



**To:** Massachusetts School Building Authority (MSBA)  
Jennifer Connarton, MSBA Field Coordinator  
**From:** PMA Consultants LLC, Owner's Project Manager  
**Project:** Town of Shrewsbury, Sherwood Middle School  
**Subject:** OPM Review and Transmittal of Architect's Design Development Submittal  
**Date:** August 9, 2010

In accordance with MSBA Project Advisory 1 - May 2010; PMA Consultants (PMA), Owner's Project Manager (OPM) for the Town of Shrewsbury Sherwood Middle School Project, hereby transmits the architect's Design Development Submittal for the Sherwood Middle School Project. These Design Development documents were prepared by the project architect, Lamoureux Pagano Associates (LPA). PMA has reviewed the enclosed documents and hereby certifies that it has found the documents to be complete and in conformity with MSBA requirements.

In addition to the two hard copies of half-sized drawings, the specifications, and one electronic file in PDF format; the architect, Lamoureux Pagano Associates (LPA) has included the following items with its Design Development submittal:

- |                                    |                                       |
|------------------------------------|---------------------------------------|
| 1. Project Update Summary          | 7. Life Cycle Cost Analysis Documents |
| 2. Project Directory               | 8. Estimated Electrical Load          |
| 3. Project Schedule                | 9. Cost Estimate Update               |
| 4. Drawing List                    | 10. Space Summary Template            |
| 5. Specification Table of Contents | 11. MA-CHPS Scorecard Update          |
| 6. Permitting Schedule Update      | 12. Interior Design Concept           |

This Design Development Submittal includes the Designer's construction cost estimate. The Designer's construction cost estimate was finalized on 8/2/10. The value of the Designer's construction cost estimate compares favorably with the current project budget (MSBA Form-3011 established at Schematic Design and documented in the Project Funding Agreement). The current construction cost estimate subtotal (exclusive of mark-ups and escalation) of \$27.03 million is 1.3% below the \$27.39 million budget amount. The current total construction cost estimate (with mark-ups and escalation) of \$33.49 million is \$3.5million (9.5%) below the current project budget of \$37.03 million. \$1.6 million of this \$3.5 million difference is attributable to reducing the design and pricing contingency from 10% to 5% and \$1.4 million of this \$3.5 million difference is attributable reducing the estimated escalation from 6% to 2%. [Refer to the attached cost estimate comparison spreadsheet for further details.]

For this project, the independent construction cost estimate was finalized on 8/1/10 by the Construction Manager (CM), Gilbane Building Company. The independent construction cost estimate of \$35.54 million is also below the current project budget of \$37.03 million;



however, it is \$2.05 million higher than the Designer's construction cost estimate. The majority of this difference is due to a difference in estimating methodologies: the CM's estimate carries a 5% CM contingency while the Designer's estimate does not carry this item; the CM's estimate carries a \$90,000 preconstruction fee while the project budget and the Designer's estimate carries this as a soft cost apart from the construction cost. When the CM's estimate is adjusted to account for these two differences in estimating methodologies, the difference in two estimates reduces to \$515,064 (1.5%).

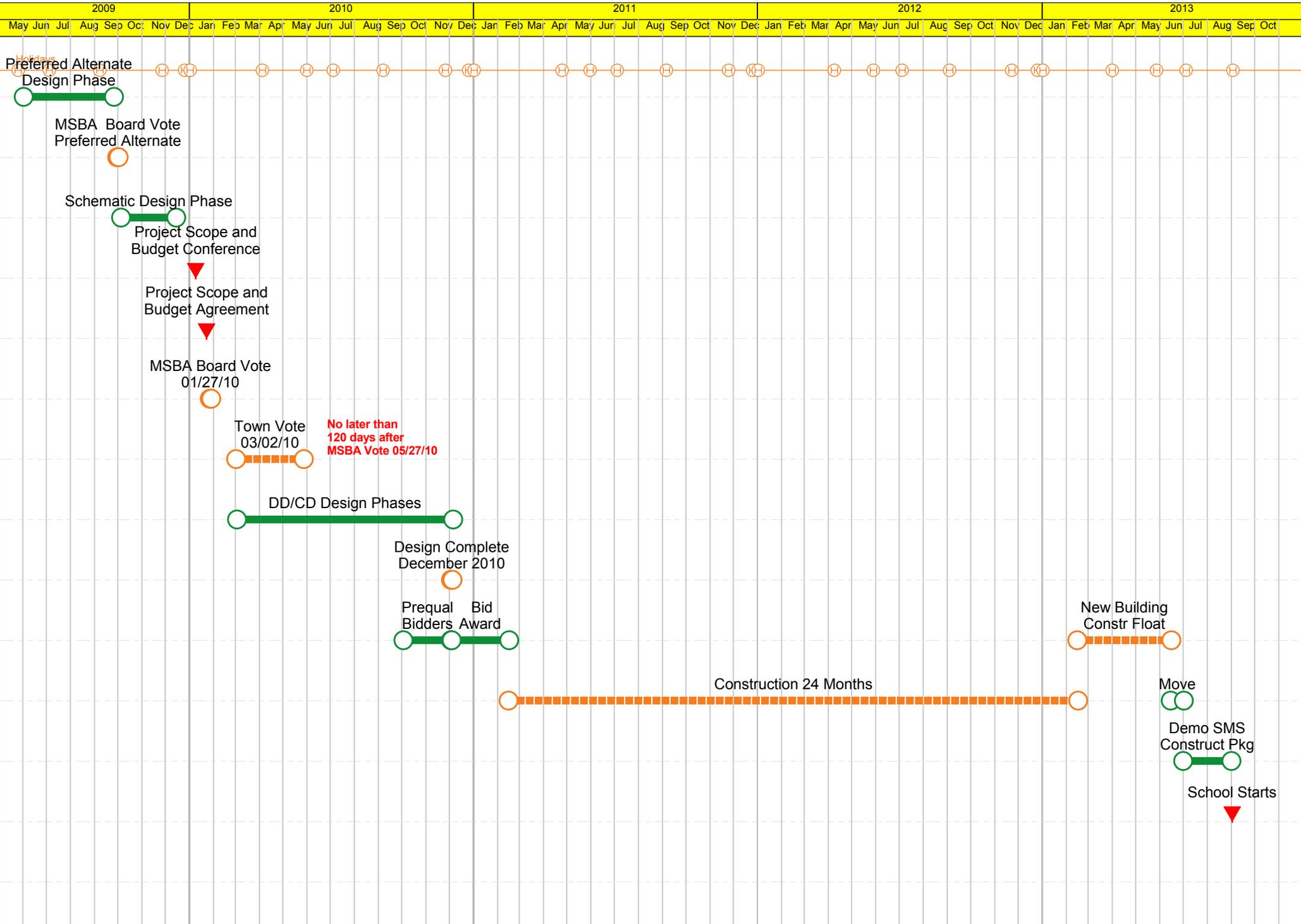
\$35,541,663	Independent Estimate Total
(\$90,000)	Less Precon Fee (this is a true cost but is a soft cost on Form-3011)
<u>(\$1,445,648)</u>	<u>Less CM Contingency (5%)</u>
\$34,006,015	Adjusted Independent Estimate (For Comparison to Designer's Estimate)
<u>(\$33,489,951)</u>	<u>Less Designer's Estimate</u>
\$516,064	1.5% Difference (without CM Contingency & Precon. Fee)

For reference, PMA has attached to this memorandum the current project budget (MSBA Form-3011), the current project schedule, and a cost estimate comparison spreadsheet comparing the current Designer's Design Development estimate current project budget. If you have any questions about the materials provided in this transmittal, please contact Paul Queeney, PMA Consultants, at 781-794-1404, extension 3119.

<b>Shrewsbury Sherwood Middle School Grades 5 &amp; 6</b>			<b>12/11/2009</b>
<b>TOTAL PROJECT BUDGET - ALL COSTS ASSOCIATED WITH THE PROJECT ARE SUBJECT TO 963 CMR 2.16(5)</b>	<b>Estimated Budget</b>	<b>*Cost/Scope Items Excluded from the Total Facilities Grant</b>	<b>*Ineligible Costs</b>
Administration			
<b>Legal Fees/Bond</b>	\$75,000		\$75,000
<b>Owner's Project Manager</b>			
<i>Programming</i>	\$32,000		
<i>Feasibility Study</i>	\$32,000		
<i>Schematic Design</i>	\$44,650		
<i>Design Development</i>			
<i>Construction Contract Documents</i>			
<i>Bidding</i>			
<i>Construction Contract Administration</i>			
<i>Closeout</i>			
<i>Extra Services (Owner's Project Manager)</i>	\$1,136,360		
<i>Reimbursable Services</i>			
<i>Other Project Manager Costs (On-site PM)</i>	\$270,400		
<b>Advertising</b>	\$10,000		
<b>Printing</b>	\$50,000		
<b>Owner's Insurance</b>	\$25,000		
<b>Other Administrative Costs (permit fees)</b>	\$10,000		
<b>Subtotal</b>	<b>\$1,685,410</b>	<b>\$0</b>	<b>\$75,000</b>
Architecture and Engineering			
<b>Basic Services</b>			
Architect and Engineer Fees			
<i>Programming</i>			
<i>Feasibility Study</i>	\$503,600		
<i>Schematic Design</i>	Included above		
<i>Design Development</i>	\$400,800		
<i>Construction Contract Documents</i>	\$904,400		
<i>Bidding</i>			
<i>Construction Contract Administration</i>	\$775,200		
<i>Closeout</i>			
<i>Other Basic Services</i>	\$20,000		
<b>Extra Services</b>			
<i>Programmatic Changes</i>			
<i>Construction Change Orders</i>			
<b>Reimbursable Services</b>			
<i>Construction testing (Forensics)</i>			
<i>Printing (over minimum)</i>			
<i>Other Reimbursable Costs</i>	\$40,000		
<b>Subconsultants</b>			
<i>Structural Peer Review (not in Dsg Contract)</i>	\$6,000		
<i>Hazardous Material</i>			
<i>Mass CHPs Registration (not in Dsg Contract)</i>	\$5,000		
<i>Site Survey (not in Dsg Contract)</i>	\$20,000		
<i>Wetlands</i>			
<i>Landscaping</i>			
<i>Technology (Not in Dsg Contract)</i>	\$50,000		
<i>Equipment FFE(not in Dsg Contract)</i>	\$70,000		
<i>Accoustical</i>			
<i>Food Service (not in Dsg Contract)</i>	\$10,000		
<i>Cost Consultants</i>			
<i>Traffic Consultants</i>			
<i>Other Consultants</i>	\$372,000		
<b>Subtotal</b>	<b>\$3,177,000</b>	<b>\$0</b>	<b>\$0</b>

Shrewsbury Sherwood Middle School Grades 5 & 6		12/11/2009	
TOTAL PROJECT BUDGET - ALL COSTS ASSOCIATED WITH THE PROJECT ARE SUBJECT TO 963 CMR 2.16(5)	Estimated Budget	*Cost/Scope Items Excluded from the Total Facilities Grant	*Ineligible Costs
CM at Risk Pre-Construction Services			
<b>Construction Management Services</b>	<b>\$370,000</b>		
Site Acquisition			
Land/Building Purchase			
Appraisal Fees			
Recording fees			
<b>Subtotal</b>	<b>\$0</b>	<b>\$0</b>	<b>\$0</b>
Construction Costs			
<b>SUBSTRUCTURE</b>			
Foundations	\$1,565,463		
Basement Construction	\$0		
<b>SHELL</b>			
SuperStructure	\$2,801,264		
Exterior Closure	\$3,486,265		
Roofing	\$770,329		
<b>INTERIORS</b>			
Interior Construction	\$2,870,244		
Staircases	\$162,600		
Interior Finishes	\$1,883,258		
<b>SERVICES</b>			
Conveying Systems	\$127,500		
Plumbing	\$1,244,228		
HVAC	\$3,414,597		
Fire Protection	\$558,007		
Electrical	\$2,705,102		
<b>EQUIPMENT &amp; FURNISHINGS</b>			
Equipment	\$656,540		
Furnishings	\$839,128		
<b>SPECIAL CONSTRUCTION &amp; DEMOLITION</b>			
Special Construction			
Existing Building Demolition	\$531,000		
In-Bldg Hazardous Material Abatement	\$575,000		
Asbestos Cont'g Floor Mat'l Abatement		\$180,000.00	
Other Hazardous Material Abatement			\$15,000
<b>BUILDING SITEWORK</b>			
Site Preparation	\$912,549		
Site Improvements	\$1,696,029		
Site Civil/ Mechanical Utilities	\$551,793		
Site Electrical Utilities	\$36,600		
Other Site Construction			
Scope Excluded Site Cost		\$1,350,209	
<b>Construction Trades Subtotal</b>	<b>\$27,387,496</b>	<b>\$1,530,209</b>	<b>\$15,000</b>
Insurance	\$314,682	\$17,582	\$172
Sub-Contractor Bonds	\$410,812	\$22,953	\$225
Contingencies (Design and Pricing)	\$3,146,669	\$175,821	\$1,724
General Conditions	\$2,191,000	\$122,417	\$1,200
Overhead & Profit	\$1,478,924	\$82,631	\$810
Escalation to Mid-Point of Construction	\$2,095,775	\$117,097	\$1,148
<b>Overall Excluded Construction Cost</b>			
<b>Construction Costs</b>	<b>\$37,025,358</b>	<b>\$2,068,710</b>	<b>\$20,279</b>

<b>Shrewsbury Sherwood Middle School Grades 5 &amp; 6</b>		<b>12/11/2009</b>	
<b>TOTAL PROJECT BUDGET - ALL COSTS ASSOCIATED WITH THE PROJECT ARE SUBJECT TO 963 CMR 2.16(5)</b>	<b>Estimated Budget</b>	<b>*Cost/Scope Items Excluded from the Total Facilities Grant</b>	<b>*Ineligible Costs</b>
<b>Alternates</b>			
<b>Subtotal</b>	\$0	\$0	\$0
<i>Construction Contingency (5%)</i>	\$1,851,268		
Miscellaneous Project Costs			
Hazmat Monitoring & Testing	\$50,000		
Material Testing	\$85,000		
Reproduction/Mailing			
Electric and Utility Backcharges	\$50,000		\$50,000
Moving & Consultant	\$50,000		\$50,000
<b>Subtotal</b>	<b>\$235,000</b>	<b>\$0</b>	<b>\$100,000</b>
Furnishings and Equipment			
Furnishings and Equipment	\$1,080,000		
Maintenance Equipment			
Computer Equipment	\$1,080,000		
<i>Student Use hardware</i>			
<i>Student Use Software</i>			
<i>Admin. Hardware</i>			
<i>Admin. Software</i>			
Scope Excluded FFE Costs			
<b>Subtotal</b>	<b>\$2,160,000</b>	<b>\$0</b>	<b>\$0</b>
Owner's Contingency			
Owner's Contingency	\$762,741		
Soft Costs that exceed 20% of Const'n Cost			\$21,136
<b>Total Project Budget</b>	<b>\$47,266,777</b>	<b>\$2,068,710</b>	<b>\$216,415</b>
Alternates	\$0		
Ineligible cost	\$216,415		
Scope items excluded	\$2,068,710		
Basis of Total Facilities Grant	\$44,981,652		
Reimbursement Rate	53.16%		
<b>Total Maximum Facilities Grant</b>	<b>\$23,912,246</b>		
<p><b>*NOTE:</b> This document was prepared by the MSBA based on a preliminary review of information and estimates provided by the Town of Shrewsbury for the Sherwood Middle School project. Based on this preliminary review, certain budget, cost and scope items have been determined to be ineligible for reimbursement, however, this document does not contain a final, exhaustive list of all budget, cost and scope items which may be ineligible for reimbursement by the MSBA. Nor is it intended to be a final determination of which budget, cost and scope items may be eligible for reimbursement by the MSBA. All project budget, cost and scope items shall be subject to review and audit by the Authority, and the Authority shall determine, in its sole discretion whether any such budget, cost and scope items are eligible for reimbursement. The MSBA may determine that certain additional budget, cost and scope items are ineligible for reimbursement.</p>			



Start Date:	05/31/2009
Finish Date:	10/30/2013
Plot Date:	12/08/2009
Mode:	Forward Pass

## Town of Shrewsbury - Sherwood Middle School

Key

Float <= Critical Threshold Days

Float > Critical Threshold Days

### Float

### Gap

### Buffer

V Link

H Link

HV Link

VH Link

# COST ESTIMATE COMPARISON

## Shrewsbury Sherwood Middle School (New Construction)

Assumed Start of Construction:		March-10			March-10		
Division #	Description	Project Scope & Budget			Design Development		
		GSF	Total Cost	Unit Cost	GSF	Total Cost	Unit Cost
A	Substructure	130,000	\$1,565,463	\$12.04	130,000	\$1,635,774	\$12.58
B	Shell	130,000	\$7,057,858	\$54.29	130,000	\$6,640,126	\$51.08
	B10 Superstructure	130,000	\$2,801,264	\$21.55	130,000	\$2,221,710	\$17.09
	B20 Exterior Enclosure	130,000	\$3,486,265	\$26.82	130,000	\$3,538,478	\$27.22
	B2010 Exterior Walls	130,000		\$0.00	130,000	\$2,809,883	\$21.61
	B2020 Exterior Windows	130,000		\$0.00	130,000	\$674,415	\$5.19
	B2030 Exterior Doors	130,000		\$0.00	130,000	\$54,180	\$0.42
	B30 Roofing	130,000	\$770,329	\$5.93	130,000	\$879,938	\$6.77
C	Interiors	130,000	\$4,916,102	\$37.82	130,000	\$5,193,396	\$39.95
D	Services	130,000	\$8,049,434	\$61.92	130,000	\$7,471,388	\$57.47
	D10 Conveying	130,000	\$127,500	\$0.98	130,000	\$117,500	\$0.90
	D20 Plumbing	130,000	\$1,244,228	\$9.57	130,000	\$1,095,805	\$8.43
	D30 HVAC	130,000	\$3,414,597	\$26.27	130,000	\$2,880,720	\$22.16
	D40 Fire Protection	130,000	\$558,007	\$4.29	130,000	\$493,166	\$3.79
	D50 Electrical	130,000	\$2,705,102	\$20.81	130,000	\$2,884,197	\$22.19
E	Furnishings & Fixed Equipment	130,000	\$1,495,668	\$11.51	130,000	\$1,506,471	\$11.59
	<b>Building Subtotal</b>	<b>130,000</b>	<b>\$23,084,525</b>	<b>\$178</b>	<b>130,000</b>	<b>\$22,447,155</b>	<b>\$172.67</b>
F	Special Construction & Demo	130,000	\$1,106,000	\$8.51	130,000	\$969,000	\$7.45
G	Other Site Construction	130,000	\$3,196,971	\$24.59	130,000	\$3,611,201	\$27.78
	G10 Site Preparation	130,000	\$912,549	\$7.02	130,000	\$624,947	\$4.81
	G20 Site Improvements	130,000	\$1,696,029	\$13.05	130,000	\$1,809,280	\$13.92
	G30 Mechanical Utilities	130,000	\$551,793	\$4.24	130,000	\$1,091,699	\$8.40
	G40 Electrical Utilities	130,000	\$36,600	\$0.28	130,000	\$85,275	\$0.66
	<b>Subtotal</b>	<b>130,000</b>	<b>\$27,387,496</b>	<b>\$211</b>	<b>130,000</b>	<b>\$27,027,356</b>	<b>\$207.90</b>
Z	Mark-Ups	130,000	\$7,542,087	27.5%	130,000	\$5,805,930	21.5%
Z	Insurance	130,000	\$314,682	1.1%	130,000	\$366,140	1.4%
Z	Subcontractor Bonds	130,000	\$410,812	1.5%	130,000	\$200,000	0.7%
Z	GC Bonds	130,000		0.0%	130,000	\$297,073	5.1%
Z	Design & Pricing Contingency	130,000	\$3,146,669	11.5%	130,000	\$1,563,490	5.8%
Z	General Conditions	130,000	\$2,191,000	8.0%	130,000	\$2,972,227	11.0%
Z	Overhead & Profit	130,000	\$1,478,924	5.4%	130,000	\$407,000	1.5%
	<b>Construction Subtotal</b>	<b>130,000</b>	<b>\$34,929,583</b>	<b>\$269</b>	<b>130,000</b>	<b>\$32,833,286</b>	<b>\$252.56</b>
Z	Escalation to Construction Mid-Point	130,000	\$2,095,775	7.7%	130,000	\$656,666	2.4%
	<b>Total Addition Cost</b>	<b>130,000</b>	<b>\$37,025,358</b>		<b>130,000</b>	<b>\$33,489,952</b>	
	<b>\$/GSF</b>		<b>\$285</b>			<b>\$258</b>	



# Sherwood Middle School

30 Sherwood Avenue, Shrewsbury, Massachusetts

## **MSBA** Design Development Submission

**19 JULY 2010**

### **OWNER**

Town of Shrewsbury  
Shrewsbury, Massachusetts

### **OPM**

PMA Consultants LLC  
Braintree, Massachusetts

### **CONSTRUCTION MANAGER**

Gilbane Building Company  
Boston, Massachusetts

Prepared by:



LAMOUREUX · PAGANO  
ASSOCIATES. ARCHITECTS

# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

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2. Project Directory
3. Project Schedule
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7. Life Cycle Cost Analysis Documents
  - HVAC
  - Water
8. Estimated Electrical Load
9. Cost Estimate Update
10. Space Summary Template
11. MA-CHPS Scorecard Update
12. Interior Design Concept

# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

### 1. PROJECT UPDATE SUMMARY

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Since the November 17, 2009 Schematic Design submission, the Design Development has progressed as a refinement of the project without any significant deviations in program or design features.

The structure was further defined with particular focus on the roof coordination for drainage and support of rooftop units as well as moment frames for flexibility within the classroom wings. All mechanical and electrical systems were further developed and coordinated with the site utilities. Site grading, layout, and materials definition was further refined to provide more accessibility throughout the project site and reduce landscape maintenance.

The Design Team met to review the MA-CHPS scorecard and confirm that the 2% reimbursement threshold is still achievable. Responsibilities for documentation were delegated and slight adjustments made to the sustainable goals.

The Building Committee voted to approve Gilbane Construction as the Construction Manager for the project and they will review the Design Development documents with respect to budget, schedule, and constructability.

The proposed schedule and phasing plan indicates that new construction will begin in the spring of 2011 and be completed by spring of 2013 while the existing Sherwood Middle School continues to be occupied. At the end of the 2012-1013 school year, the existing building will be evacuated as quickly as possible to allow the hazardous material abatement process to begin. The sequencing of the demolition of the existing building and associated site work for the summer of 2013 will be reviewed in detail to accommodate the owner's needs for the fall 2013 occupancy.

During the construction document phase, LPA will work with the construction manager and owner project manager to develop a site mobilization plan separating contractors from school population to the greatest extent possible. Temporary parking, pedestrian paths between the two schools on the site, and a bus circulation plan will be the focus of this effort.

# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

## 2. PROJECT DIRECTORY

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### OWNER

Town of Shrewsbury  
100 Maple Avenue  
Shrewsbury, MA 01545

Daniel Morgado, Town Manager  
Tel: (508) 841-8508 Fax: (508) 842-0587  
E-mail: [dmorgado@th.ci.shrewsbury.ma.us](mailto:dmorgado@th.ci.shrewsbury.ma.us)

Michael Hale, Assistant Town Manager  
Tel: (508) 841-8508 Fax: (508) 842-0587  
E-mail: [mhale@th.ci.shrewsbury.ma.us](mailto:mhale@th.ci.shrewsbury.ma.us)

Robert Cox, Super of Public Buildings  
Tel: (508) 841-8513 Fax: (508) 841-8497  
E-mail: [rcox@th.ci.shrewsbury.ma.us](mailto:rcox@th.ci.shrewsbury.ma.us)

Joe Sawyer, Superintendent of Schools  
Tel: (508) 841-8400 Fax: (508) 841-8490  
E-mail: [jsawyer@shrewsbury.k12.ma.us](mailto:jsawyer@shrewsbury.k12.ma.us)

Jay Cummings, Assist. Superintendent of Schools  
Tel: (508) 841-8400 Fax: (508) 841-8490  
E-mail: [jcumings@shrewsbury.k12.ma.us](mailto:jcumings@shrewsbury.k12.ma.us)

Anne Mahan, Director of Bus. Services  
Tel: (508) 841-8405  
E-mail: [amahan@shrewsbury.k12.ma.us](mailto:amahan@shrewsbury.k12.ma.us)

Richard Carney, Selectman  
Tel: (508) 842-6301

John LeBeaux, Selectman  
Tel: (508) 842-8684  
E-mail: [johnlebeaux@townisp.com](mailto:johnlebeaux@townisp.com)

Erin Canzano, Chair School Committee  
Tel: (508) 845-2034  
E-mail: [erincanzano@hotmail.com](mailto:erincanzano@hotmail.com)

Henry Fitzgerald, Committee Chair  
Tel: (508) 842-7456 Fax: (508) 270-2525  
Cell: (508) 270-2153  
E-mail: [henry.fitzgerald@genzyme.com](mailto:henry.fitzgerald@genzyme.com)

Kathy Nash  
Tel: (508) 523-1328  
E-mail: [kanash@townisp.com](mailto:kanash@townisp.com)

# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

## 2. PROJECT DIRECTORY

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Sherwood Middle School  
30 Sherwood Avenue  
Shrewsbury, MA 01545

Jane Lizotte, Principal of SMS  
Tel: (508) 845-9716  
E-mail: [jlizotte@shrewsbury.k12.ma.us](mailto:jlizotte@shrewsbury.k12.ma.us)

### MSBA

MSBA  
40 Broad Street  
Suite 500  
Boston, MA 02109

John Jumpe, Project Manager  
Tel: (617) 960-3082  
E-mail: [John.Jumpe@massschoolbuildings.org](mailto:John.Jumpe@massschoolbuildings.org)

Kathryn DeCristofaro, Field Coordinator  
Tel: (617) 960-3082  
Email: [kathryn.decristofaro@massschoolbuildings.org](mailto:kathryn.decristofaro@massschoolbuildings.org)

### OPM

PMA Consultants LLC  
25 Braintree Hill Office Park  
Suite 303  
Braintree, MA 02184

Christopher Carroll, Principal  
Tel: (781) 794-1404 x3107 Fax: (781) 794-1405  
E-mail: [Ccarroll@pmaconsultants.com](mailto:Ccarroll@pmaconsultants.com)

Chris Simmler, OPM  
Tel: (781) 794-1404 X3113 Fax: (781) 794-1405  
E-mail: [csimmler@pmaconsultants.com](mailto:csimmler@pmaconsultants.com)

Paul Queeney, OPM  
Tel: (857) 233-8198 Fax: (781) 794-1405  
E-mail: [pqueeney@pmaconsultants.com](mailto:pqueeney@pmaconsultants.com)

### ARCHITECT

Lamoureux Pagano & Associates  
14 East Worcester Street  
Worcester, MA 01604

Michael Pagano, Principal Architect  
Tel: (508) 752-2831 Fax: (508) 757-7769  
E-mail: [mpagano@lamoureuxpagano.com](mailto:mpagano@lamoureuxpagano.com)

Kathryn Crockett, Project Architect  
Tel: (508) 752-2831 Fax: (508) 757-7769  
E-mail: [kcrockett@lamoureuxpagano.com](mailto:kcrockett@lamoureuxpagano.com)

Eric Moore, Project Architect  
Tel: (508) 752-2831 Fax: (508) 757-7769  
E-mail: [emoore@lamoureuxpagano.com](mailto:emoore@lamoureuxpagano.com)

### CONSULTANTS

#### Site/Civil

Nitsch Engineering  
186 Lincoln Street  
Suite 200  
Boston, MA 02111

William Maher  
Tel: (617) 338-0063 Fax: (617) 338-6472  
E-mail: [wmaher@nitscheng.com](mailto:wmaher@nitscheng.com)

# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

## 2. PROJECT DIRECTORY

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<i>Structural</i>	Bolton & DiMartino Inc. 100 Grove Street Worcester, MA 01605	Joseph DiMartino, President Tel: (508) 756-8972 Fax: (508) 757-9750 E-mail: <a href="mailto:jdbdi@charterinternet.com">jdbdi@charterinternet.com</a>
<i>Plumbing/FP</i>	Akal Engineering Inc. 10 Abbey Road Boylston, MA 01505	Anup S. Khatra Tel: (508) 869-0403 Fax: (508) 869-2891 E-mail: <a href="mailto:khatra@akalengineering.com">khatra@akalengineering.com</a>
<i>HVAC</i>	Seaman Engineering Corp. 30 Faith Avenue Auburn, MA 01501	Kevin Seaman, President Tel: 508-832-3535 Fax: (508) 832-3393 E-mail: <a href="mailto:Kevin@seamanengineers.com">Kevin@seamanengineers.com</a>
<i>Electrical/Data Communications</i>	ART Engineering Corp. 76 Webster Street Worcester, MA 01604	Azim Rawji, P.E. Principal Tel: (508) 797-0333 Fax: (508) 797-5130 E-mail: <a href="mailto:azim@artec.us.com">azim@artec.us.com</a>
<i>Kitchen/Food Service</i>	Colburn & Guyette Consulting 201 Oak Street Suite 12 Pembroke, MA 02359	Todd Guyette, President Tel: (781) 826-5522 Fax: (781) 826-5523 E-mail: <a href="mailto:rtg@colburnguyette.com">rtg@colburnguyette.com</a>
<i>Sustainable Design</i>	The Green Engineer 50 Beharrell Street Concord, MA 01742	Chris Schaffner, President Tel: 978-369-8978 E-mail: <a href="mailto:chris@greenengineer.com">chris@greenengineer.com</a>
<i>Hazardous Materials</i>	Universal Environmental Consultants 12 Brewster Road Framingham, MA 01702	Ammar Dieb, President Tel: (508) 628-5486 Fax: (508) 628-5488 E-mail: <a href="mailto:adiieb@uec-env.com">adiieb@uec-env.com</a>
<i>Geotechnical</i>	McPhail Associates 2269 Massachusetts Ave Cambridge, MA 02140	Ambrose Donovan, P.E. Tel: (617) 868-1420 x117 Fax: (617) 868-1423 E-mail: <a href="mailto:adonovan@mcphailgeo.com">adonovan@mcphailgeo.com</a>
<i>Estimating</i>	A.M. Fogarty & Associates 175 Derby Street Suite 5 Hingham, MA 02043	Peter Timothy, President Tel: (781) 749-7272 Fax: (781) 740-2652 E-mail: <a href="mailto:ptim@amfogarty.com">ptim@amfogarty.com</a>
<i>Spec Writer</i>	184 Greenleaf Drive Florence, MA 01062	Martin J. Helly, Jr. Tel: (413) 586-7769 E-mail: <a href="mailto:mhspeccs@verizon.net">mhspeccs@verizon.net</a>

# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

## 2. PROJECT DIRECTORY

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*CONSTRUCTION MANAGER* Gilbane Building Company  
155 Federal Street, Suite 400  
Boston, MA 02110

William Kearny, Principal  
Tel: (617)-478-3328 Fax: (617) 478-3301  
E-mail: [wkearny@gilbanecoc.com](mailto:wkearny@gilbanecoc.com)

Jim Driscoll, Project Executive  
Cell: (617)-593-0801  
E-mail: [jdriscoll@gilbaneco.com](mailto:jdriscoll@gilbaneco.com)

Walt Kincaid, Project Manager  
Cell: (617)-438-4538  
E-mail: [wkincaid@gilbaneco.com](mailto:wkincaid@gilbaneco.com)

Joe McCoy, Chief Estimator  
Tel: (617) 478-3300 Fax: (617) 478-3301  
E-mail: [jmccoy@gilbaneco.com](mailto:jmccoy@gilbaneco.com)

Paul Ruggieri, Procurement  
Tel: (617) 478-3328 Fax: (617) 478-3301  
E-mail: [pruggieri@gilbaneco.com](mailto:pruggieri@gilbaneco.com)

Al Abdella, Sr. General Superintendent  
E-mail: [aabdella@gilbaneco.com](mailto:aabdella@gilbaneco.com)

Angel Malaxechevarria, Asst. Superintendent  
E-mail: [amalaxechevarria@gilbaneco.com](mailto:amalaxechevarria@gilbaneco.com)

Corey Dyer, Asst. Project Manager/Project Eng.  
E-mail: [cdyer@gilbaneco.com](mailto:cdyer@gilbaneco.com)

Don Venerus, Project Engineer  
E-mail: [dvenerus@gilbaneco.com](mailto:dvenerus@gilbaneco.com)

