

# QUAKER VALLEY SCHOOL DISTRICT

## QUAKER VALLEY HIGH SCHOOL

625 Beaver Street, Leetsdale, PA 15056

Mr. Andrew Surloff, Principal  
Mrs. Deborah Riccobelli, Asst. Principal



### Facility Profile

<b>Date of Construction</b>	1926	<b>Renovations/Additions</b>	1998
<b>Grades</b>	9th thru 12th		
<b>Stories</b>	Four Story		
<b>Occupancy Type</b>	Educational		
<b>Construction Type</b>	Non-Combustible / Steel Frame		
<b>Architectural Area</b>	126,563 SF	<b>Site Area</b>	13.98 acres (shared with McNamara Park)
<b>PDE FTE Capacity</b>	694		
<b>Current Enrollment</b>	677		
<b>Municipality</b>	Leetsdale Borough		
<b>Condition</b>	Poor to Good		
<b>Building History</b>	1959	Minor upgrades	
	1988	Minor upgrades	
	1998	Extensive renovations & minor additions	
	2003	Main entrance security alterations	
	2005	Water infiltration remediation, roof repair & HVAC upgrades	
	2008	Auditorium Sound System	

# QUAKER VALLEY SCHOOL DISTRICT

## Existing Building Utilization

### BASEMENT FLOOR PLAN

#### Key to Spaces

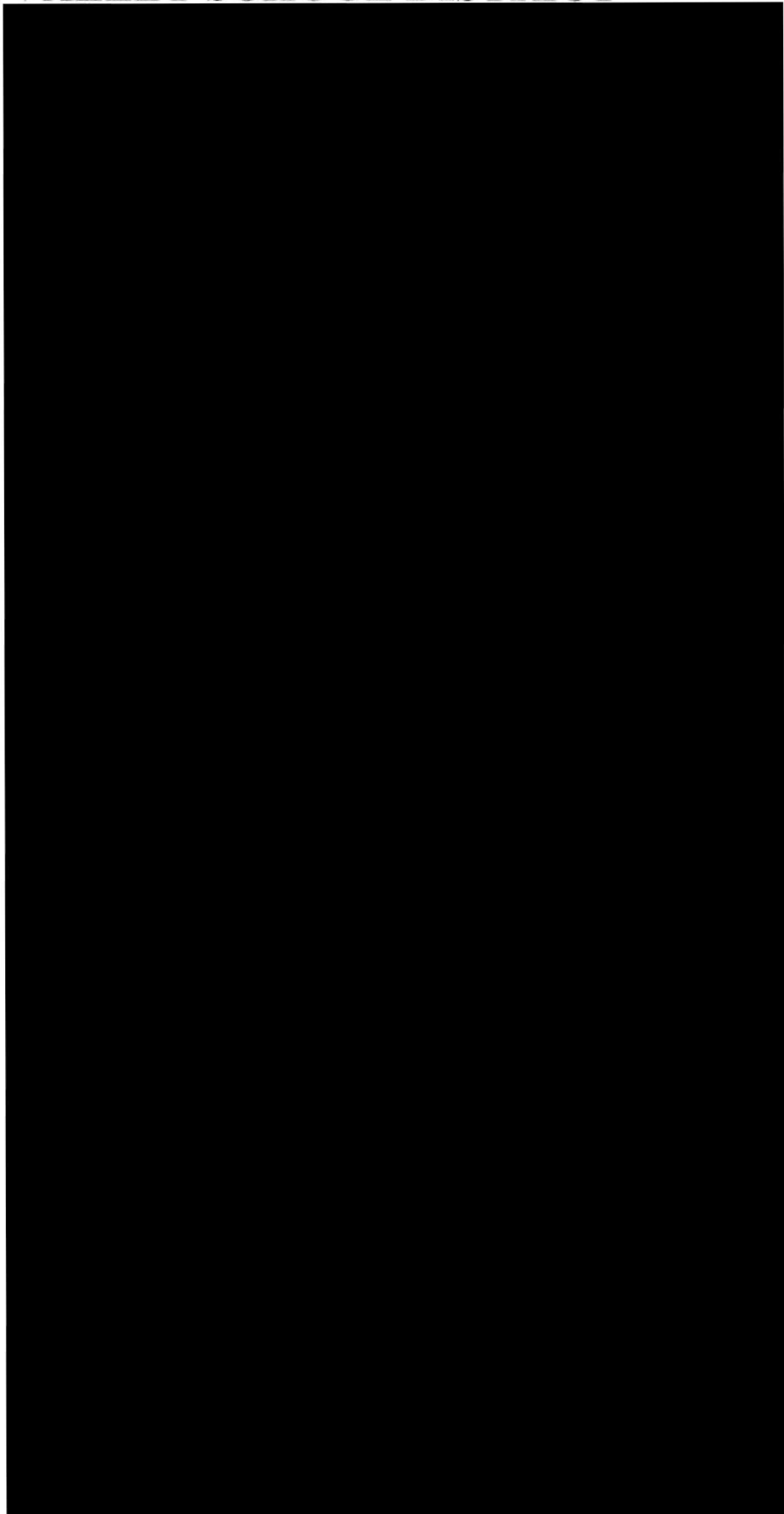
1. Entry
2. Lobby
3. Corridor
4. Administration
5. Guidance
6. Health Suite
7. Faculty/Staff
8. Gymnasium
9. Locker Rooms
10. Fitness Classrooms
11. Cafeteria
12. Kitchen
13. Auditorium
14. Stage
15. Library/Media Center
16. Library Classroom
17. Art Classroom
18. Band Classroom
19. Choral Classroom
20. Music Classroom
21. Computer/Business Classroom
22. Family & Consumer Science Classroom
23. Tech-Ed Classroom
24. General Classroom
25. Science Classroom
26. Special Education Classroom
27. Small Group Instruction
28. Student Activities
29. School Store
30. Restrooms

# QUAKER VALLEY SCHOOL DISTRICT

## GROUND FLOOR PLAN

### Key to Spaces

1. Entry
2. Lobby
3. Corridor
4. Administration
5. Guidance
6. Health Suite
7. Faculty/Staff
8. Gymnasium
9. Locker Rooms
10. Fitness Classrooms
11. Cafeteria
12. Kitchen
13. Auditorium
14. Stage
15. Library/Media Center
16. Library Classroom
17. Art Classroom
18. Band Classroom
19. Choral Classroom
20. Music Classroom
21. Computer/Business Classroom
22. Family & Consumer Science Classroom
23. Tech-Ed Classroom
24. General Classroom
25. Science Classroom
26. Special Education Classroom
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30. Restrooms



