Certification, I hereby certify that, to the best of my knowledge and belief, that the information supplied by the District is true, complete and accurate.

By: Mayor Joseph Petty  
Title: Chair of the School Committee  
Date: 12-8-14
Nelson Place School
Public Hearing Agenda
Meeting Date
Monday, September 15, 2014, 7:00pm – 9:00pm

1. INTRODUCTIONS, PROJECT OVERVIEW and UPDATE
   Julie A. Lynch, Architect, DPW+P Architectural Services

2. SCHEDULE SUMMARY
   Tishman Construction, Owner’s Project Manager

3. PROGRESS on Schematic Design
   Lamoureux Pagano Associates, Architects

4. QUESTION AND ANSWER
   Julie A. Lynch, Moderator

Meeting Schedule:

**Monday, October 27, 2014 at 7:00 – 8:30pm**
**NPS School Building Committee Update** at Nelson Place School
   Topic: Schematic Design Review.

**Monday, December 8, 2014 at 7:00 – 8:30pm**
**NPS Building Committee Meeting and VOTE** at Nelson Place School
   Topic: Review and Vote of Approval for Schematic Design by NPS Building Committee.

NOTE:
- Worcester Public Schools, Nelson Place School Website for link to all Feasibility Study Documents: [www.nelsonplace.worcesterschools.org](http://www.nelsonplace.worcesterschools.org)
- Hardcopies of the Preliminary Design Program (PDP) and Preferred Schematic Report (PSR) are available for public review at Mayor Joseph Petty’s Office at Worcester City Hall, Main Street, Worcester.

Refer comments and questions to:
Julie Lynch, Architect, City of Worcester
lynchja@ worcesterma.gov
508-799-8574
Nelson Place Elementary School

Public Hearing Summary

Meeting Date:
Monday, September 15, 2014, 7:00PM – 9:00PM

Introductions

Introductions of project team members and current project status overview provided by Worcester Department of Public Works & Parks. Project team members in attendance include:

City of Worcester, Department of Public Works & Parks (WDPW)
Julie Lynch
K. Russell Adams

Lamoureux Pagano Associates, Architect (LPA)
Robert Para, Jr., AIA
Michael A. Pagano, AIA
Christina Snyder, LEED BD+C

Tishman Construction Corp. of MA, Owner’s Project Manager (TCCMA)
Erick Bakstran

WDPW noted the following upcoming meeting schedule:

**Monday, October 27, 2014 at 7:00PM – 8:30PM**
NPS School Building Committee Update at Nelson Place School
Topic: Schematic Design Review

**Monday, December 8, 2014 at 7:00PM – 8:30PM**
NPS Building Committee Meeting & VOTE at Nelson Place School
Topic: Review and vote for approval for Schematic Design by NPS Building Committee

Schedule Update

S1 Tishman Construction Corp. of MA (TCCMA) provided a brief schedule update based on the Lamoureux Pagano Associates (LPA) slide presentation. TCCMA noted the project is currently in the Schematic Design phase. The current start of Construction is expected to be January/February 2016. TCCMA noted the current schedule anticipates the new NPS will be open by the start of classes in September 2017.

S2 Comment was raised by the public that the current start of construction in January/February 2016 is later than what had been communicated previously. Worcester Department of Public Works & Parks (WDPW) confirmed that the current schedule does show construction beginning slightly later.

S3 Question was raised regarding the start of site work and potential blasting of ledge. TCCMA stated that any blasting of ledge would occur during the preliminary site work phase of Construction, and would also be weather dependent to some degree. Any potential blasting of ledge would likely occur during the spring of 2016.
Program Overview

P1 LPA provided an update and overview of the current site plan and building floor plans, including a status update of the geotechnical survey efforts performed during August of 2014. LPA illustrated the differences between the previous site/building configuration and the most recent schematic design. LPA provided a narrative of the anticipated flow of traffic for: buses, student vans, parent pick-up and drop-off, staff parking and deliveries.

P2 LPA noted that findings from the test pits and site borings should be issued via report from the geotechnical engineer in the next couple of weeks.

P3 LPA explained the current anticipated phasing of the project, consisting of three (3) phases:

Phase 1 – Primary site development and construction of the new building
Phase 2 – Demolition of the existing school gymnasium and expanded site access
Phase 3 – Demolition of the existing NPS and completion of site improvements/landscaping

P4 It was confirmed by both LPA and WDPW that contractor parking during construction would be arranged for off-site at location(s) to be determined.

Question & Answer

Q1 Question posed regarding the “tightness” of the new building, and whether or not the new mechanical systems will include make-up air. LPA confirmed the new building would be very tight with respect to outside air and moisture infiltration, and that the new building would indeed have make-up air available to all occupied spaces.

Q2 Question posed regarding the inclusion of energy recovery wheels and/or VRF (variable refrigerant flow) systems in the new buildings design. LPA noted that multiple high efficiency and renewable energy based systems were under consideration for the new building, and that decisions would be made over the course of the Schematic Design phase. WDPW stated they have enlisted the services of a sustainable energy consultant (The Green Engineer, Inc.) to assist with this effort.