**Sherwood Middle School**  
Sherwood Avenue, Shrewsbury, MA 01545

**DESIGN DEVELOPMENT**

**3. PROJECT SCHEDULE**

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ID	Responsibility	Task Name	Duration	Start	Finish	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10	11/10	12/10	1/11	2/11	3/11	4/11	5/11	6/11	7/11	8/11	9/11	10/11
1		<b>DESIGN DEVELOPMENT PHASE</b>	<b>54 days</b>	<b>Tue 4/20/10</b>	<b>Fri 7/2/10</b>																				
2	LPA/OPM	MSBA Kick Off Meeting	5 days	Mon 5/10/10	Fri 5/14/10																				
3	LPA	Develop project permitting track	5 days	Thu 4/29/10	Wed 5/5/10																				
4	LPA/Nitsch	Confirm environmental permitting requirements and schedule	5 days	Thu 4/29/10	Wed 5/5/10																				
5	Design Team	Meet with Shrewsbury authorities to confirm project requirements	10 days	Thu 4/29/10	Wed 5/12/10																				
6	Design Team	Sustainable Design work session: confirm points/responsibilities for documentation	1 day	Thu 5/27/10	Thu 5/27/10																				
7	LPA/OPM/BC	CM@Risk Selection/Determine project role	31 days	Tue 4/20/10	Tue 6/1/10																				
8	PA/OPM/Owner	Building Committee Meeting (FFE Scope Established)	1 day	Tue 5/11/10	Tue 5/11/10																				
9	LPA/Team	Coordination Meeting	1 day	Thu 5/13/10	Thu 5/13/10																				
10	LPA/Team	Coordination Meeting/Sustainable Design/Specs	1 day	Thu 5/27/10	Thu 5/27/10																				
11		Building Committee Meeting	1 day	Tue 6/8/10	Tue 6/8/10																				
12		<b>Design Development Drawings</b>	<b>32 days</b>	<b>Thu 4/29/10</b>	<b>Fri 6/11/10</b>																				
13	LPA/Nitsch	Site contours, elevations, utilities, roads, parking, walks, recreation areas, site improvements, plant schedule.	32 days	Thu 4/29/10	Fri 6/11/10																				
14	LPA	Architectural floor plans (1/8"=1'): dims, structural grid, mechanical/electrical rooms, interior partitions including fire walls, floor elevations, millwork, furniture.	32 days	Thu 4/29/10	Fri 6/11/10																				
15	LPA	Architectural plans (1/4"=1'): specialty areas	12 days	Thu 5/27/10	Fri 6/11/10																				
16	LPA/ Team	Roof plan: roof type, drainage system, rooftop features	32 days	Thu 4/29/10	Fri 6/11/10																				
17	LPA	Building Sections (2 min.): floor to clg. hts., floor to floor hts., spaces labeled	12 days	Thu 4/29/10	Fri 5/14/10																				
18	LPA	Building elevations: full ht. showing all features, column centerlines, materials, control & expansion jts., louvers, ext. grade elevations	12 days	Thu 4/29/10	Fri 5/14/10																				
19	LPA	Wall sections: foundation/perimeter treatment, wall construction, mechanical and window penetrations, floor construction	32 days	Thu 4/29/10	Fri 6/11/10																				
20	LPA	Interior Elevations: typical and specialty spaces	12 days	Thu 5/13/10	Fri 5/28/10																				
21	LPA/Team	Reflected Ceiling Plans: MEP and architectural features	32 days	Thu 4/29/10	Fri 6/11/10																				
22	LPA	Schedules: finish, door, and window schedules by types, equipment schedule	12 days	Thu 5/13/10	Fri 5/28/10																				
23	LPA	Interior Color Concept Narrative	12 days	Thu 5/27/10	Fri 6/11/10																				
24	LPA/BDI	Structural: geotech information, framing plans, foundation plans, preliminary details incl. lateral systems	32 days	Thu 4/29/10	Fri 6/11/10																				
25	LPA/Akal	Fire Protection: all major system features, sprinkler grid and heads	32 days	Thu 4/29/10	Fri 6/11/10																				
26	LPA/Akal	Plumbing: fixtures, piping, principal equipment and connections	32 days	Thu 4/29/10	Fri 6/11/10																				
27	LPA/SEI	HVAC: heat gain/loss calcs., major features and distribution system	32 days	Thu 4/29/10	Fri 6/11/10																				
28	LPA/ART	Electrical: load calcs., services, lighting, emergency gen., fire alarm, security, communications, cable, IT, lightning protection	32 days	Thu 4/29/10	Fri 6/11/10																				
29	LPA/CG	Food Service: kitchen equipment, MEP requirements	32 days	Thu 4/29/10	Fri 6/11/10																				
30	LPA/Owner	Owner Provided Equipment: cut sheets and locations	12 days	Thu 5/6/10	Fri 5/21/10																				
31	LPA/Owner	Furniture Schedule	24 days	Tue 5/11/10	Fri 6/11/10																				
32		<b>Design Development Specifications</b>	<b>12 days</b>	<b>Thu 5/27/10</b>	<b>Fri 6/11/10</b>																				
33	LPA	Owner Input: Div. 0&1	12 days	Thu 5/27/10	Fri 6/11/10																				
34	LPA/Helly	Div. 2- 50 Unifomat: develop 3 equals or performance specs.	12 days	Thu 5/27/10	Fri 6/11/10																				
35	LPA/Helly	Incorporate sustainable design spec. items	12 days	Thu 5/27/10	Fri 6/11/10																				
36	LPA	Basis of Design narrative	5 days	Thu 5/27/10	Wed 6/2/10																				
37	LPA/Helly	Identify filed sub-bid items	5 days	Thu 5/27/10	Wed 6/2/10																				
38		<b>Design Development Cost Estimate</b>	<b>10 days</b>	<b>Mon 6/14/10</b>	<b>Fri 6/25/10</b>																				

Pro Task Progress Summary External Tasks Deadline

Dat Split Milestone Project Summary External Milestone

Shrewsbury, Massachusetts

ID	Responsibility	Task Name	Duration	Start	Finish	3/10	4/10	5/10	6/10	7/10	8/10	9/10	10/10	11/10	12/10	1/11	2/11	3/11	4/11	5/11	6/11	7/11	8/11	9/11	10/11
39	LPA/Fogarty	Uniformat II Level 2 projected to mid-point construction	10 days	Mon 6/14/10	Fri 6/25/10																				
40		<b>MA-CHPS Scorecard Update</b>	<b>12 days</b>	<b>Thu 5/27/10</b>	<b>Fri 6/11/10</b>																				
41	LPA/Gr Eng/ Team	Design Team input for achievable points / determination of required modeling	12 days	Thu 5/27/10	Fri 6/11/10																				
42		<b>Design Development MSBA submission</b>	<b>27 days</b>	<b>Thu 5/27/10</b>	<b>Fri 7/2/10</b>																				
43	LPA/OPM/BC	MSBA/Owner/Architect/OPM meeting	1 day	Mon 6/28/10	Mon 6/28/10																				
44	PA/OPM/MSBA	MSBA Commissioning agent process review	12 days	Thu 5/27/10	Fri 6/11/10																				
45	OPM	MSBA approval to proceed to CD Phase	5 days	Mon 6/28/10	Fri 7/2/10																				
46																									
47		<b>CONSTRUCTION DOCUMENT 60% PHASE</b>	<b>71 days?</b>	<b>Tue 7/6/10</b>	<b>Tue 10/12/10</b>																				
48	LPA	Updated Project Work Plan	1 day	Tue 7/6/10	Tue 7/6/10																				
49	LPA/OPM/CM	Updated Project Schedule	5 days	Tue 7/6/10	Mon 7/12/10																				
50	LPA/Team/Helly	Complete Construction Document drawings and specifications	52 days	Tue 7/6/10	Wed 9/15/10																				
51	LPA/CM	Construction Phasing Plan including project limit lines/contractor access	10 days	Mon 7/12/10	Fri 7/23/10																				
52	LPA/FFE	FFE specifications prepared	52 days?	Tue 7/6/10	Wed 9/15/10																				
53	LPA/Nitsch	Environmental Permitting assessment and timeline	5 days	Mon 7/12/10	Fri 7/16/10																				
54	LPA/Team	Certification that all applicable local, state and utility officials have been contacted and agree to proposed construction	12 days	Mon 8/2/10	Tue 8/17/10																				
55	LPA	Building code analysis including AAB	12 days	Mon 7/12/10	Tue 7/27/10																				
56	LPA/BDISEI	Structural and energy calculations	48 days	Mon 7/12/10	Wed 9/15/10																				
57	LPA/GrEng	MA-CHPS documentation final preparation	48 days	Mon 7/12/10	Wed 9/15/10																				
58	LPA	Interior Finish Color Board	23 days	Mon 8/16/10	Wed 9/15/10																				
59	Fogarty/CM/OPM	Uniformat II Level 3 Cost Estimate	14 days	Wed 9/15/10	Mon 10/4/10																				
60	LPA/OPM	Updated Project Budget	5 days	Tue 10/5/10	Mon 10/11/10																				
61	LPA	Definition of proposed alternates/unit prices	12 days	Mon 8/2/10	Tue 8/17/10																				
62	LPA	Approved stamped drawings from local building official, plumbing inspector, fire official, electrical inspector	5 days	Tue 10/5/10	Mon 10/11/10																				
63	LPA	MSBA/Owner submission	1 day	Tue 10/12/10	Tue 10/12/10																				
64																									
65		<b>CONSTRUCTION DOCUMENTS 90% PHASE</b>	<b>32 days</b>	<b>Tue 10/12/10</b>	<b>Wed 11/24/10</b>																				
66	LPA/Team	Finalize drawings and specs	24 days	Tue 10/12/10	Fri 11/12/10																				
67	LPA/Fogarty	Uniformat II Level 3 updated cost estimate including Project Budget information	8 days	Mon 11/15/10	Wed 11/24/10																				
68	LPA/Fogarty	Site costs isolated	8 days	Mon 11/15/10	Wed 11/24/10																				
69	LPA/Fogarty	Alternate scope estimates	8 days	Mon 11/15/10	Wed 11/24/10																				
70	LPA/FFE	FFE estimate	22 days	Fri 10/15/10	Mon 11/15/10																				
71	LPA/GrEng	Final MS-CHPS Filing	8 days	Mon 11/15/10	Wed 11/24/10																				
72		<b>CONSTRUCTION DOCUMENTS 100% PHASE</b>	<b>5 days</b>	<b>Mon 12/6/10</b>	<b>Fri 12/10/10</b>																				
73	LPA	Bid sets	5 days	Mon 12/6/10	Fri 12/10/10																				
74																									
75		<b>BID PERIOD</b>	<b>40 days</b>	<b>Mon 12/13/10</b>	<b>Fri 2/4/11</b>																				
76	CM	Filed Sub Bid Period	20 days	Mon 12/13/10	Fri 1/7/11																				
77	CM	Final GMP	40 days	Mon 12/13/10	Fri 2/4/11																				
78																									
79		<b>CONSTRUCTION PERIOD</b>	<b>670 days</b>	<b>Mon 2/7/11</b>	<b>Fri 8/30/13</b>																				
80	CM	New Construction	600 days	Mon 2/7/11	Fri 5/24/13																				
81	CM	Final Commissioning/Punch List	20 days	Mon 5/27/13	Fri 6/21/13																				
82	OPM/Owner	Furniture/Equipment Installation/Setup, Decommission Existing Building	46 days	Mon 6/24/13	Mon 8/26/13																				
83	CM	Demo Existing Sherwood/Finalize Site Work	52 days	Thu 6/20/13	Fri 8/30/13																				

Pro	Task		Progress		Summary		External Tasks		Deadline	
Dat	Split		Milestone		Project Summary		External Milestone			

# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

## 4. DRAWING LIST

### LIST OF DRAWINGS

#### **SITE SURVEY**

C0.01 EXISTING CONDITIONS PLAN  
C0.02 EXISTING CONDITIONS PLAN  
C0.03 EXISTING CONDITIONS PLAN  
C0.04 EXISTING CONDITIONS PLAN

#### **SITE LANDSCAPE**

L-1 SITE PREPARATION PLAN  
L-2 SITE PREPARATION PLAN  
L-3 LAYOUT & MATERIALS PLAN  
L-4 LAYOUT & MATERIALS PLAN  
L-5 GRADING PLAN  
L-6 GRADING PLAN  
L-7 PLANTING PLAN  
L-8 PLANTING PLAN  
L-9 DETAILS  
L-10 DETAILS

#### **SITE/CIVIL**

C100 SITE PREPARATION PLAN  
C101 SITE PREPARATION PLAN DETAILS  
C102 CIVIL UTILITY DRAWING  
C103 CIVIL UTILITY DRAWING  
C200 GENERAL NOTES & SITE DETAILS  
C201 SEWER/WATER DETAILS  
C202 DRAIN DETAILS

#### **ARCHITECTURALS**

A-1.1 PARTITION TYPES AND LEGENDS  
A-2.1 CODE REVIEW FLOOR PLANS  
A-2.2 ROOF PLAN AND DETAIL  
A-3.1 PARTIAL FIRST FLOOR PLAN  
A-3.2 PARTIAL FIRST FLOOR PLAN  
A-3.3 PARTIAL SECOND FLOOR PLAN  
A-3.4 PARTIAL SECOND FLOOR PLAN  
A-3.5 PARTIAL THIRD FLOOR PLAN  
A-3.6 PARTIAL THIRD FLOOR PLAN  
A-4.1 PARTIAL FIRST FLOOR REFLECTED CEILING PLAN  
A-4.2 PARTIAL FIRST FLOOR REFLECTED CEILING PLAN  
A-4.3 PARTIAL SECOND FLOOR REFLECTED CEILING PLAN  
A-4.4 PARTIAL SECOND FLOOR REFLECTED CEILING PLAN  
A-4.5 PARTIAL THIRD FLOOR REFLECTED CEILING PLAN  
A-4.6 PARTIAL THIRD FLOOR REFLECTED CEILING PLAN  
A-5.1 EXTERIOR ELEVATIONS  
A-5.2 EXTERIOR ELEVATIONS  
A-5.3 BUILDING SECTIONS  
A-6.1 WALL SECTIONS  
A-6.2 WINDOW AND STOREFRONT SCHEDULE



# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

## 4. DRAWING LIST

---

- A-7.1 ENLARGED STAIR & ELEVATOR PLANS
- A-8.1 ENLARGED CLASSROOM PLANS AND ELEVATIONS
- A-8.2 ENLARGED TOILET PLANS
- A-10.1 DOOR SCHEDULES AND DETAILS
- A-10.2 DOOR SCHEDULES AND DETAILS
- A-11.1 ROOM FINISH SCHEDULES
- K-1.1 FOODSERVICE UTILITY SCHEDULE
- K-2.1 FOODSERVICE EQUIPMENT LAYOUT PLAN

### STRUCTURAL

- S-3.1 PARTIAL FIRST FLOOR FOUNDATION PLAN
- S-3.2 PARTIAL FIRST FLOOR FOUNDATION PLAN
- S-3.3 PARTIAL SECOND FLOOR FOUNDATION & FRAMING PLAN
- S-3.4 PARTIAL SECOND FLOOR FOUNDATION & FRAMING PLAN
- S-3.5 PARTIAL THIRD FLOOR/LOW ROOF FRAMING PLAN
- S-3.6 PARTIAL THIRD FLOOR FRAMING PLAN
- S-3.7 PARTIAL ROOF FRAMING PLAN
- S-3.8 PARTIAL ROOF FRAMING PLAN
- S-4.1 SECTIONS
- S-5.1 DIAGONAL BRACING ELEVATIONS
- S-6.1 TYPICAL DETAILS AND GENERAL NOTES
- S-6.2 TYPICAL DETAILS

### FIRE PROTECTION

- FP-0.1 LEGEND, DETAIL & NOTES FIRE PROTECTION
- FP-1.1 FIRST FLOOR PARTIAL PLAN FIRE PROTECTION
- FP-1.2 FIRST FLOOR PARTIAL PLAN FIRE PROTECTION
- FP-1.3 SECOND FLOOR PARTIAL PLAN FIRE PROTECTION
- FP-1.4 SECOND FLOOR PARTIAL PLAN FIRE PROTECTION
- FP-1.5 THIRD FLOOR PARTIAL PLAN FIRE PROTECTION
- FP-1.6 THIRD FLOOR PARTIAL PLAN FIRE PROTECTION

### PLUMBING

- P-1.0 PLUMBING LEGEND AND NOTES
- P-1.1 PLUMBING SCHEDULES & DETAILS
- P-1.2 PLUMBING DETAILS
- P-1.3 PLUMBING DETAILS
- P-2.1 FIRST FLOOR PLUMBING PLAN
- P-2.2 FIRST FLOOR PLUMBING PLAN
- P-2.3 SECOND FLOOR PLUMBING PLAN
- P-2.4 SECOND FLOOR PLUMBING PLAN
- P-2.5 SECOND FLOOR PLUMBING PLAN
- P-2.6 THIRD FLOOR PLUMBING PLAN
- P-3.1 KITCHEN PLUMBING PLAN

### MECHANICAL

- H-1.1 PARTIAL FIRST FLOOR HVAC PLAN
- H-1.2 PARTIAL FIRST FLOOR HVAC PLAN
- H-1.3 PARTIAL SECOND FLOOR HVAC PLAN
- H-1.4 PARTIAL SECOND FLOOR HVAC PLAN



# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

## 4. DRAWING LIST

H-1.5	PARTIAL THIRD FLOOR HVAC PLAN
H-1.6	PARTIAL THIRD FLOOR HVAC PLAN
H-1.7	HVAC ROOF PLAN
H-2.1	HVAC DETAILS
H-2.2	HVAC CONTROLS AND SCHEDULES

### ELECTRICAL

E-0.1	ELECTRICAL LEGEND & NOTES
E-0.2	ELECTRICAL SITE PLAN
E-1.1	ELECTRICAL PARTIAL FIRST FLOOR PLAN – LIGHTING
E-1.2	ELECTRICAL PARTIAL FIRST FLOOR PLAN – LIGHTING
E-1.3	ELECTRICAL PARTIAL SECOND FLOOR PLAN – LIGHTING
E-1.4	ELECTRICAL PARTIAL SECOND FLOOR PLAN – LIGHTING
E-1.5	ELECTRICAL PARTIAL THIRD FLOOR PLAN – LIGHTING
E-1.6	ELECTRICAL PARTIAL THIRD FLOOR PLAN – LIGHTING
E-2.1	ELECTRICAL PARTIAL FIRST FLOOR PLAN – POWER
E-2.2	ELECTRICAL PARTIAL FIRST FLOOR PLAN – POWER
E-2.3	ELECTRICAL PARTIAL SECOND FLOOR PLAN – POWER
E-2.4	ELECTRICAL PARTIAL SECOND FLOOR PLAN – POWER
E-2.5	ELECTRICAL PARTIAL THIRD FLOOR PLAN – POWER
E-2.6	ELECTRICAL PARTIAL THIRD FLOOR PLAN – POWER
E-2.7	ELECTRICAL ENLARGED KITCHEN PLAN – POWER
E-3.1	ELECTRICAL PARTIAL FIRST FLOOR PLAN – HVAC POWER
E-3.2	ELECTRICAL PARTIAL FIRST FLOOR PLAN – HVAC POWER
E-3.3	ELECTRICAL PARTIAL SECOND FLOOR PLAN – HVAC POWER
E-3.4	ELECTRICAL PARTIAL SECOND FLOOR PLAN – HVAC POWER
E-3.5	ELECTRICAL PARTIAL THIRD FLOOR PLAN – HVAC POWER
E-3.6	ELECTRICAL PARTIAL THIRD FLOOR PLAN – HVAC POWER
E-3.7	ELECTRICAL PARTIAL ROOF PLAN – HVAC POWER
E-3.8	ELECTRICAL PARTIAL ROOF PLAN – HVAC POWER
E-4.1	ELECTRICAL PARTIAL FIRST FLOOR PLAN – FIRE ALARM
E-4.2	ELECTRICAL PARTIAL FIRST FLOOR PLAN – FIRE ALARM
E-4.3	ELECTRICAL PARTIAL FIRST FLOOR PLAN – FIRE ALARM
E-4.4	ELECTRICAL PARTIAL FIRST FLOOR PLAN – FIRE ALARM
E-4.5	ELECTRICAL PARTIAL SECOND FLOOR PLAN – FIRE ALARM
E-4.6	ELECTRICAL PARTIAL SECOND FLOOR PLAN – FIRE ALARM
E-5.1	ELECTRICAL PARTIAL FIRST FLOOR PLAN – LOW VOLTAGE
E-5.2	ELECTRICAL PARTIAL FIRST FLOOR PLAN – LOW VOLTAGE
E-5.3	ELECTRICAL PARTIAL SECOND FLOOR PLAN – LOW VOLTAGE
E-5.4	ELECTRICAL PARTIAL SECOND FLOOR PLAN – LOW VOLTAGE
E-5.5	ELECTRICAL PARTIAL THIRD FLOOR PLAN – LOW VOLTAGE
E-5.6	ELECTRICAL PARTIAL THIRD FLOOR PLAN – LOW VOLTAGE
E-6.1	ELECTRICAL PARTIAL ROOF PLAN – LIGHTNING PROTECTION
E-6.2	ELECTRICAL PARTIAL ROOF PLAN – LIGHTNING PROTECTION
E-6.3	ELECTRICAL PARTIAL ROOF PLAN – LIGHTNING PROTECTION DETAILS
E-7.1	ELECTRICAL DISTRIBUTION RISER DIAGRAM
E-7.2	ELECTRICAL SPEAKER & CLOCK SYSTEMS RISER DIAGRAMS
E-7.3	ELECTRICAL FIRE & INTRUSION ALARMS, VIDEO & MEDIA, TELECOM RISER, DIAGRAMS
E-7.4	ELECTRICAL SCHEDULES AND DETAILS PLAN

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Document 00 45 00	Form of Subcontract-Bid
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	(b) metal windows;
	(c) waterproofing, damp-proofing and caulking;
	(d) miscellaneous metal fabrications;
	(e) lathing and plastering;
	(f) acoustical tile;
	(h) tile;
	(i) resilient floors;
	(j) glass and glazing;
	(k) painting;
	(l) plumbing;
	(m) heating, ventilating and air-conditioning;
	(n) electrical work, including direct electrical radiation for heating;
	(o) masonry work
	(p ) fire protection

#### CONDITIONS OF THE CONTRACT

Document 00 52 23	Agreement for Construction Manager at Risk Services
Exhibit A	Additional Insurance Provisions
Exhibit B	Forms Used During Contract Award and Execution
	<ul style="list-style-type: none"><li>• Payment Bond</li><li>• Performance Bond</li><li>• Schedule for Participation by Minority/Women Business Enterprises</li><li>• Letter of Intent</li><li>• Certificate of Corporate Vote</li><li>• Certificate of Joint Venture</li><li>• Certificate of Compliance with State Tax Law</li><li>• Certificate of Compliance with Employment Eligibility Verification Requirements (I-9)</li></ul>
Exhibit C	Prevailing Wage Rates
Exhibit GC	Payment for Construction Management Services
Document 00 72 73	General Conditions of the Contract
Appendix A	Equal Employment Opportunity, Non-Discrimination and Affirmative Action Program
Appendix B	Goals For Participation By Minority Business Enterprises and Women Business Enterprises
Appendix C	Procedures for Award of Subcontracts
Appendix D	Forms for Subcontracts
Appendix E	Commonly Used Forms
	<ul style="list-style-type: none"><li>• Procedure for Payment to Contractors (CM)</li><li>• Payment Voucher Input Form</li><li>• Requisition for Payment (CM) (DCAM Form S1b) and Instructions</li><li>• Instructions Regarding Change Orders &amp; Contract Modifications (DCAM Form 13)</li><li>• Daily Time and Material Report for Change Orders</li></ul>



# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

## 5. SPECIFICATION TABLE OF CONTENTS

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- Request & Agreement for a Change in the Plans, Specifications or Contract (DCAM Form 5)
- Notice of Intent
- Contractor's Weekly Workforce Report
- Minorities/Women in Contractor's Weekly Workforce Report
- Weekly Payroll Report Form and Statement of Compliance
- Quarterly Projected Workforce Table
- Certification of Payment by Contractor to MBE/WBE and Instructions
- Certificate of Completion by Minority/Women Business Enterprise
- Form for Transfer of Title (Work Not Incorporated, DCAM Form 16)
- Certificate of Agency Use and Occupancy -E-1
- Certificate of Final Inspection, Release and Acceptance - E-2

Document 00 83 00 Special Conditions

### SPECIFICATIONS

#### DIVISION 1 GENERAL REQUIREMENTS

Section 01 11 00	Summary of Work
Section 01 22 00	Unit Prices
Section 01 23 00	Alternates
Section 01 31 00	Project Management and Coordination
Section 01 32 00	Construction Progress Documentation
Section 01 33 00	Submittal Procedures
Section 01 42 00	References
Section 01 43 39	Mock-Ups
Section 01 45 00	Quality Control
Section 01 45 90	Program of Structural Tests and Inspections
Section 01 50 00	Temporary Facilities and Controls
Section 01 74 19	Construction Waste Management
Section 01 77 00	Contract Closeout

#### DIVISION 2 – EXISTING CONDITIONS

Section 02 41 10 Site Clearing and Preparation

#### DIVISION 3 CONCRETE

Section 03 30 00 Cast-In-Place Concrete

#### DIVISION 4 MASONRY

Section 04 21 13 Brick Masonry\*

#### DIVISION 5 METALS

Section 05 12 00	Structural Steel
Section 05 21 00	Steel Joists
Section 05 31 00	Steel Deck
Section 05 40 00	Cold-Formed Metal Framing
Section 05 41 00	Steel Stud Shear Connectors
Section 05 50 01	Metal Fabrications*



# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

## 5. SPECIFICATION TABLE OF CONTENTS

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### DIVISION 6 WOOD AND PLASTICS

Section 06 10 00	Rough Carpentry
Section 06 20 00	Finish Carpentry
Section 06 40 23	Interior Architectural Woodwork
Section 06 82 00	Glass Fiber Reinforced Plastic

### DIVISION 7 THERMAL AND MOISTURE PROTECTION

Section 07 13 26	Self-Adhering Sheet Waterproofing*
Section 07 21 00	Thermal Insulation
Section 07 24 16	Polymer Modified Exterior Insulation and Finish System
Section 07 40 00	Metal Wall Panels
Section 07 54 23	Thermoplastic Polyolefin Roofing*
Section 07 60 00	Flashing and Sheet Metal*
Section 07 72 00	Roof Accessories*
Section 07 84 00	Firestopping
Section 07 92 00	Joint Sealants*
Section 07 95 00	Expansion Control

### DIVISION 8 DOORS AND WINDOWS

Section 08 11 00	Metal Doors and Frames
Section 08 14 00	Wood Doors
Section 08 31 00	Access Doors and Panels
Section 08 33 23	Overhead Coiling Doors
Section 08 41 13	Aluminum Entrances and Storefronts*
Section 08 51 13	Aluminum Windows*
Section 08 71 00	Door Hardware
Section 08 81 00	Glass Glazing
Section 08 91 00	Louvers

### DIVISION 9 FINISHES

Section 09 21 16	Gypsum Board Assemblies
Section 09 25 16	Polymer Modified Exterior Finish System*
Section 09 30 13	Ceramic Tiling*
Section 09 51 00	Acoustical Ceilings*
Section 09 64 00	Wood Flooring
Section 09 65 00	Resilient Flooring*
Section 09 66 00	Athletic Flooring
Section 09 68 16	Sheet Carpeting
Section 09 91 00	Painting*

### DIVISION 10 SPECIALTIES

Section 10 11 00	Visual Display Surfaces
Section 10 14 00	Signage
Section 10 21 13	Toilet Compartments
Section 10 22 26	Operable Partitions
Section 10 28 00	Toilet Accessories
Section 10 44 13	Fire Extinguisher Cabinets
Section 10 51 13	Metal Lockers



# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

## 5. SPECIFICATION TABLE OF CONTENTS

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### DIVISION 11 EQUIPMENT

Section 11 40 00	Food Service Equipment*
Section 11 52 13	Projection Screens
Section 11 61 43	Curtains
Section 11 66 23	Gymnasium Equipment
Section 11 66 53	Gymnasium Dividers

### DIVISION 12 FURNISHINGS

Section 12 20 00	Window Treatments
Section 12 66 13	Bleachers
Section 12 93 00	Site Furnishings

### DIVISION 14 CONVEYING SYSTEMS

Section 14 20 00	Elevators*
Section 14 42 00	Wheelchair Lifts

### DIVISION 21 – FIRE SUPPRESSION

Section 21 00 01	Fire Protection*
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### DIVISION 22 – PLUMBING

Section 22 00 01	Plumbing*
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### DIVISION 23 – HEATING, VENTILATION AND AIR CONDITIONING

Section 23 00 00	HVAC*
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### DIVISION 26 ELECTRICAL

Section 26 00 00	Electrical Work*
Section 26 05 00	Common Work Results For Electrical
Section 26 05 19	Electrical Power Conductors And Cables
Section 26 05 26	Grounding And Bonding For Electrical Systems
Section 26 05 29	Hangers And Supports For Electrical Systems
Section 26 05 33	Raceway And Boxes For Electrical Systems
Section 26 05 36	Cable Trays For Electrical Systems
Section 26 05 48	Vibration And Seismic Controls For Electrical Systems
Section 26 05 53	Identification For Electrical Systems
Section 26 09 23	Lighting Control Devices
Section 26 22 00	Low-Voltage Transformers
Section 26 24 13	Switchboards
Section 26 24 16	Panelboards
Section 26 24 19	Motor-Control Centers
Section 26 27 26	Wiring Devices
Section 26 28 13	Fuses
Section 26 28 16	Enclosed Switches And Circuit Breakers
Section 26 32 13	Engine Generators
Section 26 33 53	Static Uninterruptible Power Supply
Section 26 36 00	Transfer Switches



# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

## 5. SPECIFICATION TABLE OF CONTENTS

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Section 26 41 13	Lightning Protection For Structures
Section 26 43 13	Transient-Voltage Suppression System
Section 26 51 00	Interior Lighting
Section 26 56 00	Exterior Lighting

### DIVISION 27 COMMUNICATIONS

Section 27 11 00	Communications Equipment Room Fittings
Section 27 13 00	Communications Backbone Cabling
Section 27 15 00	Communications Horizontal Cabling
Section 27 40 00	Audio-Video Communications
Section 27 50 00	Distributed Communications And Monitoring Systems

### DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

Section 28 10 00	Electronic Access Control And Intrusion Detection
Section 28 20 00	Video Surveillance
Section 28 31 11	Addressable Fire-Alarm System

### DIVISION 31 – EARTHWORK

Section 31 20 10	Earthwork
Section 31 25 00	Erosion and Sedimentation Controls
Section 31 32 19	Geotextile Fabric

### DIVISION 32 – EXTERIOR IMPROVEMENTS

Section 32 10 00	Bases, Ballast and Paving
Section 32 12 16	Asphalt Paving
Section 32 13 13	Concrete Paving
Section 32 16 40	Curbing
Section 32 30 00	Site Improvements
Section 32 80 00	Irrigation
Section 32 90 00	Planting

### DIVISION 33 – UTILITIES

Section 33 10 00	Water Utilities
Section 33 30 00	Sanitary Sewerage Utilities
Section 33 40 00	Storm Drainage Utilities
Section 33 46 17	Turf Drainage System

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DESIGN DEVELOPMENT

6. PERMITTING SCHEDULE UPDATE

#	AGENCY	PERMIT/ISSUE	COMMENTS	FILING PHASE	DUR-ATION	FEE
1	Massachusetts DEP Shrewsbury Conservation Commission	WPA Form 4A Abbreviated Notice of Recourse Area Designation	Determines boundaries of wetlands in advance of detailed planning. The wetlands have been flagged and information gathered.	Schematic Design Stage	COMPLETE	\$0
2	Massachusetts DEP Shrewsbury Conservation Commission	WPA Form 3 (NOI) Notice of Intent	To be filed w/ "Permitting" stage of design at beginning of Construction Documents.	CD Phase "Permitting Phase"	July 20, 2010	\$0
3	Massachusetts DEP Shrewsbury Conservation Commission	WPA Form 5 Order of Conditions	Issued by ConCom/ DEP at completion of NOI process.		By Aug. 10, 2010	Registry Record'g fee
4	Massachusetts DEP Shrewsbury Conservation Commission	WPA Form 8A, 8B Request for & Certificate of Compliance	Requested by Owner or Contractor at completion of project.	At Completion of work		NA
5	LPA/Nitsch	SW PPP approval	Stormwater Pollution Protection Plan. Plan published w/ documents filed by Contractor.	Beginning of construction	Outline w/ NOI submission. Filed by Contractor prior to construction	NA
6	US EPA	Notice of Intent (NPDES)	Filed by Contractor prior to construction.	Beginning of construction	2 days prior to construction	NA
7	Town of Shrewsbury	Sewer Connection	Review in advance w/ Town.	Construction Phase	Aug., 2010	NA
8	Town of Shrewsbury	Water Connection	Review in advance w/ Town.	Construction Phase	Aug., 2010	NA
9	Massachusetts DEP	Asbestos Removal Permit & Notifications	Requirements outlined in Asbestos Report.	Beginning of construction or demolition		TBD
10	Massachusetts DEP	BWP AQ06 Notification	Filed by Contractor prior to construction.	Beginning of construction	10 days	TBD
11	Town of Shrewsbury	Demolition Permit	Filed by Contractor prior to construction.	Beginning of Construction		NA
12	Town of Shrewsbury	Building Permit, Certificate of Occupancy	Filed by Contractor prior to construction.	Beginning of Construction		NA
13	Town of Shrewsbury	Board of Health	Kitchen Plan Review	CD Phase "Permitting Phase"	Aug., 2010	NA
14	Town of Shrewsbury	Fire Department	Fire Department Review	CD Phase "Permitting Phase"	Aug., 2010	NA
15	Massachusetts Architectural Access Board			CD Phase "Permitting Phase"	60-90 days	NA

**Sherwood Middle School**  
Sherwood Avenue, Shrewsbury, MA 01545

**DESIGN DEVELOPMENT**

**7. LIFE CYCLE COST ANALYSIS DOCUMENTS**

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**HVAC DESIGN DEVELOPMENT  
NARRATIVE & LIFE CYCLE REPORT**

**FOR THE**

***SHERWOOD MIDDLE SCHOOL***

***IN***

***SHREWSBURY, MA***

**July 2, 2010**

**Prepared by:**

**SEAMAN ENGINEERING CORPORATION**

30 Faith Avenue  
Auburn, MA 01501  
Ph (508) 832-3535  
Fax (508) 832-3393

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## I. EXECUTIVE SUMMARY

This report defines the Heating, Ventilating and Air Conditioning (HVAC) systems being designed for the new Sherwood Middle School. In addition, it evaluates a base case system which meets the minimum state mandated energy performance requirements against various energy saving and high performance system features being implemented. The systems described as DD Design and Solar Wall, currently implemented into the design are shown on the submitted design development drawings referenced in Appendix A.

The following briefly describes the major differences between the base case and the DD Design and Solar Wall:

### Base Case – Classroom Unit Ventilators:

Incorporates a standard efficiency 82% gas-fired boiler plant coupled to classroom unit ventilator systems and air handler coils supporting the heating and ventilation needs of the building. Unit ventilators support classroom areas whereas air handling systems support the administration, gym, café and lobby areas. Air cooled AC is provided on systems serving administrative office spaces and computer labs.

#### *Advantages:*

- Lower initial cost
- High operating cost

#### *Disadvantages:*

- Elevated noise levels in classroom
- High maintenance cost

### DD Design – Classroom Radiation & ERU w/ Dehum.:

Incorporates a high efficiency 93%+ efficiency gas-fired boiler plant coupled to fin-tube radiation and air handler coils supporting the heating and ventilation needs of the building. Fin-tube radiation support classroom areas whereas air handling systems support the administration, gym, café and lobby areas. The ventilation needs of all the classroom areas are supported by total energy recovery units distributing reclaimed and tempered outdoor air to each classroom via a VAV terminal box which maintains constant airflow during all room occupied periods. In addition, the classroom units have refrigerant based dehumidification cycles which use hot gas from the refrigeration cycle for reheating. Air handling systems support the administration, gym, café and lobby areas. The café system incorporates total energy recovery technology. Air cooled AC is provided on systems serving administrative office spaces and computer labs.