# QUAKER VALLEY SCHOOL DISTRICT

## FIRST FLOOR PLAN

### Key to Spaces

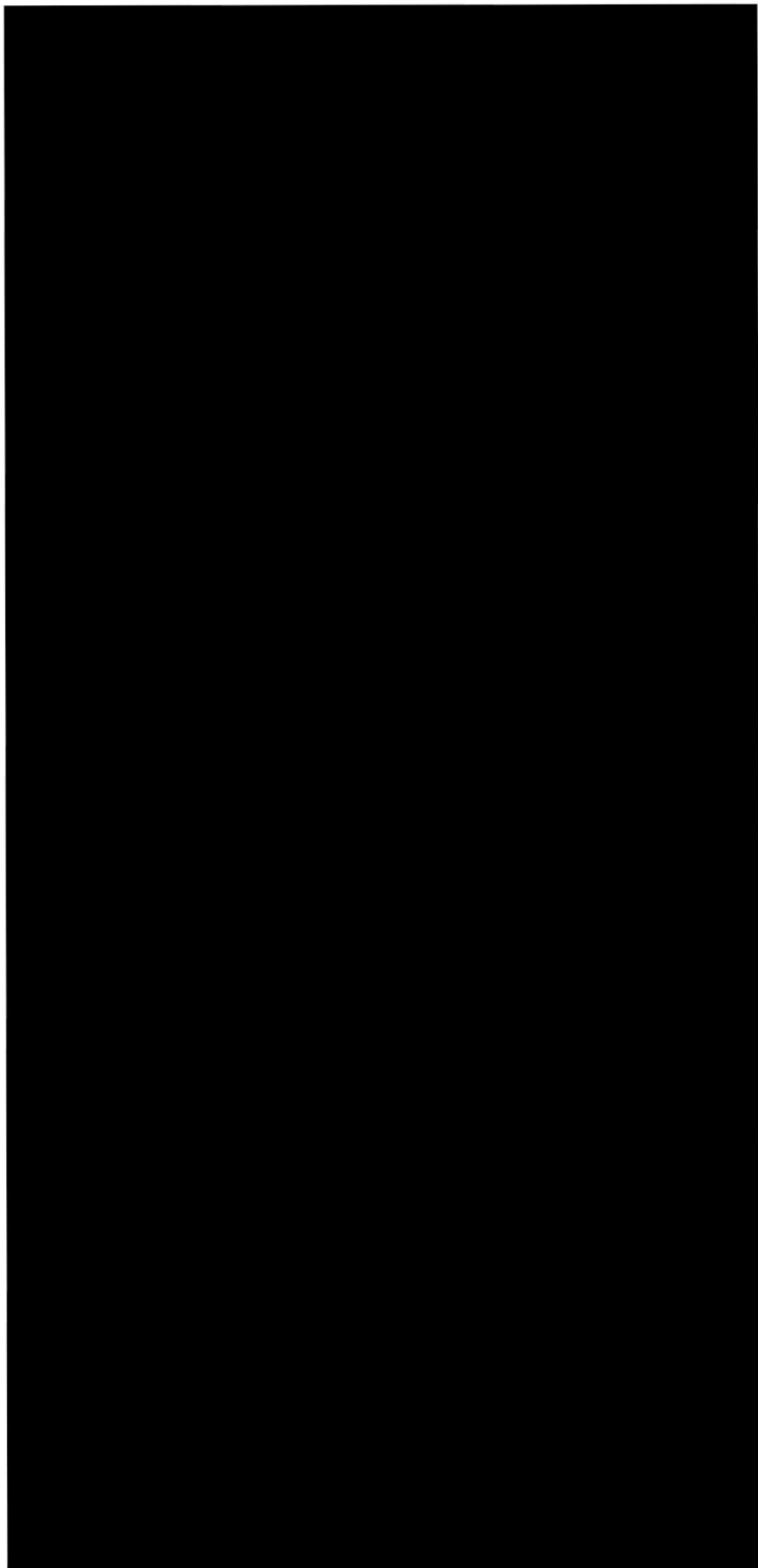
1. Entry
2. Lobby
3. Corridor
4. Administration
5. Guidance
6. Health Suite
7. Faculty/Staff
8. Gymnasium
9. Locker Rooms
10. Fitness Classrooms
11. Cafeteria
12. Kitchen
13. Auditorium
14. Stage
15. Library/Media Center
16. Library Classroom
17. Art Classroom
18. Band Classroom
19. Choral Classroom
20. Music Classroom
21. Computer/Business Classroom
22. Family & Consumer Science Classroom
23. Tech-Ed Classroom
24. General Classroom
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27. Small Group Instruction
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30. Restrooms

# QUAKER VALLEY SCHOOL DISTRICT

## SECOND FLOOR PLAN

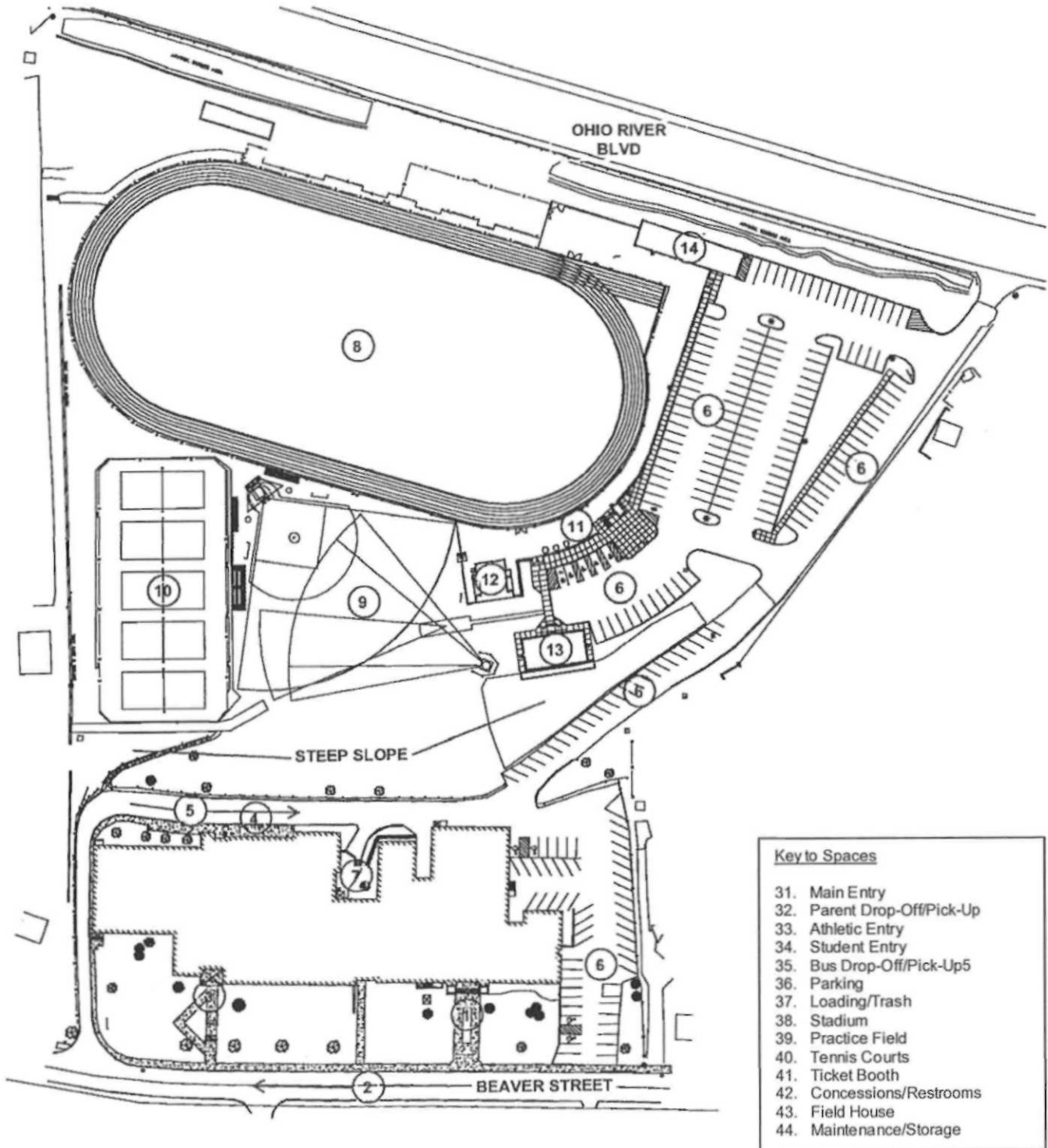
### Key to Spaces

1. Entry
2. Lobby
3. Corridor
4. Administration
5. Guidance
6. Health Suite
7. Faculty/Staff
8. Gymnasium
9. Locker Rooms
10. Fitness Classrooms
11. Cafeteria
12. Kitchen
13. Auditorium
14. Stage
15. Library/Media Center
16. Library Classroom
17. Art Classroom
18. Band Classroom
19. Choral Classroom
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21. Computer/Business Classroom
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## SITE PLAN