Q3 Questions posed regarding the design of the proposed access road, including: surface material, lighting requirements, access control (bollards), plowing frequency, etc. The individual requested that the final surface be 100% permeable, and that any proposed lighting be minimal, if required at all. WDPW confirmed the access road was deemed necessary by the City’s security consultant. Final materials and lighting are still being designed with an emphasis on minimizing the impact of the access road on the surrounding neighbors.

Q4 Question posed regarding the latest parking configuration. WDPW confirmed the latest parking configuration is based on minimizing the number of cars that will be visible from Nelson Place, as this was a concern raised by the public at previous meetings. The current configuration includes some parking at the north east corner of the site, with a second lot located at the south west corner of the site.

Q5 Question posed regarding the future lighting along the proposed access road. It was requested that the lighting be located closer to grade to minimize the impact to the surrounding area. WDPD stated there are vandalism concerns with locating the lighting too close to grade, but that the request would be considered as the design progresses.

Q6 Question posed regarding the anticipated blasting of ledge for the new building, including locations, quantity, schedule, proximity to adjacent buildings, etc. LPA noted that the exact location of required blasting will not be known until the report on the test pits and borings is issued by the geotechnical engineer. LPA confirmed that any blasting would only be performed after a complete survey, pre-planning, sequence and safety precautions have been established by the Contractor, and agreed to by the Owner and A/E.
Q7 Question posed regarding whether or not blasting would occur while the existing school was in session. WDPW stated it has not yet been determined if that would occur. WDPW noted that their structural engineer is closely monitoring the condition of the existing structure for signs of movement, and will continue to do so through the course of the project. Blasting will only be permitted once it has been deemed safe to proceed.

Q8 Question posed regarding radon mitigation measure included in the future building. LPA confirmed the future building will include below slab radon mitigation measure, including roof top fans connected to the emergency power circuit(s).

Q9 Question posed regarding the change in the amount of land being taken by the City in the current design versus what was presented previously. LPA stated that the ring road and site limits along the east edge of the site have been moved approximately 40 feet to the west. WDPW noted that not all of the land taken for the construction of the new building would be required in the final condition. WDPW noted a portion of the land would be returned to the neighbors in a landscaped state.

Q10 Question posed regarding the design of the buffer zone along the access road. WDPW stated that many of the mature trees currently on the site between the neighbors and the proposed access road will be protected and remain in place. LPA noted the future design includes a slight earthen berm and native evergreen species to mitigate the impact of the access road on the adjacent neighbors.

Q11 Question posed regarding the number of exit points from the site, and how the exits of the building will be monitored by the school staff. WDPW stated the current design of the building and site provides for bus and van access and egress from the easterly drive. Parents picking up or dropping off would access the site from the easterly drive, circulate around the building to the west elevation where they will pick up or drop off, then exit the site from the westerly drive. The design intent was to eliminate any temporary parking on Nelson Place, and provide for an efficient flow of traffic onto and away from the site.

Q12 Question posed regarding the necessity of the rear parking lot currently shown on the site plan, and the possibility of increasing the size and capacity of the front parking lot and decreasing the size, or completely eliminating the rear parking lot. The individual requested that the City reconsider locating this lot where it is shown, preserving the wooded area currently there. WDPW noted that the current parking configuration was based on previous concerns raised by the public regarding excessive parking visible from Nelson Place, but they and the Designer would reevaluate the scheme. Additionally, WPW noted that by providing parking at the rear of the building, a larger contiguous play space was created along Nelson Place. Play space visible from the street was requested at previous Public Hearings.

Q13 Question was posed regarding any incentives to the future contractor to complete the project on time. WDPW stated that the CM at Risk contract would contain provisions, such as liquidated damages, to ensure the project is completed on or ahead of schedule.

Q14 Question posed regarding the total anticipated amount of soil cut and fill required, and how that translates into quantity of trucks accessing the site. LPA stated the current cut and fill estimate is approximately 50,000 cubic yards. The desire is to retain and reuse as much soil on site rather than dispose of the existing and import new. It will depend on the character of the soil, and whether or not it is deemed acceptable by the structural engineer.

Q15 Question posed regarding the necessity of the emergency access road, and which authority was requiring it. WDPW reiterated the access road was not a requirement of the Worcester Fire Department. Rather, it was a recommendation of the City’s security consultant. LPA stated the future road would primarily follow the existing grade. The expectation is that snow will be plowed to the edges similar to any other roadway.
Q16 Question posed regarding current state of surface water run-off, and how the new site/building design will impact the surrounding areas. Individual noted previous instances of flooding, and their concern that the new site design would only increase the chance of flooding. WDPW stated the new site design will include infrastructure (catch basin, curbing, underground holding tank, etc.) to capture and manage any run-off coming from the new paved areas. WDPW stated the new site would not add any run-off to the adjacent isolated land subject to flooding (ILSF).

Q17 Question posed regarding the possibility of including new sidewalks along Hapgood Street in the scope of work of this project, citing safety concerns. WDPW stated that new sidewalks along Hapgood Street are not currently part of the project. WDPW clarified that any future sidewalks along Hapgood Street would be assessed against the adjacent residents.

Q18 Question posed regarding the incorporation of a green roof on the project. WDPW stated that there are no plans to include a green, or vegetative, roof, as the long term maintenance concerns would be prohibitive. WDPW stated that the majority of the flat roof areas of the building will accommodate photo voltaic panels.