#### *Advantages:*

- Low noise in classroom
- Improved comfort due to dehum. Control
- Tempered cooling from the dehum. process

#### *Disadvantages:*

- Slightly higher operation cost over Op.#1

### Alternate #1 (in addition to Base Case or DD Design) – Solar Wall.:

#### *Advantages:*

- Passive heating device
- Improved heating energy efficiency

#### *Disadvantages:*

- Added installed cost

The following table defines the economic differences between the respective options. Although Option #1 yields the best payback we have recommended **Option #2** being that it incorporates a space humidity control and inherent air tempering feature for the classroom areas during the more humid and warmer weather thereby providing improved comfort year-round over Option #1. All life cycles were run on an average life cycle of 20 years however life of equipment will vary such as boilers at 30 years and RTU's at 15+ years. Values below are in current dollars, simple payback method with no discount factor applied nor an escalation rate for energy or maintenance costs.

**ECONOMIC COMPARISON SUMMARY**

<b>System</b>	<b>Installed Cost</b>	<b>Annual Energy Cost</b>	<b>Annual Maint.</b>	<b>20 year Life Cycle Cost</b>	<b>Annual Savings E &amp; M</b>	<b>Simple Payback</b>
Base Case	\$3,335,100	\$69,160	\$29,900	5,316,300	-----	-----
<b>DD Design</b>	<b>\$3,452,000</b>	<b>\$61,205</b>	<b>\$17,900</b>	<b>5,034,100</b>	<b>\$19,955</b>	<b>5.9 years</b>
<b>Solar Wall</b>	<b>\$52,850</b>	<b>-\$8,687*</b> <b>(-)savings</b>	<b>\$800</b>	<b>-\$104,890</b> <b>(-)savings</b>	<b>\$7,687*</b>	<b>6.1 years*</b>

*\*Information on Solar Wall has been provided by the manufacturer. It is anticipated that the savings, when combined with the Base Case or DD Design will be less and the payback period will double to approximately 12+ years due to implementation of varying outdoor air flow routines included in both these options.*

## II. HVAC NARRATIVE

### A. DESIGN INTENT

The heating medium for the building shall be hot water generated by high efficiency condensing gas fired hot water boilers located in a ground floor boiler room. These boilers support the heating requirements of all areas of the building. The heating water is distributed to fin-tube radiation, VAV terminal units, air handler units, cabinet and unit heaters and fan coil units.

DX based air cooled space cooling equipment has been limited to support of the following areas: 1) Office /Administration, 2) Media Center, 3) Computer Labs, 4) Tel/Data MDF room. DX based dehumidification outdoor air pretreating systems are also provided for most all classroom spaces.

The air distribution systems consist of the following:

- a. Treated outdoor air (VAV) terminals in the classrooms.
- b. VAV terminals with reheat in administration areas.
- c. Classroom ventilation is supported with central packaged VAV air handlers on the roof complete with total energy recovery wheels, hot water coils and dehumidification cycles utilizing DX based system with hot gas reheat cycle.
- d. Central packaged VAV air handlers on the roof complete with total energy recovery wheels, hot water coils and DX cooling provide conditioned air to the spaces designate previously as being cooled. VAV terminals in these spaces control individual space temperature control.
- e. Central packaged VAV air handlers on the roof and/or in an upper level mechanical room with hot water coils provide conditioned air to the gymnasium, cafeteria and lobby areas. These systems have the ability to pretreat the incoming outdoor air by directing the incoming outdoor air thru a solar wall system located on the South wall of the gymnasium.
- f. Exhaust fans will vent specific areas such as bathrooms, storage areas and the kitchen.

The school is designed with a direct digital control (DDC) energy management system (EMS) that monitors and controls the HVAC equipment for efficient use. The system is designed on PC based architecture and adjustments are made on a graphics based presentation of building systems. The system also supports maintenance and record keeping needs of the facility. Occupancy of the school is based on the standard school year with occupied/unoccupied conditions based on current school day practice. This is an adjustable feature that can be made to reflect additional operating needs and use of the school building by staff or others.

The adjustable operating schedule, in general, is from 7:30 a.m. to 5:00 p.m., five days per week. It is expected that the building or certain areas within the building will also be used several evenings a week and occasionally on weekends.

The Designer of Record will certify that the HVAC systems have been installed in accordance with the approved construction documents, in conformance with Commonwealth of Massachusetts State Building Code 780 CMR Chapter 13.

## B. BASIS OF DESIGN

The HVAC systems and components are designed in accordance with the requirements of the Commonwealth of Massachusetts State Building Code - 7<sup>th</sup> Edition, 780 CMR, and conform to the energy conservation requirements of Chapter 13 of that code.

The Sherwood Middle School is located in Shrewsbury, MA and complies with the criteria for Climate Zone 14a in Worcester County. The design criteria used for the development and sizing of the HVAC systems and components are:

Heating Degrees Winter:	-1°F
Cooling Degrees (db) Summer:	86°F
Cooling Degrees (wb) Summer:	73°F
Heating degree Days (base 65):	6894
Cooling Degree Days (base 65):	507

Interior design temperature set points are 72°F for heating and 75°F for cooling (for spaces with cooling cycles) during occupied conditions however, setpoints in operation shall include a minimum 5°F deadband between cooling and heating such as 70°F heating and 75°F cooling. Space conditions are allowed to drop to 62°F during the heating season and rise to 88°F during the cooling season when spaces are in the unoccupied condition. Morning warm-up or cool-down period is optimized to achieve design space conditions at the commencement of occupied periods.

Design occupant levels by space are contained within the architectural documents included as part of the approved schematic documents.

## C. HVAC SYSTEM CONTROLS

Heating and cooling systems of the Sherwood Middle School shall be monitored and controlled by an Energy Management System (EMS) using Direct Digital Control (DDC) technology. Each system is monitored for conformance to spatial design conditions and design point settings are adjustable through the DDC system. The DDC system is based on PC architecture with the central monitoring and control station located adjacent to the boiler room. System shall be web based and accessible via password protection through internet browser software.

The HVAC systems are generally operated on a school day basis coinciding with the occupied/unoccupied schedule of the standard 180-day school year. Adjustments can be made through the DDC system to allow for usage during periods other than the usual school operating periods.

Space temperature is monitored by individual space sensors that transmit data to the central monitoring and control station. Space conditions are adjustable through DDC system and can be modified to meet individual needs. Local control of space conditions is limited to predefined adjustments in space temperature and to facilitate a 3-hour occupied override feature.

Several systems shall also include carbon dioxide (CO<sub>2</sub>) indoor air quality (IAQ) sensors which optimize the fresh outdoor air ventilation levels in response to variations in space occupancies.

The building shall be connected to an emergency power source for operation of heating boilers and pumps during emergency conditions.

#### D. SYSTEMS AND EQUIPMENT CAPABILITIES

The heating needs of the school shall be provided for by three (3) high efficiency condensing gas-fired hot water boilers with a combined gross input capacity of 4,500,000 BTUH and an average combustion efficiency of 93%.

High efficiency packaged roof-top units provide treated outdoor air to each classroom space utilizing total energy recovery energy exchange and hot water heating coils. In addition each system incorporates a dehumidification cycle utilizing refrigeration cycle based dehumidification with hot gas coil reheating to minimize classroom high limit humidity levels.

Systems and there capacities are as follows:

##### Abbreviations:

H&V – Heating & Ventilation; HVAC – Heating, ventilation and air conditioning; ERV – Energy Recovery Ventilation; VAV- Variable Air Volume

- AHU-1: Kitchen Make-up Air, 6,000 CFM
- AHU-2: Café, 6,000 CFM, H&V with ERU & CO<sub>2</sub> control
- AHU-3: Gymnasium, 12,000 CFM, H&V with CO<sub>2</sub> control
- AHU-4: Lobbies, 8,000 CFM, H&V
- RTU-1 Art Rooms, 1,900 CFM VAV, H&V with ERV and Dehum. Control
- RTU-2 Media & Tech., 8,000 CFM VAV, HVAC with ERV
- RTU-3 Office, 8,000 CFM VAV, HVAC with ERV
- RTU-4 Classrooms, 4,100 CFM VAV, H&V with ERV and Dehum. Control
- RTU-5 Classrooms, 3,000 CFM VAV, H&V with ERV and Dehum. Control

- RTU-6 Classrooms, 6,300 CFM VAV, H&V with ERV and Dehum. Control
- RTU-7 Classrooms, 5,400 CFM VAV, H&V with ERV and Dehum. Control
- RTU-8 Band, 810 CFM, H&V with ERV and Dehum. Control
- RTU-9 Music/Drama, 945 CFM VAV, H&V with ERV and Dehum. Control
- RTU-10 Locker Room 2,400 CFM, H&V with ERV
- RTU-11 Core Restrooms, 2,700 CFM, H&V with ERV

Supplemental cabinet and unit heaters are located at building entrances and other areas to mitigate drafts from entering internal building spaces.

#### E. TESTING

The HVAC equipment and systems are required to be tested and reports submitted for review and record as part of the construction document requirements. In addition, systems shall be properly commissioned by an independent 3<sup>rd</sup> party. Systems and equipment requiring testing and report submittal are:

- a. Heating system includes all boilers, pumps, and heating coils of connected equipment.
- b. Cooling system including DX split systems and packaged rooftop units.
- c. All piped distribution systems are required to pass a hydrostatic test using water as the pressure medium at a test pressure of 150 percent of operation pressure. All hydronic heating and cooling systems will be tested and balanced. A testing, adjusting, and balancing (TAB) report will be prepared for each system and submitted for review and record to the architect and engineer. TAB shall be done by an independent testing and balancing contractor
- d. All airside components of the HVAC systems shall operate as designed and conform to the specifications for airflow as defined in the contract documents. A testing, adjusting, and balancing (TAB) report will be prepared for each system and submitted for review and record to the architect and engineer. TAB shall be done by an independent testing and balancing contractor.
- e. Ductwork shall be tested for leak integrity and performed in accordance with SMACNA standards.
- f. Systems or equivalent components not meeting the design criteria of the contract documents shall be corrected and re-tested for conformance to contract documents at no additional cost to the owner.
- g. Visual inspection of all equipment installations for conformance to contract documents with respect to sound, vibration and installation integrity. Manufacturers' recommendations for equipment installation will be followed. All HVAC systems will operate in accordance with the sequence of operation defined for that system.

### III. DESIGN PARAMETERS & LOADS

#### DESIGN CRITERIA

The design criteria used for the development and sizing of the HVAC systems and components was as defined in the Commonwealth of Massachusetts State Building Code 780 CMR and applicably referenced ICC International Mechanical Code 2006. Outdoor design conditions utilize were:

Heating Degrees Winter:	-1°F
Cooling Degrees (db) Summer:	86°F
Cooling Degrees (wb) Summer:	73°F

Interior design temperature set points are 72°F for heating and 75°F for cooling (for spaces with cooling) during occupied conditions however, setpoints in operation shall include a minimum 5°F deadband between cooling and heating such as 70°F heating and 75°F cooling. Indoor dehumidification setpoint for classroom spaces was set at 55%.

Outside air ventilation requirements were based on the ICC International Mechanical Code 2006 as referenced by the building code as well as cross references to ASHRAE Ventilation Standard 62.1-2007. In general design outdoor air levels of 20 cfm per person for office type occupancy and 15 CFM per person in classroom spaces was utilized.

#### COOLING & HEATING LOADS

Cooling and heating load calculations were performed utilizing the design data referenced above. Climate data for Worcester, MA was selected for load and energy calculations in that it offers the most applicable environmental conditions to Shrewsbury, MA in addition to the fact that Worcester was the closest city in which pertinent hourly weather data was available for the computer simulation. Summary output data can be found in Appendix C.

The building heating and cooling load requirements under peak design load conditions as indicated above are estimated as follows (cooling loads only for Offices and Media):

	Heating Load	Cooling Load	Tons
Building Loads	3,132,000 BTUH	470,300 BTUH	39.2

The estimates do not include localized cooling loads for tel/data rooms as well as additional heating loads for some area such as vestibules, boiler room, mechanical room and small ancillary spaces.

#### **IV. ENERGY SIMULATIONS**

Energy simulations were run for the base case and the current DD design. The final results can be found in Appendix D. Data on the passive solar wall system was supplied by the manufacturer and can also be found in Appendix D.

There are various limitations to energy simulation programs especially in a building such as this where occupant loads can vary greatly day to day and space to space. We have listed some of our assumptions below, some of which may have been forced by program modeling limitations.

*Assumptions:*

- Occupancy times are from 7:00 AM to 4:00 PM Monday thru Friday with varying loading.
- Partial occupancy was assumed for most time periods in the gymnasium space
- Indoor space temperature setpoints are 75°F/88°F occ/unocc cooling (in areas where cooling is supplied and 72°/60° occ/unocc heating.
- Indoor space humidity dehumidification setpoint for classroom spaces is 55% RH.
- Natural gas cost @ \$1.50 per therm
- Electric rate cost @ \$0.14 per kW

## V. COST ESTIMATES

Order of magnitude cost estimates for the selected schematic Option #2 were assembled utilizing the schematic estimates from A.M. Fogarty & Associates, Inc. amended as required based on known equipment prices from vendors. In addition, we projected estimates for the base case and Option #1 utilizing RS Means Cost Data and current knowledge of system pricing. Estimate for the passive Solar Wall was provided by the Solar Wall manufacturer. Refer to Solar wall data in Appendix D.

A summary of the installed cost estimates are as follows:

- **Base Case – Classroom Unit Ventilators:** → **\$3,335,100**
- **DD Design – Classroom Radiation & ERU w/ Dehum.:** → **\$3,452,000**
- **Alternate #1 – Solar Wall:** → **\$52,850**

## **Appendix A**

### **Design Development Drawings**

**(refer to schematic drawing set submission)**

**Appendix B**  
**Proposed Equipment Data**



# RN Series



## PACKAGED ROOFTOP UNITS, HEAT PUMPS & OUTDOOR AIR HANDLERS



### Features:

- Air-cooled or water-cooled condenser, with unit capacities from 6-70 Tons
- Available as a chilled water or non-compressorized DX air handler, from 1,400-28,500 CFM
- Air-source and water-source heat pump options
- R-410A scroll compressors, one, two or four stage cooling
- 10-100% variable capacity scroll compressors are available for load matching cooling and increased part load efficiency
- Electric, gas, steam, or hot water heating
- Direct drive backward curved plenum supply fans
- Power exhaust and power return options
- Factory installed AAONAIRE® total and sensible energy recovery wheels
- Double wall rigid polyurethane foam panel construction with a minimum R-value of 13
- Service access doors with full length stainless steel piano hinges and zinc cast lockable handles
- Sloped stainless steel drain pans

Application Flexibility  
Minimizes Installation Time and Reduces Cost

• *Make-up Air Applications  
Up to 100% Outside Air*

• *Dehumidification and  
Filtration Capabilities*

• *Large Tonnage Rooftops  
with Small Footprints*

• *Factory Installed or Customer  
Specific Controls Options*

# RN Series Rooftop/Air Handler

*The AAON RN Series continues to lead the industry in packaged rooftop equipment performance and serviceability. Double wall foam insulated cabinet construction and direct drive backward curved plenum fans allow the units to have quiet, energy efficient airflow with high static pressure capabilities. RN Series units also feature lockable hinged doors which provide service access to all sections of the unit.*

## Superior Features

- R-410A environmentally friendly refrigerant.
- Cabinet construction consists of rigid polyurethane foam panels with G90 galvanized steel on both sides and a closed cell polyurethane foam interior core. The inner wall protects the insulation from moisture damage, prevents microbial growth, and is easy to clean.
- 2 inch rigid polyurethane foam insulated panels have at least a thermal resistance R-value of 13, which exceeds the R-value of a cabinet with 4 inch thick fiberglass construction. They also make the cabinet more rigid and resistant to damage and provide increased sound dampening.
- Access doors with full length stainless steel piano hinges and quarter turn, zinc cast, lockable handles provide improved reliability over single point hinges and plastic or sheet metal handles, and make the unit easily serviceable.
- Corrosion resistant polyurethane paint exceeds a 2,500 hour salt spray test - over 5 times the industry standard of 500 hours.
- Compressors and unit controls are contained within a compartment isolated from the air stream for ease of service and increased sound dampening.
- Direct drive backward curved plenum fans with rubber isolation mounts provide improved energy efficiency and reduced maintenance versus belt driven fans.
- Sloped stainless steel drain pans eliminate standing water which can support microbial growth and stainless steel construction prevents corrosion that could lead to water leaks and contaminants in the air stream.
- Run test report, wiring diagram, and Installation, Operation, and Maintenance manual with startup form provided in control access compartment of every unit.
- 5 year non-prorated compressor warranty, 15 year non-prorated aluminized steel gas heat exchanger warranty, and 25 year non-prorated stainless steel gas heat exchanger warranty.

## B Cabinet

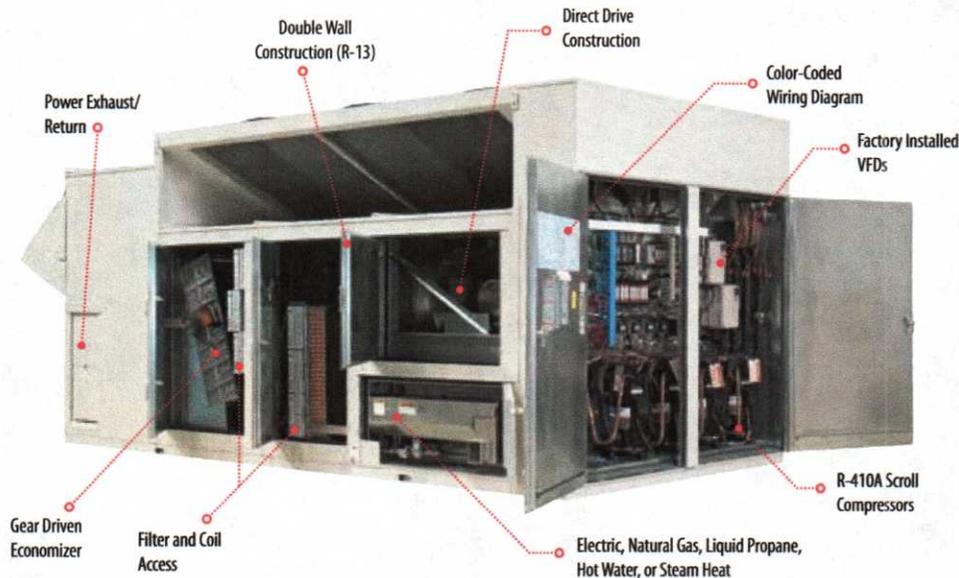


## Premier Options

- 10-100% variable capacity scroll compressors are available for load matching cooling and increased part load efficiency.
- Refrigerant-to-water heat exchanger for improved unit efficiency.
- Air-source and water-source heat pump options for energy efficient heating.
- Factory installed total or sensible AAONAIRES® energy recovery wheels.
- Humidity control options including: High Capacity Coils, Modulating Humidity Control, Return Air Bypass, and Mixed Air Bypass.
- Chilled water cooling coils allow unit to tie into existing chilled water system.
- Hot water or steam heating coils allow unit to tie into existing boiler system.
- Polymer e-coated coils, copper finned coils, and stainless steel coil casings are available to extend the life of the coils and protect them in corrosive environments.
- Power exhaust and power return fans with economizer for application flexibility.
- VFD controlled supply, exhaust, and return fans for precise airflow control, building pressure control, and reduced power consumption.
- Modulating gas heat with stainless steel heat exchanger provides greater fuel efficiency, longer heater life, and improved occupancy comfort.
- SCR (Silicon Controlled Rectifier) electric heat control for reduced power consumption, longer heater life, and improved occupant comfort.
- Multiple high efficiency air filtration options.
- Unit controls options including factory installed controls by others.

# Air-Cooled or Water-Cooled Condensers

## D Cabinet



## R-13 Double Wall Rigid Polyurethane Foam Panel Construction

AAON is setting a new standard for performance with double wall construction using closed cell polyurethane foam insulation. Not only does it have more than twice the insulating R-value, it creates a far more rigid and stronger assembly with less air leakage than fiberglass insulated panels.

## Dehumidification

AAON offers many humidity control options. High capacity cooling coils are available which allow for more dehumidification versus standard cooling coils. Return air bypass and mixed air bypass are available on RN Series units for single coil humidity control. Modulating humidity control is available to provide energy efficient dehumidification, even with low sensible heat loads, without the temperature swings common with on/off reheat systems.

## Make Up Air Capability

AAON RN Series units have make up air capability and can be specified with up to 100% outside air. AAONAIRE® energy recovery wheels are available on make up air units to increase the unit's energy efficiency. High capacity cooling coils are available to handle the higher latent load of outside air. Modulating gas heat and SCR electric heat are available to provide energy efficient, consistent supply air temperature heating. Modulating humidity control is available to provide dehumidification without overcooling when the outside air humidity is above setpoint. Variable capacity scroll compressors are available to provide energy efficient consistent supply air temperature cooling.

## Air Handler Option

AAON RN Series outdoor air handlers provide a hydronic cooling and heating option in the RN Series unit size. Gas, electric, steam, and hot water heating are available on an RN Series outdoor air handler. Cabinet construction is similar to the RN Series packaged rooftop units with easily accessible coil connections.

RN Model	Cabinet	Air-Cooled EER	Water-Cooled EER	Nominal CFM	Width	Length*	Height*
006	A	Up to 14.0	Up to 18.4	2,400	79	82	44
007				2,600			
008				3,400			
010				3,600			
009	B	Up to 13.9	Up to 19.4	3,400	96	88	50
011				3,600			
013				3,800			
015				4,200			
016	C	Up to 12.7	Up to 16.9	6,400	101	110	59
018				6,800			
020				7,000			
025				9,000			
030				10,500			
026				10,000			
031	D	Up to 12.2	Up to 16.5	12,400	100	155	97
040				16,000			
050				20,000			
060				23,000			
070				25,000			

\*Length and height may vary depending on options selected  
All dimensions are in inches

# AAON Environmentally Friendly HVAC Product Family

**Customer Commitment** – AAON encourages environmentally responsible design by incorporating many energy saving features into our superior heating and cooling products. In addition to energy efficiency, AAON also offers environmentally friendly R-410A refrigerant capability in all our cooling and heat pump equipment. As countries throughout the world phase out CFC and HCFC refrigerants, R-410A is becoming the global standard and AAON is leading the way!



## Rooftop Units



## Condensing Units



## Air-Cooled or Evaporative-Cooled Chiller



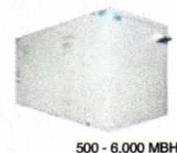
## Outdoor Air Handling Units



## Indoor Air Handling Units



## Boiler



## Self Contained



## Custom Indoor or Outdoor Air Handling Units



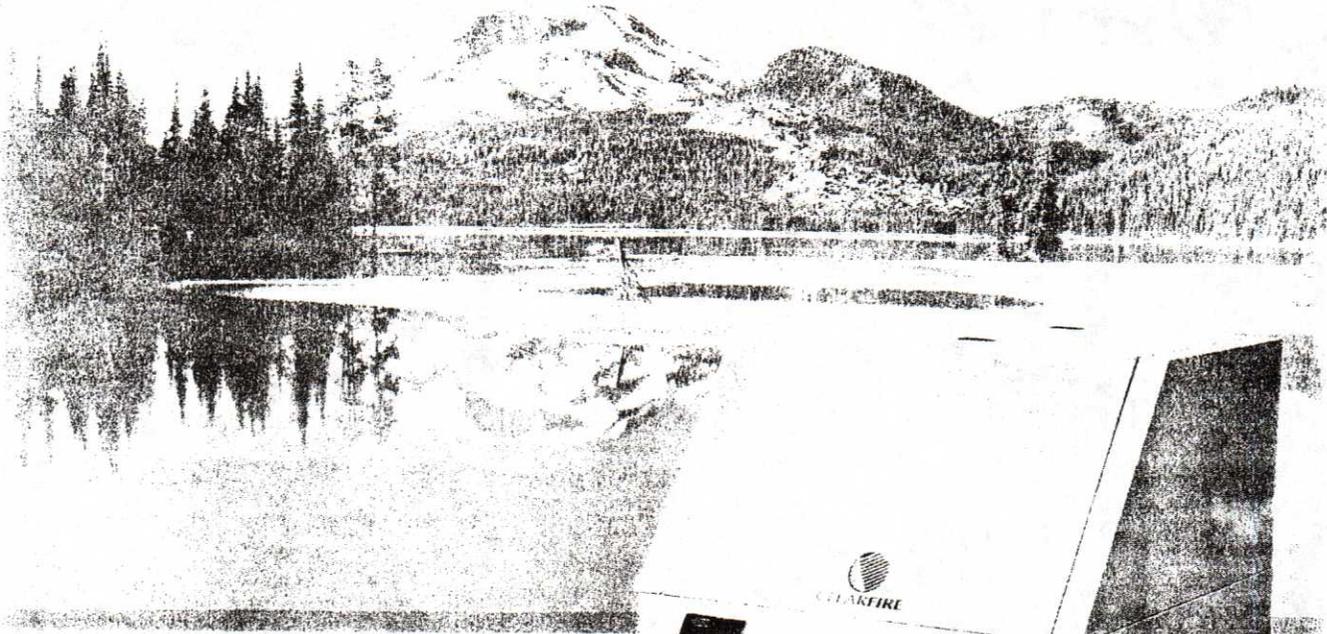
Defining Quality. Building Comfort.

It is the intent of AAON to provide accurate and current pricing information. However, in the interest of product improvement, AAON reserves the right to change pricing, specifications, and/or design of its product without notice, obligation, or liability.

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Cleaver Brooks

REVOLUTIONARY MODULAR HOT WATER BOILER DESIGN FROM CLEAVER-BROOKS



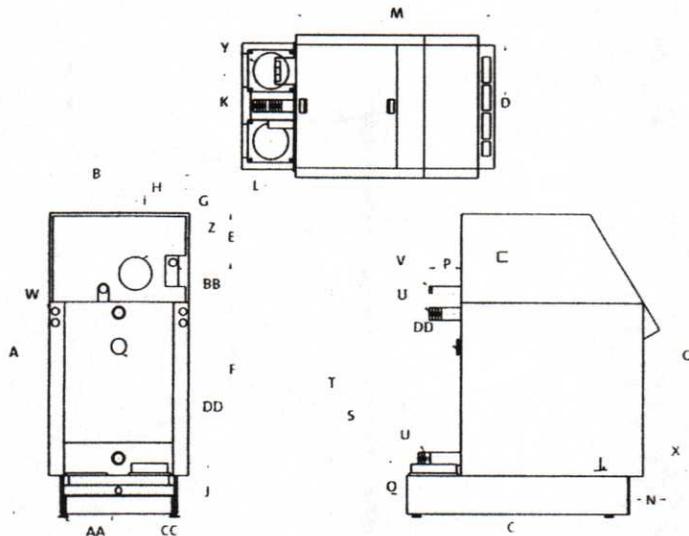
 CLEARFIRE

CONSERVE ENERGY AND THE ENVIRONMENT AND TODAY'S MARKET NEEDS

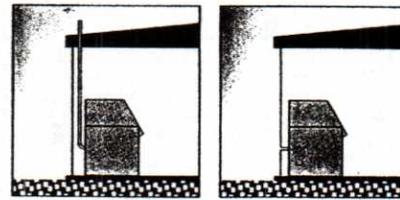
For more information, contact your local Cleaver-Brooks distributor or call 1-800-447-2263.



## DIMENSIONS AND RATINGS



## VENTING OPTIONS

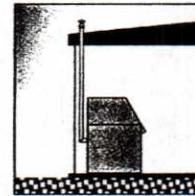


CONVENTIONAL VENT

THROUGH-WALL VENT



DIRECT VENT/  
SEALED COMBUSTION



VERTICAL VENT/  
SEALED COMBUSTION

LABEL	DESCRIPTION	750	1,000	1,500	1,800
	BTU INPUT	750,000	1,000,000	1,500,000	1,800,000
	BTU OUTPUT	675,000	900,000	1,350,000	1,620,000
	SHIPPING WEIGHT	1,477	1,554	1,940	2,061
A	OVERALL HEIGHT	76.2"	76.2"	82.4"	82.4"
B	OVERALL WIDTH	36.6"	36.6"	43.7"	43.7"
C	OVERALL DEPTH	62.7"	62.7"	66.6"	66.6"
D	WIDTH LESS SIDE CASING	31.1"	31.1"	38.1"	38.1"
E	GAS CONNECTION TO TOP OF CASING	8.8"	8.8"	10.0"	10.0"
F	GAS CONNECTION TO FLOOR	67.3"	67.3"	72.4"	72.4"
G	SIDE OF CASING TO GAS CONNECTION	5.6"	5.6"	5.6"	5.6"
H	CASING TO CENTER LINE OF BOILER	22.2"	22.2"	25.8"	25.8"
I	BOILER CENTERLINE TO CENTERLINE OF AIR INTAKE	4.0"	4.0"	7.0"	7.0"
J	FLOOR TO TOP OF STACK STUB	18.9"	18.9"	20.0"	20.0"
K	SPACING BETWEEN LEFT AND RIGHT STACK STUBS	17.0"	17.0"	21.0"	21.0"
L	REAR OF BOILER TO CENTERLINE OF STACK STUB	7.5"	7.5"	8.2"	8.2"
M	FRONT OF BOILER TO REAR OF CASING	50.0"	50.0"	50.0"	50.0"
N	CONTROL PANEL PROJECTION	4.1"	4.1"	4.2"	4.2"
O	CASING HEIGHT	60.0"	60.0"	65.3"	65.3"
P	VENT PROJECTION FROM REAR OF CASING	7.3"	7.3"	8.0"	8.0"
Q	FLOOR TO CENTERLINE OF RETURN	20.0"	20.0"	21.4"	21.4"
R	FLOOR TO CENTERLINE OF OUTLET	56.7"	56.7"	58.5"	58.5"
S	FLOOR TO CENTERLINE OF VENT	63.4"	63.4"	64.4"	64.4"
U	CONNECTION (SUPPLY AND RETURN)	2.5"	2.5"	3.0"	3.0"
V	VENT	1.0"	1.0"	1.0"	1.0"
W	ELECTRICAL CONNECTION, LEFT OR RIGHT SIDE (OPTIONAL)	-	-	-	-
X	DRAIN	1.5"	1.5"	1.5"	1.5"
Y	FLUE GAS CONNECTION, LEFT OR RIGHT SIDE (OPTIONAL)	10.0"	10.0"	12.0"	12.0"
Z	AIR INLET CONNECTION	6.0"	6.0"	6.0"	6.0"
AA	BOILER ADJUSTMENT FOOT	3.1"	3.1"	3.1"	3.1"
BB	GAS INLET	1"	1"	1"	1"
CC	CONDENSATE CONNECTION	3/4" (NPT)	3/4" (NPT)	3/4" (NPT)	3/4" (NPT)
DD	WATERSIDE INSPECTION PORT	-	-	-	-

NOTE: OUTPUT BASED ON 80% FIRING RATE AND 105° F RETURN WATER TEMPERATURE.

**C-B Package**  
**Boiler Systems**

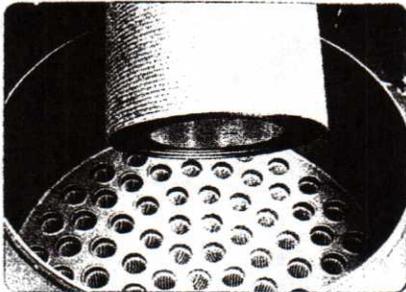
*Our Skill And Strength Turns Fire Into Power!*

A Cleaver-Brooks Company

[www.cleaver-brooks.com](http://www.cleaver-brooks.com)

## HIGH COMBUSTION EFFICIENCY AND LOW EMISSIONS

The *Clearfire* FeCrAlloy metal fiber burner has been specifically designed to pre-mix the air and fuel to achieve a precise ratio resulting in optimum combustion efficiency. The result is an almost flameless combustion of the homogenous gas/air mixture. The solid body radiation of the burner's surface cools the flame allowing extremely low emissions with NOx levels to sub 10 ppm. The FeCrAlloy metal fiber body is also flexible, preventing thermal stresses, resulting in extended life.



The high thermal efficiency of the *Clearfire* burner/burner package results from a combination of the burner and boiler working together to maximize heat transfer. One of the key features of our full condensing and 98% fuel to water efficiency are the fans used in the *Clearfire*. The design is constructed of stainless steel to withstand complex alternating flow patterns that will be encountered during the burner's operation, providing a high velocity and turbulent flow which further enhances heat transfer while keeping the fan side clean and efficient.



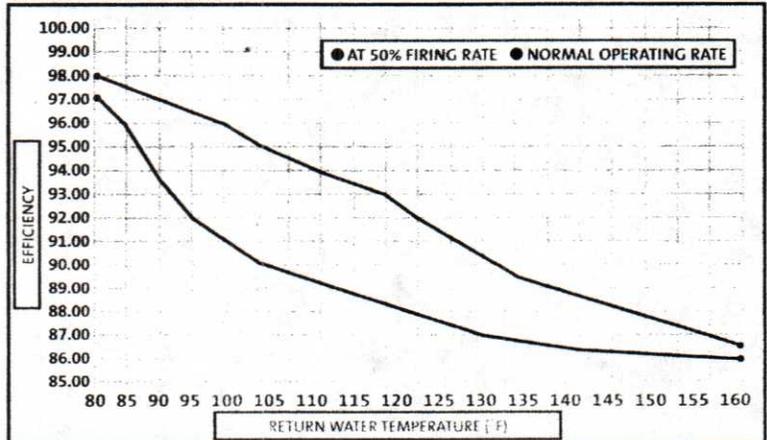
**CLEARFIRE**

## CLEARFIRE'S HIGH PERFORMANCE STANDARD

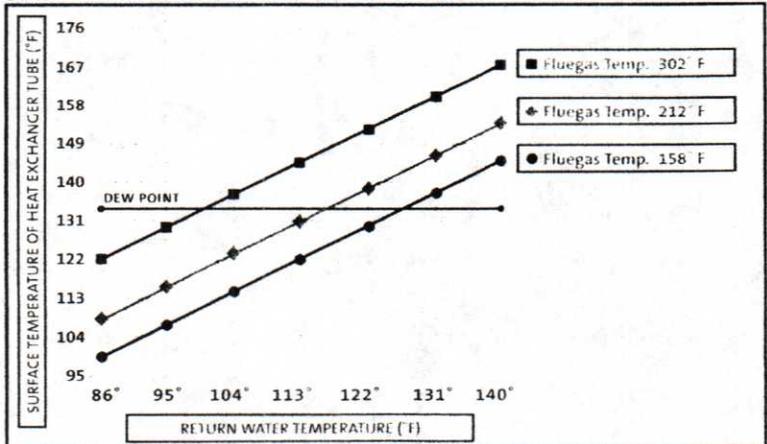
The *Clearfire*, with a range of sizes to meet almost any commercial application, combines engineering expertise with ISO 9001 quality standards to deliver a product unsurpassed in the industry when it comes to peak performance and low environmental impact. When deciding on your next heating boiler to specify or buy, consider these ten *Clearfire* advantages:

- Modular boiler design offering sizes from 750 – 1800 MBH
- Rugged stainless steel construction with 20 year thermal shock guarantee
- Ultra high performance (full condensing) with efficiencies to 98%
- Fully modulating burner with variable speed fan
- "Whisper" quiet operation with a decibel rating of <70 dB at high fire
- Low emissions; NOx levels to sub 10 ppm
- Sealed combustion capability
- No minimum flow or water temperature requirements
- Low waterside pressure drop
- Fully backed by Cleaver-Brooks Authorized Sales and Service Network

### CLEARFIRE EFFICIENCIES



### STACK TEMPERATURE VS. RETURN WATER TEMPERATURE



## **Appendix C**

### **Heating & Cooling Load Calculations**

## Heating Plant Sizing Summary for 93% Boiler Plant

Sherwood Middle School OPTION #2  
Johnson & Seaman Engineering

12/09/2009  
06:52AM

**1. Plant Information:**

Plant Name ..... 93% Boiler Plant  
Plant Type ..... Hot Water Boiler Plant  
Design Weather ..... Worcester, Massachusetts

**2. Heating Plant Sizing Data:**

Maximum Plant Load ..... 3132.0 MBH  
Load occurs at ..... Winter Design  
BTU/(hr-ft<sup>2</sup>) ..... 30.4 BTU/(hr-ft<sup>2</sup>)  
Floor area served by plant ..... 103155.0 ft<sup>2</sup>

**3. Coincident Air System Heating Loads for Winter Design**

Air System Name	Mult.	System Heating Coil Load ( MBH )
#2 ART ROOMS	1	57.9
#2 BAND	1	66.3
BATHROOMS	1	72.5
CAFE SYSTEM	1	414.8
#2 CLASS BOTTOM LEFT	1	279.7
#2 CLASS BOTTOM RIGHT	1	301.5
#2 CLASS TOP RIGHT BOTTOM	1	139.4
#2 CLASS TOP RIGHT TOP	1	2.5
GYM	1	811.0
KITCHEN	1	459.8
LOBBY	1	154.5
LOCKER ROOMS	1	73.4
MEDIA/TECH	1	121.4
#2 MUSIC/DRAMA	1	55.9
OFFICES	1	121.6

System loads are for coils whose heating source is ' Hot Water ' .