# QUAKER VALLEY SCHOOL DISTRICT

## Existing Conditions Analysis

### General

The existing High School was originally constructed in 1926 and underwent a Major Renovations and Additions project completed in 1998. The existing High School building is in fair to good condition. Although the renovations performed in 1998 were extensive they were not comprehensive and were not all designed for longevity & maintainability. If properly maintained and with minor upgrades, these renovated areas of the building should provide the district with an additional 5 to 10 years of service without need for any major renovations. The additions built in 1998 are in good to good condition, with proper maintenance and minor upgrades as needed, these areas of the building should serve the district for the next 15 plus years without the need for major renovations. The District has struggled with numerous water infiltration issues over the years since the renovations and although the majority of the water was addressed in a water remediation project in 2005, the building has suffered with moisture related issues.

The District has been able to effectively deliver their educational program over the last 12 years, however current and future needs are becoming more challenging to meet as the educational program expands, especially in the arts and the athletics. The building presents a challenge in offering more programs as the building is already fully utilized and numerous educational spaces are undersized. The 1998 and prior renovations to the building left carved-up and reconfigured the existing structure in ways that compromise the efficiency and usability of space.

The 1998 renovations addressed handicapped accessibility upgrades, any future renovations or improvement projects should be designed to current accessibility standards.

The building was partially re-roofed as part of the 1998 project; consideration should be given to re-roofing the remainder of the building, tearing off all layers of old roofing.

Although the HVAC system was brought up to building codes of the time, air conditioning was not a part of that project scope. The lack of air conditioning in the building has proved to be an administrative issue for the District, the number of students with environmental allergies has risen and the District ability to provide summertime programs has been hampered.

With the nature of the tight site, traffic patterns around the building are compromised. The bus and parent drop-off areas are effectively separated but neither circulation path is ideal and cause congestion and unsafe conditions. The buses circle around to the back of the building and drop-off and pick up students on the buildings lowest level. The bus drive is tight, forcing the busses to maneuver the tight corner around the building and stack out onto Beaver Street. The parent drop-off and pick-up is along Beaver street at the front of the building. Beaver Street is a fairly heavily trafficked municipal street; the vehicular circulation is congested with parents mixing with both thru traffic and buses. The traffic conditions should be addressed as part of any option. Staff & Student parking is provided on site with the parking spaces located along the drive between the school & McNamara Park and within the McNamara Park parking lots. The students and staff walk up the drive way to the school. Visitor and administrative parking is in a small lot adjacent to the main entrance. Buses and students and staff circulate through this lot. Additional visitor parking is needed on site and should be separated from the vehicular circulation paths.

### Building Systems

See Attached 'Exhibit C' for HVAC, Plumbing/Fire Protection and Electrical Facility and Food Service/Kitchen Assessments.

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The following is a preliminary list of additional High School identified program, facility and deferred maintenance needs (some may be previously mentioned):

- Adequate classroom space based on enrollment and educational program needs
- Create adequate classroom space throughout building, rooms are currently undersized
- Access control system needed (keycards)
- Keying system is obsolete
- Flooring repair/replacement throughout
- Gymnasium and wellness upgrades needed
- Security cameras needed for both interior & exterior monitoring
- Classroom technology stations needed to include LCD projectors
- HVAC systems upgrades & equipment replacement
- Replace carpet with linoleum
- Reconfigure and re-equip kitchen
- Relocate Guidance Office closer to Main Administration Office
- Water supply and sanitary waste lines to be addressed
- Replace plumbing fixtures with high-efficiency/low flow type
- Green design and energy efficiency improvements
- Address site traffic patterns – improve safety
- Parking upgrades and expansion
- Building code and accessibility upgrades
- Fire alarm system upgrades
- Exterior masonry repair and re-grouting including parapet repair
- Auditorium, stage, and theatrical lighting upgrades
- Lighting upgrades – interior and exterior
- Resolve water infiltration issues



# QUAKER VALLEY SCHOOL DISTRICT

## OPTION 2A – High School

### Deferred Maintenance and Capitol Improvement Upgrades

	<u>SUMMARY</u>	<u>COSTS</u>	
		<u>Low</u>	<u>High</u>
<b>ARCHITECTURAL UPGRADES</b>	<ul style="list-style-type: none"> <li>• Kitchen &amp; Servery upgrades &amp; equipment replacement</li> <li>• Roof Replacement</li> <li>• Replace fire escape</li> <li>• Exterior door and hardware replacement</li> <li>• Stage Upgrades</li> <li>• Site Improvements to include 'governors drive', additional visitor parking, &amp; existing parking lot repairs</li> </ul>	\$1,750,000	\$2,500,000
<b>HVAC UPGRADES</b>	<ul style="list-style-type: none"> <li>• Building-wide air conditioning</li> <li>• Replace terminal equipment</li> <li>• Replace boilers</li> <li>• Replace air handling equipment</li> <li>• New DDC controls</li> <li>• New Chiller</li> <li>• New HVAC system to serve Kitchen</li> </ul>	\$2,000,000	\$3,500,000
<b>PLUMBING UPGRADES</b>	<ul style="list-style-type: none"> <li>• New Plumbing to accommodate Kitchen upgrades</li> <li>• Upgrade to low-flow fixtures</li> <li>• Replace hot water boilers</li> <li>• Install kitchen grease interceptor</li> </ul>	\$400,000	\$700,000
<b>ELECTRICAL UPGRADES</b>	<ul style="list-style-type: none"> <li>• New Electrical to accommodate Kitchen upgrades</li> <li>• Site lighting at new 'governors drive' &amp; parking</li> <li>• Technology Upgrades</li> <li>• Security Upgrades</li> </ul>	\$100,000	\$150,000
<b>CONSTRUCTION COST</b>		<b>\$4,250,000</b>	<b>\$6,850,000</b>
<b>PROJECT COST*</b>		<b>\$5,100,000</b>	<b>\$8,220,000</b>

\* Project Costs include 20% soft costs.

### SUMMARY

The scope of work in this option is viewed as the work that would be necessary to perform if the District were to maintain the status quo for more than the next five years.

### CHALLENGES

This option does not include any improvements to accommodate current or future programmatic needs. Educational, administrative and community needs have changed over the years and are anticipated to change in the future and this option does not accommodate those needs or anticipate the changing trends in education.

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Due to the age of the building and the nature of the previous renovations, other significant capital improvement needs could exist but be unknown at this time. It is generally recognized that the previous renovation projects did not address the building comprehensively, concealed conditions may exist that could become evident with time or construction activity.