Q19 Question posed regarding the roof configuration of the future building, citing concern over inherent problems of leaks and flat roofs. WDPW stated that most of the roof area of the new building would be flat, but emphasized the stringent warranty requirements that will be included in the Specifications to ensure the roof is constructed properly. WDPW did note that the design will strive to compliment the surrounding area by including some degree of sloped roof areas/awnings.

End of meeting.

These summary comments reflect Tishman Construction Corporation of MA’s interpretation of the discussions that took place. Any discrepancies or omissions should be brought to the author’s attention immediately. This summary shall be included as part of the Project record.

Prepared By: Erick Bakstran, Project Manager, TCCMA Date: September 16, 2014
Nelson Place Elementary School

Schematic Design Project Update
September 15th, 2014

Agenda:
• Introductions, Project Overview & Update: Julie Lynch, DPW+P Architectural Services
• Schedule Summary: Tishman Construction
• Schematic Design Progress: LPA
• Question and Answer
UPCOMING DATES:

- NPS School Bldg. Committee Update: Oct. 27, 2014
- Budget Review: Nov. 5-Dec. 5 2014
- DESE Submission: Dec. 5, 2014
- NPS School Bldg. Committee Update: Dec. 8 2014
- MSBA Schematic Design Submission: Dec. 11, 2014
PROGRAM OVERVIEW:

- 600 Students, Pre-K through 6th grade
- 110,000 square foot building
- Integrated Autism and Special Education programs
- 140 Daily parking spaces
- Separated bus, parent, SPED & Pre-K pick-up areas
- 10-12 Buses, staggered arrival and departure
- 10 Half-size buses, staggered arrival and departure
- 5 After-school vans
- Fenced in play areas, separated by age group
- Service & delivery area, no loading dock
- Parent pick-up areas, rolling queue
- Secondary access
- Sustainable Design / Zero Net Energy Goal
City of Worcester

- Multiple play areas separated by age group
- Parking arrangement is flexible, can be shifted to front or developed into play areas
- Central administration & lobby for circulation control and safety
- Maximum flexibility in site circulation
- Pedestrian/emergency access to be a paved pedestrian-width path with adequate clearance for emergency vehicles.
- Allows maximum buffer zones between neighbors along property lines

PSR PREFERRED SOLUTION – OPTION C-2 - Site Plan

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<th>ADDITIONAL LAND</th>
<th>ACRES*</th>
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<tr>
<td>1 Land Acquisition</td>
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<tr>
<td>2 Land Acquisition</td>
<td>.29</td>
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<tr>
<td>5 Access &amp; Grading Easement</td>
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<tr>
<td>6 Grading Easement</td>
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</tr>
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</table>
SCHEMATIC DESIGN – Upper and Lower Floor Plans

Upper Floor Plan
18,600 SF

Lower Floor Plan
22,100 SF
SCHEMATIC DESIGN – Landscape Concepts

A. CONCEPT ELEVATION TOWARDS 7 REDWING LANE
1/8" = 1'-0"
SCHEMATIC DESIGN–Phasing Plan

PHASE I
Feb 2016-May 2017
- Fence & erosion control at perimeter
- Potential construction fill storage & parking area
- Extent FBD

PHASE II
May 2017-Aug. 2017
- Gym Demo & Access

PHASE III
June 2017/Sept. 2017
- Block retaining & solid wall/fence
- Building demo & site completion through Nov. 2017

City of Worcester

LAMOUREUX • PAGANO
ARCHITECTS • PROJECT MANAGERS
1. WELCOME and INTRODUCTIONS
   Mayor Petty
   DPW&P, Commissioner Moosey

2. MEETING AGENDA and PROJECT OVERVIEW
   Julie Lynch, DPW&P, Architectural Services

   Objective:
   Nelson Place School Building Committee review of Schematic Design prior to submission for estimating.

3. PROJECT SCHEDULE
   Tishman Construction, Owner’s Project Manager

4. PRESENTATION of the SCHEMATIC DESIGN
   Lamoureux Pagano Associates, Architects

5. QUESTION AND ANSWER
   Julie Lynch, Moderator

UPCOMING MEETING SCHEDULE:

- **Monday, December 8, 2014, 7:00pm - 8:30pm**
  Nelson Place School Building Committee Meeting for VOTE of APPROVAL:
  Topic: Review of Schematic Design and Vote of Approval by the Nelson Place School Building Committee.