## Air System Sizing Summary for MEDIA/TECH

Project Name: Sherwood Middle School OPTION #2  
 Prepared by: Johnson & Seaman Engineering

12/09/2009  
 06:43AM

### Air System Information

Air System Name ..... MEDIA/TECH  
 Equipment Class ..... PKG ROOF  
 Air System Type ..... VAV

Number of zones ..... 1  
 Floor Area ..... 6211.0 ft<sup>2</sup>  
 Location ..... Worcester, Massachusetts

### Sizing Calculation Information

Zone and Space Sizing Method:  
 Zone CFM ..... Peak zone sensible load  
 Space CFM ..... Individual peak space loads

Calculation Months ..... Jan to Dec  
 Sizing Data ..... Calculated

### Central Cooling Coil Sizing Data

Total coil load ..... 20.9 Tons  
 Total coil load ..... 250.2 MBH  
 Sensible coil load ..... 186.0 MBH  
 Coil CFM at Jul 1500 ..... 6673 CFM  
 Max block CFM at Jul 1400 ..... 7292 CFM  
 Sum of peak zone CFM ..... 7292 CFM  
 Sensible heat ratio ..... 0.743  
 ft<sup>2</sup>/Ton ..... 297.9  
 BTU/(hr-ft<sup>2</sup>) ..... 40.3  
 Water flow @ 10.0 °F rise ..... N/A

Load occurs at ..... Jul 1500  
 OA DB / WB ..... 86.0 / 73.0 °F  
 Entering DB / WB ..... 79.4 / 64.7 °F  
 Leaving DB / WB ..... 52.6 / 51.4 °F  
 Coil ADP ..... 49.7 °F  
 Bypass Factor ..... 0.100  
 Resulting RH ..... 48 %  
 Design supply temp. .... 55.0 °F  
 Zone T-stat Check ..... 1 of 1 OK  
 Max zone temperature deviation ..... 0.0 °F

### Preheat Coil Sizing Data

Max coil load ..... 0.7 MBH  
 Coil CFM at Des Htg ..... 2280 CFM  
 Max coil CFM ..... 7292 CFM  
 Water flow @ 20.0 °F drop ..... 0.07 gpm

Load occurs at ..... Des Htg  
 Ent. DB / Lvg DB ..... 49.7 / 50.0 °F

### Supply Fan Sizing Data

Actual max CFM at Jul 1400 ..... 7292 CFM  
 Standard CFM ..... 7029 CFM  
 Actual max CFM/ft<sup>2</sup> ..... 1.17 CFM/ft<sup>2</sup>

Fan motor BHP ..... 8.00 BHP  
 Fan motor kW ..... 5.97 kW  
 Fan static ..... 3.00 in wg

### Return Fan Sizing Data

Actual max CFM at Jul 1400 ..... 7292 CFM  
 Standard CFM ..... 7029 CFM  
 Actual max CFM/ft<sup>2</sup> ..... 1.17 CFM/ft<sup>2</sup>

Fan motor BHP ..... 8.00 BHP  
 Fan motor kW ..... 5.97 kW  
 Fan static ..... 3.00 in wg

### Outdoor Ventilation Air Data

Design airflow CFM ..... 2280 CFM  
 CFM/ft<sup>2</sup> ..... 0.37 CFM/ft<sup>2</sup>

CFM/person ..... 15.00 CFM/person



## Air System Design Load Summary for MEDIA/TECH

Project Name: Sherwood Middle School OPTION #2  
 Prepared by: Johnson & Seaman Engineering

12/09/2009  
 06:43AM

	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1500			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 86.0 °F / 73.0 °F			HEATING OA DB / WB 0.0 °F / -1.6 °F		
ZONE LOADS	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	524 ft²	9571	-	524 ft²	-	-
Wall Transmission	1328 ft²	1249	-	1328 ft²	4146	-
Roof Transmission	6211 ft²	15981	-	6211 ft²	17913	-
Window Transmission	524 ft²	1300	-	524 ft²	11658	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	0 ft²	0	-	0 ft²	0	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	6211 W	21192	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	17000 W	58004	-	0	0	-
People	152	37240	31160	0	0	0
Infiltration	-	7113	15719	-	46560	0
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
<b>&gt;&gt; Total Zone Loads</b>	-	<b>151649</b>	<b>46879</b>	-	<b>80276</b>	<b>0</b>
Zone Conditioning	-	147994	46879	-	76201	0
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	6673 CFM	16388	-	2280 CFM	-2699	-
Ventilation Load	2280 CFM	5226	17347	2280 CFM	50556	0
Supply Fan Load	6673 CFM	16388	-	2280 CFM	-2699	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
<b>&gt;&gt; Total System Loads</b>	-	<b>185995</b>	<b>64226</b>	-	<b>121360</b>	<b>0</b>
Central Cooling Coil	-	185995	64229	-	0	0
Preheat Coil	-	0	-	-	728	-
Zone Heating Unit Coils	-	0	-	-	120632	-
<b>&gt;&gt; Total Conditioning</b>	-	<b>185995</b>	<b>64229</b>	-	<b>121360</b>	<b>0</b>
<b>Key:</b>	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

## Air System Sizing Summary for OFFICES

Project Name: Sherwood Middle School OPTION #2  
 Prepared by: Johnson & Seaman Engineering

12/09/2009  
 06:43AM

### Air System Information

Air System Name	OFFICES	Number of zones	16
Equipment Class	PKG ROOF	Floor Area	7692.0 ft <sup>2</sup>
Air System Type	VAV	Location	Worcester, Massachusetts

### Sizing Calculation Information

Zone and Space Sizing Method:		Calculation Months	Jan to Dec
Zone CFM	Peak zone sensible load	Sizing Data	Calculated
Space CFM	Individual peak space loads		

### Central Cooling Coil Sizing Data

Total coil load	18.3	Tons	Load occurs at	Jul 1600
Total coil load	220.1	MBH	OA DB / WB	85.5 / 72.9 °F
Sensible coil load	161.1	MBH	Entering DB / WB	79.5 / 65.0 °F
Coil CFM at Jul 1600	5773	CFM	Leaving DB / WB	52.7 / 51.5 °F
Max block CFM at Jul 1600	6474	CFM	Coil ADP	49.8 °F
Sum of peak zone CFM	6570	CFM	Bypass Factor	0.100
Sensible heat ratio	0.732		Resulting RH	48 %
ft <sup>2</sup> /Ton	419.3		Design supply temp.	55.0 °F
BTU/(hr-ft <sup>2</sup> )	28.6		Zone T-stat Check	16 of 16 OK
Water flow @ 10.0 °F rise	N/A		Max zone temperature deviation	0.0 °F

### Preheat Coil Sizing Data

Max coil load	0.9	MBH	Load occurs at	Des Htg
Coil CFM at Des Htg	1920	CFM	Ent. DB / Lvg DB	49.6 / 50.0 °F
Max coil CFM	6474	CFM		
Water flow @ 20.0 °F drop	0.09	gpm		

### Supply Fan Sizing Data

Actual max CFM at Jul 1600	6474	CFM	Fan motor BHP	7.11	BHP
Standard CFM	6242	CFM	Fan motor kW	5.30	kW
Actual max CFM/ft <sup>2</sup>	0.84	CFM/ft <sup>2</sup>	Fan static	3.00	in wg

### Return Fan Sizing Data

Actual max CFM at Jul 1600	6474	CFM	Fan motor BHP	7.11	BHP
Standard CFM	6242	CFM	Fan motor kW	5.30	kW
Actual max CFM/ft <sup>2</sup>	0.84	CFM/ft <sup>2</sup>	Fan static	3.00	in wg

### Outdoor Ventilation Air Data

Design airflow CFM	1920	CFM	CFM/person	15.00	CFM/person
CFM/ft <sup>2</sup>	0.25	CFM/ft <sup>2</sup>			

## Zone Sizing Summary for OFFICES

Project Name: Sherwood Middle School OPTION #2  
 Prepared by: Johnson & Seaman Engineering

12/09/2009  
 06:43AM

### Air System Information

Air System Name	OFFICES	Number of zones	16
Equipment Class	PKG ROOF	Floor Area	7692.0 ft <sup>2</sup>
Air System Type	VAV	Location	Worcester, Massachusetts

### Sizing Calculation Information

Zone and Space Sizing Method:

Zone CFM	Peak zone sensible load	Calculation Months	Jan to Dec
Space CFM	Individual peak space loads	Sizing Data	Calculated

### Zone Sizing Data

Zone Name	Maximum Cooling Sensible (MBH)	Design Air Flow (CFM)	Minimum Air Flow (CFM)	Time of Peak Load	Maximum Heating Load (MBH)	Zone Floor Area (ft <sup>2</sup> )	Zone CFM/ft <sup>2</sup>
Zone 1	1.8	86	15	Jul 1500	1.2	160.0	0.54
Zone 2	14.3	689	210	Jul 1600	8.1	761.0	0.91
Zone 3	1.6	77	15	Jul 1500	1.0	140.0	0.55
Zone 4	5.9	281	195	Jul 1500	4.4	585.0	0.48
Zone 5	8.9	429	180	Jul 1500	4.6	620.0	0.69
Zone 6	27.8	1334	150	Jun 1700	13.9	660.0	2.02
Zone 7	11.2	536	45	Jun 1700	10.0	360.0	1.49
Zone 8	5.8	279	45	Jun 1700	5.5	330.0	0.84
Zone 9	11.1	532	150	Jul 1500	6.7	891.0	0.60
Zone 10	7.8	374	180	Jul 1500	3.7	500.0	0.75
Zone 11	7.2	348	180	Jul 1500	3.3	445.0	0.78
Zone 12	12.7	610	150	Jul 1500	10.2	840.0	0.73
Zone 13	0.8	37	15	Jul 1500	0.4	55.0	0.68
Zone 14	2.0	96	15	Jul 1400	1.5	140.0	0.68
Zone 15	7.4	355	195	Jul 1400	6.1	585.0	0.61
Zone 16	10.6	508	180	Jul 1400	6.4	620.0	0.82

### Zone Terminal Sizing Data

Zone Name	Reheat Coil Load (MBH)	Reheat Coil Water gpm @ 20.0 °F	Zone Htg Coil Load (MBH)	Zone Htg Water gpm @ 20.0 °F	Mixing Box Fan Airflow (CFM)
Zone 1	0.0	-	1.5	0.15	0
Zone 2	0.0	-	11.8	1.18	0
Zone 3	0.0	-	1.3	0.13	0
Zone 4	0.0	-	7.8	0.78	0
Zone 5	0.0	-	7.8	0.78	0
Zone 6	0.0	-	16.5	1.66	0
Zone 7	0.0	-	10.8	1.08	0
Zone 8	0.0	-	6.3	0.63	0
Zone 9	0.0	-	9.3	0.93	0
Zone 10	0.0	-	6.9	0.69	0
Zone 11	0.0	-	6.5	0.65	0
Zone 12	0.0	-	12.9	1.29	0
Zone 13	0.0	-	0.7	0.07	0
Zone 14	0.0	-	1.7	0.17	0
Zone 15	0.0	-	9.5	0.95	0
Zone 16	0.0	-	9.6	0.96	0

### Space Loads and Airflows

Zone Name /	Cooling Sensible	Time of	Air Flow	Heating Load	Floor Area	Space
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## Zone Sizing Summary for OFFICES

Project Name: Sherwood Middle School OPTION #2  
 Prepared by: Johnson & Seaman Engineering

12/09/2009  
 06:43AM

Space Name	Mult.	(MBH)	Load	(CFM)	(MBH)	(ft²)	CFM/ft²
<b>Zone 1</b>							
B OFFICE	1	1.8	Jul 1500	86	1.2	160.0	0.54
<b>Zone 2</b>							
B SEMINAR	1	11.8	Jul 1600	568	6.5	551.0	1.03
B WORK	1	2.5	Jul 1500	121	1.6	210.0	0.58
<b>Zone 3</b>							
1 OFFICE	1	1.6	Jul 1500	77	1.0	140.0	0.55
<b>Zone 4</b>							
1 ELL	1	5.9	Jul 1500	281	4.4	585.0	0.48
<b>Zone 5</b>							
1 SEMINAR	1	5.2	Jul 1500	247	2.5	330.0	0.75
1 WORK	1	3.8	Jul 1500	182	2.2	290.0	0.63
<b>Zone 6</b>							
1 WAITING	1	27.8	Jun 1700	1334	13.9	660.0	2.02
<b>Zone 7</b>							
1 OFFICE 2	1	3.7	Jun 1700	179	3.3	120.0	1.49
1 OFFICE 3	1	3.7	Jun 1700	179	3.3	120.0	1.49
1 OFFICE 4	1	3.7	Jun 1700	179	3.3	120.0	1.49
<b>Zone 8</b>							
1 OFFICE 5	1	2.3	Jun 1700	112	2.2	120.0	0.94
1 OFFICE 6	1	3.5	Jul 1700	167	3.3	210.0	0.79
<b>Zone 9</b>							
1 GEN OFFICE	1	6.8	Jul 1500	326	4.1	550.0	0.59
1 MAIL	1	1.7	Jul 1500	82	0.9	126.0	0.65
1 WORK 2	1	2.6	Jul 1500	123	1.6	215.0	0.57
<b>Zone 10</b>							
1 CONFERENCE	1	7.8	Jul 1500	374	3.7	500.0	0.75
<b>Zone 11</b>							
1 OT/PT	1	7.2	Jul 1500	348	3.3	445.0	0.78
<b>Zone 12</b>							
1 NURSE	1	12.7	Jul 1500	610	10.2	840.0	0.73
<b>Zone 13</b>							
1 REC	1	0.8	Jul 1500	37	0.4	55.0	0.68
<b>Zone 14</b>							
2 OFFICE	1	2.0	Jul 1400	96	1.5	140.0	0.68
<b>Zone 15</b>							
2 SPEECH LAN	1	7.4	Jul 1400	355	6.1	585.0	0.61
<b>Zone 16</b>							
2 SEMINAR	1	6.0	Jul 1400	289	3.4	330.0	0.88
2 WORK	1	4.6	Jul 1400	219	3.0	290.0	0.75

## Air System Design Load Summary for OFFICES

Project Name: Sherwood Middle School OPTION #2  
 Prepared by: Johnson & Seaman Engineering

12/09/2009  
 06:43AM

ZONE LOADS	DESIGN COOLING			DESIGN HEATING		
	COOLING DATA AT Jul 1600			HEATING DATA AT DES HTG		
	COOLING OA DB / WB 85.5 °F / 72.9 °F			HEATING OA DB / WB 0.0 °F / -1.6 °F		
	Details	Sensible (BTU/hr)	Latent (BTU/hr)	Details	Sensible (BTU/hr)	Latent (BTU/hr)
Window & Skylight Solar Loads	875 ft²	29395	-	875 ft²	-	-
Wall Transmission	671 ft²	755	-	671 ft²	2095	-
Roof Transmission	1355 ft²	3142	-	1355 ft²	3908	-
Window Transmission	875 ft²	2131	-	875 ft²	19467	-
Skylight Transmission	0 ft²	0	-	0 ft²	0	-
Door Loads	0 ft²	0	-	0 ft²	0	-
Floor Transmission	4502 ft²	0	-	4502 ft²	3961	-
Partitions	0 ft²	0	-	0 ft²	0	-
Ceiling	0 ft²	0	-	0 ft²	0	-
Overhead Lighting	7692 W	26245	-	0	0	-
Task Lighting	0 W	0	-	0	0	-
Electric Equipment	9783 W	33379	-	0	0	-
People	128	31360	26240	0	0	0
Infiltration	-	8411	18764	-	57662	5
Miscellaneous	-	0	0	-	0	0
Safety Factor	0% / 0%	0	0	0%	0	0
<b>&gt;&gt; Total Zone Loads</b>	-	<b>134817</b>	<b>45004</b>	-	<b>87092</b>	<b>5</b>
Zone Conditioning	-	129886	45004	-	83839	5
Plenum Wall Load	0%	0	-	0	0	-
Plenum Roof Load	0%	0	-	0	0	-
Plenum Lighting Load	0%	0	-	0	0	-
Return Fan Load	5773 CFM	13623	-	1920 CFM	-2332	-
Ventilation Load	1920 CFM	3974	14055	1920 CFM	42457	0
Supply Fan Load	5773 CFM	13623	-	1920 CFM	-2332	-
Space Fan Coil Fans	-	0	-	-	0	-
Duct Heat Gain / Loss	0%	0	-	0%	0	-
<b>&gt;&gt; Total System Loads</b>	-	<b>161107</b>	<b>59058</b>	-	<b>121632</b>	<b>5</b>
Central Cooling Coil	-	161107	59032	-	0	0
Preheat Coil	-	0	-	-	885	-
Zone Heating Unit Coils	-	0	-	-	120748	-
<b>&gt;&gt; Total Conditioning</b>	-	<b>161107</b>	<b>59032</b>	-	<b>121632</b>	<b>0</b>
<b>Key:</b>	Positive values are clg loads Negative values are htg loads			Positive values are htg loads Negative values are clg loads		

**Appendix D**  
**Energy Analysis Data**

## Annual Cost Summary

Sherwood Middle School  
Johnson & Seaman Engineering

12/08/2009  
11:41AM

Table 1. Annual Costs

Component	Sherwood Option #2 (\$)
Air System Fans	22,761
Cooling	5,235
Heating	29,822
Pumps	3,386
Cooling Tower Fans	0
<b>HVAC Sub-Total</b>	<b>61,205</b>
Lights	35,631
Electric Equipment	22,051
Misc. Electric	0
Misc. Fuel Use	0
<b>Non-HVAC Sub-Total</b>	<b>57,683</b>
<b>Grand Total</b>	<b>118,888</b>

Table 2. Annual Cost per Unit Floor Area

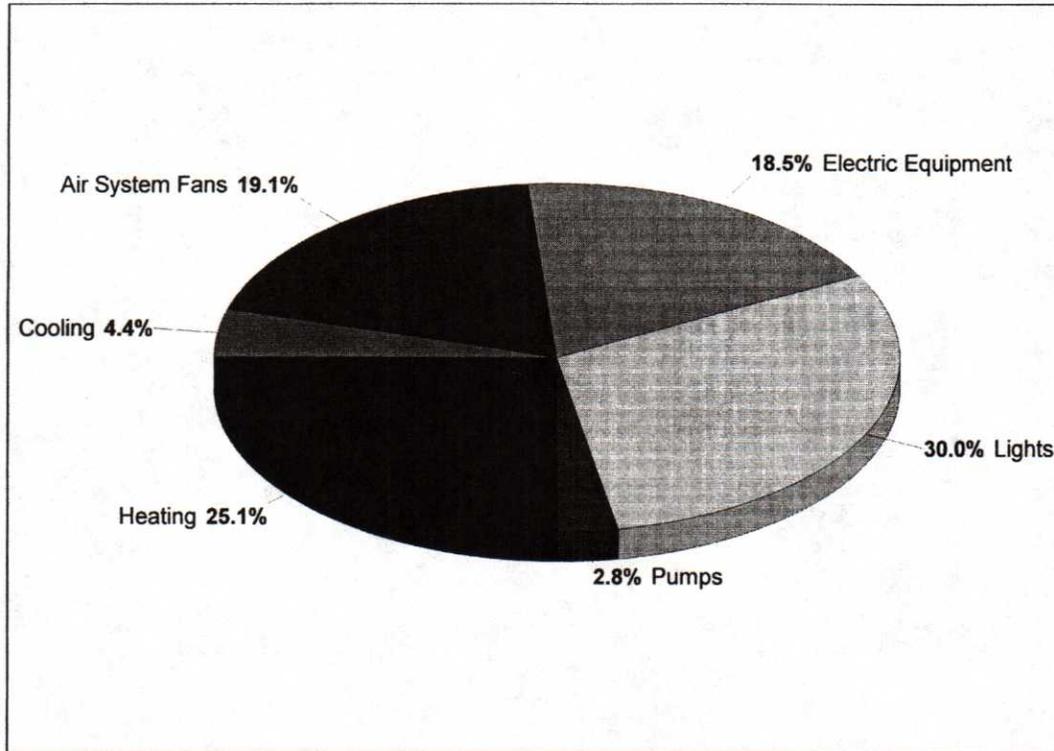
Component	Sherwood Option #2 (\$/ft <sup>2</sup> )
Air System Fans	0.221
Cooling	0.051
Heating	0.289
Pumps	0.033
Cooling Tower Fans	0.000
<b>HVAC Sub-Total</b>	<b>0.593</b>
Lights	0.345
Electric Equipment	0.214
Misc. Electric	0.000
Misc. Fuel Use	0.000
<b>Non-HVAC Sub-Total</b>	<b>0.559</b>
<b>Grand Total</b>	<b>1.153</b>
Gross Floor Area (ft <sup>2</sup> )	103155.0
Conditioned Floor Area (ft <sup>2</sup> )	103155.0

Note: Values in this table are calculated using the Gross Floor Area.

Table 3. Component Cost as a Percentage of Total Cost

Component	Sherwood Option #2 (%)
Air System Fans	19.1
Cooling	4.4
Heating	25.1
Pumps	2.8
Cooling Tower Fans	0.0
<b>HVAC Sub-Total</b>	<b>51.5</b>
Lights	30.0
Electric Equipment	18.5
Misc. Electric	0.0
Misc. Fuel Use	0.0
<b>Non-HVAC Sub-Total</b>	<b>48.5</b>
<b>Grand Total</b>	<b>100.0</b>

## Annual Component Costs - Sherwood Option #2



### 1. Annual Costs

Component	Annual Cost (\$)	(\$/ft <sup>2</sup> )	Percent of Total (%)
Air System Fans	22,761	0.221	19.1
Cooling	5,235	0.051	4.4
Heating	29,822	0.289	25.1
Pumps	3,386	0.033	2.8
Cooling Tower Fans	0	0.000	0.0
<b>HVAC Sub-Total</b>	<b>61,205</b>	<b>0.593</b>	<b>51.5</b>
Lights	35,631	0.345	30.0
Electric Equipment	22,051	0.214	18.5
Misc. Electric	0	0.000	0.0
Misc. Fuel Use	0	0.000	0.0
<b>Non-HVAC Sub-Total</b>	<b>57,683</b>	<b>0.559</b>	<b>48.5</b>
<b>Grand Total</b>	<b>118,888</b>	<b>1.153</b>	<b>100.0</b>

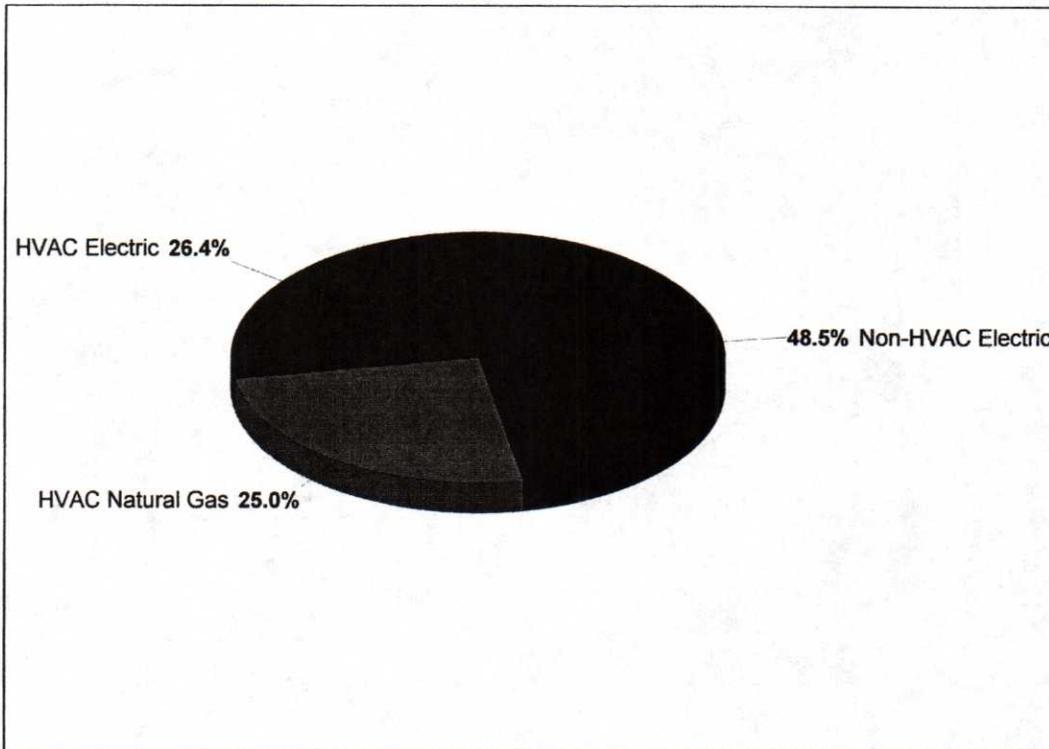
Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... 103155.0 ft<sup>2</sup>  
 Conditioned Floor Area ..... 103155.0 ft<sup>2</sup>

## Annual Energy Costs - Sherwood Option #2

Sherwood Middle School  
Johnson & Seaman Engineering

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### 1. Annual Costs

Component	Annual Cost (\$/yr)	(\$/ft <sup>2</sup> )	Percent of Total (%)
<b>HVAC Components</b>			
Electric	31,430	0.305	26.4
Natural Gas	29,774	0.289	25.0
Fuel Oil	0	0.000	0.0
Propane	0	0.000	0.0
Remote Hot Water	0	0.000	0.0
Remote Steam	0	0.000	0.0
Remote Chilled Water	0	0.000	0.0
<b>HVAC Sub-Total</b>	<b>61,205</b>	<b>0.593</b>	<b>51.5</b>
<b>Non-HVAC Components</b>			
Electric	57,682	0.559	48.5
Natural Gas	0	0.000	0.0
Fuel Oil	0	0.000	0.0
Propane	0	0.000	0.0
Remote Hot Water	0	0.000	0.0
Remote Steam	0	0.000	0.0
<b>Non-HVAC Sub-Total</b>	<b>57,682</b>	<b>0.559</b>	<b>48.5</b>
<b>Grand Total</b>	<b>118,886</b>	<b>1.153</b>	<b>100.0</b>

Note: Cost per unit floor area is based on the gross building floor area.

Gross Floor Area ..... 103155.0 ft<sup>2</sup>  
 Conditioned Floor Area ..... 103155.0 ft<sup>2</sup>

## Energy Budget by System Component - Sherwood Option #2

Sherwood Middle School  
Johnson & Seaman Engineering

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### 1. Annual Coil Loads

Component	Load (kBTU)	(kBTU/ft <sup>2</sup> )
Cooling Coil Loads	986,993	9.568
Heating Coil Loads	2,263,906	21.947
<b>Grand Total</b>	<b>3,250,898</b>	<b>31.515</b>

### 2. Energy Consumption by System Component

Component	Site Energy (kBTU)	Site Energy (kBTU/ft <sup>2</sup> )	Source Energy (kBTU)	Source Energy (kBTU/ft <sup>2</sup> )
Air System Fans	554,726	5.378	1,981,165	19.206
Cooling	127,592	1.237	455,687	4.418
Heating	2,288,889	22.189	2,291,875	22.218
Pumps	82,526	0.800	294,735	2.857
Cooling Towers	0	0.000	0	0.000
<b>HVAC Sub-Total</b>	<b>3,053,734</b>	<b>29.603</b>	<b>5,023,462</b>	<b>48.698</b>
Lights	868,389	8.418	3,101,389	30.065
Electric Equipment	537,424	5.210	1,919,373	18.607
Misc. Electric	0	0.000	0	0.000
Misc. Fuel Use	0	0.000	0	0.000
<b>Non-HVAC Sub-Total</b>	<b>1,405,813</b>	<b>13.628</b>	<b>5,020,761</b>	<b>48.672</b>
<b>Grand Total</b>	<b>4,459,547</b>	<b>43.232</b>	<b>10,044,223</b>	<b>97.370</b>

#### Notes:

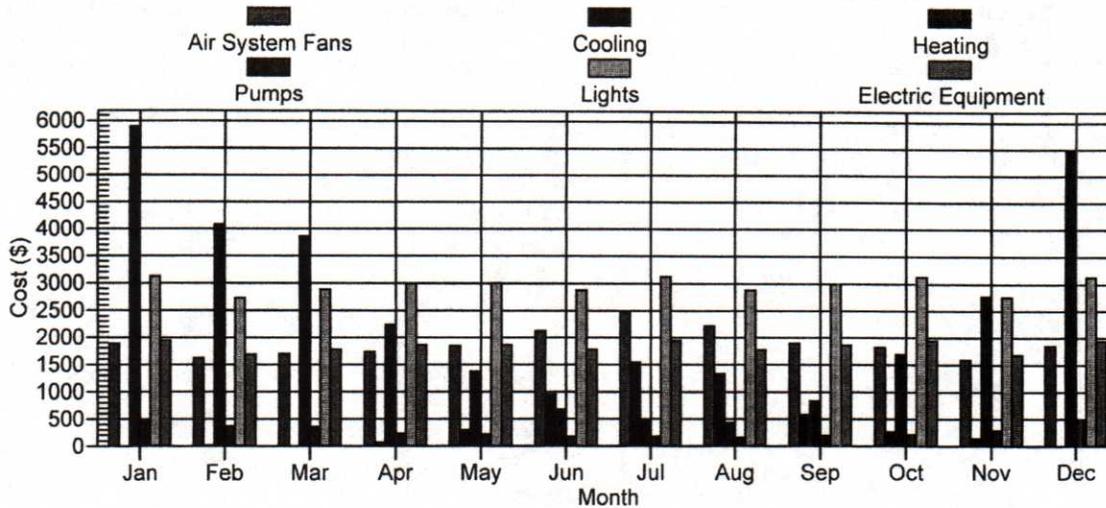
1. 'Cooling Coil Loads' is the sum of all air system cooling coil loads.
2. 'Heating Coil Loads' is the sum of all air system heating coil loads.
3. Site Energy is the actual energy consumed.
4. Source Energy is the site energy divided by the electric generating efficiency (28.0%).
5. Source Energy for fuels equals the site energy value.
6. Energy per unit floor area is based on the gross building floor area.
 