# QUAKER VALLEY SCHOOL DISTRICT

## OPTION 2B – High School

### Comprehensive Alterations & Additions

	<u>SUMMARY</u>	<u>COSTS</u>	
		<u>Low</u>	<u>High</u>
PROJECTED ENROLLMENT (PDE – 2016/17)	626		
PDE CAPACITY (FTE)	953		
EXISTING BUILDING RENOVATIONS**	126,560 SF	\$18,984,000*	\$20,249,600*
NEW CONSTRUCTION**	45,900 SF	\$8,262,000*	\$8,721,000*
SITE DEVELOPMENT	13.98 Acres (allowance****)	\$3,000,000*	\$4,000,000*
CONSTRUCTION COST		\$30,246,000	\$32,970,600
PROJECT COST***		\$36,900,120	\$40,224,132

\* Construction Costs are based on \$150/sf to \$160/sf for Renovations and \$180/sf to \$190/sf for New Construction plus site development

\*\* Proposed Area (including both Existing & New) is based on the Proposed Program Table in Exhibit D

\*\*\* Project Costs include 22% soft costs

### SUMMARY

This option contemplates comprehensive alterations to the existing building and additions to accommodate program needs. In addition to physical plant updates and general modernization, it is recommended that the internal organization of the existing building be reconfigured to more effectively meet the program needs. Numerous educational spaces are currently undersized, internal walls should be moved to provide appropriately sized classrooms and support spaces. The interior environment should be outfitted to support the various educational programs. The comprehensive alterations will address the identified deficiencies within the existing facility and will include upgrades and modernizations that will bring the building up to current codes.

#### Considerations:

- The District has identified programmatic deficiencies in the Food Service, Arts, Family & Consumer Science, Tech-Ed, and Athletics departments and Administration and it is assumed that additions will include facilities to enhance these program areas.
- The Existing Gymnasium is undersized and an addition would be necessary to enlarge it to the desired size.
- The existing Auditorium, stage, and support spaces are undersized and do not provide the appropriate amount of flexibility for a multi-use assembly space. An addition would be necessary to provide a large group assembly venue to meet both performance and educational needs.

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- The usability/efficiency of the existing building is compromised by the organization of the original construction and previous improvement projects. The efficiency of the building may not be enhanced after renovations due to the existing building limitations.
- While the existing site utilization separates Bus and Parent drop-off zones, the circulation paths cross and are not adequately sized to accommodate the traffic. The parent drop-off occurs on a heavily trafficked main municipal street leading to congestion and unsafe conditions. Site modifications should address the traffic issues by providing an on-site parent drop-off, a more appropriate bus route and drop-off/pick-up area, and additional visitor and staff parking.

## CHALLENGES

This option assumes that the entire existing building will be renovated & reused in the additions and alterations project. It would be fair to speculate that when the schematic design is developed that the proposed program may not pair up exactly to the existing facility and at that time it may be considered that portions of the existing building be demolished and replaced with new construction. The extent to which that may be found to be desirable or necessary cannot be determined at this time.

The district should consider vacating the existing building during construction. While it might be possible to renovate and build new additions in phases while keeping the building occupied, it may not be a practical solution at this site. The site is already very congested and the buildable area of the site is limited by the adjacent residential properties, the city street, and the large slope that separates the High School from McNamara Park. Occupying the building during construction may prove to limit the design options, lengthen the construction timeline, add to the construction costs and further congest the existing site.

The Department of Education's recommendation for this High School based on full-time equivalents (FTE's) is 44 acres, the existing site area is approximately 30 acres below the recommended acreage, and a portion of the existing site exceeds a 20% slope.

# QUAKER VALLEY SCHOOL DISTRICT

## OPTION 2C – High School

### New Building on New Site

	<u>SUMMARY</u>	<u>COSTS</u>	
		<u>Low</u>	<u>High</u>
PROJECTED ENROLLMENT (PDE – 2016/17)	626		
PDE CAPACITY (FTE)	953		
EXISTING BUILDING RENOVATIONS	n/a		
NEW CONSTRUCTION	172,460SF**	\$31,042,800*	\$32,767,400*
SITE DEVELOPMENT	(allowance****)	\$3,500,000*	\$4,500,000*
CONSTRUCTION COST		\$34,542,800	\$37,267,400
PROJECT COST***		\$43,178,500	\$46,584,250

\* Construction Costs are based on \$180/sf to \$190/sf for New Construction plus site development

\*\* Proposed Area is based on the Proposed Program Table in Exhibit D

\*\*\* Project Costs include 25% soft costs

\*\*\*\* The nature of the site is unknown, allowance assumes that site is relatively flat and that basic utilities would be available in close proximity to the proposed building location

Note: Site Acquisition Costs are not included;

PDE's recommended acreage = 44 acres, For a HS it is 35 acres + 1 acre for every 100 FTE's

### **SUMMARY**

This option contemplates the construction of a new building with associated site development to support the High School on a new site within the District. The design options available for a new building on a new site should be extensive and be able to be driven by the program needs for the building and without the constraints of the existing building and site.

#### Considerations:

- The District would need to acquire land (costs outside this analysis); a site with a useable area of approximately 44 acres is recommended by PDE.
- The District may consider incorporating the District Administration Offices into the facility.
- This option assumes that the athletic facilities at McNamara Park will remain at the existing High School site & will not be relocated as part of this project.
- The new building should be designed to accommodate community and evening events within secured public areas.

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- The new site should be organized to provide separate Bus and Parent circulation during arrival & dismissal, adequate staff and visitor parking, and outdoor recreational facilities for use of the school and community.
- The existing school can be utilized during construction of a new facility without any on-site construction activity.

## CHALLENGES

The availability of property within the district is an unknown and while the state does reimburse for property acquisition, the costs associated with site acquisition and development of the property could be high. These costs for acquisition, regulatory approvals & site development beyond typical earthmoving to receive the building are not factored into the above costs.

# QUAKER VALLEY SCHOOL DISTRICT

## OPTION 2D – High School

### New Building on Existing Site

	<u>SUMMARY</u>	<u>COSTS</u>	
		<u>Low</u>	<u>High</u>
PROJECTED ENROLLMENT (PDE – 2016/17)	626		
PDE CAPACITY (FTE)	953		
EXISTING BUILDING RENOVATIONS	n/a		
NEW CONSTRUCTION	172,460SF**	\$31,042,800*	\$32,767,400*
BUILDING DEMOLITION	(allowance)	\$1,000,000	\$1,500,000
SITE DEVELOPMENT	13.98 Acres (allowance****)	\$3,500,000*	\$4,500,000*
CONSTRUCTION COST		\$35,542,800	\$38,767,400
PROJECT COST***		\$44,428,500	\$48,459,250

\* Construction Costs are based on \$180/sf to \$190/sf for New Construction plus site development

\*\* Proposed Area is based on the Proposed Program Table in Exhibit D

\*\*\* Project Costs include 25% soft costs

\*\*\*\* The allowance assumes that the existing site would be utilized in its current configuration, with the new building occupying roughly the same area of the site as the existing building and that McNamara Park would be preserved.

### SUMMARY

This option contemplates the construction of a new building with associated site development to support the High School on the existing site. The demolition of the existing building provides additional opportunities for development of the site. The organization of the building design should be greatly improved; however it is assumed that the building would need to be multiple floors (possible 4 to 5) in order to accommodate the building on this site.