NOTE:

- See Worcester Public Schools, Nelson Place School Website for link to all Feasibility Study Documents: [www.nelsonplace.worcesterschools.org](http://www.nelsonplace.worcesterschools.org)
- Hardcopies of the Preliminary Design Program (PDP) and Preferred Schematic Report (PSR) are available for public review at Mayor Petty’s Office at Worcester City Hall, Main Street, Worcester.
- Refer comments to:
  Julie Lynch, Architect, City of Worcester
  lynchja@ worcesterma.gov
Nelson Place Elementary School

School Building Committee Update Summary

Meeting Date:
Monday, October 27, 2014, 7:00PM – 8:30PM

Introductions

Introductions of project team members and current project status overview provided by Worcester Department of Public Works & Parks. Project team members in attendance include:

City of Worcester, Department of Public Works & Parks (WDPW)
Paul Moosey
Julie Lynch

Lamoureux Pagano Associates, Architect (LPA)
Robert Para, Jr., AIA
Michael A. Pagano, AIA
Christina Snyder, LEED BD+C

Tishman Construction Corp. of MA, Owner’s Project Manager (TCCMA)
Erick Bakstran

WDPW noted the following upcoming meeting schedule:

**Monday, December 8, 2014 at 7:00PM – 8:30PM**
**NPS Building Committee Meeting & VOTE** at Nelson Place School
Topic: Review and vote for approval for Schematic Design by NPS Building Committee

Schedule Update

S1 Tishman Construction Corp. of MA (TCCMA) provided a brief schedule update based on the Lamoureux Pagano Associates (LPA) slide presentation. TCCMA noted the project is currently in the Schematic Design phase. The current start of Construction is expected to be January/February 2016. TCCMA noted the current schedule anticipates the new NPS will be open by the start of classes in August 2017.

Program Overview

P1 LPA provided an update and overview of the current building design and program layout. New information provided included three dimensional renderings of the exterior elevations of the proposed school, and more detailed two dimensional building elevations and sections.

P2 LPA described the proposed site layout and anticipated traffic flows for buses, parents and deliveries. This included the proposed berm and tree plantings to create a buffer between the new loop road and the adjoining properties.

P3 LPA explained the current anticipated phasing of the project, consisting of three (3) phases:

Phase 1 – Primary site development and construction of the new building
Phase 2 – Demolition of the existing school gymnasium and expanded site access
Phase 3 – Demolition of the existing NPS and completion of site improvements/landscaping
P4 WDPW reiterated the primary program requirements for the new school, including:
- Pre-kindergarten through 6th Grade
- 110,000 SF
- 600 Students
- Morning and afternoon sessions for Kindergarten

**Question & Answer**

Q1 Question raised regarding the proposed start of site clearing. WDPW referred to the proposed CM at Risk delivery method being pursued for the Project, and explained this could enable the project to perform site clearing in advance of the current proposed start of construction, in February of 2016. More information would be available as the project and schedule are developed.

Q2 Question raised regarding the necessity of the rear parking lot, and what has changed since the previous discussion on September 15, 2014. WDPW stated the rear lot is necessary to provide the required number of spaces for the new building. WDPW clarified the number of spots represented at the rear lot has been reduced.

Q3 Question raised regarding any additional neighborhood impacts. WDPW stated there should be no additional impacts beyond items previously discussed. WDPW clarified the design for the emergency access road has been modified to reflect a ten foot wide drive lane and four feet of landscaping on either side. The access road will not be lit.

Q4 Question raised regarding the abatement of the existing building before and during the demolition. WDPW stated the abatement will be performed prior to the demolition of the building, and will be performed and managed in accordance with applicable MA DEP regulations.

Q5 Question raised regarding the volume and type of traffic that will utilize the west entrance of the loop road. WDPW clarified that the west entrance to the loop road will primarily be for supplies and deliveries. These deliveries will be made primarily via box trucks. WPS does not anticipate very many deliveries made via 18 wheel tractor trailer. WDPW noted that parents dropping off or picking up will exit the property via the west end of the loop road. The goal is to eliminate the on street double parking that is currently occurring during these times. WDPW also noted that Nelson Place will be widened to a consistent 24’ width.

Q6 Additional question raised regarding the necessity of the rear parking lot, including storm water run-off concerns and loitering during off hours. WDPW stated that all run-off generated during the construction of the project will be controlled by the Contractor. LPA clarified that a fence (black vinyl clad chain link) will be provided along the east and west limits of the property. WDPW reiterated that the majority of deliveries to the new school will be via box trucks.

Q7 Comment made that the front of the proposed building appears to be too much of a box, and can it be dressed up at all. WDPW stated the design is ongoing, and it is too early to tell exactly what the façade of the building will look like.

Q8 Question raised on the revised design of the emergency access road from the previous iteration, and how it will be coordinated with the relatively steep existing grades at that part of the site. WDPW clarified that the access road will only be 10’ wide with 4’ of open, flat area with grass at each side and landscaping beyond, and it will be situated as far back from the property line as is practical. The existing grade will be cut down in some areas to maintain a maximum grade of 5%.

Q9 Question raised regarding the availability of the current drawings. WDPW stated they should be available on the project web site identified on the meeting agenda. It was stated that not all of the information appeared to be available. WDPW to confirm all of the links are functioning properly.
Q10 Additional question raised on the necessity of the rear parking lot. LPA clarified that the lot had been pulled as much as 40’ in board of the property line. WDPW will confirm the final count of parking spaces to be provided within the lot. WDPW confirmed the rear parking lot is intended for teachers and staff working within the south end of the building. Signage and lighting will be provided. Visitor parking will be identified in front of the main entrance on the east side of the building.

Q11 Question raised regarding the duration of the drop off and pick up activities. WDPW and WPS clarified that this design is based on other schools with similar arrangements, and it has been observed to be very efficient. Total time for drop off or pick up is expected to be approximately 15 minutes.