Gross Floor Area	103155.0	ft <sup>2</sup>
Conditioned Floor Area	103155.0	ft <sup>2</sup>

## Monthly Component Costs - Sherwood Option #2

Sherwood Middle School  
Johnson & Seaman Engineering

12/08/2009  
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### 1. HVAC Component Costs

Month	Air System Fans (\$)	Cooling (\$)	Heating (\$)	Pumps (\$)	Cooling Towers (\$)	HVAC Total (\$)
January	1,886	4	5,892	492	0	8,274
February	1,626	14	4,082	369	0	6,091
March	1,699	4	3,864	355	0	5,922
April	1,732	69	2,236	234	0	4,271
May	1,842	300	1,379	222	0	3,743
June	2,124	950	676	182	0	3,932
July	2,465	1,549	470	180	0	4,664
August	2,215	1,342	440	167	0	4,164
September	1,895	587	840	198	0	3,520
October	1,830	268	1,698	217	0	4,013
November	1,595	143	2,772	295	0	4,805
December	1,853	4	5,474	475	0	7,806
<b>Total</b>	<b>22,761</b>	<b>5,235</b>	<b>29,822</b>	<b>3,386</b>	<b>0</b>	<b>61,205</b>

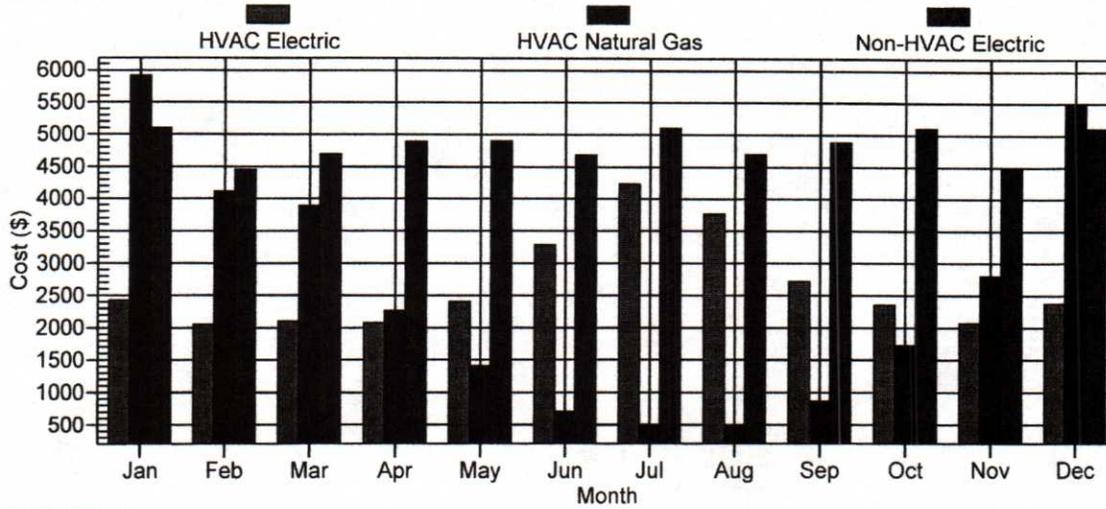
### 2. Non-HVAC Component Costs

Month	Lights (\$)	Electric Equipment (\$)	Misc. Electric (\$)	Misc. Fuel Use (\$)	Non-HVAC Total (\$)	Grand Total (\$)
January	3,126	1,943	0	0	5,070	13,344
February	2,731	1,690	0	0	4,421	10,512
March	2,886	1,774	0	0	4,660	10,582
April	2,994	1,859	0	0	4,853	9,124
May	3,006	1,859	0	0	4,865	8,608
June	2,874	1,774	0	0	4,649	8,581
July	3,126	1,943	0	0	5,070	9,734
August	2,886	1,774	0	0	4,660	8,824
September	2,994	1,859	0	0	4,853	8,373
October	3,126	1,943	0	0	5,070	9,083
November	2,754	1,690	0	0	4,444	9,249
December	3,126	1,943	0	0	5,070	12,876
<b>Total</b>	<b>35,631</b>	<b>22,051</b>	<b>0</b>	<b>0</b>	<b>57,683</b>	<b>118,888</b>

## Monthly Energy Costs - Sherwood Option #2

Sherwood Middle School  
Johnson & Seaman Engineering

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### 1. HVAC Costs

Month	Electric (\$)	Natural Gas (\$)	Fuel Oil (\$)	Propane (\$)	Remote Hot Water (\$)	Remote Steam (\$)	Remote Chilled Water (\$)
January	2,391	5,883	0	0	0	0	0
February	2,016	4,075	0	0	0	0	0
March	2,064	3,858	0	0	0	0	0
April	2,038	2,232	0	0	0	0	0
May	2,366	1,377	0	0	0	0	0
June	3,257	675	0	0	0	0	0
July	4,194	469	0	0	0	0	0
August	3,725	439	0	0	0	0	0
September	2,682	839	0	0	0	0	0
October	2,318	1,695	0	0	0	0	0
November	2,037	2,767	0	0	0	0	0
December	2,342	5,465	0	0	0	0	0
<b>Total</b>	<b>31,430</b>	<b>29,774</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

### 2. Non-HVAC Costs

Month	Electric (\$)	Natural Gas (\$)	Fuel Oil (\$)	Propane (\$)	Remote Hot Water (\$)	Remote Steam (\$)
January	5,069	0	0	0	0	0
February	4,420	0	0	0	0	0
March	4,660	0	0	0	0	0
April	4,853	0	0	0	0	0
May	4,865	0	0	0	0	0
June	4,648	0	0	0	0	0
July	5,069	0	0	0	0	0
August	4,660	0	0	0	0	0
September	4,853	0	0	0	0	0
October	5,069	0	0	0	0	0
November	4,444	0	0	0	0	0
December	5,069	0	0	0	0	0
<b>Total</b>	<b>57,682</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>



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Clean Energy Project Analysis Software

## Solar Air Heating Project Model

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Solar Resource

Cost Analysis

Greenhouse Gas Analysis

Financial Summary

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Cost Data

Unit Options

Currency Options

Sensitivity Analysis



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### Partners



Units: Imperial

Site Conditions	Estimate	Notes/Range
Project name	<b>Sherwood Middle School</b>	<a href="#">See Online Manual</a>
Project location	<span style="border: 1px solid black; padding: 2px;">Shrewsbury, MA</span>	
Nearest location for weather data	Worcester, MA	→ <a href="#">Complete SR sheet</a>
Annual solar radiation (tilted surface)	<span style="border: 1px solid black; padding: 2px;">kWh/ft²</span> #NAME?	
Annual average temperature	°F 46.8	
Annual average wind speed	mph 9.6	

System Characteristics	Estimate	Notes/Range
Heating application type	- <span style="border: 1px solid black; padding: 2px;">Ventilation air</span>	
<b>Base Case Heating System</b>		
Heating fuel type	- <span style="border: 1px solid black; padding: 2px;">Natural gas - 100 ft³</span>	
Heating system seasonal efficiency	% <span style="border: 1px solid black; padding: 2px;">93%</span>	0% to 350%
<b>Building</b>		
Building type	- <span style="border: 1px solid black; padding: 2px;">Commercial</span>	
Indoor temperature	°F <span style="border: 1px solid black; padding: 2px;">72.0</span>	68.0 to 77.0
Maximum delivered air temperature	°F <span style="border: 1px solid black; padding: 2px;">80.0</span>	
R-value of building wall	ft² - °F/(Btu/h) <span style="border: 1px solid black; padding: 2px;">21.0</span>	0.6 to 56.8
<b>Airflow Requirements</b>		
Design airflow rate	cfm <span style="border: 1px solid black; padding: 2px;">13,000</span>	29 to 588,578
Operating days per week (weekday)	d/w <span style="border: 1px solid black; padding: 2px;">5.0</span>	0.0 to 5.0
Operating hours per day (weekday)	h/d <span style="border: 1px solid black; padding: 2px;">12.0</span>	5.0 to 24.0
Operating days per week (weekend)	d/w <span style="border: 1px solid black; padding: 2px;">2.0</span>	0.0 to 2.0
Operating hours per day (weekend)	h/d <span style="border: 1px solid black; padding: 2px;">6.0</span>	5.0 to 24.0
<b>Solar Collector</b>		
Design objective	- <span style="border: 1px solid black; padding: 2px;">High temperature rise</span>	
Collector colour	- <span style="border: 1px solid black; padding: 2px;">Black</span>	<a href="#">See Product Database</a>
Solar absorptivity	- <span style="border: 1px solid black; padding: 2px;">0.95</span>	0.20 to 0.99
Suggested solar collector area	ft² <span style="border: 1px solid black; padding: 2px;">6,604</span>	
Solar collector area	ft² <span style="border: 1px solid black; padding: 2px;">3,000</span>	
Percent shading during season of use	% <span style="border: 1px solid black; padding: 2px;">0%</span>	0% to 50%
SAH fan flow rate	cfm/ft² 4	
Average air temperature rise	°F #NAME?	
Incremental fan power	W/ft² <span style="border: 1px solid black; padding: 2px;">0.0</span>	0.0 to 0.7

Annual Energy Production (9.0 months analysed)	Estimate	Notes/Range
Incremental fan energy	MWh <b>0.0</b>	
Specific yield	kWh/ft² #NAME?	
Collector efficiency	% #NAME?	
Solar availability while operating	% #NAME?	
Renewable energy collected	million Btu #NAME?	
Building heat loss recaptured	million Btu #NAME?	
Renewable energy delivered	MWh #NAME?	
	<span style="border: 1px solid black; padding: 2px;">million Btu</span> #NAME?	

[Complete Cost Analysis sheet](#)

RETScreen® Solar Resource - Solar Air Heating Project

Site Latitude and Collector Orientation		Estimate	Notes/Range
Nearest location for weather data		Worcester, MA	<a href="#">See Weather Database</a>
Latitude of project location	°N	42.3	-90.0 to 90.0
Slope of solar collector	°	90.0	0.0 to 90.0
Azimuth of solar collector	°	20.0	0.0 to 180.0

Monthly Inputs					
Month	Fraction of month used (0 - 1)	Monthly average daily radiation on horizontal surface (kWh/m <sup>2</sup> /d)	Monthly average temperature (°F)	Monthly average wind speed (mph)	Monthly average daily radiation in plane of solar collector (kWh/m <sup>2</sup> /d)
January	1.00	1.89	23.0	11.2	#NAME?
February	1.00	2.76	25.0	11.0	#NAME?
March	1.00	3.78	33.8	11.0	#NAME?
April	1.00	4.68	44.4	10.7	#NAME?
May	1.00	5.48	55.8	9.4	#NAME?
June	0.25	5.95	64.4	8.5	#NAME?
July	0.00	5.92	69.8	7.8	#NAME?
August	0.00	5.23	67.8	7.8	#NAME?
September	0.75	4.19	60.1	8.3	#NAME?
October	1.00	2.99	49.8	8.9	#NAME?
November	1.00	1.88	39.4	9.8	#NAME?
December	1.00	1.54	27.7	10.5	#NAME?
			<b>Annual</b>	<b>Season of use</b>	
Solar radiation (horizontal)		kWh/ft <sup>2</sup>	130.99	83.52	
Solar radiation (tilted surface)		kWh/ft <sup>2</sup>	#NAME?	#NAME?	
Average temperature		°F	46.8	40.0	
Average wind speed		mph	9.6	10.1	

[Return to Energy Model sheet](#)

RETScreen® Cost Analysis - Solar Air Heating Project

Type of analysis: **Pre-feasibility**

Currency: **\$**

Cost references: **None**

Initial Costs (Credits)	Unit	Quantity	Unit Cost	Amount	Relative Costs	Quantity Range	Unit Cost Range
<b>Feasibility Study</b>							
Other - Feasibility study	Cost	0	\$ -	\$ -	-	-	-
Sub-total :				\$ -	0.0%		
<b>Development</b>							
Other - Development	Cost	0	\$ -	\$ -	-	-	-
Sub-total :				\$ -	0.0%		
<b>Engineering</b>							
Other - Engineering	Cost	1	\$ 3,000	\$ 3,000	-	-	-
Sub-total :				\$ 3,000	5.7%		
<b>Energy Equipment</b>							
Solar collector materials	ft²	3,000	\$ 10	\$ 29,850	-	-	-
Equipment installation	ft²	3,000	\$ 6	\$ 18,000	-	-	-
Cladding material credit	ft²	-3,000	\$ -	\$ -	-	-	-
Cladding labour credit	ft²	-3,000	\$ -	\$ -	-	-	-
Incremental transportation	project	1	\$ 2,000	\$ 2,000	-	-	-
Other - Energy Equipment	Credit		\$ -	\$ -	-	-	-
Sub-total :				\$ 49,850	94.3%		
<b>Balance of Equipment</b>							
Fans and ducting materials	cfm	13,000	\$ -	\$ -	-	-	-
Fans and ducting labour	cfm	13,000	\$ -	\$ -	-	-	-
Fan and duct material credit	cfm	-13,000	\$ -	\$ -	-	-	-
Fan and duct labour credit	cfm	-13,000	\$ -	\$ -	-	-	-
Incremental transportation	project	0	\$ -	\$ -	-	-	-
Other - Balance of Equipment	Cost	0	\$ -	\$ -	-	-	-
Sub-total :				\$ -	0.0%		
<b>Miscellaneous</b>							
Overhead	%	0%	\$ 49,850	\$ -	-	-	-
Training	p-h	0	\$ -	\$ -	-	-	-
Contingencies	%	0%	\$ 52,850	\$ -	-	-	-
Sub-total :				\$ -	0.0%		
<b>Initial Costs - Total</b>				\$ 52,850	100.0%		

Annual Costs (Credits)	Unit	Quantity	Unit Cost	Amount	Relative Costs	Quantity Range	Unit Cost Range
<b>O&amp;M</b>							
Property taxes/insurance	project	0	\$ -	\$ -	-	-	-
O&M labour	project	0	\$ -	\$ -	-	-	-
Travel and accommodation	p-trip	0	\$ -	\$ -	-	-	-
Other - O&M	Cost	0	\$ -	\$ -	-	-	-
Contingencies	%	0%	\$ 49,850	\$ -	-	-	-
Sub-total :				\$ -			
<b>Fuel/Electricity</b>	kWh	0	\$ -	\$ -	-	-	-
<b>Annual Costs - Total</b>				\$ -			

Periodic Costs (Credits)	Period	Unit Cost	Amount	Interval Range	Unit Cost Range
			\$ -	-	-
			\$ -	-	-
			\$ -	-	-
End of project life			\$ -		

[Go to GHG Analysis sheet](#)

RETScreen® Greenhouse Gas (GHG) Emission Reduction Analysis - Solar Air Heating Project

Use GHG analysis sheet?  Yes

Type of analysis:  Standard

Background Information

Project Information

Project name: erwood Middle School  
 Project location: Shrewsbury, MA

Global Warming Potential of GHG

1 tonne CH<sub>4</sub> = 21 tonnes CO<sub>2</sub> (IPCC 1996)  
 1 tonne N<sub>2</sub>O = 310 tonnes CO<sub>2</sub> (IPCC 1996)

Base Case Electricity System (Baseline)

Fuel type	Fuel mix (%)	CO <sub>2</sub> emission factor (kg/GJ)	CH <sub>4</sub> emission factor (kg/GJ)	N <sub>2</sub> O emission factor (kg/GJ)	Fuel conversion efficiency (%)	T & D losses (%)	GHG emission factor (t <sub>CO2</sub> /MWh)
Diesel (#2 oil)	100.0%	74.1	0.0020	0.0020	30.0%	8.0%	0.975
Electricity mix	100%	268.5	0.0072	0.0072		8.0%	0.975

Base Case Heating System (Baseline)

Fuel type	Fuel mix (%)	CO <sub>2</sub> emission factor (kg/GJ)	CH <sub>4</sub> emission factor (kg/GJ)	N <sub>2</sub> O emission factor (kg/GJ)	Fuel conversion efficiency (%)	GHG emission factor (t <sub>CO2</sub> /MWh)
Heating system						
Natural gas	100.0%	56.1	0.0030	0.0010	93.0%	0.219

Proposed Case Heating System (Solar Air Heating Project)

Fuel type	Fuel mix (%)	CO <sub>2</sub> emission factor (kg/GJ)	CH <sub>4</sub> emission factor (kg/GJ)	N <sub>2</sub> O emission factor (kg/GJ)	Fuel conversion efficiency (%)	GHG emission factor (t <sub>CO2</sub> /MWh)
Heating system						
Electricity	#NAME?	268.5	0.0072	0.0072	100.0%	#NAME?
Solar	#NAME?	0.0	0.0000	0.0000	100.0%	#NAME?
Heating energy mix	#NAME?	#NAME?	#NAME?	#NAME?		#NAME?

GHG Emission Reduction Summary

Heating system	Base case GHG emission factor (t <sub>CO2</sub> /MWh)	Proposed case GHG emission factor (t <sub>CO2</sub> /MWh)	End-use annual energy delivered (MWh)	Annual GHG emission reduction (t <sub>CO2</sub> )
	0.219	#NAME?	#NAME?	#NAME?
Net GHG emission reduction t <sub>CO2</sub> /yr				#NAME?

[Complete Financial Summary sheet](#)

RETScreen® Financial Summary - Solar Air Heating Project

Annual Energy Balance					
Project name	Sherwood Middle School	Electricity required	MWh	-	
Project location	Shrewsbury, MA				
Renewable energy delivered	MWh	#NAME?	Net GHG reduction	t <sub>CO2</sub> /yr	#NAME?
Heating fuel displaced	-	Natural gas	Net GHG emission reduction - 30 yrs	t <sub>CO2</sub>	#NAME?

Financial Parameters					
Avoided cost of heating energy	\$/100 ft³	1.500	Debt ratio	%	0.0%
GHG emission reduction credit	\$/t <sub>CO2</sub>	-	Income tax analysis?	yes/no	No
Retail price of electricity	\$/kWh	-			
Energy cost escalation rate	%	5.0%			
Inflation	%	2.5%			
Discount rate	%	9.0%			
Project life	yr	30			

Project Costs and Savings					
<b>Initial Costs</b>			<b>Annual Costs and Debt</b>		
Feasibility study	0.0%	\$	-	O&M	\$
Development	0.0%	\$	-	Fuel/Electricity	\$
Engineering	5.7%	\$	3,000		
Energy equipment	94.3%	\$	49,850	<b>Annual Costs - Total</b>	\$
Balance of equipment	0.0%	\$	-		
Miscellaneous	0.0%	\$	-	<b>Annual Savings or Income</b>	
<b>Initial Costs - Total</b>	100.0%	\$	<b>52,850</b>	Heating energy savings/income	\$ #NAME?
Incentives/Grants		\$	-	RE production credit income - 15 yrs	\$ #NAME?
				GHG reduction income - 10 yrs	\$ #NAME?
<b>Periodic Costs (Credits)</b>				<b>Annual Savings - Total</b>	\$ #NAME?
		\$	-		
		\$	-		
		\$	-		
End of project life -		\$	-		

Financial Feasibility					
Pre-tax IRR and ROI	%	#VALUE!	Calculate GHG reduction cost?	yes/no	No
After-tax IRR and ROI	%	#VALUE!			
Simple Payback	yr	#NAME?	Project equity	\$	52,850
Year-to-positive cash flow	yr	#NAME?			
Net Present Value - NPV	\$	#NAME?			
Annual Life Cycle Savings	\$	#NAME?			
Benefit-Cost (B-C) ratio	-	#NAME?			

Yearly Cash Flows			
Year #	Pre-tax \$	After-tax \$	Cumulative \$
0	(52,850)	(52,850)	(52,850)
1	#NAME?	#NAME?	#NAME?
2	#NAME?	#NAME?	#NAME?
3	#NAME?	#NAME?	#NAME?
4	#NAME?	#NAME?	#NAME?
5	#NAME?	#NAME?	#NAME?
6	#NAME?	#NAME?	#NAME?
7	#NAME?	#NAME?	#NAME?
8	#NAME?	#NAME?	#NAME?
9	#NAME?	#NAME?	#NAME?
10	#NAME?	#NAME?	#NAME?
11	#NAME?	#NAME?	#NAME?
12	#NAME?	#NAME?	#NAME?
13	#NAME?	#NAME?	#NAME?
14	#NAME?	#NAME?	#NAME?
15	#NAME?	#NAME?	#NAME?
16	#NAME?	#NAME?	#NAME?
17	#NAME?	#NAME?	#NAME?
18	#NAME?	#NAME?	#NAME?
19	#NAME?	#NAME?	#NAME?
20	#NAME?	#NAME?	#NAME?
21	#NAME?	#NAME?	#NAME?
22	#NAME?	#NAME?	#NAME?
23	#NAME?	#NAME?	#NAME?
24	#NAME?	#NAME?	#NAME?
25	#NAME?	#NAME?	#NAME?
26	#NAME?	#NAME?	#NAME?
27	#NAME?	#NAME?	#NAME?
28	#NAME?	#NAME?	#NAME?
29	#NAME?	#NAME?	#NAME?
30	#NAME?	#NAME?	#NAME?

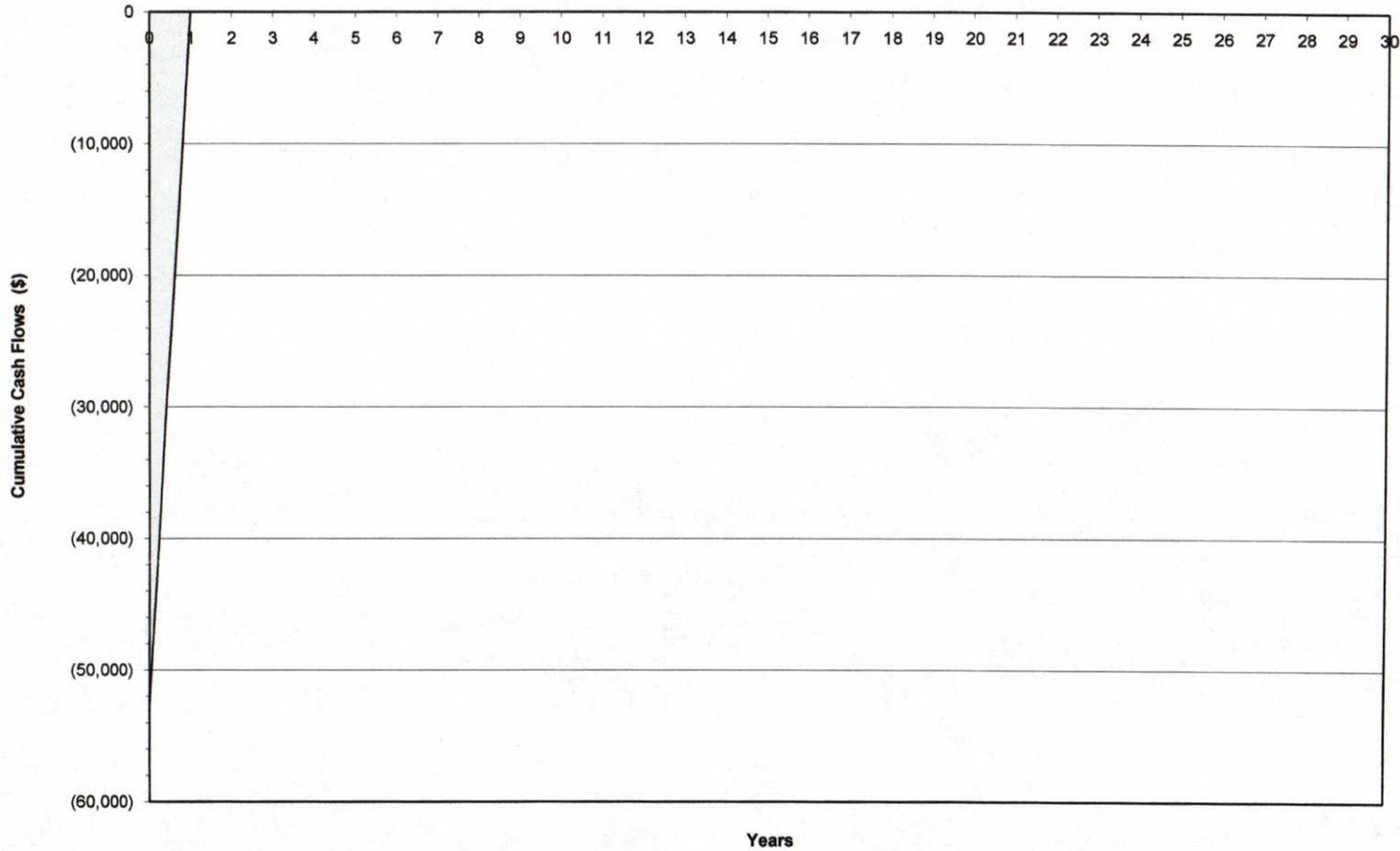
Cumulative Cash Flows Graph

### SAH Project Cumulative Cash Flows Sherwood Middle School, Shrewsbury, MA

Renewable energy delivered (MWh/yr): #NAME?

Total Initial Costs: \$ 52,850

Net average GHG reduction (t<sub>CO2</sub>/yr): #NAME?



#####

Net Present Value: \$ #NAME?

**RETScreen® Sensitivity and Risk Analysis - Solar Air Heating Project**

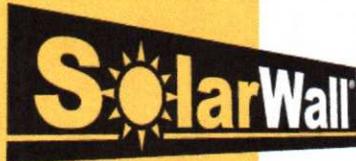
Use sensitivity analysis sheet?

No

Version 3.1

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NRCan/CETC - Varennes



November 18, 2009

Jerimey Moran  
Seaman Engineers

I have attached the Sherwood Middle School Energy model for you to review based on the information provided. I sized the SolarWall @ 3,000ft<sup>2</sup> with a cfm rate of 4.3/ft<sup>2</sup>.

- Engineering cost - \$3,000 - approximate
- Shipping - \$2,000 - you would be billed actual
  
- Installation - it varies from region to region I used \$6 sq ft any reputable sheet metal install can do the install
- SolarWall System - includes 26gauge panels, framing, fasteners, flats {25% of panel area}, foam closures \$9.95 sq ft
  
- I did not include fans, controls or ducting – usually the local HVAC has brands that they both service and sell –
  
- Average Temperature Rise – 14.6 Degrees Fahrenheit
  
- Greenhouse Gas [GHG] Emission Reduction 34.2 tonsCO<sub>2</sub>/year
  
- Annual Fuel Savings –Total - \$8,687
  
- Positive cash flow payback 5.2 years - this factors in the expected 5% escalation of energy over the 30 yr life of the project - it is more accurate than the simple payback of 6.1 years
  
- If the feasibility of the SolarWall meets your financial parameters our engineer TJ Johnson would need:
  1. Picture of the building
  2. Elevation and section views
  3. Where the proposed wall would be installed
  4. Dimensions to scale w/ reference
  5. Structure material of building wall

Respectfully submitted,

John F. Hickey  
[jhickey@solarwall.com](mailto:jhickey@solarwall.com)

**Conserval**

**Systems Inc.**

4242 Ridge Lea Rd.

Suite 28

Buffalo, New York

USA 14226

T: 716.835.4903

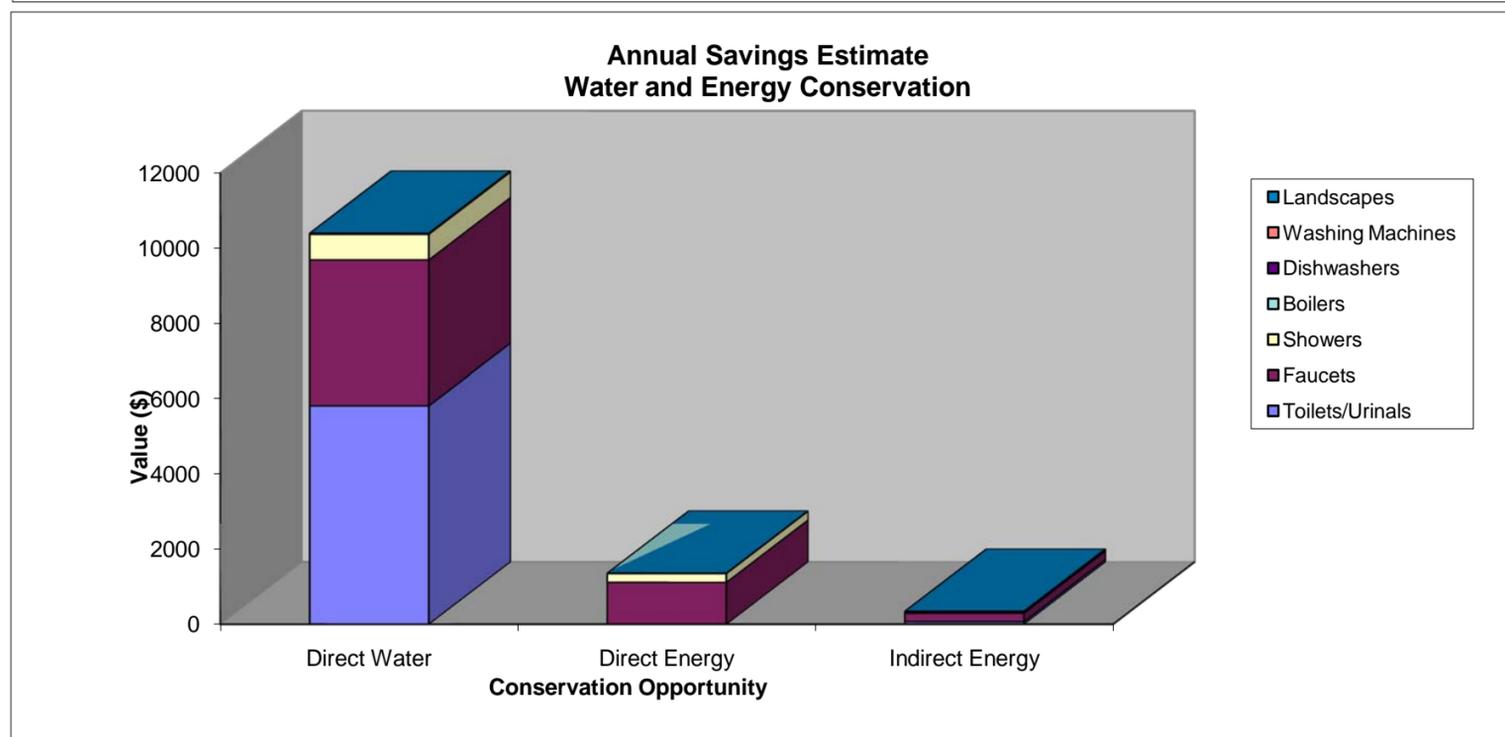
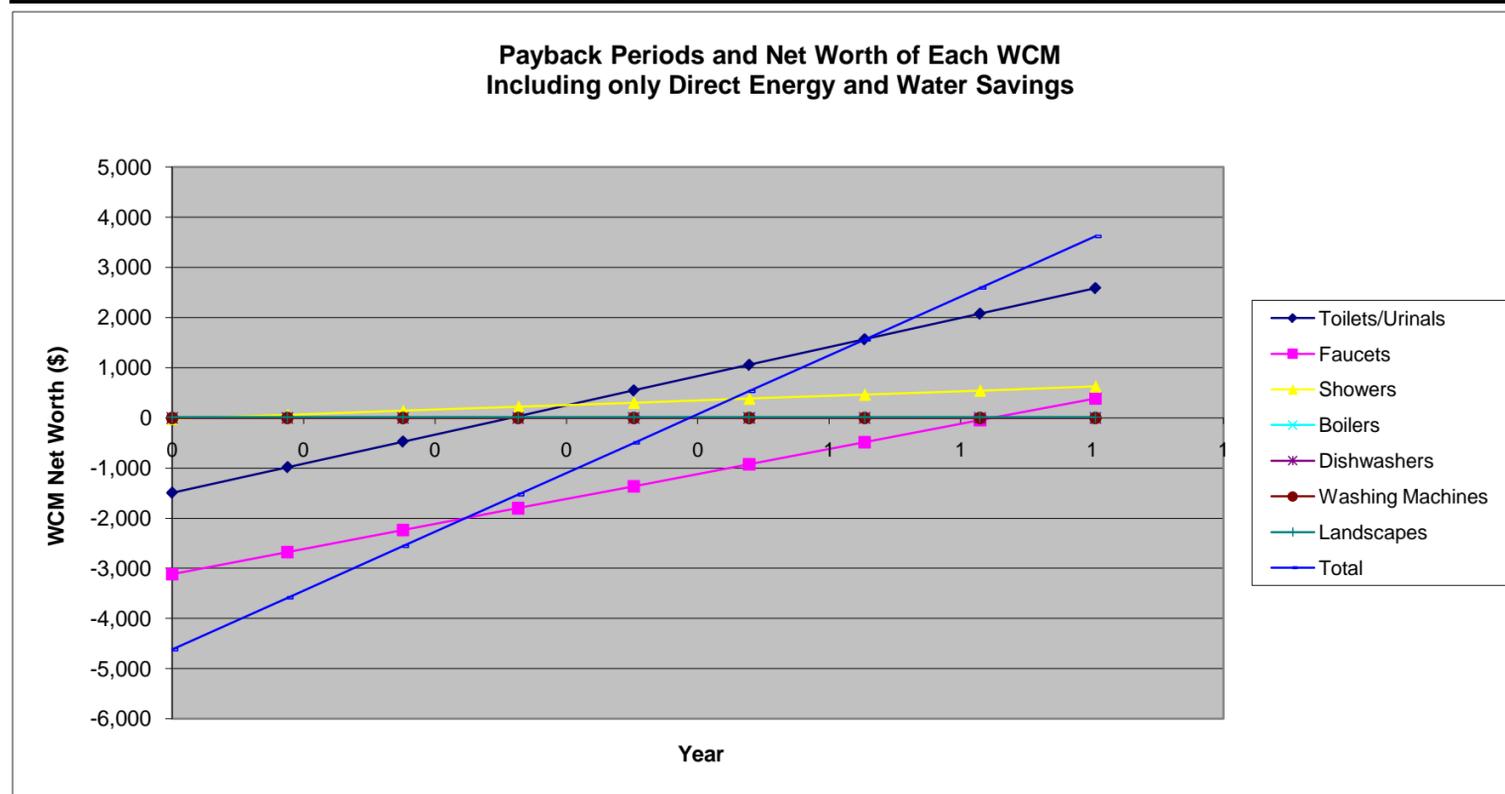
F: 716.835.4904

E: [solarwallUSA@solarwall.com](mailto:solarwallUSA@solarwall.com)

W: [www.solarwall.com](http://www.solarwall.com)

### Water Conservation & LCCA

Conservation Method	Number of Installations	Total Initial Cost (\$)	Annual Savings (\$)			Payback Period* (yrs) <i>Includes Direct Energy Only</i>
			Direct Water	Direct Energy	Indirect Energy	
Installation of ULF toilets and ULF urinals	46	\$1,496	\$5,815	\$0	\$67	0.26
Installation of automatic faucets	50	\$2,400	\$5,131	\$1,475	\$299	0.36
Installation of faucet aerators	55	\$715	\$308	\$89	\$18	1.80
Low Flow showerhead	2	\$20	\$683	\$236	\$46	0.02
Boiler blowdown optimization	3	\$0	\$0	\$4	\$0	0.00
Efficient dishwashers	2	\$0	\$0	\$0	\$0	#N/A
Efficient washing machines	1	\$0	\$0	\$0	\$0	#N/A
Landscape irrigation optimization	#N/A	\$12	\$23	\$0	\$0	Annual
<b>Total (excluding Landscape)</b>		<b>\$4,631</b>	<b>\$11,936</b>	<b>\$1,804</b>	<b>\$430</b>	<b>0.34</b>



**Implementation Questions**

Do you want to look at Waterless or Low-Flow urinals?

2	1=WATERLESS 2=LOW FLOW
---	---------------------------

Do you want to look at faucet replacement (with IR sensed faucets) or aerators only for restroom faucets?