#### Considerations:

- The District may consider incorporating the District Administration Offices into the facility.
- With a new building on this site, there may be an opportunity to develop parking under the building footprint.
- It is advisable that if a project is to be considered on the existing site, the District look into acquisition of adjacent property.
- While the existing site utilization separates Bus and Parent drop-off zones, the circulation paths cross and are not adequately sized to accommodate the traffic. The parent drop-off occurs on a heavily trafficked main municipal street leading to congestion and unsafe conditions. Site

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modifications should address the traffic issues by providing an on-site parent drop-off, a more appropriate bus route and drop-off/pick-up area, and additional visitor and staff parking.

## CHALLENGES

The district should consider vacating the existing building during construction. While it might be possible to renovate and build a new building & demolish the existing building in phases while keeping the building occupied, it may not be a practical solution at this site. The site is already very congested and the buildable area of the site is limited by the adjacent residential properties, the city street, and the large slope that separates the High School from McNamara Park. Occupying the building during construction may prove to limit the design options, lengthen the construction timeline, add to the construction costs and further congest the existing site.

While the organization of the building should be greatly improved over the existing, the site will still be constrained by the property limits, municipal streets, and the steep slope that separates the High School from McNamara Park. These site limitations will limit the availability to fully differentiate bus, parent and student circulation.

The Department of Education's recommendation for this High School based on full-time equivalents (FTE's) is 44 acres; the existing site area is approximately 30 acres below the recommended acreage.



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## OPTION 2E – High School

### Partial Demolition and Comprehensive Alterations & Additions

	<u>SUMMARY</u>	<u>COSTS</u>	
		<u>Low</u>	<u>High</u>
PROJECTED ENROLLMENT (PDE – 2016/17)	626		
PDE CAPACITY (FTE)	953		
EXISTING BUILDING RENOVATIONS**	69,000 SF	\$10,350,000*	\$11,040,000*
NEW CONSTRUCTION**	103,460 SF	\$18,622,800*	\$19,657,400*
PARTIAL DEMOLITION	(allowance)	\$500,000	\$1,000,000
SITE DEVELOPMENT	13.98 Acres	\$3,000,000*	\$4,000,000*
CONSTRUCTION COST		\$32,472,800	\$35,697,400
PROJECT COST***		\$40,591,000	\$44,621,750

\* Construction Costs are based on \$150/sf to \$160/sf for Renovations and \$180/sf to \$190/sf for New Construction plus site development

\*\* Proposed Area (including both Existing & New) is based on the Proposed Program Table in Exhibit D

\*\*\* Project Costs include 25% soft costs

### **SUMMARY**

This option contemplates the partial demolition of the existing building, those that offer limitations to their re-use, alterations to the remaining portion of the building, and construction of sizable additions. The demolition of the existing building provides additional opportunities for development of the site. The organization of the building design should be greatly improved; however it is assumed that the building would need to be multiple floors (possible 4 to 5) in order to accommodate the building on this site.

#### Considerations:

- It would be recommended that the new portion of the building include the large venue spaces like the gym, auditorium and cafeteria, the highly specialized instructional and support spaces such as tech-ed, science, art, and music, and the existing building be utilized to accommodate general instruction.
- The District may consider incorporating the District Administration Offices into the facility.
- With a large portion of new building on this site, there may be an opportunity to develop parking under the building footprint.

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- It is advisable that if a project is to be considered on the existing site, the District look into acquisition of adjacent property.
- While the existing site utilization separates Bus and Parent drop-off zones, the circulation paths cross and are not adequately sized to accommodate the traffic. The parent drop-off occurs on a heavily trafficked main municipal street leading to congestion and unsafe conditions. Site modifications should address the traffic issues by providing an on-site parent drop-off, a more appropriate bus route and drop-off/pick-up area, and additional visitor and staff parking.

## CHALLENGES

The district should consider vacating the existing building during construction. While it might be possible to renovate, demolish portions of the existing building and build new additions in phases while keeping the building occupied, it may not be a practical solution at this site. The site is already very congested and the buildable area of the site is limited by the adjacent residential properties, the city street, and the large slope that separates the High School from McNamara Park. Occupying the building during construction may prove to limit the design options, lengthen the construction timeline, add to the construction costs and further congest the existing site.

The Department of Education's recommendation for this High School based on full-time equivalents (FTE's) is 44 acres; the existing site area is approximately 30 acres below the recommended acreage.

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## Exhibit C – Facility Assessments



### **Middle School HVAC Assessment**

Tower Engineering, Jim N. Kosinski, PE, February 9, 2010

### **Middle School Plumbing and Fire Protection Assessment**

Tower Engineering, Mary T. Smith, P, February 9, 2010

### **Middle School Electrical Assessment**

Tower Engineering, John C. West, PE, February 9, 2010

### **High School HVAC Assessment**

Tower Engineering, Jim N. Kosinski, PE, February 9, 2010

### **High School Plumbing and Fire Protection Assessment**

Tower Engineering, Mary T. Smith, P, February 9, 2010

### **High School Electrical Assessment**

Tower Engineering, John C. West, PE, February 9, 2010

### **Food Service Assessment – Middle and High Schools**

McFarland Kistler & Assoc., Inc., Ken Kistler, FCSI, February 12, 2010

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Project Name: Quaker Valley School District – Middle School and High School  
Tower Project Number: A9108  
Client: Eckles Architecture and Engineering  
Date of Report: February 9, 2010  
Author: James N. Kosinski, PE

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**Subject: High School HVAC Assessment**

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### General Comments and Recommendations:

- Overall System Type - Classrooms: [REDACTED]
- Overall System Type – Remaining Areas: [REDACTED]
- Construction and Renovation History: The latest renovation occurred in 1997 and while most of the HVAC equipment was replaced in the 1997 renovation, some older hot water piping still exists throughout the building.
- Comparison to Current Standards:
  - The [REDACTED] ventilators are similar to the equipment installed in numerous primary/secondary schools with the exception that modern classroom systems are designed with increased ventilation air capabilities and usually have an integral cooling coil.
  - Modern HVAC design for K-12 facilities has moved away from [REDACTED] design towards vertical unit ventilator, water-source heat pump, Variable Air Volume, and fan-coil designs. These systems have numerous advantages including indoor air quality, acoustics, maintenance requirements and energy efficiency.
  - Improvements to the building HVAC systems that bring the building systems up to or exceed current energy efficiency standards should be considered to decrease the overall energy usage.
- Overall Recommendation: See specific recommendations below

### Central Heating Plant:

- Description of Existing System:
  - Plant Type: Plant Age: 1997: [REDACTED]
  - Fuel: [REDACTED]
  - Boiler: [REDACTED]
  - Pump Configuration: [REDACTED]
  - Variable Speed Drive: [REDACTED]
  - HW Valve Configuration: [REDACTED]
  - Glycol [REDACTED]
- Code Violations and Safety Concerns:
  - The boiler room does not comply with the 2010 edition of the International Mechanical Code with respect to boiler room combustion air requirements.
- Comments and Recommendations:

- The combustion air intakes do not have motorized dampers
- If the boilers are retained, install in-line dedicated recirculation pumps to eliminate potential for thermal shock and condensation
- Consider replacement of existing [REDACTED] boilers with new condensing boilers
- Consider replacement of existing hot water pumps with new pumps with the capability of lead/lag operation
- Consider installation of variable speed drives on the hot water pumps for energy efficiency

Central Cooling Plant: not applicable

Control System:

- Description of Existing Control System:
  - [REDACTED]
- Comments and Recommendations:
  - Upgrade to direct digital control system

Classrooms:

- Description of Existing System:
  - System Type: [REDACTED] The majority of the unit ventilators are heating only and there are various unit ventilators throughout the building that are furnished with heating and DX cooling. Relief air from the classrooms is via a [REDACTED]
  - Age: 1997
  - Cooling Source: [REDACTED]
  - Heating Source: [REDACTED]
  - Ventilation Source: [REDACTED]
- Comments and Recommendations:
  - Existing unit ventilators have [REDACTED] to minimize potential for freeze failures.
  - It is unlikely that the existing system meets current ventilation codes (15 cfm per student in each classroom).
  - There is evidence that humidity levels are very high at times making ceiling tiles sag in numerous classrooms.
  - Consider installing newer vertical unit ventilators with, hot water heat and heat recovery to increase energy efficiency.