Q12 Question raised regarding potential additional uses the new school building will serve. WDPW clarified that the new school will be a community building. It may contain a library that will open to the public at scheduled times, and some rental of the gymnasium is expected. WDPW confirmed that high school level basketball games will not be held at the new school, as the court will not be sufficiently sized.

Q13 Question raised regarding how much earlier than what is shown in the current schedule will activities begin on site. WDPW noted there will potentially be some “early packages” including site clearing and foundations, that could start prior to February of 2016, but every effort will be made to minimize the disturbance.

Q14 Question raised regarding the anticipated working hours during construction. TCCMA clarified that the contract will be written based on regular hours (7:00 AM to 3:30 PM, Monday through Friday, non-holiday). Overtime during the week and on weekends may occur, but only when necessary to recover lost time.

Q15 Question raised regarding off-site parking for construction workers. WDPW confirmed the current plan includes the use of an off-site parking lot for a majority of the construction workers, and buses to transport the workers to and from the site.

Q16 Question raised regarding the inclusion of a greenhouse in the future school design. WDPW stated the greenhouse does not have sufficient funding at this time. Fund raising will occur in the future.

Q17 Question raised regarding the distance the new school will be set back from Nelson Place. WDPW clarified the current plan shows the school approximately 150 to 175 feet back from Nelson Place.

Q18 Question raised regarding the proposed entrance for construction traffic. WDPW clarified that the east entrance to the loop road will be the primary point of access to the site for all construction traffic.

End of meeting.

These summary comments reflect Tishman Construction Corporation of MA’s interpretation of the discussions that took place. Any discrepancies or omissions should be brought to the author’s attention immediately. This summary shall be included as part of the Project record.

Prepared By: Erick Bakstran, Project Manager, TCCMA Date: November 3, 2014
Nelson Place Elementary School

Schematic Design Project Update
October 27th, 2014

Agenda:
• Welcome & Introductions: Mayor Petty & DPW+P Commissioner Moosey
• Project Overview & Update: Julie Lynch, DPW+P Architectural Services
• Schedule Summary: Tishman Construction
• Schematic Design Progress: Lamoureux Pagano Associates, Architects
• Question and Answer
UPCOMING DATES:

- NPS School Bldg. Committee Update: Oct. 27, 2014
- Budget Review: Nov. 5-Dec. 5 2014
- DESE Submission: Dec. 5, 2014
- NPS School Bldg. Committee Update: Dec. 8 2014
- MSBA Schematic Design Submission: Dec. 11, 2014
PROGRAM OVERVIEW:

- 600 Students, Pre-K through 6th grade
- 110,000 square foot building
- Integrated Autism and Special Education programs
- 140 Daily parking spaces
- Separated bus, parent, SPED & Pre-K pick-up areas
- 8 Buses, staggered arrival and departure
- 6 Half-size buses, staggered arrival and departure
- 4 After-school vans
- Fenced in play areas, separated by age group
- Service & delivery area, no loading dock
- Parent pick-up areas, rolling queue
- Secondary access
- Sustainable Design / Zero Net Energy Goal
Upper Floor Plan
18,460 SF

Lower Floor Plan
22,040 SF
SCHEMATIC DESIGN – Exterior Renderings

Approach from Nelson Place

Main Entry
SCHEMATIC DESIGN – Exterior Elevations

East Elevation

North Elevation

West Elevation

North-South Section

City of Worcester
SCHEMATIC DESIGN–Site Plan

<table>
<thead>
<tr>
<th>Parcel</th>
<th>Land transfer Acquisition (SF)</th>
<th>Temporary Grading Easement (SF)</th>
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<td>1,427</td>
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<tr>
<td>6</td>
<td>+/−36′ /−1′,3/8</td>
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</tr>
</tbody>
</table>

Potential construction fill storage & parking area

Fence
Temporary Grading Easement
Land from abutter
Land to abutter
Deliveries entry & exit

Fence
Permanent R.O.W.
Temporary grading easement
Radius as req’d for emergency vehicles
Curb Cut

Access Road 18′ wide
Fence
Retaining wall & fence

Upper FFE: 66′
Main IFE: 65′
Lower FFE: 63′

Project street improvements, widen paved way

Street access improvements by DPW

Scale 1:50
December 9, 2014

Ms. Diane Sullivan
Senior Capital Program Manager
40 Broad Street
Boston, Massachusetts 02109

Dear Ms. Sullivan,

This letter serves to certify that the attached Nelson Place School Building Committee meeting minutes dated December 8, 2014, sign in sheet and roll call vote forms to approve the revised Preliminary Design Program and the Preferred Schematic Report at the School Building Committee meeting on December 8, 2014 are accurate to the best of my knowledge.

Sincerely,

[Signature]

Julie A. Lynch
City of Worcester, Architectural Services
Registered Architect, MCPPO Design and Construction

Dated: 12-09-2014
City of Worcester
1. WELCOME and INTRODUCTIONS
   Mayor Petty
   DPW&P, Commissioner Moosey

2. MEETING AGENDA and PROJECT OVERVIEW
   Julie Lynch, DPW&P, Architectural Services

   Objective:
   This is the final meeting of the Nelson Place School Feasibility Study and will include a review of the Schematic Design and a VOTE OF APPROVAL by the NELSON PLACE SCHOOL BUILDING COMMITTEE.