2	1=AERATORS ONLY 2=FAUCET
---	-----------------------------

**Target Usage for Conserving Plumbing Fixtures**

ULF Toilet	1.2	Gallons per flush
ULF Urinal	0.4	Gallons per flush
Waterless Urinal	0.001	Gallons per use ( <i>uses just 2-3 gallons HOT water for cleaning, every 8500 uses</i> )
Faucet	0.5	Gallons per minute
Showerhead	2.0	Gallons per minute
Dishwasher	8.5	Gallons per load
Washing Machine	30.0	Gallons per load
Faucet Aerator	2.0	Gallons per minute

**Assumptions**

Hot Water Heating	0.2	kWh/gallon for Electrical hot water heaters
	0.5	cf gas/gallon for natural gas hot water heaters
Faucet	50%	of usage is hot water
Shower	60%	of usage is hot water
Dishwasher	100%	of usage is hot water
Wash Machine	25%	of usage is hot water
Leaks	10%	of usage is hot water
Water Treatment	0.58	kWh / 1,000 gallons treated - Indirect savings
UAF Gas	2.1%	of natural gas unaccounted for - Indirect savings
WW elec	2.85	kWh / 1,000 gallons treated - Indirect savings
Line Losses	14%	of Electricity lost in transmission - Indirect savings
IR Sensed Faucet	0.17	minutes per use
Heat in Boiler	362	Btu/lb - estimate
Heat of Nat gas	1,040	Btu/cf
Heat of Fuel oil	145,000	Btu/gal
Boiler Efficiency	70%	Default - 95% for electric, 80% for gas/oil 20 years or less, 70% for all others
Faucet Cleaning Use	50%	of non-restroom faucets' usage for cleaning (i.e. bucket filling) or other uses that will not be reduced by an aerator.
Landscape Savings	50%	of water reduced using ET watering techniques
Blowdown Reduction	20%	of Boiler blowdown reduced through process optimization
Heat of Electricity	3412	Btu=1 kWh
One Year	260	days (total work days assumed, not total calendar days)

**Cost Information**

	<u>Equipment</u>	<u>Labor</u>	<u>Total</u>
ULF Toilet (Incremental Cost diff)	\$30	\$2	\$32
ULF Urinal (Incremental Cost diff)	\$30	\$5	\$35
Waterless Urinals	\$500	\$125	\$625
Aerators	\$8	\$5	\$13
Sensored Faucets	\$40	\$8	\$48
Showerheads	\$8	\$2	\$10
Leak Detection			\$0
Once Thru Conversion			\$0
Cooling Water Reduction			\$0
Blowdown Reduction			\$0
Lawn Sprinkling reduction			50% of water savings value
Washing Machine	\$400	\$25	\$425
Dishwasher	\$250	\$75	\$325

*SAVEnergy Action Plans*

**Attachment A - Water**

Prepared By:	Anup S Khatra (AKAL Eng)		
Agency:			
Facility:	Sherwood M. School		
Contact Name:			
Address:	30 Sherwood AVE		
City:	Shrewsbury	State: MA	Zip:
Phone/Fax:			
Date of Audit:			
Buildings included in Survey:	School		
Water Provider(s):	Shrewsbury		
Number of Water Meters:	0		
Account/Meter Numbers:	N/A		

**DOMESTIC WATER USE**

**Toilets**

	Base Case	Fixture Type	GPF	Count	User Count		GPX	GPD
					Female	Male		
1	P-1 & 1A	valve	1.6	38	450	450	75.78947368	2880
2							0	0
3							0	0
4							0	0
5							0	0
6							0	0
							Total GPD=	<u>2880</u>

Calculations:

GPF=Gallons per flush, estimated or measured  
 GPD=GPF x (3 x Female Count + 1 x Male Count)  
 = Average gallons per day for all toilets  
 GPX=GPD/Fixture Count  
 =Average gallons per day per fixture

**Urinals**

	Base Case	Fixture Type	GPF	Count	User Count		GPX	GPD
					Female	Male		
1	P-2	valve	1.00	8		450	112.5	900
2							0	0
3							0	0
4							0	0
5							0	0
							Total GPD=	<u>900</u>

Calculations:

GPD=GPF x (2 x Male Count)  
 =Average gallons per day urinals

**Lavatory Sinks**

	Base Case	Fixture Type	GPM	Count	User Count		Wash duration (min.)	GPD
					Female	Male		
1	P-3 & 3A	Faucet	2	50	450	450	0.17	1071
2							0.17	0
3							0.17	0
4							0.17	0
5							0.17	0
							Total Hand Washing GPD=	<u>1071</u>

Assume 3 hand washings per 8 hour work day per male, 4 per female.  
 Unless otherwise indicated, assume 10 sec. of flow per hand washing.

Calculations:

GPM=Measured gallons per minute of faucet flow  
 GPD= 0.17 GPM x (3 x Male Count + 4 x Female Count)  
 =Average gallons per day for hand washing

**Other Sinks (janitor's closet, laundry, kitchen, etc.)**

Base Case	Fixture Type	GPM	Count	Avg. time on Daily	GPD
1	Classrom Sink	2.2	54	8 min.	950.4
2	Service	3	1	10 min.	30
3	Kitchen	2	1	15 min.	30
4				min.	0
Total Non-Lavatory Washing GPD:					<u>1010.4</u>

Calculations:

$$\text{GPD} = \text{Time On} \times \text{GPM} \times \text{Fixture Count}$$

=Average gallons per day for other sink use.

**Showers**

Location:	GPM	Count	Avg. Use per Day	daily GPD
1 Moen Dtchble	2.5	1	120 min.	300
2 Moen Dtchble	2.5	1	180 min.	450
3			min.	0
4			min.	0
Total GPD=				<u>750</u>

**Known Leaks**

Location:	GPM	Count	Avg. Time On	daily GPD
1 None	1	5	2 min.	10
2			min.	0
3			min.	0
4			min.	0
Total GPD=				<u>10</u>

Calculations:

$$\text{GPD} = \text{Time on} \times \text{GPM} \times \text{Fixture Count}$$

=Average gallons per day for leaks

**PLANT COOLING AND HEATING**

**Cooling Towers**

Number: [REDACTED]  
 Age: [REDACTED] years  
 Size: [REDACTED]  
 % Blow down: [REDACTED] % Make-up [REDACTED]  
 Water Treatment Method: [REDACTED]

**Evaporative Coolers**

Number: [REDACTED]  
 Age: [REDACTED] years

**Air Washers**

Description: [REDACTED]

**Humidifiers**

Description: [REDACTED]

**Boilers**

Number: 3  
 Age: 21 years  
 Fuel Source: 2 <<<<<<<<< ENTER < 

1	Electricity
2	Nat. Gas
3	Fuel Oil

  
 Size: 0  
 Lbs. Steam/hr. 0.1  
 Pressure: 200 psi  
 % Condensate return: 100% % Boiler Blow-down: 2%

**Pumps**

Number: [REDACTED]  
 Age: [REDACTED] years  
 Size: [REDACTED] hp

**ONCE-THROUGH COOLING**

**Air Conditioners**

Number of Units: [REDACTED]  
 Age: [REDACTED] years  
 Size: [REDACTED] tons 0 gallons

**Other Once Through**

[REDACTED]

**OTHER**

	Quantity	Uses/day	Gallons/use	Total Usage per day
<i>Dishwashers</i>	2	2	4	<u>16</u> gal
<i>Washing Machines</i>	1	2	5	<u>10</u> gal
				<u>26</u> gal

**LANDSCAPE AND DECORATIVE USES**

	Square Ft	Acres	Ft water/acre/yr	Acre-ft/yr
<i>Turf Area (square feet)</i>	50	<u>0.0011364</u>	10	<u>0.0113636</u>
<i>Landscaped Area (square feet)</i>	0	<u>0</u>	10	<u>0</u>

**SUMMARY**

**TOTAL DAILY DOMESTIC WATER USAGE:**      6647 gal/day      *\*does not include boiler use or landscape use.*

**TOTAL ANNUAL DOMESTIC WATER USAGE:**      1,728,324 gal/yr      *\*assumes 260 operational days per year (see Inputs & Assumptions sheet to change).*

**DESIGN DEVELOPMENT**

**8. ESTIMATED ELECTRICAL LOAD**

	SF	VA/sf	Connected kVA	Demand Factor	Demand kVA
	130,000				
Interior Lighting		0.70	91.0	1.25	113.8
Exterior Lighting			5.0	1.25	6.3
Elevators			30.0	1.00	30.0
Computer Receptacles		1.00	130.0	1st 10kVA	10.0
				Remainder 50%	60.0
General Purpose Receptacles		0.50	65.0	1st 10kVA	10.0
				Remainder 50%	27.5
Miscellaneous Loads		1.00	130.0	1st 10kVA	10.0
				Remainder 50%	60.0
Kitchen			75.0	0.65	48.8
HVAC Loads (Cooling)					
AHU-1			7.5	0.80	6.0
AHU-2			12.5	0.80	10.0
AHU-3			18.0	0.80	14.4
AHU-4			35.0	0.80	28.0
RTU-1			8.0	0.80	6.4
RTU-2			50.0	0.80	40.0
RTU-3			46.0	0.80	36.8
RTU-4			34.0	0.80	27.2
RTU-5			24.0	0.80	19.2
RTU-6			59.0	0.80	47.2
RTU-7			43.0	0.80	34.4
RTU-8			10.0	0.80	8.0
RTU-9			10.0	0.80	8.0
RTU-10			7.0	0.80	5.6
RTU-11			8.0	0.80	6.4
Exhaust Fans			5.0	0.80	4.0
Pumps P-1, P-2			25.0	1.00	25.0
Boilers			5.0	1.00	5.0
Ancillary AC Units			10.0	0.80	8.0
					<b>715.9</b>
Future Capacity 25%					179.0
					<b>894.8</b>
<b>Power Factor</b>		<b>0.9</b>			
<b>Load in kVA</b>			<b>895 kVA</b>		
<b>Total Load Current 277Y/480V</b>			<b>1,077 A</b>		
<b>Estimated Service Size</b>			<b>1600 A</b>		

**Sherwood Middle School**  
Sherwood Avenue, Shrewsbury, MA 01545

**DESIGN DEVELOPMENT**

**9. COST ESTIMATE UPDATE**

---

**Sherwood Middle School**  
**Shrewsbury, MA**

2-Aug-10

**Design Development**  
GRAND SUMMARY

<b>BASE ESTIMATE</b>		<b>\$27,027,356</b>
		-----
	TOTAL DIRECT COST	\$27,027,356
PRECONSTRUCTION SERVICE		N/A
GENERAL CONDITIONS	GILBANE	\$2,806,715
GENERAL REQUIREMENTS	GILBANE	\$1,028,725
FEE	GILBANE	\$407,000
P&P BOND	0.0%	\$0
PERMIT	0.0%	\$0
DESIGN CONTINGENCY	5%	\$1,563,490
ESCALATION ( Feb 2011)	2%	\$656,666
		-----
	TOTAL CONSTRUCTION COST	\$33,489,951
	COST PER S.F.	\$258.85

PROJECT: Sherwood Middle School  
 LOCATION: Shrewsbury, MA  
 CLIENT: Lamoureux Pagano Associates Architects  
 DATE: 02-Aug-10

NO. OF SQ. FT.: 129,939  
 COST PER SQ. FT.: \$208.00

No.: 08108

**SUMMARY**

	<u>TOTAL</u>	<u>PERCENT OF PROJECT</u>	<u>COST PER SF</u>
<b>A. SUBSTRUCTURE</b>			
A10 - FOUNDATIONS			
A1010 STANDARD FOUNDATIONS	1,243,477	5%	9.57
A1020 SPECIAL FOUNDATIONS	0	0%	0.00
A1030 SLAB ON GRADE	392,297	1%	3.02
A20 - BASEMENT CONSTRUCTION			
A2010 BASEMENT EXCAVATION	0	0%	0.00
A2020 BASEMENT WALLS	0	0%	0.00
<b>B. SHELL</b>			
B10 - SUPERSTRUCTURE			
B1010 FLOOR CONSTRUCTION	1,333,437	5%	10.26
B1020 ROOF CONSTRUCTION	888,273	3%	6.84
B20 - EXTERIOR ENCLOSURE			
B2010 EXTERIOR WALLS	2,809,883	10%	21.62
B2020 EXTERIOR WINDOWS	674,415	2%	5.19
B2030 EXTERIOR DOORS	54,180	0%	0.42
B30 - ROOFING			
B3010 ROOF COVERINGS	877,438	3%	6.75
B3020 ROOF OPENINGS	2,500	0%	0.02
<b>C. INTERIORS</b>			
C10 - INTERIOR CONSTRUCTION			
C1010 PARTITIONS	1,587,391	6%	12.22
C1020 INTERIOR DOORS	476,886	2%	3.67
C1030 FITTINGS	653,422	2%	5.03
C20 - STAIRS			
C2010 STAIR CONSTRUCTION	174,780	1%	1.35
C2020 STAIR FINISHES	22,938	0%	0.18
C30 - INTERIOR FINISHES			
C3010 WALL FINISHES	797,142	3%	6.13
C3020 FLOOR FINISHES	982,565	4%	7.56
C3030 CEILING FINISHES	498,272	2%	3.83
<b>D. SERVICES</b>			
D10 - CONVEYING			
D1010 ELEVATORS & LIFTS	117,500	0%	0.90
D1010 ESCALATORS & MOVING WALKS	0	0%	0.00
D1090 OTHER CONVEYING SYSTEMS	0	0%	0.00
D20 - PLUMBING			
D2010 PLUMBING	1,095,805	4%	8.43

Sherwood Middle School

	<u>TOTAL</u>	<u>PERCENT OF PROJECT</u>	<u>COST PER SF</u>
<b>D30 - HVAC</b>			
D3010 ENERGY SUPPLY	878,125	3%	6.76
D3030 COOLING GENERATING SYSTEMS	20,000	0%	0.15
D3040 DISTRIBUTION SYSTEMS	1,329,568	5%	10.23
D3050 TERMINAL & PACKAGE UNITS	123,750	0%	0.95
D3060 CONTROLS AND INSTRUMENTATION	389,817	1%	3.00
D3070 SYSTEMS TESTING & BALANCING	139,460	1%	1.07
D3090 OTHER HVAC SYSTEMS & EQUIPMENT	0	0%	0.00
<b>D40 - FIRE PROTECTION</b>			
D4010 SPRINKLERS	493,166	2%	3.80
D4020 STANDPIPES	0	0%	0.00
D4030 FIRE PROTECTION SPECIALTIES	0	0%	0.00
D4090 OTHER FIRE PROTECTION SYSTEMS	0	0%	0.00
<b>D50 - ELECTRICAL</b>			
D5010 ELECTRICAL SERVICE & DISTRIBUTION	1,298,350	5%	9.99
D5020 LIGHTING & BRANCH WIRING	643,109	2%	4.95
D5030 COMMUNICATION & SECURITY	813,187	3%	6.26
D5090 OTHER ELECTRICAL SYSTEMS	129,551	0%	1.00
<b>E. EQUIPMENT &amp; FURNISHINGS</b>			
<b>E10 - EQUIPMENT</b>			
E1010 COMMERCIAL EQUIPMENT	467,000	2%	3.59
E1020 INSTITUTIONAL EQUIPMENT	0	0%	0.00
E1030 VEHICULAR EQUIPMENT	0	0%	0.00
E1090 OTHER EQUIPMENT	191,950	1%	1.48
<b>E20 - FURNISHINGS</b>			
E 2010 FIXED FURNISHINGS	847,521	3%	6.52
E2020 MOVABLE FURNISHINGS	0	0%	0.00
<b>F. SPECIAL CONSTRUCTION &amp; DEMOLITION</b>			
<b>F10 - SPECIAL CONSTRUCTION</b>			
F1010 SPECIAL STRUCTURES	0	0%	0.00
F1020 INTEGRATED CONSTRUCTION	0	0%	0.00
F1030 SPECIAL CONSTRUCTION SYSTEMS	0	0%	0.00
F1040 SPECIAL FACILITIES	0	0%	0.00
F1050 SPECIAL CONTROLS & INSTRUMENTATION	0	0%	0.00
<b>F20 - SELECTIVE BUILDING DEMOLITION</b>			
F2010 BUILDING ELEMENTS DEMOLITION	394,000	1%	3.03
F2020 HAZARDOUS COMPONENTS ABATEMENT	575,000	2%	4.43
<b>G. BUILDING SITEWORK</b>			
<b>G10 - SITE PREPARATION</b>			
G1010 SITE CLEARING	61,186	0%	0.47
G1020 SITE DEMOLITION & RELOCATIONS	219,253	1%	1.69
G1030 SITE EARTHWORK	344,508	1%	2.65
G1040 HAZARDOUS WASTE REMEDIATION	0	0%	0.00
<b>G20 - SITE IMPROVEMENTS</b>			
G2010 ROADWAYS	737,718	3%	5.68
G2020 PARKING LOTS	0	0%	0.00
G2030 PEDESTRIAN PAVING	214,210	1%	1.65
G2040 SITE DEVELOPMENT	278,410	1%	2.14

Sherwood Middle School

	<u>TOTAL</u>	<u>PERCENT OF PROJECT</u>	<u>COST PER SF</u>
G2050 LANDSCAPING	578,942	2%	4.46
G30 - SITE MECHANICAL UTILITIES			
G3010 WATER SUPPLY	76,877	0%	0.59
G3020 SANITARY SEWER	79,212	0%	0.61
G3030 STORM SEWER	913,110	3%	7.03
G3040 HEATING DISTRIBUTION	0	0%	0.00
G3050 COOLING DISTRIBUTION	0	0%	0.00
G3060 FUEL DISTRIBUTION	22,500	0%	0.17
G3090 OTHER SITE MECHANICAL UTILITIES	0	0%	0.00
G40 - SITE ELECTRICAL UTILITIES			
G4010 ELECTRICAL DISTRIBUTION	77,275	0%	0.59
G4030 SITE COMMUNICATIONS & SECURITY	8,000	0%	0.06
G4090 OTHER SITE ELECTRICAL UTILITIES	0	0%	0.00
G90 - OTHER SITE CONSTRUCTION			
G9010 SERVICE AND PEDESTRIAN TUNNELS	0	0%	0.00
G9090 OTHER SITE SYSTEMS	0	0%	0.00
TOTAL DIRECT COST	----- 27,027,356	----- 100%	----- 208.00

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
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**A. SUBSTRUCTURE****A10 - FOUNDATIONS**

## A1010 STANDARD FOUNDATIONS

## Int. Wall Footing 2' x 1' :

4000 psi, NW, (incl. placement)	8	CY	132.00	1,056
Formwork	212	SFCA	6.00	1,272
Rebar (2.25 lbs/cf)	486	LBS	0.98	476
<i>*unit cost \$350.54</i>				

## Wall Footing 3' x 1' :

4000 psi, NW, (incl. placement)	158	CY	132.00	20,856
Formwork	2,844	SFCA	6.00	17,064
Rebar (2.25 lbs/cf)	9,599	LBS	0.98	9,407
<i>*unit cost \$299.54</i>				

## Stepped Wall Footing 3' x 1' :

4000 psi, NW, (incl. placement)	3	CY	132.00	396
Formwork	48	SFCA	12.00	576
Rebar (2.5 lbs/cf)	203	LBS	0.98	199
<i>*unit cost \$390.31</i>				

## Retaining Wall Footing (1'-6" thick)

4000 psi, NW, (incl. placement)	268	CY	132.00	35,376
Formwork	2,078	SFCA	16.00	33,248
Rebar (3 lbs/cf)	21,708	LBS	0.98	21,274
<i>*unit cost \$335.44</i>				

## Column Footing ( as shown 64 ea):

4000 psi, NW, (incl. placement)	140	CY	132.00	18,480
Formwork	2,372	SFCA	8.00	18,976
Rebar (3 lbs/cf)	11,340	LBS	0.98	11,113
<i>*unit cost \$346.92</i>				

## Column Footing ( allow not shown 18 ea):

4000 psi, NW, (incl. placement)	22	CY	132.00	2,904
Formwork	480	SFCA	8.00	3,840
Rebar (3 lbs/cf)	1,782	LBS	0.98	1,746
<i>*unit cost \$385.93</i>				

## Column Pier ( 4'-8'high):

4000 psi, NW, (incl. placement)	6	CY	140.00	840
Formwork	320	SFCA	8.00	2,560
Rebar (3 lbs/cf)	486	LBS	0.98	476
<i>*unit cost \$646.05</i>				

## Column Pier ( 10'-14' high):

4000 psi, NW, (incl. placement)	3	CY	136.00	408
Formwork	712	SFCA	8.00	5,696
Rebar (3 lbs/cf)	243	LBS	0.98	238

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<i>*unit cost \$2,114.05</i>				
Tie beam 2' thick x 1' high: 4000 psi, NW, (incl. placement)	15	CY	136.00	2,040
Formwork	412	SFCA	16.00	6,592
Reinforcing steel (3.5 lbs/cf)	1,418	LBS	0.98	1,390
<i>*unit cost \$668.11</i>				
Tie beam 1' 8" thick x 7' high: 4000 psi, NW, (incl. placement)	13	CY	136.00	1,768
Formwork	406	SFCA	16.00	6,496
Reinforcing steel (3.5 lbs/cf)	1,229	LBS	0.98	1,204
<i>*unit cost \$728.34</i>				
Foundation Retaining Wall 1'-8" thick x 15-18' high: 4000 psi, NW, (incl. placement)	425	CY	136.00	57,800
Formwork	13,759	SFCA	16.00	220,144
Waterstop	456	LF	9.00	4,104
Reinforcing steel (3.75 lbs/cf)	43,031	LBS	0.98	42,170
<i>*unit cost \$762.87</i>				
Foundation Frost Wall 1-4" x 4'- 8' deep: 4000 psi, NW, (incl. placement)	328	CY	136.00	44,608
Formwork	13,269	SFCA	9.00	119,421
Brick Shelf	1,427	LF	12.00	17,124
Reinforcing steel (3.5 lbs/cf)	30,996	LBS	0.98	30,376
<i>*unit cost \$644.91</i>				
Foundation Interior 12" x 3' deep: 4000 psi, NW, (incl. placement)	12	CY	142.00	1,704
Formwork	654	SFCA	9.00	5,886
Reinforcing steel (3 lbs/cf)	972	LBS	0.98	953
<i>*unit cost \$711.88</i>				
Loading Dock Wall 1'x8' High: 4000 psi, NW, (incl. placement)	7	CY	136.00	952
Formwork	384	SFCA	9.00	3,456
Reinforcing steel (3.5 lbs/cf)	567	LBS	0.98	556
<i>*unit cost \$709.09</i>				
Foundation Stepped Frost Wall 1-4" x 10' deep Avg.: 4000 psi, NW, (incl. placement)	19	CY	136.00	2,584
Formwork	620	SFCA	9.00	5,580
Brick Shelf	31	LF	12.00	372
Reinforcing steel (2.7.5 lbs/cf)	1,411	LBS	0.98	1,383
<i>*unit cost \$522.04</i>				
Foundation Stepped Frost Wall 1-4" x 14' deep Avg.: 4000 psi, NW, (incl. placement)	42	CY	136.00	5,712
Formwork	1,353	SFCA	9.00	12,177
Brick Shelf	48	LF	12.00	576
Reinforcing steel (4 lbs/cf)	4,536	LBS	0.98	4,445
<i>*unit cost \$545.48</i>				

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Found. wall beam seat	37	EA	35.00	1,295
Elevator Mat	4	CY	575.00	2,300
Elevator Pit Wall	5	CY	650.00	3,250
Pilaster - pilaster	20	CY	850.00	17,000
Equipment pads	1	LS	4,000.00	4,000
Thermal and Moisture:				
Dampproof frost wall	7,621	SF	1.75	13,337
Waterproof ground floor wall	6,888	SF	6.75	46,494
Elev. pit waterproofing	1	LS	3,850.00	3,850
3" Rigid found. insul	14,509	SF	2.95	42,802
Earthwork:				
Building Cut	2,697	CY	10.00	26,970
Structural fill	5,017	CY	22.00	110,374
Excavate Foundation	2,000	CY	6.00	12,000
Backfill Foundation (on site mat'l)	2,800	CY	6.00	16,800
Dispose of spoil (non haz.unlined landfill)	2,697	CY	15.00	40,455
Foundation drains	1	LS	25,000.00	25,000
Ledge Removal	1,500	CY	45.00	67,500
				-----
				1,243,477
A1020 SPECIAL FOUNDATIONS				
		NOT USED		
				-----
				0
A1030 SLAB ON GRADE				
5" Slab on grade	56,508	SF	3.30	186,476
2" Rigid Slab Insul.	56,508	SF	2.15	121,492
18 Mil poly	56,508	SF	0.65	36,730
12" Gravel base	2,096	CY	21.00	44,016
Thicken slab @ col. ftg	18	CY	135.00	2,430
Loading dock slab	192	SF	6.00	1,152
				-----
				392,297
<b>TOTAL A10 FOUNDATIONS</b>				<b>1,635,774</b>

**B. SHELL**

**B10 - SUPERSTRUCTURE**

B1010 FLOOR CONSTRUCTION

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Pedestrian Bridge:				
Structural slab	317	SF	25.00	7,925
Wide flange floor fry	285	TONS	2,200.00	627,000
TS columns (2 lbs/sf)	63	TONS	2,450.00	154,350
TS brace frame	11.5	TONS	2,600.00	29,900
3" x 18 Ga comp deck	71,533	SF	2.37	169,533
5 1/2" NW deck fill	62,733	SF	3.40	213,292
7 1/2" Deck fill - gym	8,800	SF	4.20	36,960
Shear studs	6,270	EA	5.10	31,977
Moment connections	100	EA	625.00	62,500
				-----
				1,333,437

**B1020 ROOF CONSTRUCTION**

LH bar joist	35.2	TONS	1,900.00	66,880
Type K bar joist	21.3	TONS	1,850.00	39,405
Truss A (100 LF)	4	TONS	2,500.00	10,000
Girder (308 LF)	12	TONS	2,500.00	30,000
Wide flange beam	161	TONS	2,200.00	354,200
TS column (2 lbs/sf)	57	TONS	2,200.00	125,400
Galv. RTU dunnage	10	TONS	3,100.00	31,000
TS Roof screen support	6	TONS	3,850.00	23,100
3"x18 Ga. acoustical roof deck - band rm	1,950	SF	5.50	10,725
3"x18 Ga. acoustical roof deck - gym	8,900	SF	5.50	48,950
1 1/2"x20 Ga. roof deck	44,864	SF	2.10	94,214
3" x 18 Ga comp deck	2,400	SF	2.35	5,640
5 1/2" NW deck fill	2,400	SF	3.40	8,160
Shear studs	240	EA	5.10	1,224
Moment connections	63	EA	625.00	39,375
				-----
				888,273

<b>TOTAL B10 SUPERSTRUCTURE</b>				<b>2,221,711</b>
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**B20 - EXTERIOR ENCLOSURE**

**B2010 EXTERIOR WALLS**

Back-up:				
8" x 16 Ga. stud @ 16" oc typ	38,946	SF	7.50	292,095
8" x 16 Ga stud @ class parapet 1'6"	1,600	SF	7.25	11,600
Furring @ solar panel	3,457	SF	1.70	5,877
12"x16 Ga stud - gym	6,490	SF	9.50	61,655
12"x16 Ga stud - gym parapet	2,018	SF	9.50	19,171

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
6" Ext. ceiling frame	2,473	SF	3.70	9,150
6" Ext. soffit frame	919	SF	9.00	8,271
3" Stud at soffit and Collector end and cap	839	SF	6.00	5,034
OH door frame	3	EA	350.00	1,050
Masonry Veneer:				
Precast - water table	3,898	SF	45.00	175,410
Water table cap	1,098	LF	55.00	60,390
Brick water table cap - sgl	88	LF	50.00	4,400
Pre Cast veneer @ covered entry	508	SF	45.00	22,860
Solar Wall:				
Relieving angle	63	LF	75.00	4,725
Perforated solar collector	3,457	SF	27.00	93,339
Solar Panel collector end panel and cap	839	SF	27.00	22,653
Metal Wall Panels:				
2 3/4" Metal backup panel	42,711	SF	20.00	854,220
PP-A profile finish	5,358	SF	16.50	88,407
PP-B profile finish	13,344	SF	16.50	220,176
PP-C profile finish	13,673	SF	16.50	225,605
3 3/4" Finished metal panel	11,132	SF	37.00	411,884
Adhered perimeter flashing	5,500	LF	7.25	39,875
Misc.:				
Roof Screen Panel - allow	2,000	SF	28.00	56,000
Roof screen cap - allow	395	LF	25.00	9,875
EIFS ext. ceiling	2,473	SF	18.00	44,514
Column Covers (10 EA)	104	VLF	145.00	15,080
Misc Sealants	1	LS	25,000.00	25,000
Masonry Wall flashing	1,186	LF	9.50	11,267
Alum louvers	1	LS	5,000.00	5,000
Exterior painting	1	LS	5,000.00	5,000
Loading dock bumper	12	LF	25.00	300
				-----
				2,809,883
B2020 EXTERIOR WINDOWS				
4 1/2" Alum. window A-G	3,828	SF	52.00	199,056
6" Alum. storefront J-L	6,337	SF	61.00	386,557
6" Alum. storefront - segmented	540	SF	61.00	32,940
Aluminum sun shade - allow		NIC		
7 1/2" P.T. - perm blocking	5,386	LF	4.50	24,237
Exterior sealants	5,500	LF	5.75	31,625
				-----
				674,415
B2030 EXTERIOR DOORS				

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Alum. Doors (Incl. Hardware):				
Alum. Entry Door - DBL	6	PR	5,900.00	35,400
Alum. Entry w/ Sidelight - SGL	2	EA	4,000.00	8,000
*Storefront system included w/B2020				
Insulated Metal Doors (Incl. Hardware):				
Loading Dock - SGL	1	EA	800.00	800
Mech Rm - SGL w/transom	1	EA	1,200.00	1,200
Roof access - sgl	1	EA	70.00	70
Paint HM door - sgl	3	EA	70.00	210
Overhead Door - 8x10	1	EA	2,500.00	2,500
Overhead Door - 10x11	2	EA	3,000.00	6,000
				-----
				54,180
<b>TOTAL B20 - EXTERIOR ENCLOSURE</b>				<b>3,538,478</b>

**B30 - ROOFING**

B3010 ROOF COVERINGS

Vapor retarder 3 ply	58,114	SF	1.65	95,888
TPO roof w/4" rigid insul & prot bd	58,114	SF	9.50	552,083
Tapered insulation - premium	14,500	SF	3.50	50,750
Membrane flashing/walkway pads	1	LS	30,000.00	30,000
Roof blocking	2,136	LF	12.50	26,700
Wpg w/pavers @ ped bridge	317	SF	30.00	9,510
Guardrail @ ped bridge	25	LF	175.00	4,375
Parapet membrane	2,345	SF	2.75	6,449
Parapet sheathing	2,345	SF	2.30	5,394
Alum. Clad Trim & Flashing:				
Radius roof edge	88	LF	35.00	3,080
Parapet cap - class	1,137	LF	26.00	29,562
Parapet cap - gym	307	LF	28.00	8,596
Gravel stop	604	LF	18.00	10,872
Base flashing	475	LF	32.00	15,200
Roof drain		w/Plumbing		
Scupper	18	EA	450.00	8,100
Exp. jt	40	LF	75.00	3,000
Galv. roof ladder (3 EA)	24	VLF	120.00	2,880
Misc. metal flashing	1	LS	15,000.00	15,000
				-----
				877,438

B3020 ROOF OPENINGS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Elevator vent	1	LS	2,500.00	2,500
				----- 2,500
<b>TOTAL B30 ROOFING</b>				<b>879,938</b>

**C. INTERIORS**

**C10 - INTERIOR CONSTRUCTION**

C1010 PARTITIONS

Carpentry:

Interior Blocking	129,939	GSF	0.35	45,479
Misc. Rough Carpentry	129,939	GSF	0.50	64,970

Firestopping	129,939	GSF	0.35	45,479
Joint sealants	129,939	GSF	1.20	155,927

CMU Partitions:

Elevator Shaft	1,344	SF	14.00	18,816
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Drywall Partitions:

1 lyr 5/8" at exterior	49,109	SF	1.80	88,396
Corridor partition	39,293	SF	8.00	314,344
F6A stair hall partition	4,546	SF	7.50	34,095
S4A typical partition	15,423	SF	7.25	111,817
Plumbing/chase - 1 side	5,979	SF	5.50	32,885
S10A gymnasium part.	3,997	SF	13.50	53,960
F4C 2 hr part.	1,247	SF	13.00	16,211
Furr and gyp foundation		N/A		
S4H @ music rm	1,856	SF	15.00	27,840
S4H @ expansion	685	SF	15.00	10,275
S4J @ mech rm	805	SF	16.00	12,880
S4J @ music rm	908	SF	16.00	14,528
S4G class separation	27,046	SF	8.50	229,891
Sim. S4G class sep/box column	1,288	SF	8.50	10,948
Furr elev CMU shaft	747	SF	4.50	3,362
S4F stair hall chase 1 side	3,490	SF	6.75	23,558
Music/locker rm partition 20'	5,715	SF	8.00	45,720
Music/locker rm chase partitions 20'	1,827	SF	6.00	10,962
S4A bulkhead @ storefront	717	SF	7.25	5,198
S10A gym	3,997	SF	12.00	47,964
Box corridor col/locker end wall	3,870	SF	5.00	19,350

Misc. drywall assemblies	129,939	GSF	1.00	129,939
Abuse res. gyp prem. PE/platform	14,000	SF	0.90	12,600

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1,587,391

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<b>C1020 INTERIOR DOORS</b>				
<b>H.M. Frames:</b>				
Cased opening	2	EA	250.00	500
Door Frame - SGL	200	EA	235.00	47,000
Door Frame - Dbl	32	EA	245.00	7,840
Sidelight frame - Type B	59	EA	420.00	24,780
Gym office window - 4'	32	SF	32.00	1,024
Kitchen office window 4'	52	SF	32.00	1,664
Café sidelite 7'	49	SF	32.00	1,568
Media ctr sidelite 7'	35	SF	32.00	1,120
Office sidelite 7'	70	SF	32.00	2,240
<b>Hollow Metal Door:</b>				
M1-sgl	19	EA	245.00	4,655
M1-dbl	10	EA	490.00	4,900
2 Hr. M1-sgl	2	EA	265.00	530
M2 dbl	3	EA	530.00	1,590
1 Hr M2-sgl	3	EA	310.00	930
1Hr M2-dbl	9	EA	620.00	5,580
M3-sgl	1	EA	420.00	420
M3-dbl	8	EA	840.00	6,720
<b>Wood Door (Prefinished):</b>				
W1-sgl	174	EA	270.00	46,980
W1-dbl	2	EA	540.00	1,080
W3-sgl	1	EA	400.00	400
<b>Specialty Doors:</b>				
9' Overhead coiling door at Café (4 ea)	396	SF	65.00	25,740
Access Panels	1	LS	15,000.00	15,000
<b>Finish Hardware:</b>				
Stair Hall - SGL	4	EA	1,800.00	7,200
Stair Hall - DBL	11	EA	2,700.00	29,700
Corridor -DBL	7	EA	2,700.00	18,900
Administration/Office - SGL	40	EA	550.00	22,000
Kitchen -DBL	1	EA	900.00	900
Mech/Elect - SGL	12	EA	400.00	4,800
Mech/Elect - DBL	2	EA	650.00	1,300
Toilet rm - sgl fixture	15	EA	500.00	7,500
Storage - SGL	12	EA	350.00	4,200
Storage - DBL	4	EA	600.00	2,400
Classroom - SGL	57	EA	550.00	31,350
Interconnecting Classroom - SGL	45	EA	260.00	11,700
Music - DBL	2	EA	1,000.00	2,000
Music - SGL	3	EA	700.00	2,100
Toilet rm/locker room - SGL	10	EA	550.00	5,500
Gym - DBL	3	EA	2,500.00	7,500
Media ctr - sgl	1	EA	700.00	700
Media ctr - dbl	1	EA	1,300.00	1,300
Café - sgl	1	EA	700.00	700
Café - dbl	1	EA	1,300.00	1,300