Office & Health Suite:

- Description of Existing System:
  - System Type: [REDACTED]
  - Age: 1997
  - Cooling Source: [REDACTED]
  - Heating Source: [REDACTED]

- Comments and Recommendations:
  - The Office & Health Suite is served via a [REDACTED]
  - Individual rooms have [REDACTED]
  - The thermostat for the air handling system is located in [REDACTED]
  - Consider converting the existing [REDACTED] to a zoned system for better temperature control

Tech Ed & Basement:

- Description of Existing System:
  - System Type: [REDACTED]
  - Age: 1997
  - Cooling Source: [REDACTED]
  - Heating Source: [REDACTED]
- Comments and Recommendations:
  - The inlet control vanes on the air handling unit are [REDACTED] indicating that the unit is at its maximum capacity
  - The ductwork insulation is pulling away from the ductwork indicating that the vapor barrier on the ductwork has been breached. Moisture from condensation on the ductwork has permeated the insulation making it ineffective. All of the insulation should be replaced
  - Heating at the unit is controlled via a [REDACTED]
  - Verify actual airflow requirements and upgrade air flow capacities as required
  - Consider installation of a variable speed drive for the supply fan

Library:

- Description of Existing System:
  - System Type: [REDACTED]
  - Age: 1997
  - Cooling Source: [REDACTED]
  - Heating Source: [REDACTED]
- Comments and Recommendations:
  - The ductwork insulation is pulling away from the ductwork indicating that the vapor barrier on the ductwork has been breached. Moisture from condensation on the ductwork has permeated the insulation making it ineffective. All of the insulation should be replaced
  - Heating at the unit is controlled via [REDACTED]

Kitchen:

- Description of Existing System:
  - Kitchen System Type: [REDACTED]
  - Age: 1997
  - Cooling Source: [REDACTED]
  - Heating Source: [REDACTED]
- Code Issues: no direct ventilation is provided
- Comments and Recommendations:
  - Install a dedicated makeup air unit to provide direct mechanical ventilation to the kitchen
  - The majority of the heating hot water supply and return piping is not insulated. Insulate all uninsulated heating hot water supply and return piping
  - Based upon observations, it appears that insufficient makeup air exists within the Cafeteria to compensate for hood exhaust. Installation of a dedicated makeup air unit would improve this situation.
  - Transfer air into the kitchen is through a [REDACTED]
  - There are [REDACTED] that are showing signs of rust. Replace existing exhaust fans and exposed ductwork

Cafeteria:

- Description of Existing System:
  - System Type: [REDACTED]
  - Age: 1997
  - Cooling Source: [REDACTED]
  - Heating Source: [REDACTED]
- Code Issues: none noted
- Comments and Recommendations: none
  - Consider adding cooling capability

Boys and Girls Locker Rooms

- Description of Existing System:
  - System Type: [REDACTED]
  - Age: 1997
  - Cooling Source: [REDACTED]
  - Heating Source: [REDACTED]
- Code Issues: none noted
- Comments and Recommendations:
  - none

### Guidance Suite

- Description of Existing System:
  - System Type: Constant Volume Air Handling System in roof penthouse – McQuay model LSL103CH
  - Age: 1997
  - Cooling Source: none
  - Heating Source: hot water
- Code Issues: none noted
- Comments and Recommendations:
  - Consider adding cooling capability

### Band/Chorus Room

- Description of Existing System:
  - System Type: [REDACTED]
  - Age: Recently modified
  - Cooling Source: [REDACTED]
  - Heating Source: [REDACTED]
- Code Issues: The condensing unit is within 10'-0" of the roof parapet
- Comments and Recommendations:
  - This system was recently replaced with the exception to the fan section which remained
  - A new hot water coil, evaporator coil and air cooled condenser section was installed
  - The supply fan discharge has a [REDACTED] This was installed as a means to divert air to the return duct when the system is at lower loads
  - Relocate condensing unit or install hand rail at parapet

### Corridors

- Description of Existing System:
  - System Type: [REDACTED]
  - Age: NA
  - Cooling Source: [REDACTED]
  - Heating Source: [REDACTED]
- Code Issues: Ventilation required per 2009 International Mechanical Code - .06 cfm/sq.ft.
- Comments and Recommendations:
  - Provide ventilation air via a dedicated heating and ventilation unit. This could be tied into a new heating and ventilation that would serve the classrooms.

### Weight Room - Basement

- Description of Existing System:
  - System Type: [REDACTED] Reheat
  - Age: 1997



- Cooling Source: [REDACTED]
- Heating Source: [REDACTED]
- Code Issues: none
- Comments and Recommendations:
  - Consider adding cooling capability

Gymnasium

- Description of Existing System:
  - System Type [REDACTED] (from original building construction)
  - Age: Unknown
  - Cooling Source: [REDACTED]
  - Heating Source: [REDACTED]
- Code Issues: none
- Comments and Recommendations:
  - Replace existing units with new packaged rooftop units with cooling capability

# TOWER

ENGINEERING

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Project Name: Quaker Valley School District – Middle School and High School  
Tower Project Number: A9108  
Client: Eckles Architecture and Engineering  
Date of Report: February 9, 2010  
Author: Mary T. Smith, PE

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**Subject: High School Plumbing and Fire Protection Assessment**

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## General Comments and Recommendations:

- An initial discussion was held with QV personnel to get an overview of the concerns for the plumbing systems.
  - The building is to be functional for another 20 years of service life.
  - High efficiency sinks and toilets: It is desired to replace the water closets, sinks and urinals with fixtures that use less water. Auto-sensor flush valves can be used for the urinal. Manual flush valves will be used for the water closets. Sloan is the preferred manufacturer for flush valves. Crane is not preferred. The district has a preference to use Chicago Faucets. The model will be provided to the AE team.
  - Science labs: The science lab areas need to be reviewed to determine if they are code compliant.
  
- Overall Recommendation: Replace the plumbing fixtures with lower flow models. Replace existing equipment to meet the requirement of an additional 20 years of service. Additional recommendations follow.

## Water Supply:

- Description of Existing System:
  - [REDACTED] installed in 1997, it enters the building [REDACTED]
  - Present configuration includes a [REDACTED]
  - [REDACTED]
  - Pressure gage reading [REDACTED]
  - There is [REDACTED]
- [REDACTED] see the Fire Protection section for additional information.
- Code Violations and Safety Concerns:
  - None identified at this time.
- Comments and Recommendations:
  - See Fire Protection Section

## Sanitary Sewer:

- Description of Existing System:

- Sanitary lines exit the building from [REDACTED] and discharge to a manhole.
- Code Violations and Safety Concerns:
  - None identified at this time.
- Comments and Recommendations:
  - Have the underground sanitary lines video scoped to determine the condition of these lines.
  - Replace aboveground sanitary piping that was not replaced in the most recent renovation of 1997.