3. PROJECT SCHEDULE
   Tishman Construction, Owner’s Project Manager

4. PRESENTATION of the SCHEMATIC DESIGN
   Lamoureux Pagano Associates, Architects

5. QUESTION AND ANSWER
   Julie Lynch, Moderator

6. SCHOOL BUILDING COMMITTEE VOTES
   i. School Building Committee Roll-Call Vote on Schematic Design for submission to the Massachusetts School Building Authority for project approval.

NOTE:

- See Worcester Public Schools, Nelson Place School Website for link to all Feasibility Study Documents: www.nelsonplace.worcesterschools.org
- Hardcopies of the Preliminary Design Program (PDP) and Preferred Schematic Report (PSR) are available for public review at Mayor Petty’s Office at Worcester City Hall, Main Street, Worcester.
- Refer comments to: Julie A. Lynch, Architect, City of Worcester, DPW&P lynchja@worcesterma.gov
Nelson Place Elementary School

School Building Committee Meeting & Vote Summary

Meeting Date:
Monday, December 8, 2014, 7:00PM – 8:30PM

Introductions

Introductions of project team members and current project status overview provided by Worcester Department of Public Works & Parks. Project team members in attendance include:

City of Worcester, Department of Public Works & Parks (DPW&P)
Paul Moosry
Julie Lynch

Lamoureaux Pagano Associates, Architect (LPA)
Robert Para, Jr., AIA
Michael A. Pagano, AIA
Christina Bazelmans, LEED BD+C

Tishman Construction Corp. of MA, Owner’s Project Manager (TCCMA)
Erick Bakstran

DPW&P provided a brief update of the status of the Project. DPW&P recognized the efforts of all those involved to progress the Schematic Design for the new Nelson Place Elementary School to its current state, particularly the input received from the public and adjacent residents.

Schedule Update

S1 Tishman Construction Corp. of MA (TCCMA) provided a brief schedule update based on the Lamoureaux Pagano Associates (LPA) slide presentation. TCCMA noted the project is currently in the Schematic Design phase. The current start of Construction is expected to be January/February 2016. TCCMA noted the current schedule anticipates the new NPS will be open by the start of classes in August 2017.

S2 Significant upcoming schedule related activities include the formal submission of the Schematic Design Binder to the Massachusetts School Building Authority (MSBA) on December 11, 2014, and the receipt and review of proposals from the prospective Construction Manager at Risk (CM at Risk) candidates currently due on December 23, 2014.

S3 Schedule related question posed regarding start of construction activities, and the potential of construction activity occurring on site during 2015. TCCMA stated the current planned start of construction activities is early 2016. TCCMA noted that early work packages may be considered by the Project if it is deemed to be in the best interest of the City and the Project. This determination will be made once a CM at Risk candidate has been selected and awarded the Project.
Program Overview

P1 LPA provided an update and overview of the current building design and program layout, including updated exterior elevations and site plans, including the following key components of the current design:

- Minor adjustments have been made to the configuration of the building stairways.
- Grade grouping within the building is consistent with previous presentations.
- The new school will be "super insulated" including increased R Values of the building envelope.
- Solar panels proposed for the building roof will support the low energy use goals of the Project.
- On-site parking design based on 140 spaces.
- Traffic pattern design based on containing all bus and parent pick-up and drop-off traffic on site and off of Nelson Place.
- Perimeter buffering including grading, trees and other plantings and new chain link fencing.
- Geotechnical analysis of the site including soil composition and identification of ledge.
- Effort made to minimize the amount of land takings from adjacent properties.
- Updated exterior elevations of the proposed school.
- Proposed phasing plan for the construction of the new school and demolition of the existing school.
- Management of storm water run-off during construction shall be in accordance with the Massachusetts Department of Environmental Protection (MA DEP) regulations.
- Exterior play areas for the different student age groups.

P2 LPA stated the current gross square footage area of the proposed school is approximately 111,000 square feet, noting this is consistent with what has been presented previously.

School Building Committee Question & Answer

Q1 Question raised regarding the anticipated construction traffic to and from the site, and its impact on existing retaining walls of adjacent properties located to the east of the school site. LPA stated the proposed future access road(s) would be of an elevation that would likely eliminate the retaining walls from the final grading.

Q2 Question raised regarding the management of storm water flows from the site, and their impact on Indian Lake. LPA stated that storm water flows from the site will flow to Indian Lake. The project storm water drainage system will be designed in accordance with the MA DEP regulations. LPA stated the post-design flows will be the same as the pre-design flows achieved through the use of water quality structures, underground detention systems and surface level water quality swales. LPA noted the proposed design would be included in the formal Notice of Intent (NOI), file with the MA DEP in or around April of 2015.

TCCMA commented previously that it will be the responsibility of the future CM at Risk to manage the run-off to prevent silt and sediment from flowing to the lake. The management of the storm water flows through construction shall be in accordance with the MA DEP Storm Water Pollution Prevention Plan (SWPPP) regulations.