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<b>Glass and Glazing:</b>				
HM window/sidelite 1/2" temp	946	SF	14.00	13,244
Door glazing 1/4" temp	164.5	SF	14.00	2,303
Door glazing -wire	4	SF	16.00	64
Misc. glazing	1	LS	5,000.00	5,000
<b>Aluminum Storefront and Entries:</b>				
Vestibule Door - DBL	2	PR	5,300.00	10,600
Main office - sgl	1	EA	3,000.00	3,000
Main office - dbl	1	PR	4,900.00	4,900
Music corridor	1	PR	4,900.00	4,900
Music rm	1	PR	4,900.00	4,900
Storefront 9'6"	759	SF	61.00	46,299
Paint HM frame - sgl	202	EA	25.00	5,050
Paint HM frame - dbl	32	EA	30.00	960
Paint HM door - sgl	25	EA	75.00	1,875
Paint HM door - dbl	30	EA	125.00	3,750
Paint HM window/sidelite frame	946	SF	5.00	4,730
				-----
				476,886
<b>C1030 FITTINGS</b>				
<b>Folding Partition:</b>				
Drama/choral @ platform 14'	448	SF	80.00	35,840
Band/orchestra class 14'	490	SF	80.00	39,200
<b>Stage Platform:</b>				
Light gauge stl frame	400	SF	12.00	4,800
Comp deck	400	SF	2.80	1,120
Deck fill	400	SF	3.30	1,320
12' FRP col cover lobby (4 EA)	48	VLF	95.00	4,560
12' (FRP col cover café (9 EA)	108	VLF	95.00	10,260
Solid surface window stool (A-G)	1,003	LF	28.00	28,084
Exp. jt assemblies	1	LS	10,000.00	10,000
Wall & corner guards	1	LS	10,000.00	10,000
Roof access catwalk - platform	300	SF	30.00	9,000
Catwalk guardrail	75	LF	150.00	11,250
Lobby glazed railing	46	LF	275.00	12,650
Corridor ramp wall rail		N/A		
Misc. metals	129,939	GSF	0.50	64,970
Platform trim	1	LS	15,000.00	15,000
Media ctr display cabinet	1	EA	5,000.00	5,000
Corridor display cabinet	3	EA	7,500.00	22,500
Solid Surface lav countertop	24	LF	270.00	6,480

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<b>Solid Plastic Toilet Partitions:</b>				
Std. partition	18	EA	1,050.00	18,900
HC Partition	10	EA	1,225.00	12,250
Urinal screen	4	EA	275.00	1,100
Locker rm changing stall w/bench	12	EA	1,300.00	15,600
HC locker rm changing stall w/bench	2	EA	1,500.00	3,000
<b>Toilet and Shower Accessories:</b>				
Paper towel dispenser/disposal	25	EA	250.00	6,250
Toilet tissue dispenser	43	EA	48.00	2,064
Grab bars	50	EA	95.00	4,750
Soap dispenser	42	EA	42.00	1,764
Framed mirror - 3'	42	EA	195.00	8,190
Coat hooks	43	EA	20.00	860
Shower rod w/curtain	3	EA	35.00	105
Towel hook	3	EA	15.00	45
Janitor shelf	4	EA	200.00	800
Misc. accessories	1	LS	2,000.00	2,000
*Excludes classroom accessories				
Student lockers (12"x15"x30") dbl tier	926	EA	215.00	199,090
Locker rm bench	107	LF	70.00	7,490
Gym Lockers - basket (12"x12"x12")	440	EA	75.00	33,000
Life Skill Locker 15" DBL (12"x15"x30")	16	EA	265.00	4,240
Kitchen staff locker		w/E1010		
Fire extinguisher and cab - allow	6	EA	450.00	2,700
Building directory - allow	1	EA	5,000.00	5,000
Int. ADA signage	129,939	GSF	0.15	19,491
16" Alum. Letters	20	EA	350.00	7,000
Cubicle track w/curtain (4 EA)	60	LF	95.00	5,700
				-----
				653,422
<b>TOTAL C10 - INTERIOR CONSTRUCTION</b>				<b>2,717,699</b>

**C20 - STAIRS**

C2010 STAIR CONSTRUCTION

<b>Metal Pan Stair w/Rails:</b>				
Stair w/4' tread	3	FLTS	15,000.00	45,000
Stair w/6' tread	6	FLTS	19,000.00	114,000
Conc stair pan fill full flt	7	FLTS	1,500.00	10,500
Stair hall gate	1	EA	1,500.00	1,500
Stage stair	2	EA	950.00	1,900
Stage stair guardrail	10	LF	188.00	1,880
				-----
				174,780

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<b>C2020 STAIR FINISHES</b>				
Rubber treads and risers	1,273	LFR	12.50	15,913
Stage stair tread	22	LFT	12.50	275
Paint stair & rail	9	FLT	750.00	6,750
				-----
				22,938
<b>TOTAL C20 - STAIRS</b>				<b>197,718</b>

**C30 - INTERIOR FINISHES**

**C3010 WALL FINISHES**

Custom Fabricated P. Lam Wall Panel:

Café - allow	1,000	SF	45.00	45,000
Lobby - allow	3,500	SF	45.00	157,500
Seal/exp. conc. found wall	5,253	SF	1.20	6,304
End wall gym padding 7'	630	SF	12.50	7,875
Kitchen FRP panel 7'	2,940	SF	7.25	21,315
Gym Acoustical panels - each end	840	SF	20.00	16,800
Band Orchestra Acoustical wall panel	500	SF	25.00	12,500
Misc. Music Room panels	1	LS	10,000.00	10,000
Ceramic Wall Tile:				
Toilet rm - 5' wainscot	6,338	SF	13.00	82,394
Corridors - 7'	7,993	SF	13.00	103,909
Stair Halls - 7' avg	3,581	SF	13.00	46,553
Tile backer bd premium	14,331	SF	1.60	22,930
Kitchen ceramic wall tile	2,235	SF	13.50	30,173
Wall painting	129,939	GSF	1.80	233,890
				-----
				797,142

**C3020 FLOOR FINISHES**

Ceramic Tile:

Shower receptor	3	EA	475.00	1,425
Ceramic floor tile - thin set	4,599	SF	15.00	68,985
Ceramic floor tile waterproofing	3,500	SF	7.00	24,500
Marble Threshold	29	EA	48.00	1,392
Built-up Ceramic base	1,328	LF	10.00	13,280
Quarry tile - thin set	2,781	SF	14.50	40,325
Quarry tile base	474	LF	7.50	3,555
Resilient Flooring:				
VCT 1	53,904	SF	2.85	153,626

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
VCT 2	16,080	SF	2.85	45,828
VCT 3	4,702	SF	2.85	13,401
Sheet Linoleum - lobby	9,826	SF	8.50	83,521
Rubber tile at stair hall/landing	2,388	SF	7.50	17,910
Rubber base	11,981	LF	2.05	24,561
Vapor Emission coating	96,823	SF	3.00	290,469
Wood Flooring:				
Gym resil. wd	8,444	SF	15.50	130,882
Stage front wd floor	206	SF	12.00	2,472
Stage rear/choral class - masonite	1,464	SF	3.50	5,124
Vented base - gym	335	LF	5.75	1,926
Carpet	9,923	SF	4.50	44,654
Conc. Sealer	3,926	SF	0.95	3,730
Vestibule walk-off mat	500	SF	22.00	11,000
				-----
				982,565
 C3030 CEILING FINISHES				
ACT 1 - 2x2 typ	86,333	SF	3.90	336,699
ACT 2 - MR 2x2 kitchen	4,041	SF	5.00	20,205
ACT 3 - MR toilet rm/locker rm	5,231	SF	5.00	26,155
ACT 4 - 2x2 band & music	2,722	SF	5.50	14,971
Magna grid 8"x8"	502	SF	15.00	7,530
Unistrut grid - art rm	519	SF	10.00	5,190
Gyp ceiling	4,737	SF	6.75	31,975
2 Hr. gyp ceiling	20	SF	15.00	300
Gyp soffit	1,332	SF	12.00	15,984
Paint gyp ceilings & soffits	5,462	SF	1.00	5,462
Paint exposed structure	16,096	SF	2.10	33,802
				-----
				498,272
<b>TOTAL C30 - INTERIOR FINISHES</b>				<b>2,277,979</b>

**D. SERVICES**

**D10 - CONVEYING**

D1010 ELEVATORS & LIFTS

Stage lift	1	LS	18,000.00	18,000
3500 lbs Hydraulic Elevator	3	STOP	31,500.00	94,500
Elev. framing	1	LS	3,000.00	3,000
Elev. pit ladder	1	EA	1,500.00	1,500

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Elev. sump grate	1	EA	500.00	500
				-----
				117,500
<b>TOTAL D10 - CONVEYING</b>				<b>117,500</b>

**D20 - PLUMBING**

D2010 PLUMBING FIXTURES

JOELS NEW 7/8/10:

Fixtures:

P1 Water closet	18	EA	1,450.00	26,100
P1A Water closet ADA	25	EA	1,450.00	36,250
P2 Urinal	8	EA	1,300.00	10,400
P3 Lavatory	13	EA	950.00	12,350
P3A Lavatory ADA	23	EA	1,120.00	25,760
P4 Classroom sink	57	EA	975.00	55,575
P5 Lavatory	7	EA	850.00	5,950
P6 Drinking cooler	5	EA	270.00	1,350
P7 Sink ADA	3	EA	1,350.00	4,050
P8 Sink ADA	2	EA	1,350.00	2,700
P9 Art room sink	4	EA	1,600.00	6,400
P10 Shower	2	EA	1,800.00	3,600
P11 Service sink	3	EA	1,100.00	3,300
P12 Wall hung service sink	1	EA	975.00	975
P13 Washing machine connect	1	EA	450.00	450
WH/HB	10	EA	400.00	4,000
Fixture connection	172	EA	500.00	86,000
Kitchen equip. connection	36	EA	700.00	25,200

Misc.:

Oil/sediment interceptor	1	EA	3,300.00	3,300
Grease trap	1	EA	7,500.00	7,500
Grease holding tank	1	EA	2,500.00	2,500
RP 1, 2 10 gpm circ pump	2	EA	8,500.00	17,000
1" BFP	1	EA	925.00	925

Water Heaters:

100 Gal gas WH-1,2	2	EA	7,100.00	14,200
WH-3 tankless	1	EA	1,800.00	1,800
Water heater 4" flue	60	LF	75.00	4,500
WH piping and rough	1	LS	15,000.00	15,000

Roof/Storm Drain System

Underground D/W/V Pipe:

4"	135	LF	35.50	4,793
10"	95	LF	108.00	10,260

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
12"	85	LF	136.00	11,560
FCO	2	EA	450.00	900
WCO	1	EA	375.00	375
Above Ground D/W/V Pipe:				
4"	110	LF	37.00	4,070
6"	335	LF	50.50	16,918
8"	515	LF	82.50	42,488
10"	30	LF	111.00	3,330
CO	11	EA	375.00	4,125
Roof drain Zurn 163 dbl	24	EA	1,250.00	30,000
Sanitary System:				
Underground D/W/V Pipe:				
3"	185	LF	30.50	5,643
4"	1,180	LF	35.50	41,890
6"	140	LF	50.50	7,070
FCO	16	EA	450.00	7,200
FD	17	EA	620.00	10,540
Above Ground D/W/V Pipe:				
2"	1,555	LF	27.50	42,763
3"	250	LF	32.00	8,000
4"	300	LF	37.00	11,100
Copper Pipe:				
3/4"	4,030	LF	16.10	64,883
1"	330	LF	19.40	6,402
1 1/2"	180	LF	28.50	5,130
2"	820	LF	39.50	32,390
2 1/2"	490	LF	54.50	26,705
3"	145	LF	70.50	10,223
4"	170	LF	113.00	19,210
Branch piping	3,500	LF	22.00	77,000
Misc. Valve and trim	1	LS	10,000.00	10,000
1" Pipe Insulation:				
3/4"	4,030	LF	6.15	24,785
1"	330	LF	6.50	2,145
1 1/2"	180	LF	6.95	1,251
2"	820	LF	7.30	5,986
2 1/2"	490	LF	7.80	3,822
3"	145	LF	8.25	1,196
4"	170	LF	10.15	1,726
Branch piping	3,500	LF	7.00	24,500
Gas Pipe:				
2 1/2"	370	LF	47.00	17,390
6"	110	LF	85.50	9,405
Boiler connection	1	LS	3,000.00	3,000
Underground Water Service:				
4"	10	LF	120.00	1,200
Water service (inc. bfp)	1	LS	8,800.00	8,800
Sewer service	1	LS	3,500.00	3,500

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Permit test and clean	1	LS	25,000.00	25,000
Direct Job Expense	1	LS	50,000.00	50,000
Commissioning coordination	1	LS	20,000.00	20,000
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				1,095,805

<b>TOTAL D20 - PLUMBING</b>	<b>\$8.43 /sf</b>			<b>1,095,805</b>
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**D30 - HVAC**

D3010 ENERGY SUPPLY

Boiler:

B1, B2, B3 (1800 mbh)	3	EA	30,000.00	90,000
Boiler feed	1	LS	2,200.00	2,200
Air separator	1	EA	15,000.00	15,000
Expansion tank	2	EA	3,300.00	6,600
Chemical feed	1	EA	7,500.00	7,500
Acid waste tank'	1	EA	1,200.00	1,200
Bouiler rough-in	1	LS	15,000.00	15,000

Flue:

12"	60	LF	130.00	7,800
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Pumps:

P1, P2 (440 gpm)	2	EA	8,500.00	17,000
VFD Drive	2	EA	3,200.00	6,400

Air Handling Unit (AHU):

AHU - 1	1	EA	10,000.00	10,000
AHU - 2	1	EA	10,000.00	10,000
AHU - 3 café	1	EA	15,000.00	15,000
AHU - 4 gym	1	EA	20,000.00	20,000

Fan Coil Unit:

FC 1, 2 (no size)	2	EA	4,500.00	9,000
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Roof Top Unit (RTU):

RTU 8 (2 ton)	810	CFM	9.00	7,290
RTU 9 (3 ton)	945	CFM	9.00	8,505
RTU 1 (5 ton)	19,000	CFM	8.50	161,500
RTU 10, 11 (9 ton)	5,100	CFM	8.00	40,800
RTU 5 (11 ton)	3,000	CFM	8.00	24,000
RTU 4 (16 ton)	4,100	CFM	8.00	32,800
RTU 2, 3, 7 (18 ton)	20,400	CFM	7.00	142,800
RTU 6 (25 ton)	6,300	CFM	9.00	56,700

Unit Heater:

UH-1	8	EA	975.00	7,800
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DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<b>Cabinet Unit Heater:</b>				
Wall mtd (no size)	5	EA	1,800.00	9,000
Ceiling mtd (no size)	17	EA	2,250.00	38,250
<b>Electric Cabinet Unit Heater:</b>				
ECH-1	5	EA	950.00	4,750
Fin tube radiator	1,406	LF	55.00	77,330
Curved radiant panel	83	LF	300.00	24,900
<b>Exhaust Fans:</b>				
EF 1, 2 (no size)	2	EA	4,500.00	9,000
Kitchen exhaust fan	1	EA	5,500.00	
				-----
				878,125
<b>D3030 COOLING GENERATING SYSTEMS</b>				
				*DX Cooling inc. w/ RTU's
Split AC system at elev. Mach rm	1	LS	8,000.00	8,000
Split AC system at elev. Data rm	1	LS	12,000.00	12,000
				-----
				20,000
<b>D3040 DISTRIBUTION SYSTEMS</b>				
<b>HVAC Pipe:</b>				
Hot Water - 2 pipe	129,939	SF	4.00	519,756
<b>Supply:</b>				
<b>Registers:</b>				
Grilles/registers	171	EA	230.00	39,330
4' Linear diffuser	144	EA	240.00	34,560
Volume and fire dampers	1	LS	10,000.00	10,000
Flexible connection	195	EA	65.00	12,675
Galvanized ductwork	50,000	LBS	8.50	425,000
Duct Insul	3,700	SF	3.50	12,950
<b>Return:</b>				
<b>Registers:</b>				
Grilles/registers	145	EA	185.00	26,825
Flexible connection	64	EA	65.00	4,160
<b>Dampers:</b>				
Volume	71	EA	210.00	14,910
Galvanized ductwork	25,000	LBS	8.50	212,500
Welded kitchen exhaust	243	LBS	14.00	3,402
2 hr Fire wrap	1	LS	3,500.00	3,500
Solar wall fan and tie in	1	LS	10,000	10,000
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				1,329,568

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
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D3050 TERMINAL & PACKAGE UNITS

Variable Air Volume Unit:

VAV	93	EA	1,250.00	116,250
FVAV	5	EA	1,500.00	7,500

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123,750

D3060 CONTROLS AND INSTRUMENTATION

DDC Controls	129,939	GSF	3.00	389,817
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389,817

D3070 SYSTEMS TESTING & BALANCING

Test and Balance	129,939	GSF	0.65	84,460
Direct Job Expense	1	LS	35,000.00	35,000
Commissioning corrdination	1	LS	20,000.00	20,000

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139,460

<b>TOTAL D30 - HVAC</b>	<b>\$22.17 /SF</b>			<b>2,880,720</b>
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**D40 - FIRE PROTECTION**

D4010 SPRINKLERS

Heads/br piping	129,683	SF	3.50	453,891
Valve assembly	1	EA	5,200.00	5,200
8" UG fire service	10	LF	75.00	750
8" Gate vlv	2	EA	1,650.00	3,300
8" Check vlv	2	EA	3,500.00	7,000
4" Check vlv	1	EA	2,250.00	2,250
6" BF vlv	5	EA	850.00	4,250
Flow switch	7	EA	225.00	1,575
2 1/2" FDV	12	EA	825.00	9,900
Siamese conn	1	EA	1,000.00	1,000
6" FCVA	3	EA	1,350.00	4,050

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493,166

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<b>TOTAL D40 - FIRE PROTECTION</b>				
	<b>\$3.80</b>	<b>/sf</b>		<b>493,166</b>

**D50 - ELECTRICAL**

D5010 ELECTRICAL SERVICE & DISTRIBUTION

POWER DISTRIBUTION

MAIN SWITCHBOARD

1600 AMP 1 EA 25,490.00 25,490

PANELBOARDS

120-208 Volt 100% Neutral:

225 AMP main lug 1 EA 4,151.00 4,151

100 AMP main brkr 2 EA 1,865.00 3,730

225 AMP main brkr 5 EA 2,369.00 11,845

120-208 Volt 200% Neutral:

225 AMP main brkr 6 EA 4,419.00 26,514

277-480 Volt 100% Neutral:

100 AMP main lug 1 EA 4,371.00 4,371

225 AMP main lug 5 EA 4,503.00 22,515

Lighting control panel 4 EA 2,650.00 10,600

100 AMP main brkr 1 EA 4,803.00 4,803

225 AMP main brkr 1 EA 5,666.00 5,666

METERING

Single meter can 1 EA 330.00 330

100% NEUTRAL FEEDERS

FEEDERS - IN EMT - THREE PHASE

50 AMP 60 LF 22.65 1,359

70 AMP 40 LF 28.25 1,130

100 AMP 40 LF 35.20 1,408

125 AMP 60 LF 40.00 2,400

200 AMP 210 LF 47.40 9,954

225 AMP 40 LF 57.60 2,304

PVC - UNDERGROUND - THREE PHASE

60 AMP 40 LF 11.15 446

100 AMP 520 LF 21.40 11,128

125 AMP 270 LF 27.70 7,479

200 AMP 540 LF 35.60 19,224

225 AMP 80 LF 44.60 3,568

1600 AMP 40 LF 409.10 16,364

SPARE OR EMPTY RACEWAYS

PVC - UNDERGROUND

4" 750 LF 18.30 13,725

EMT EXPOSED

4" 80 LF 35.70 2,856

GENERATOR SIGNAL - UNDERGROUND

Annunciator circuits 40 LF 11.70 468

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<b>CABLE TRAY - LADDER TYPE</b>				
12" Ladder	120	LF	33.45	4,014
<b>UNINTERRUPTABLE POWER SUPPLY</b>				
30KVA	1	EA	27,560.00	27,560
<b>ENCLOSED CIRCUIT BREAKER - 3 PHASE - TO 600 VOLTS</b>				
225 AMP	1	EA	1,312.00	1,312
<b>LIGHTING CONTACTORS</b>				
20 AMP 12 pole	1	EA	978.00	978
Relay	27	EA	75.00	2,025
Time clock	1	EA	385.00	385
Photocell	59	EA	55.00	3,245
<b>DISCONNECT SWITCHES - HEAVY DUTY</b>				
<b>3 POLE - TO 600 VOLTS</b>				
30 AMP NF	3	EA	216.00	648
30 AMP F	9	EA	325.00	2,925
60 AMP F	2	EA	419.00	838
30 AMP NF WP	3	EA	294.00	882
30 AMP F WP	3	EA	477.00	1,431
60 AMP F WP	4	EA	595.00	2,380
100 AMP F WP	2	EA	850.00	1,700
<b>DRY TYPE TRANSFORMER - NON K RATED</b>				
30 KVA	3	EA	2,500.00	7,500
75 KVA	2	EA	4,405.00	8,810
<b>DRY TYPE - K13 RATED</b>				
15 KVA	2	EA	2,904.00	5,808
45 KVA	6	EA	5,139.00	30,834
<b>MOTOR CONTROLS</b>				
<b>LOCAL MOTOR CONTROL:</b>				
<b>MANUAL STARTERS</b>				
120 Volt 1 pole	149	EA	103.00	15,347
<b>AUTOMATIC TRANSFER SWITCH</b>				
100 AMP	1	EA	3,706.00	3,706
225 AMP	1	EA	5,027.00	5,027
<b>WIRING DEVICES</b>				
<b>METAL CLAD WIRING - PLASTIC PLATES</b>				
<b>SWITCHES</b>				
S	96	EA	163.00	15,648
S3	4	EA	186.00	744
SS	10	EA	252.00	2,520
S3S3	2	EA	402.00	804
SSSS	56	EA	415.00	23,240
Occupancy sensor	134	EA	246.00	32,964
<b>COMBO SWITCHES</b>				
SSD	4	EA	275.00	1,100
SSSD	1	EA	363.00	363

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<b>RECEPTACLE</b>				
Duplex	439	EA	194.00	85,166
Duplex GFI	160	EA	215.00	34,400
Double duplex	309	EA	201.00	62,109
Double surge	69	EA	232.00	16,008
Double duplex surge	12	EA	301.00	3,612
50 AMP recept	1	EA	234.00	234
<b>EMT RACEWAYS</b>				
<b>SWITCHES</b>				
S WP	1	EA	279.00	279
<b>RECEPTACLE</b>				
Duplex	27	EA	312.00	8,424
Duplex GFI	1	EA	328.00	328
Double duplex	14	EA	369.00	5,166
20 AMP twist lock	18	EA	330.00	5,940
Duplex GFI WP	26	EA	300.00	7,800
<b>Rough In:</b>				
Tel/data/video	603	EA	125.00	75,375
<b>PVC RACEWAY - UNDERSLAB</b>				
Duplex GFI	17	EA	450.00	7,650
Double duplex	4	EA	452.00	1,808
20 AMP special recept	28	EA	458.00	12,824
1 GANG floor box w/recept	14	EA	470.00	6,580
<b>PUBLIC ADDRESS SYSTEM</b>				
<b>Rough In:</b>				
Amplifier	2	EA	358.00	716
Ceiling/wall speaker	134	EA	136.00	18,224
Scoreboard	1	EA	12,000.00	12,000
Volume control	46	EA	125.00	5,750
Mike outlet	2	EA	125.00	250
<b>Install:</b>				
Amplifier	2	EA	2,230.00	4,460
Ceiling/wall speaker	199	EA	175.00	34,825
Volume control	46	EA	136.00	6,256
Mike outlet	2	EA	155.00	310
<b>CLOCK SYSTEM</b>				
<b>Rough In:</b>				
Clock backbox	44	EA	57.00	2,508
Clock-speaker backbox	65	EA	165.00	10,725
<b>Install:</b>				
Clock	109	EA	220.00	23,980
Integrated program mgmt. system	1	EA	25,000.00	25,000
<b>BRANCH CIRCUITS</b>				
<b>IN EMT</b>				
<b>20 AMP CIRCUIT:</b>				
One circuit	388	EA	579.00	224,652
<b>IN PVC - UNDERSLAB</b>				
<b>20 AMP CIRCUIT:</b>				
One circuit	50	EA	484.00	24,200

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<b>MOTOR CIRCUITS</b>				
IN EMT				
SINGLE PHASE:				
20 AMP	39	EA	660.00	25,740
THREE PHASE				
20 AMP	15	EA	700.00	10,500
30 AMP	1	EA	754.00	754
40 AMP	2	EA	810.00	1,620
50-60 AMP	3	EA	840.00	2,520
70 AMP	1	EA	1,103.00	1,103
100 AMP	1	EA	1,396.00	1,396
IN PVC - UNDERSLAB				
THREE PHASE				
20 AMP	2	EA	634.00	1,268
30 AMP	1	EA	691.00	691
50-60 AMP	1	EA	840.00	840
Lightning protection	1	LS	30,000.00	30,000
Permit/temporary electric	1	LS	12,000.00	12,000
<b>DIESEL GENERATORS</b>				
175 KW	1	EA	48,793.00	48,793
<b>SPECIAL ENCLOSURES</b>				
100-200 KW	1	EA	15,000.00	15,000
				-----
				1,298,350

D5020 LIGHTING & BRANCH WIRING

LIGHTING FIXTURES

Type A8	1	EA	473.00	473
Type A12	18	EA	698.00	12,564
Type A16	198	EA	757.00	149,886
Type A20	16	EA	1,076.00	17,216
Type A24	3	EA	1,135.00	3,405
Type A36	4	EA	1,833.00	7,332
Type A48	2	EA	2,270.00	4,540
Type B	93	EA	287.00	26,691
Type B1	25	EA	287.00	7,175
Type C	70	EA	233.00	16,310
Type C1	10	EA	233.00	2,330
Type D	198	EA	349.00	69,102
Type D1	77	EA	349.00	26,873
Type D2	6	EA	249.00	1,494
Type E	28	EA	433.00	12,124
Type E1	11	EA	450.00	4,950
Type F	15	EA	349.00	5,235
Type F1	3	EA	399.00	1,197
Type H	9	EA	300.00	2,700
Type J	22	EA	233.00	5,126
Type K	23	EA	400.00	9,200
Type L4	13	EA	380.00	4,940

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Type L8	1	EA	396.00	396
Type L12	4	EA	578.00	2,312
Type L16	4	EA	844.00	3,376
Type M	1	EA	420.00	420
Type N	24	EA	782.00	18,768
Type O	2	EA	272.00	544
Type P1	64	EA	449.00	28,736
Type Q	30	EA	600.00	18,000
Type Y	16	EA	650.00	10,400
Exit	83	LS	298.00	24,734
Light lifter	1	LS	5,000.00	5,000
Stage dimming system	1	LS	35,000.00	35,000

SITE LIGHTING FIXTURES

Type Z1	9	EA	3,260.00	29,340
Type Z2	22	EA	3,280.00	72,160
Type Z3	1	EA	3,060.00	3,060

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643,109

D5030 COMMUNICATION & SECURITY

TELECOMMUNICATIONS

Install:				
Tel/data	603	EA	306.00	184,518
Each addl cable	467	EA	297.00	138,699
Racks	1	EA	20,000.00	20,000
Tel comm equipment	1	LS	400,000.00	400,000

SECURITY SYSTEM

Security panel	1	EA	6,500.00	6,500
Door switch	21	EA	371.00	7,791
Motion detector	10	EA	458.00	4,580
Break glass station	52	EA	321.00	16,692
Card reader	9	EA	1,022.00	9,198
CCTV camera	10	EA	2,413.00	24,130
Monitor	1	EA	1,079.00	1,079

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813,187

D5090 OTHER ELECTRICAL SYSTEMS

FIRE ALARM - ADDRESSABLE  
PLENUM CABLE

Fire alarm control panel to 20 zones	1	EA	6,285.00	6,285
Annunciator	1	EA	2,180.00	2,180
Smoke detector	114	EA	268.00	30,552
Heat detector	4	EA	257.00	1,028
Duct smoke detector	28	EA	548.00	15,344
Pull station	16	EA	262.00	4,192

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Remove indicator	1	EA	182.00	182
Remote test switch	28	EA	234.00	6,552
Horn-strobe unit	136	EA	322.00	43,792
Strobe unit only	51	EA	244.00	12,444
Weatherproof beacon	1	EA	573.00	573
Monitor module	27	EA	226.00	6,102
Knox box	1	EA	325.00	325
				-----
				129,551
<b>TOTAL D50 - ELECTRICAL</b>	<b>\$22.20</b>	<b>/SF</b>		<b>2,884,197</b>

**E. EQUIPMENT & FURNISHINGS**

**E10 - EQUIPMENT**

E1010 COMMERCIAL EQUIPMENT

Kitchen Equipment & Casework	1	LS	467,000.00	467,000
				-----
				467,000

E1090 OTHER EQUIPMENT

Athletic Equipment:				
Basketball backstops - electric	6	EA	7,500.00	45,000
Motorized gym divider curtain (2 EA)	3,300	SF	21.00	69,300
Volley ball court equip.(2EA)	2	EA	700.00	1,400
Scoreboard w / shot clock		W/D5010		
Folding Bleachers	500	SEAT	125.00	62,500
Misc. athletic equip	1	LS	5,000.00	5,000

Residential Appliances:

Faculty kitchen	1	EA	3,000.00	3,000
Nurses office refrigerator	1	EA	750.00	750
Life skills kitchen	1	EA	5,000.00	5,000
Kitchen laundry		W/E5010		

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191,950

<b>TOTAL E10 - EQUIPMENT</b>				<b>658,950</b>
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**E20 - FURNISHINGS**

E 2010 FIXED FURNISHINGS

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Staging curtain and rigging	1	LS	20,000.00	20,000
Entrance Mats -allow	3	EA	2,500.00	7,500
Electric shades at café premium	1	LS	15,000.00	15,000
Interior window shades	1	LS	5,000.00	5,000
Window treatment	10,000	SF	4.00	40,000
Architectural Casework, Tackboards, Markerboards & Projection Screens:				
General Classroom ( 41ea):				
M1 Teacher wardrobe - DBL	41	EA	1,650.00	67,650
M2 Storage Unit - DBL	41	EA	1,700.00	69,700
M3 Base and Wall Cabinet	328	LF	330.00	108,240
M4 Window low shelving unit	977	LF	130.00	127,010
V2 - 8' Marker board	41	EA	550.00	22,550
V3 - 4' Markerboard	82	EA	200.00	16,400
Corridor Common Rooms (5EA):				
Ceiling mounted 8' projection screen	5	EA	750.00	3,750
V2 - 8' Marker board	20	EA	550.00	11,000
Prep Room (5EA):				
P.L. Countertop	221	LF	120.00	26,520
M5 Shelving unit	50	LF	20.00	1,000
M2 Storage Unit - DBL	10	EA	1,900.00	19,000
Seminar/Work Room(3EA):				
Full Ht Shelving unit - 18"	56	LF	400.00	22,400
M6 Base and Wall Cabinet	28	LF	330.00	9,240
V2 - 8' Marker board	3	EA	550.00	1,650
SPED Classroom (6EA):				
M1 Teacher wardrobe - DBL	6	EA	1,650.00	9,900
M2 Storage Unit - DBL	6	EA	1,700.00	10,200
M3 Base and Wall Cabinet	24	LF	330.00	7,920
M4 Window low shelving unit	156	LF	130.00	20,280
V2 - 8' Marker board	6	EA	550.00	3,300
V3 - 4' Markerboard	12	EA	200.00	2,400
Reading/Speech (4EA):				
M1 Teacher wardrobe - DBL	4	EA	1,650.00	6,600
M2 Storage Unit - DBL	4	EA	1,700.00	6,800
M3 Base and Wall Cabinet	16	LF	330.00	5,280
M4 Window low shelving unit	72	LF	130.00	9,360
V2 - 8' Marker board	8	EA	550.00	4,400
V3 - 4' Markerboard	4	EA	200.00	800
Life Skills Classroom (1EA):				
M1 Teacher wardrobe - DBL	1	EA	1,650.00	1,650
M2 Storage Unit - DBL	2	EA	1,700.00	3,400
M2 Clean-up Cabinet	6	LF	200.00	1,200
M4 Window low shelving unit	18.5	LF	130.00	2,405
M12 Kitchen Base and Wall	19	LF	330.00	6,270
V2 - 8' Marker board	1	EA	550.00	550
V3 - 4' Markerboard	1	EA	200.00	200

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<b>Media Center:</b>				
Work Room Base and Wall Cabinet	11.5	LF	330.00	3,795
Custom Desk w/ SS ctr	20	LF	550.00	11,000
Rear Desk Base and Wall Cabinet	14	LF	375.00	5,250
*Excludes book storage				
<b>Technology Labs:</b>				
M1 Teacher wardrobe - DBL	2	EA	1,650.00	3,300
M2 Storage Unit - DBL	2	EA	1,750.00	3,500
M3 Base and Wall Cabinet	8	LF	330.00	2,640
M4 Window low shelving unit	53	LF	130.00	6,890
V2 - 8' Marker board	2	EA	550.00	1,100
V3 - 4' Markerboard	4	EA	200.00	800
<b>Art Room (epoxy counters):</b>				
Sink Base Cabinet w/ shelving above	24	LF	370.00	8,880
M1 Teacher wardrobe - DBL	2	EA	1,650.00	3,300
M2 Storage Unit - DBL	2	EA	1,750.00	3,500
M4 Window low shelving unit	40	LF	130.00	5,200
V2 - 8' Marker board	2	EA	550.00	1,100
<b>Art Prep Room (epoxy counters):</b>				
M2 Storage Unit - DBL	1	EA	1,700.00	1,700
M7 30"x40" adj shelving unit	2	EA	1,500.00	3,000
Kiln	1	EA	3,500.00	3,500
M11 Base Cabinet w/ shelving above	15.5	LF	330.00	5,115
Shelving unit -5 tier	117.5	LF	20.00	2,350
<b>Music Room:</b>				
M1 Teacher wardrobe - DBL	1	EA	1,650.00	1,650
M2 Storage Unit - DBL	1	EA	1,750.00	1,750
M3 Base and Wall Cabinet	6	LF	330.00	1,980
V2 - 8' Marker board	2	EA	550.00	1,100
<b>Band/Orchestra:</b>				
M1 Teacher wardrobe - DBL	2	EA	1,650.00	3,300
M2 Storage Unit - DBL	2	EA	1,750.00	3,500
M3 Base and Wall Cabinet	8	LF	330.00	2,640
V2 - 8' Marker board	2	EA	550.00	1,100
*Excludes instrument storage				
<b>Choral/Drama - platform:</b>				
Motorized projection screen 16'	1	EA	5,000.00	5,000
*Excludes choral risers				
<b>Administration Suite:</b>				
Main desk w/ SS top	32	LF	350.00	11,200
M8 Closet shelf	8	LF	22.00	176
Work counter	10	LF	170.00	1,700
M6 Base and Wall Cabinet	34	LF	330.00	11,220
MP Mail box unit w/ base cabinet	24	LF	500.00	12,000
V2 - 8' Marker board	1	EA	550.00	550
<b>Nurse Suite:</b>				