Storm Sewer:

- Description of Existing System:
  - Storm lines exit from [REDACTED]
  - Some storm lines within the building were replaced in 1997.
- Code Violations and Safety Concerns:
  - Secondary roof drains or scuppers are required by IPC section 1107 should the roof construction allow the entrapment of water if the primary drains allow buildup.
- Comments and Recommendations:
  - Have the underground storm lines video scoped to determine the condition of these lines.
  - Determine adequacy of overflow scuppers to provide secondary roof drainage.

Natural Gas Service:

- Description of Existing System:
  - The gas service comes from [REDACTED]
- Code Violations and Safety Concerns:
  - There is [REDACTED]
- Comments and Recommendations:
  - Install an [REDACTED]

Interior Water Distribution:

- Description of Existing System:
  - In 1997, a majority of the cold water, hot water and hot water recirculation system and the gas piping to the labs was replaced.
- Code Violations and Safety Concerns:
  - None identified at this time.
- Comments and Recommendations:
  - Replace plumbing systems that were not replaced in 1997.
  - Replace/repair piping that is leaking.
  - Replace missing or damaged insulation on plumbing lines.

Plumbing Fixtures:

- Description of Existing System:

- Some plumbing fixtures were replaced in 1988 and others were replaced in 1997. There is a mix of wall mounted and floor mounted water closets with manual flush valves. Water closet water consumption is 1.6 GPF. Urinal water consumption is 1 GPF, with manual and sensor flush valves. Lavatories had manual faucets.
- Electric water coolers were installed in 1997.
- Most of the service sinks are wall mounted. A few have been replaced with floor mounted mop sinks.
- Tempered and cold water is provided for the showers.
- Code Violations and Safety Concerns:
  - Current IPC requires tempered (85 to 110 deg F) water for public hand washing.
- Comments and Recommendations:
  - Replace the water closets and urinals with low flow fixtures (1.28 GPF and 0.5 GPF respectively).
  - Install sensor operated (battery powered) flush valves on the urinals.
  - Install manual flush valves on the water closets
  - Install new faucets on the lavatories. The lavatories are in reasonable condition, but could be replaced if the other fixtures are being replaced.
  - Replace service sinks with mop sinks where possible. Replace faucets at service/mop sinks.
  - Replace electric water coolers
  - Replace shower heads and shower faucets.
  - Replace tempering valves to showers.
  - Install tempering valve to provide tempered water in the building's existing hot water distribution system. Install separate hot water line to kitchen area.

#### Domestic Water Heaters:

- Description of Existing System:
  - There are two [REDACTED]
  - There are [REDACTED] (2) [REDACTED] [REDACTED] (4)
  - [REDACTED] The tank was installed in 1997. There was no indication of problems, from school personnel, with the volume or temperature of the hot water system.
- Code Violations and Safety Concerns:
  - None identified at this time.
- Comments and Recommendations:
  - Replace the water heaters (same capacity) with higher energy efficient units, comparable to the building boilers replacement. Replace the circulating pumps.

#### Kitchen/Cafeteria:

- Description of Existing System:
  - The kitchen does not presently have a grease interceptor.
- Code Violations and Safety Concerns:
  - A grease interceptor is required per IPC section 1003.3.1 for school kitchens.

- Comments and Recommendations:
  - Replace floor drain grates with stainless steel grates.
  - Replace hand wash sink with stainless steel.
  - Replace the dishwasher booster heater.
  - Install a minimum 1,000 gallon grease interceptor (minimum size per Allegheny County Plumbing Code)

Science Labs:

- Description of Existing System:
  - During the 1997 renovation gas turrets, sinks, water, gas and drain piping was installed.
  - At the instructor's station there are [REDACTED]
- Code Violations and Safety Concerns:
  - Tepid water is required for emergency eyewash and safety shower.
- Comments and Recommendations:
  - Determine if tepid water is provided to the emergency eye wash, if not, provide safety fixture mixing valve.

Miscellaneous Plumbing:

- Description of Existing System:
  - Acid waste neutralization tank for science labs located [REDACTED] [REDACTED] was replaced in 2009.
  - In the art and silk screen rooms there are [REDACTED] that are problematic.
  - Home economics room has [REDACTED]
- Code Violations and Safety Concerns:
  - None identified at this time.
- Comments and Recommendations:
  - Provide new solids interceptors.
  - Darkroom sink needs the faucet replaced.
  - In the Home economics room reroute the lines on the [REDACTED]

Fire Protection:

- Description of Existing System:
  - Presently there is [REDACTED] This [REDACTED]
  - [REDACTED]
  - The sprinklers and fire hose connections are [REDACTED] On the day of the site visit 2/01/2010, the water pressure gage reading for the building was 58 PSI. There are [REDACTED]

- Code Violations and Safety Concerns:

- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]
- [REDACTED]

- Comments and Recommendations:

- A discussion should be held with the local authority having jurisdiction (AHJ) to discuss the fire protection for the building.
- [REDACTED] to the required pressures can be obtained at the fire hoses.
- A hydrant flow test should be conducted.
- Adequacy of existing sprinkler coverage was not evaluated at this time, pending the overall sprinkler issue.

# TOWER

ENGINEERING

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Project Name: Quaker Valley School District – Middle School and High School  
Tower Project Number: A9108  
Client: Eckles Architecture and Engineering  
Date of Report: February 9, 2010  
Author: John C. West Jr., PE

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**Subject: High School Electrical Assessment**

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Power Distribution:

- Description of Existing System

- Utility Connection

- Equipment Manufacturer: General Electric

- Main Building Service:

- Branch Distribution

- Code Violations and Safety Concerns

- All clearances around the electrical distribution equipment meet the requirements of the National Electric Code (NEC), with the exception of the main switchboard. Per the latest edition of the NEC 2008, the clearance in front of the main switchboard should be 36". At this time

- Expected Life

- The distribution equipment is approximately 12 years old and has another 25-30 years of life before replacement is required. Replacement parts are readily available for this equipment through GE.

- Recommendations:

- Where branch panelboards are located care should be taken to keep these panelboards locked at all times.

- The current main electric service for this building is not near its limit for capacity and can be added to for future air conditioning needs in the building, but the switchboard does not have physical space to add fusible switches to serve these new loads. One option would be to replace the fusible switch distribution sections with circuit breaker distribution sections. This would require the disconnection and reconnection of all feeders connected to the switchboard and fault current/coordination study to be provided.
- To correct the clearance issue in the [REDACTED]
- In the classrooms, the [REDACTED] could be removed because it is not being used.

Emergency Lighting and Power System:

- Description of Existing System
  - Existing generator [REDACTED]  
transfer switch [REDACTED]  
[REDACTED]
  - Emergency egress lighting
    - [REDACTED]
    - [REDACTED]
    - [REDACTED]
- Code Violations and Safety Concerns
  - The current wiring method for the lighting in the gymnasium is no longer permitted by the NEC.
  - The life safety emergency loads need to be [REDACTED]  
[REDACTED]
  - [REDACTED]  
This transfer switch needs to be located in a separate room for the current edition of the NEC.
  - Per current codes, the [REDACTED]  
[REDACTED]
- Expected Life.
  - As long as the emergency generators are properly maintained, they should be able to operate another 15-20 years.
- Recommendations
  - The lighting in the gymnasium should be revised to be circuited so that the current code violation is corrected.