Public Question & Answer

Q1 Question raised regarding the proposed rear parking lot, and how the seasonal storm water run-off will be addressed with the removal of existing trees. LPA stated the pre and post construction storm water flows from the site are anticipated to be approximately the same. DPW&B added that the rear parking area will have curbing and catch basins to accommodate any run-off from the new parking area. LPA stated the management of the storm water flows during construction will be in accordance with the MA DEP Storm Water Pollution Prevention Plan (SWPPP) regulations.
School Building Committee Roll Call Vote

DPW&P conducted a roll call vote of the School Building Committee members to determine the acceptability of the Schematic Design of the proposed Nelson Place Elementary School, and it's suitability for submission to the MSBA on December 11, 2014. DPW&P stated the acceptable responses to the vote question are "yes", "no" or "abstain".

The results of the vote were eighteen (18) votes in favor, no votes against, no abstentions and two members of the committee were not present for the vote. It should be noted that one of the affirmative votes was made in absentia. DPW&P to include the confirming documentation of this member's vote with the official roll call vote results.

End of meeting.

These summary comments reflect Tishman Construction Corporation of MA's interpretation of the discussions that took place. Any discrepancies or omissions should be brought to the author's attention immediately. This summary shall be included as part of the Project record.

Prepared By: Erick Bakstran, Project Manager, TCCMA

Date: December 8, 2014

[Signature]

[Signature]
At the School Building Committee meeting held on Monday, December 8, 2014, at 7:00pm at the Nelson Place School, the committee members are asked to vote their approval of the Nelson Place Elementary School, Schematic Design as presented at the meeting by the Project team. The approved Schematic Design will be submitted to the Massachusetts School Building Authority (MSBA) on December 11, 2014. The School Building Committee votes are indicated below.

<table>
<thead>
<tr>
<th>Member Designation</th>
<th>Name and Title</th>
<th>Attendance Signature</th>
<th>YES</th>
<th>NO</th>
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<tr>
<td>Co-Chair SBC</td>
<td>Joseph Petty, MAYOR</td>
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<tr>
<td>Co-Chair SBC</td>
<td>Paul Moosey, DPW + P Commissioner</td>
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<tr>
<td>SBC Member</td>
<td>Julie Lynch, Architect, MCPPO, DPW+P</td>
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<td>Local CEO</td>
<td>Edward Augustus, City Manager</td>
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<tr>
<td>SBC Member</td>
<td>John Foley, WPS School Commit:ee</td>
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<tr>
<td>Superintendent of Schools</td>
<td>Dr. Melinda Boone, WPS, Superintendent</td>
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<td>Local Official</td>
<td>Jeffrey Martin, WPS Acting Facilities Director</td>
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<tr>
<td>School Principal</td>
<td>Monica Poitras, WPS Principal</td>
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<tr>
<td>SBC Member</td>
<td>Dr. Marco Rodrigues, WPS Chief Academic Officer</td>
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<tr>
<td>SBC Member</td>
<td>Brian Allen, WPS Chief Financial Officer</td>
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### School Building Committee Member Sign-In Sheet

**Nelson Place School Project**

| Meeting Date: Monday, December 08, 2014 | Time: 7:00 PM |

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**SCHOOL BUILDING COMMITTEE VOTE**

At the School Building Committee meeting held on Monday, December 8, 2014, at 7:00pm at the Nelson Place School, the committee members are asked to vote their approval of the Nelson Place Elementary School, Schematic Design as presented at the meeting by the Project team. The approved Schematic Design will be submitted to the Massachusetts School Building Authority (MSBA) on December 11, 2014. The School Building Committee votes are indicated below.

<table>
<thead>
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<td>SBC Member</td>
<td>Tony Economou, City Councillor</td>
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<tr>
<td>SBC Member</td>
<td>Bethany Emery, NPS Staff</td>
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<td>SBC Member</td>
<td>Phil Giarusso, Neighbor</td>
<td>Phil Giarusso</td>
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<tr>
<td>SBC Member</td>
<td>Pam Landry, Parent</td>
<td>Pam Landry</td>
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</tr>
<tr>
<td>SBC Member</td>
<td>Peter Wells, VP Finance and Administration, Assumption College</td>
<td>Peter Wells</td>
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<tr>
<td>SBC Member</td>
<td>Jessica McGuire, Neighbor</td>
<td>Jessica McGuire</td>
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<tr>
<td>SBC Member</td>
<td>Elizabeth O'Connell, NPS Staff</td>
<td>Elizabeth O'Connell</td>
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<td>SBC Member</td>
<td>Palmira Padilha, Parent</td>
<td>Palmira Padilha</td>
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<tr>
<td>SBC Member</td>
<td>Alision Vigeant, Parent</td>
<td>Alision Vigeant</td>
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</tr>
<tr>
<td>SBC Member</td>
<td>Thomas Zidelis, CFO, CoW</td>
<td>Thomas Zidelis</td>
<td>NO</td>
</tr>
</tbody>
</table>
Lynch, Julie A.

From: Jack Foley <jfoley@clarku.edu>
Sent: Friday, December 05, 2014 9:38 AM
To: Lynch, Julie A.
Subject: RE: Nelson Place School Building Committee Meeting

Thanks Julie. Unfortunately, my schedule will not allow me to be there for the meeting, but I would like to extend a “yes” vote in favor of the proposed plan for Nelson Place School.