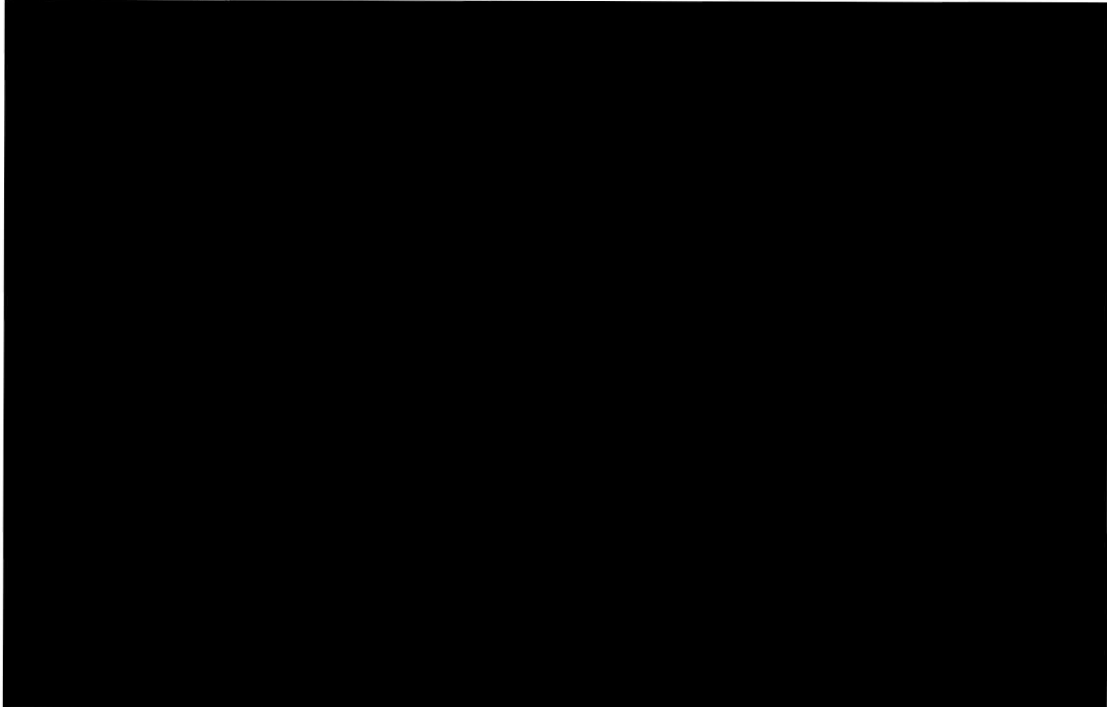


- A second automatic transfer switch should be added to shift the life safety emergency loads off of the existing automatic transfer switch. This automatic transfer switch should then be located a separate space with a one hour enclosure. Once this is accomplished, the power for the network closets could be added to the non-essential emergency automatic transfer switch.

Lighting Systems:

- Description of Existing Systems

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- Code Violations and Safety Concerns

- At this time, there are no apparent code violations pertaining to the lighting systems in the building, although one concern that was raised recently was in regard to the light levels in the classrooms. It was observed that these levels may be too high.

- Expected Life

- Most light fixtures have a life expectancy of 20 – 25 years, and since the light fixtures are only 12 years old, they should be able to operate another 15 – 20 years before needing to be replaced.

- Recommendations

- No changes are required to the lighting systems in the building at this time.
- If alterations to the building are planned in the near future, then to comply with the current energy codes, lighting control devices (timer switches, occupancy sensors) will be required to provide automatic shut-off of light fixtures during unoccupied times. Also, a low voltage lighting relay control panel could be installed to provide a central control point for the lighting in the building.
- If alterations to the classrooms and office spaces are planned, the light fixtures could be replaced with more efficient light fixtures that would provide greater spacing, which would reduce the amount energy consumed. This would also lower light levels to provide a softer environment on the eye.

Fire Alarm System:

- Description of Existing Systems
  - The existing fire alarm system is manufactured by Gamewell.
- Code Violations and Safety Concerns
  - Almost all areas are equipped with adequate fire alarm devices with the exception of [REDACTED]. All pull stations appear to meet code required mounting heights along with all strobe devices and horn/strobe devices.
  - The existing fire alarm system is a coded system and not addressable. The school district staff indicated that this system has [REDACTED].
- Expected Life
  - The existing fire alarm system is now around 12 years old and will soon need to be replaced or upgraded. Replacement parts will become more difficult to obtain.
- Recommendations
  - The fire alarm system should be upgraded to a more current generation of equipment and additional devices should be added to comply with current codes, including adding devices in the classrooms.

Building Intercom, Clock, and Cable Television System (CATV):

- Description of Existing Systems
  - Building paging/intercom system is manufactured by Telecor. This system is used for all pages throughout the entire building and includes call-in switches in the classrooms.
  - There are also several local sound systems in the auditorium and gymnasium.
  - There is no [REDACTED] in the building.
  - The main paging/intercom cabinet is located [REDACTED]. All speaker cabling is landed on 66 blocks at this location and cross connected into the cabinet [REDACTED].
  - The cable television distribution system is routed into each classroom and split in [REDACTED]. The coaxial cable is then distributed within the classroom to the television and desk mounted VCR. The head-end equipment for cable television distribution system is located [REDACTED].
- Code Violations and Safety Concerns
  - None
- Expected Life
  - The paging/intercom system is 12 years old and currently experiencing issues that require service calls to correct. This system will soon need to be replaced or upgraded because replacement parts will become more difficult to obtain. From the administrative handset [REDACTED].
  - The cable television system may be completely replaced with newer technology that utilizes the building data network rather than upgrading the current equipment in the central rack.
- Recommendations
  - The building paging/intercom system should be evaluated for potential replacement. This may require the replacement of speakers and cabling along with the head-end rack.
  - Provide [REDACTED] in the building to establish better time control in the building.

Telephone and Data Network System:

- Description of Existing Systems
  - [REDACTED]
  - [REDACTED]
- Code Violations and Safety Concerns
  - None
- Expected Life
  - The data cabling throughout the building is within the typical 15 year warranty period but should be retested and certified to ensure the cabling system can accommodate present and future technologies that will operate at gigabit Ethernet speeds. Also, fiber optic cabling from the [REDACTED] [REDACTED] retested for signal loss due to dust at connection points, etc.
- Recommendations
  - The data cabling in the building should be tested and recertified for use with gigabit Ethernet speeds.
  - Fiber optic cabling in the building should be retested for signal loss due to dust at connection points, etc.
  - A voice over IP type telephone system may be considered.

Classroom Audio/Visual System:

- Description of Existing Systems
  - The present classroom AV system consists of a ceiling mounted LCD projector and speakers mounted at the projector. This equipment was obtained as part of a grant several years ago and has begun to have maintenance issues for the staff.
- Code Violations and Safety Concerns
  - None
- Expected Life
  - The LCD projectors in the classrooms are nearing the end of the life because when they were obtained as part of a grant, they were not the highest quality.
- Recommendations
  - All classrooms should be upgraded to a ceiling mounted LCD projector with wall or ceiling mounted speakers and voice amplification within the classroom. This design would be similar to what has been installed at the two elementary school buildings. This would require the removal of the older LCD projectors and speakers. Once this equipment is removed, consideration should be given to removing all coaxial cabling in the building and converting the cable television distribution system in the building to a network based system, similar to a VBrick type system.
  - A suggestion was also made to add an IP based camera in each classroom for distance learning capabilities.