Jack Foley
Worcester School Committee

From: Lynch, Julie A. [mailto:LynchJA@worcesterma.gov]
Sent: Thursday, December 04, 2014 5:08 PM
To: A. Vigeano; Adams, K. Russell; Allen, Brian; Emery, Bethany; B. McGinn; C. Datena; C. Korenarsky; C. McDowell; C. Zukowski; Gribouski, Dolores; DCusson; DPagagni; Economou, Tony; G. Gumbrell; J. Bing; Jack Foley; J. Forgit; J. Forjette; J. Kelley; J. Larson; J. Lavine; J. Malm; J. Martin; J. McGuire; J. Obrien; K. Kadamus; L. Teasdale; Lynch. Julie A.; M. Foley; M. Ohl; Rodrigues, Marco; Moossey, Paul J.; N. Caligiuri; NJFoxBuck; Petty, Joseph M.; PJ George; PNelson; PPapagni; R. Krasnick; R. Lamothe; R. Plourde; S. Foster; S. Hayman; Martella, Sharon; S. Ospina; SDKelleher; SMartella; SMBelz; SchoolCommittee
Subject: Nelson Place School Building Committee Meeting

Attached please find a draft powerpoint presentation and the agenda for the upcoming Nelson Place School Building Committee Meeting.

This meeting is for a **VOTE to approve the Schematic Design**, which is the final phase of the Feasibility Study.

Again, I would like to thank everyone for their valuable input during this process. We have a better project as a result of your participation.

I hope to see you all at the meeting on Monday.

Julie
Agenda:
- Project Overview & Update: Julie Lynch, DPW+P Architectural Services
- Schematic Design Progress: Lamoureux Pagano Associates, Architects
- Question and Answer
- School Building Committee Vote
UPCOMING DATES:

- NPS School Bldg. Committee Update: Dec. 8 2014
- MSBA Schematic Design Submission: Dec. 11, 2014
SCHEMATIC DESIGN – Main Floor Plan

Upper Level Floor Plan
19,100 SF

Ground Level Floor Plan
22,166 SF
City of Worcester

SCHEMATIC DESIGN – Exterior Elevations

Main Entrance - East Elevation
SCHEMATIC DESIGN – Exterior Elevations

Parent Pick-Up and Service Area- West Elevation
SCHEMATIC DESIGN – Exterior Elevations

Classroom Wing - West Elevation
Classroom Wing – North Elevation
SCHEMATIC DESIGN–Phasing Plan

PHASE I
Feb 2016-May 2017

PHASE II
May 2017-Aug. 2017
Cym Demo & Access

PHASE III
June 2017-Sept. 2017
Building demo & site completion through Nov. 2017

Fence & erosion control at perimeter

Temporary grading line
Block retaining & solid wall/fence
New Wall
Project street improvements: Widen paved way
Access for school

Temporary drain connection (potential permanent system - to be reviewed at DD phase)
Temporary storm water detention system (potential permanent system - to be reviewed at DD phase)
4.1.3 SCHEMATIC DESIGN PROJECT MANUAL

A. List of Specifications Sections
   (refer to complete separate bound set)
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CONDITIONS OF THE CONTRACT – TO BE INCLUDED AT A LATER DATE

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Section 01 22 00  Unit Prices
Section 01 23 00  Alternates
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Section 01 33 00  Submittal Procedures
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Section 01 45 16  Field Engineering
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Section 04 20 00  Unit Masonry*

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- Section 06 40 23  Interior Architectural Woodwork
- Section 06 82 00  Glass Fiber Reinforced Plastic

### DIVISION 7 THERMAL AND MOISTURE PROTECTION
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- Section 07 21 00  Thermal Insulation
- Section 07 42 17  Insulated-Core Metal Wall Backup Panels
- Section 07 54 19  Polyvinyl-Chloride (PVC) Roofing
- Section 07 60 00  Flashing and Sheet Metal
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- Section 08 41 13  Aluminum Entrances and Storefronts*
- Section 08 45 00  Translucent Wall and Roof Assemblies
- Section 08 51 13  Aluminum Windows
- Section 08 71 00  Door Hardware
- Section 08 81 00  Glass and Glazing
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- Section 09 30 00  Tiling*
- Section 09 51 00  Acoustical Ceilings*
- Section 09 52 00  Fabric Covered Wall Panels
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- Section 10 14 00  Signage
- Section 10 21 13  Toilet Compartments
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- Section 10 28 00  Toilet Accessories
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Section 10 44 13 Fire Extinguisher Cabinets
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Section 26 05 53 Identification For Electrical Systems
Section 26 09 13 Electrical Power Monitoring & Control
Section 26 09 36 Dimming Controls
Section 26 09 43 Network Lighting Controls
Section 26 22 00 Low-Voltage Transformers
Section 26 24 13 Switchboards
Section 26 24 16 Panelboards
Section 26 27 26 Wiring Devices
Section 26 28 13 Fuses
Section 26 28 16 Enclosed Switches And Circuit Breakers
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Section 26 32 13 Engine Generators
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Section 26 51 00 Interior Lighting
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Section 28 20 00 Video Surveillance
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Section 32 31 13 Chain Link Fences and Gates
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