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
M3 Base and Wall Cabinet	14	LF	330.00	4,620
M5 Adjustable shelving -5tier	65	LF	20.00	1,300
V2 - 8' Marker board	2	EA	550.00	1,100
Locker Room:				
V3 - 4' Tackboard	2	EA	200.00	400
Cafeteria:				
Motorized projection screen 12'	1	EA	4,000.00	4,000
Faculty Dining:				
M3 Base and Wall Cabinet	8	LF	330.00	2,640
V2 - 8' Marker board	1	EA	550.00	550
Janitor Closet (4EA):				
M5 Adjustable shelving - 5tier	80	LF	20.00	1,600
*Excludes classroom projection screens & smart boards				
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				847,521

E2020 MOVABLE FURNISHINGS

not included

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<b>TOTAL E20 - FURNISHINGS</b>	<b>847,521</b>
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**F. SPECIAL CONSTRUCTION & DEMOLITION**

<b>TOTAL F10 - SPECIAL CONSTRUCTION</b>	<b>0</b>
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**F20 - SELECTIVE BUILDING DEMOLITION**

F2010 BUILDING ELEMENTS DEMOLITION

Remove Existing:				
Brick elementary school	88,000	GSF	4.00	352,000
Portable classroom	12,000	GSF	3.50	42,000
				-----
				394,000

F2020 HAZARDOUS COMPONENTS ABATEMENT

Hazardous Waste Removal - allow	1	LS	575,000.00	575,000
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DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
				575,000
<b>TOTAL F20 - SELECTIVE BUILDING DEMOLITION</b>				<b>969,000</b>

**G. BUILDING SITEWORK**

**G10 - SITE PREPARATION**

G1010 SITE CLEARING

Erosion control	2,719	LF	3.45	9,381
Clear & grub	91,476	SF	0.30	27,443
Inlet protection	11	EA	40.00	440
Tree removal	31	EA	325.00	10,075
Infield clay	11,078	SF	1.25	13,848
				61,186

G1020 SITE DEMOLITION & RELOCATIONS

Remove Existing				
Remove gas line	417	LF	8.00	3,336
Remove drain line	1,534	LF	12.00	18,408
Catch basin	9	EA	115.00	1,035
Drain manhole	1	EA	115.00	115
Sawcut pavement	240	LF	5.00	1,200
Cut and cap utilities	1	LS	5,000.00	5,000
Stone wall	238	LF	10.00	2,380
Oil tank	1	LS	10,000.00	10,000
Conc. entry pavement	1,400	SF	1.15	1,610
Bit. pavement	187,916	SF	0.80	150,333
Chain link fence	1,871	LF	3.00	5,613
Light pole	10	EA	75.00	750
Utility pole	3	EA	75.00	225
Sewer manhole	4	EA	400.00	1,600
Sewer line	635	LF	12.00	7,620
Hydrant	1	EA	75.00	75
Jersey barriers	52	LF	7.00	364
Septic tank & pump chamber	1	LS	5,000.00	5,000
Flag pole	1	EA	125.00	125
Stair structure	203	SF	8.00	1,624
Traffic sign	5	EA	30.00	150
Basketball hoop	1	EA	90.00	90
Salvage bike rack	1	EA	100.00	100
Baseball backstop	2	EA	500.00	1,000
Salvage bleachers	1	LS	500.00	500
Memorial plaque and peace pole	1	LS	1,000.00	1,000

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
				----- 219,253
<b>G1030 SITE EARTHWORK</b>				
Strip and stack topsoil - 6"	11,430	CY	2.90	33,147
Site Cut	19,223	CY	4.75	91,309
Site fill - on site mat'l	18,113	CY	4.00	72,452
Site grading	81,000	SY	0.60	48,600
Dewatering - allow	1	LS	25,000.00	25,000
Haul away surplus	1,100	CY	15.00	16,500
Misc. site earthwork	1	LS	25,000.00	25,000
Ledge removal allowance:				
Site	500	CY	65.00	32,500
				----- 344,508
<b>TOTAL G10 - SITE PREPARATION</b>				<b>624,947</b>

**G20 - SITE IMPROVEMENTS**

**G2010 ROADWAYS**

Resurface existing 2"	219	SY	7.25	1,588
Bituminous drive/parking (2" wearing)	20,940	SY	11.25	235,575
Bituminous drive/parking (2" base)	20,940	SY	11.25	235,575
18" Gravel base @ drive	10,470	CY	19.00	198,930
Parking/Traffic signage	8	LS	130.00	1,040
Granite curb straight	1,242	LF	27.50	34,155
Granite curb radius	276	LF	30.50	8,418
Berm	5,471	LF	2.25	12,310
Parking striping	5,479	LF	1.00	5,479
HC Pavement markings	8	EA	65.00	520
Crosswalk striping	1,628	SF	1.00	1,628
Basketball court lines	1	LS	2,500.00	2,500
				----- 737,718

**G2020 PARKING LOTS**

\*Included with G2010

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0

**G2030 PEDESTRIAN PAVING**

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Bit. concrete walkway	10,893	SF	2.30	25,054
4" Conc. Ped. pavement	10,548	SF	3.55	37,445
Concrete unit paver	9,756	SF	12.00	117,072
BB Court surface	3,400	SF	2.30	7,820
HC ramp/curb cut	15	EA	450.00	6,750
Gravel Base:				
6" Gravel @ ped. paving	854	CY	23.50	20,069
				-----
				214,210

G2040 SITE DEVELOPMENT

35' Flag pole w/conc base	1	EA	5,500.00	5,500
Site sign - allow	1	LS	5,000.00	5,000
Site bench - allow	4	EA	1,500.00	6,000
Bicycle rack (10 bikes )	2	EA	1,250.00	2,500
Basketball goal post	2	EA	1,250.00	2,500
Steel bollard	12	EA	600.00	7,200
6' CL fence	268	LF	24.00	6,432
CL gate - sgl	1	EA	900.00	900
CL gate - dbl	1	EA	1,500.00	1,500
Baseball dugout bench	4	EA	2,000.00	8,000
Baseball home plate & pitching rubber	1	EA	2,500.00	2,500
Baseball back stop	2	EA	12,000.00	24,000
Chain link fence	155	LF	32.00	4,960
Stair hand railing	53	LF	155.00	8,215
Retaining wall railing	183	LF	150.00	27,450
Concrete stair tread	135	LFR	55.00	7,425
Concrete stair foundation	12	CY	650.00	7,800
Granite planter edge (5 ea )	584	LF	40.00	23,360
Stone wall - reconstruct	160	LF	30.00	4,800
2 Rail wood fence	808	LF	42.00	33,936
Tree grate and guard		NIC		
Concrete light pole bases	32	EA	475.00	15,200
Site Walls:				
Wall footing (1x4)	24	CY	320.00	7,680
12"x8' Walkway (93 LF)	28	CY	675.00	18,900
Loading Dock Retaining Wall 12" thick x 14' high (90 LF):				
4000 psi, NW, (incl. placement)	46	CY	136.00	6,256
Formwork	2,520	SFCA	12.50	31,500
Waterstop	90	LF	9.00	810
Reinforcing steel (5 lbs/cf)	6,210	LBS	0.98	6,086
<i>*unit cost \$970.69</i>				
Dampproof concrete retaining wall	1,000	SF	2.00	2,000
				-----
				278,410

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
<b>G2050 LANDSCAPING</b>				
Fields:				
Infield mix	21,231	SF	2.75	58,385
Respread/ammend loam	11,430	CY	12.00	137,160
Rake, seed and fertilize	55,001	SY	1.80	99,002
Planting allowance	1	LS	20,000.00	20,000
Deciduous Trees:				
Red Sunset Maple (3-3.5" cal.)	6	EA	700.00	4,200
October Glory Red Maple (3-3.5" cal.)	8	EA	700.00	5,600
Green Mountain Sugar Maple (3-3.5" cal.)	8	EA	700.00	5,600
Heritage River Birch (12-14' ht)	7	EA	290.00	2,030
Skyline Honey Locust (3-3.5" cal.)	25	EA	700.00	17,500
Aristocrat Flowering Pear (3-3.5" cal.)	5	EA	700.00	3,500
Kwanzan Cherry (3-3.5" cal.)	10	EA	700.00	7,000
Red Oak (3-3.5" cal.)	1	EA	700.00	700
Evergreen Trees:				
Austrian Pine (7-8' ht)	15	EA	320.00	4,800
Eastern White Pine (9-10' ht)	9	EA	290.00	2,610
Emerald Green Arborvitae (7-8' ht)	13	EA	135.00	1,755
Green Giant Arborvitae (8-9' ht)	6	EA	150.00	900
Mulch - allowance	1	LS	5,000.00	5,000
Irrigation system	350,000	SF	0.50	175,000
Transplant trees	6	EA	2,000.00	12,000
Wetland replication	5,400	SF	3.00	16,200
				-----
				578,942
<b>TOTAL G20 - SITE IMPROVEMENTS</b>				<b>1,809,280</b>

**G30 - SITE MECHANICAL UTILITIES**

**G3010 WATER SUPPLY**

6" Gate valve	1	EA	675.00	675
Site connection	2	EA	2,500.00	5,000
Gate valve	4	EA	1,050.00	4,200
8" Water line	617	LF	74.00	45,658
4" Domestic	24	LF	46.00	1,104
6" Fire service line	218	LF	55.00	11,990
Hydrant	3	EA	1,850.00	5,550
Tie into existing	3	EA	500.00	1,500
PI valve	1	EA	1,200.00	1,200
				-----
				76,877

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
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G3020 SANITARY SEWER

Grease trap (5,000 gal)		see plumbing		
10" PVC Sanitary main	1,072	LF	45.00	48,240
Sanitary manhole	5	EA	2,250.00	11,250
Maintain exist. sys during construction	1	LS	5,000.00	5,000
6" PVC	366	LF	29.00	10,614
4" Vent	67	LF	24.00	1,608
Connect to existing	1	EA	2,500.00	2,500
				-----
				79,212

G3030 STORM SEWER

Stormwater Collection System:

Connect CB to DMH	1	EA	500.00	500
Adjust CB/DMH rim	15	EA	375.00	5,625
Stormceptor	2	EA	8,000.00	16,000
Catch basin	15	EA	3,500.00	52,500
Outlet control structure	1	EA	2,500.00	2,500
Drainage manhole	15	EA	2,250.00	33,750
Drain line	3,313	LF	44.00	145,772
Roof drain line	280	LF	38.00	10,640
Connect to existing	7	EA	500.00	3,500
Flared end w/ rip rap	2	EA	1,500.00	3,000
Clean out	2	EA	750.00	1,500
12" RCP Culvert	76	LF	52.00	3,952
Head wall	1	LS	3,200.00	3,200

Field Drainage:

Additional 4" loam	2,675	CY	32.00	85,600
Additional 4" loam (amend and re-use)	2,263	CY	12.00	27,156
6" Perf under drain w/ filter fabric	10,120	LF	18.50	187,220
12" Gravel bed	400,000	SF	0.52	208,000
Collector piping	1	LS	50,000.00	50,000

Infiltration Field:

Excavate and haul	1,466	CY	20.00	29,320
1 1/2" Crush stone	740	CY	22.00	16,280
6" Gravel borrow	104	CY	14.00	1,456
Ordinary borrow	620	CY	8.50	5,270
24" Perf. pipe	500	LF	32.00	16,000
Filter fabric	12,136	SF	0.36	4,369
				-----
				913,110

G3060 FUEL DISTRIBUTION

Gas meter pad	1	EA	1,500.00	1,500
---------------	---	----	----------	-------

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
Trench excavation/backfill	500	LF	42.00	21,000
Gas service		By Gas Co.		
*Central Street gas line extension by Gas Co.				
				----- 22,500
G3090 OTHER SITE MECHANICAL UTILITIES		N/A		
				----- 0
<b>TOTAL G30 - SITE MECHANICAL UTILITIES</b>				<b>1,091,699</b>

**G40 - SITE ELECTRICAL UTILITIES**

G4010 ELECTRICAL DISTRIBUTION

FEEDERS - 100% NEUTRAL:

PVC - UNDERGROUND - THREE PHASE

60 AMP	60	LF	11.15	669
100 AMP	60	LF	21.40	1,284
225 AMP	60	LF	44.60	2,676
1600 AMP	50	LF	409.10	20,455

SPARE OR EMPTY RACEWAYS

PVC - UNDERGROUND

3"	1,080	LF	14.00	15,120
4"	720	LF	18.30	13,176
5"	480	LF	28.20	13,536

GENERATOR SIGNAL - UNDERGROUND

Annunciator circuits	60	LF	11.70	702
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GROUNDING

Ground rod 3/4" x 10'	4	EA	123.00	492
Bare copper wire - #1/0	50	LF	3.30	165

Transformer pad	1	EA	1,500.00	1,500
Emergency generator pad	1	EA	1,500.00	1,500
Conc. duct bank		N/A		
Trench/sand bed	240	LF	25.00	6,000
Removal utility poles		By others		
Utility Backcharge		By others		
				-----

DESCRIPTION	QUANTITY	UNIT	UNIT COST	TOTAL
-------------	----------	------	-----------	-------

77,275

G4030 SITE COMMUNICATIONS & SECURITY

4" Conduit -Conc. Duct bank Trench/sand bed	320	N/A LF	25.00	8,000
				----- 8,000

G4090 OTHER SITE ELECTRICAL UTILITIES

N/A

-----  
0

<b>TOTAL G40 - SITE ELECTRICAL UTILITIES</b>				<b>85,275</b>
--	--	--	--	---------------

**G90 - OTHER SITE CONSTRUCTION**

G9010 SERVICE AND PEDESTRIAN TUNNELS

N/A

-----  
0

G9090 OTHER SITE SYSTEMS

N/A

-----  
0

<b>TOTAL G90 - OTHER SITE CONSTRUCTION</b>				<b>0</b>
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**Sherwood Middle School**  
**Design Development Estimate**  
**Estimate Summary**

*Final Reconciled*

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>SUBSTRUCTURE</b>			
FOUNDATIONS	129,939.00 sf	13.74 /sf	1,785,045
<b>SUBSTRUCTURE</b>	<b>129,939.00 SF</b>	<b>13.74 /SF</b>	<b>1,785,045</b>
<b>SHELL</b>			
SUPERSTRUCTURE	129,939.00 sf	18.47 /sf	2,399,472
EXTERIOR CLOSURE	129,939.00 sf	26.95 /sf	3,502,075
ROOFING	129,939.00 sf	6.41 /sf	833,283
<b>SHELL</b>	<b>129,939.00 SF</b>	<b>51.83 /SF</b>	<b>6,734,830</b>
<b>INTERIORS</b>			
INTERIOR CONSTRUCTION	129,939.00 sf	21.00 /sf	2,728,279
STAIRWAYS	129,939.00 sf	1.50 /sf	195,270
INTERIOR FINISHES	129,939.00 sf	17.65 /sf	2,293,498
<b>INTERIORS</b>	<b>129,939.00 SF</b>	<b>40.15 /SF</b>	<b>5,217,047</b>
<b>SERVICES</b>			
CONVEYING SYSTEMS	129,939.00 sf	0.89 /sf	115,500
PLUMBING SYSTEMS	129,939.00 sf	8.89 /sf	1,154,450
HVAC SYSTEMS	129,939.00 sf	24.63 /sf	3,200,586
FIRE PROTECTION SYSTEMS	129,939.00 sf	3.84 /sf	499,512
ELECTRICAL SYSTEMS	129,939.00 sf	22.43 /sf	2,915,098
<b>SERVICES</b>	<b>129,939.00 SF</b>	<b>60.68 /SF</b>	<b>7,885,146</b>
<b>EQUIPMENT AND FURNISHINGS</b>			
EQUIPMENT	129,939.00 sf	5.31 /sf	689,600
FURNISHINGS	129,939.00 sf	7.04 /sf	915,140
<b>EQUIPMENT AND FURNISHINGS</b>	<b>129,939.00 SF</b>	<b>12.35 /SF</b>	<b>1,604,741</b>
<b>OTHER BUILDING CONSTRUCTION</b>			
BUILDING DEMOLITION	129,939.00 SF	7.50 /SF	974,850
<b>OTHER BUILDING CONSTRUCTION</b>	<b>129,939.00 SF</b>	<b>7.50 /SF</b>	<b>974,850</b>
<b>SITWORK</b>			
SITE PREPARATION	129,939.00 sf	3.67 /sf	476,948
SITE IMPROVEMENTS	129,939.00 sf	14.16 /sf	1,840,191
SITE UTILITIES	129,939.00 sf	10.51 /sf	1,365,435
<b>SITWORK</b>	<b>129,939.00 SF</b>	<b>28.34 /SF</b>	<b>3,682,574</b>
<b>SITE SERVICES</b>			
SITE SERVICES	129,939.00 sf	7.92 /sf	1,028,725
<b>SITE SERVICES</b>	<b>129,939.00 SF</b>	<b>7.92 /SF</b>	<b>1,028,725</b>



**Sherwood Middle School**  
**Design Development Estimate**  
**Estimate Summary**

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**Estimate Totals**

Description	Amount	Totals	Rate	Cost per Unit
<b>Trade Cost Total</b>	<b>28,912,958</b>	<b>28,912,958</b>		<b>222.51 /Sqft</b>
Estimate Contingency	1,445,648		5.000 %	11.13 /Sqft
Escalation	433,694		1.500 %	3.34 /Sqft
CM Contingency	1,445,648		5.000 %	11.13 /Sqft
- Subtotal	3,324,990	32,237,948		248.10 /Sqft
		32,237,948		248.10 /Sqft
CM Preconstruction Services	90,000			0.69 /Sqft
CM General Conditions	2,806,715			21.60 /Sqft
Builders Risk Insurance (Incl)				
CM Liab Insurance (Incl)				
CM Bond (Incl)				
CM Fee	407,000			3.13 /Sqft
- Subtotal	3,303,715	35,541,663		273.53 /Sqft
<b><u>Total</u></b>		<b><u>35,541,663</u></b>		<b>273.53 /Sqft</b>



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>SUBSTRUCTURE</b>			
<b>FOUNDATIONS</b>			
<b>Standard Foundations</b>			
<b>Perimeter Wall Footings</b>			
Continuous Footing Forms	4,533.00 sf	7.00 /sf	31,731
- EVO, Radial Forms	4,533.00 sf	3.00 /sf	13,599
- EVO, Footing Steps	14.00 ea	675.00 /ea	9,450
Keyway @Continuous Footing	2,027.00 lf	3.50 /lf	7,095
Rebar - Supply & Install - Continuous Footing	22.00 ton	1,850.00 /ton	40,700
3000 psi Concrete - Continuous Footings	448.00 cy	95.00 /cy	42,560
Place Concrete - Continuous Footings	435.00 cy	30.00 /cy	13,048
<b>Perimeter Wall Footings</b>	<b>435.00 Cuyd</b>	<b>363.64 /Cuyd</b>	<b>158,184</b>
<b>Column Footings</b>			
Column Footings Forms	2,293.00 sf	8.50 /sf	19,490
Column Diamonds, Grout	60.00 ea	75.00 /ea	4,500
Rebar - Supply & Install - Column Footing	7.00 ton	1,850.00 /ton	12,950
3000 psi Concrete - Column Footings	138.00 cy	95.00 /cy	13,110
Place Concrete - Column Footings	134.00 cy	30.00 /cy	4,020
<b>Column Footings</b>	<b>134.00 Cuyd</b>	<b>403.51 /Cuyd</b>	<b>54,070</b>
<b>Foundation Walls &lt; 8'</b>			
Form Walls = 4' and 6' Frost Walls	13,707.00 sf	8.00 /sf	109,655
EVO - Form Radial Walls	1,041.00 sf	4.00 /sf	4,164
Brick Shelf	1,550.00 lf	5.00 /lf	7,750
Rub Exposed Foundation Wall	2,000.00 sf	7.50 /sf	15,002
Rebar - Supply & Install - Standard Foundation Wall	16.00 ton	1,850.00 /ton	29,600
4000 psi Concrete - Frost Walls	261.00 cy	105.00 /cy	27,405
Place Concrete - Frost Walls	253.00 cy	35.00 /cy	8,855
<b>Foundation Walls &lt; 8'</b>	<b>253.00 Cuyd</b>	<b>800.12 /Cuyd</b>	<b>202,430</b>
<b>Foundation Walls &gt; 8'</b>			
Form Walls = 11', 13', and 15'	14,702.00 sf	11.00 /sf	161,670
<b>EVO - Bracing for backfill - prior to steel erection</b>	<b>N.A.</b>	<b>/N.A.</b>	
Rebar - Supply & Install - Standard Foundation Wall	30.00 ton	1,850.00 /ton	55,500
4000 psi Concrete - Foundation Walls	475.00 cy	105.00 /cy	49,875
Place Concrete - Foundation Walls	460.00 cy	35.00 /cy	16,099
<b>Foundation Walls &gt; 8'</b>	<b>460.00 Cuyd</b>	<b>615.53 /Cuyd</b>	<b>283,144</b>
<b>Foundation Walls - Damproof, Insulation, Vapor Barrier</b>			
Foundation Insulation	14,205.00 sf	2.90 /sf	41,195
Drainiage Mat	14,205.00 sf	3.00 /sf	42,615
Damproof@Frost Walls	6,854.00 sf	1.50 /sf	10,281
Waterproofing / Vapor Barrier @Foundation Walls	7,351.00 sf	5.00 /sf	36,755
<b>Foundation Walls - Damproof, Insulation, Vapor Barrier</b>	<b>14,205.00 sf</b>	<b>9.21 /sf</b>	<b>130,845</b>
<b>Piers - Stand alone</b>			
Form Piers @ Isolated Column Footing	480.00 sf	11.99 /sf	5,757
Rebar - Supply & Install - Piers	0.63 ton	1,850.00 /ton	1,156
4000 psi Concrete - Column Footing Pier	10.00 cy	105.00 /cy	1,050
Place Concrete - Column Footing Pier	9.00 cy	35.00 /cy	315
<b>Piers - Stand alone</b>	<b>9.00 Cuyd</b>	<b>919.78 /Cuyd</b>	<b>8,278</b>
<b>Pilasters @Walls</b>			
Form Pilasters @Foundation Wall	600.00 sf	12.00 /sf	7,200
Rebar - Supply & Install - Pilasters	2.00 ton	1,850.00 /ton	3,700
4000 psi Concrete -Pilasters	18.00 cy	105.00 /cy	1,890
Place Concrete - Pilasters	17.00 cy	32.00 /cy	544



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Pilasters @Walls</b>	<b>17.00 Cuyd</b>	<b>784.37 /Cuyd</b>	<b>13,334</b>
<b>Tie Beams</b>			
Tie Beam Forms	1,954.00 sf	9.00 /sf	17,586
Rebar - Supply & Install - Tie Beams	3.00 ton	1,850.00 /ton	5,550
4000 psi Concrete - Tie Beams	51.00 cy	105.00 /cy	5,355
Place Concrete - Tie Beams	49.00 cy	30.00 /cy	1,470
<b>Tie Beams</b>	<b>49.00 Cuyd</b>	<b>611.45 /Cuyd</b>	<b>29,961</b>
<b>Misc Special Conditions</b>			
Set Misc Embeds / Anchor Bolts / Provide Utility Box-outs	1.00 Ls	2,500.00 /Ls	2,500
<b>Winter Conditions - Excluded</b>	<b>Excl</b>	<b>/Excl</b>	
Misc. Accessories / Tools / Equip	1.00 Ls	5,000.00 /Ls	5,000
Lay-out & Engineering	1.00 Ls	3,500.00 /Ls	3,500
Railings / Toe Boards @Openings	1.00 Ls	15,000.00 /Ls	15,000
Misc Safety / Osha	1.00 Allw	10,000.00 /Allw	10,000
<b>Misc Special Conditions</b>	<b>129,939.00 sf</b>	<b>0.28 /sf</b>	<b>36,000</b>
<b>Excavate for Footings</b>			
Excav. Continuous Footings & Foundation Walls Below Subgrade	5,850.00 cyds	8.00 /cyds	46,803
Excav. Column Footings Below subgrade	1,100.00 cyds	8.00 /cyds	8,801
Excav. Elevator Pits	35.00 cyds	8.00 /cyds	280
Rough Grade Continuous Footings	2,030.00 sy	1.50 /sy	3,044
Rough Grade Column Footings	335.00 sy	1.50 /sy	502
Fine Grade Continuous Footings / Grade Beams	18,250.00 sf	0.70 /sf	12,775
Fine Grade Column Footings / Pit Mat Slab	3,000.00 sf	0.70 /sf	2,100
Site Fills from Borrow - Structural Fill within footprint - compacted in lifts	4,350.00 cy	18.00 /cy	78,300
Site Fills from Borrow - Drainage Fill @Foundation Walls	3,950.00 cy	18.00 /cy	71,100
Ledge Blasting & Removal - Bulk Excavation	1,500.00 cy	50.00 /cy	75,000
Gravel Backfill Continuous Footings Below Subgrade	750.00 cyds	20.00 /cyds	15,001
Gravel Backfill Column Footings below subgrade	150.00 cyds	20.00 /cyds	3,001
Perimeter / Underslab Foundation Drainage	625.00 lf	4.00 /lf	25,000
<b>Excavate for Footings</b>	<b>129,939.00 sf</b>	<b>2.63 /sf</b>	<b>341,706</b>
<b>Standard Foundations</b>	<b>129,939.00 sf</b>	<b>9.68 /sf</b>	<b>1,257,953</b>
<b>Slab on Grade</b>			
<b>Slab on Grade</b>			
Slab Edge Form	2,500.00 lf	5.50 /lf	13,752
S-O-G Const Joints - Slab on Grade	1,060.00 lf	4.50 /lf	4,770
Rebar - Supply & Install - Slab on Grade (@Perimeter)	7.00 ton	1,825.00 /ton	12,775
Wire Mesh 6x6 - W2.9xW2.9 - Slab on Grade, +10%	58,300.00 sf	0.70 /sf	40,810
3000 psi Concrete - Slab on Grade	842.00 cy	93.00 /cy	78,306
Place Concrete - Slab on Grade	818.00 cy	25.00 /cy	20,451
Column Diamonds - Complete with Concrete - Slab on Grade	135.00 ea	50.00 /ea	6,750
Finish- Slab on Grade	53,000.00 sf	0.95 /sf	50,349
Saw Cut Control Jnts - Slab on Grade	3,180.00 lf	2.60 /lf	8,254
Cure & Protect	53,000.00 sf	0.10 /sf	5,300
<b>Slab on Grade</b>	<b>53,000.00 sf</b>	<b>4.56 /sf</b>	<b>241,516</b>
<b>Underslab Insulation &amp; Vapor Retarder</b>			
Rigid Insulation @ SOG	53,000.00 sf	2.80 /sf	148,400
Vapor Barrier @SOG - 15 mil poly	53,000.00 sf	0.50 /sf	26,500
<b>Underslab Insulation &amp; Vapor Retarder</b>	<b>53,000.00 sf</b>	<b>3.30 /sf</b>	<b>174,900</b>
<b>Misc Special Conditions</b>			
Slab Depressions	1.00 Ls	5,000.00 /Ls	5,000
<b>Thickened Slab / Haunched Slab @Interior Masonry</b>	<b>NA</b>	<b>/NA</b>	
Misc Curbs	1.00 Allw	2,500.00 /Allw	2,500
Mech Pads	1.00 Allw	5,000.00 /Allw	5,000



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Misc Special Conditions</b>			
Loading Dock Slab	232.00 Sqft	25.00 /Sqft	5,800
Structural Slab - One Way Slab Pedestrian Bridge above Dock	280.00 Sqft	40.00 /Sqft	11,200
<b>Misc Special Conditions</b>	<b>53,000.00 sf</b>	<b>0.56 /sf</b>	<b>29,500</b>
<b>Excavation &amp; Backfill</b>			
Rough Grade & Roll Bldg Slab	5,900.00 sy	0.85 /sy	4,998
Fine Grade @ Slab	53,000.00 sf	0.45 /sf	23,811
Gravel @Slab on Grade	2,000.00 cyds	20.00 /cyds	40,000
<b>Excavation &amp; Backfill</b>	<b>53,000.00 sf</b>	<b>1.30 /sf</b>	<b>68,809</b>
<b>Slab on Grade</b>	<b>53,000.00 sf</b>	<b>9.71 /sf</b>	<b>514,725</b>
<b>Pit Walls &amp; Slabs</b>			
<b>Pit Slab</b>			
Pit Slab Edge Forms	42.00 sf	8.50 /sf	357
Rebar - Supply & Install - Pit Slab	0.25 ton	1,850.00 /ton	463
4000 psi Concrete - Elev Pit Mat Slab	4.00 cy	105.00 /cy	420
Place Concrete - Elev Pit Mat Slab	4.00 cy	30.00 /cy	120
<b>Pit Slab</b>	<b>4.00 Cuyd</b>	<b>339.88 /Cuyd</b>	<b>1,360</b>
<b>Pit Walls</b>			
Form Wall to 4' - Elev Pit Wall	251.00 sf	9.00 /sf	2,260
Foundation Insulation - Elev. Pit	125.00 sf	3.00 /sf	375
Rebar - Supply & Install - Elev. Pit Wall	0.35 ton	1,850.00 /ton	648
4000 psi Concrete - Elevator Pit Walls	5.00 cy	105.00 /cy	525
Place Concrete - Elevator Pit Walls	5.00 cy	30.00 /cy	150
<b>Pit Walls</b>	<b>5.00 Cuyd</b>	<b>791.41 /Cuyd</b>	<b>3,957</b>
<b>Waterproof Pit</b>			
Waterproofing - Pit Slab	110.00 sf	30.00 /sf	3,300
Waterproofing - Pit Wall	125.00 sf	30.00 /sf	3,750
<b>Waterproof Pit</b>	<b>235.00 sf</b>	<b>30.00 /sf</b>	<b>7,050</b>
<b>Pit Walls &amp; Slabs</b>	<b>9.00 Cuyd</b>	<b>1,374.07 /Cuyd</b>	<b>12,367</b>
<b>FOUNDATIONS</b>	<b>129,939.00 sf</b>	<b>13.74 /sf</b>	<b>1,785,045</b>
<b>SUBSTRUCTURE</b>	<b>129,939.00 SF</b>	<b>13.74 /SF</b>	<b>1,785,045</b>
<b>SHELL</b>			
<b>SUPERSTRUCTURE</b>			
<b>Floor Construction - Steel Framed</b>			
<b>Structural Steel &amp; Metal Deck</b>			
<b>Perimeter Protection</b>	<b>Incl</b>	<b>/Incl</b>	
Columns-WF	126.00 ton	1,725.00 /ton	217,350
Beams & Girders-WF	234.00 ton	1,725.00 /ton	403,650
<b>HSS / AESS</b>	<b>Excl</b>	<b>/Excl</b>	
Bracing Bays - HSS	20.00 ton	2,000.00 /ton	40,000
Base Plates / Anchor Bolts	135.00 sets	75.00 /sets	10,125
Misc shapes & connections - 10%	40.00 ton	1,900.00 /ton	76,000
Labor premium @Column Splices (allow)	150.00 ea	200.00 /ea	29,999
Labor premium @moment connections (allow)	250.00 ea	250.00 /ea	62,500
Beam Penetrations - Shop - allow	500.00 Loc	500.00 /Loc	250,000
Shear Studs	5,385.00 ea	2.00 /ea	10,770
Opening Support Framing - allow	20.00 ton	1,800.00 /ton	36,000
Metal Floor Deck 1 1/2" x 20 Ga. x Composite x Galv	70,738.00 sf	2.90 /sf	205,141
Bent Plate Slab Stop	2,896.00 lf	6.00 /lf	17,376
<b>Structural Steel &amp; Metal Deck</b>	<b>440.00 Tons</b>	<b>3,088.43 /Tons</b>	<b>1,358,910</b>
<b>Spray-on Fireproofing</b>			
Spray Fireproofing framing - columns (only stair / shaft bays)	1,500.00 sfca	3.50 /sfca	5,250



# Sherwood Middle School Design Development Estimate

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Spray-on Fireproofing</b>			
Spray Fireproofing framing - beams & girders (only stair / shaft bays)	5,000.00 sfca	2.75 /sfca	13,750
<b>Spray Fireproofing floor deck</b>	<b>Excl</b>	<b>/Excl</b>	
<b>Spray-on Fireproofing</b>	<b>129,939.00 sf</b>	<b>0.15 /sf</b>	<b>19,000</b>
<b>Intumescent Fireproofing</b>			
<b>Intrumescent Fireproofing</b>	<b>Excl</b>	<b>/Excl</b>	
<b>Perimeter Firestopping</b>			
Perimeter Firesafing @slab edge	3,000.00 Lnft	20.00 /Lnft	60,000
<b>Perimeter Firestopping</b>	<b>129,939.00 sf</b>	<b>0.46 /sf</b>	<b>60,000</b>
<b>Slab on Metal Deck</b>			
Rebar - Supply & Install - Slab on Metal Deck - Typical @Perimeter Edge	7.50 tons	1,850.00 /tons	13,875
Wire Mesh 6x6 - W2.9xW2.9 - Slab on Metal Deck	77,812.00 sf	0.75 /sf	57,959
4000 psi Concrete - Slab on Metal Deck - Normalwt	1,355.00 cy	105.00 /cy	142,275
Place Concrete - Slab on Metal Deck	1,315.00 cy	25.00 /cy	32,875
Finish - Slab on Metal Deck	70,738.00 sf	1.20 /sf	84,886
Cure & Protect Slab-on-Deck	70,738.00 sf	0.15 /sf	10,611
<b>Slab on Metal Deck</b>	<b>70,238.00 sf</b>	<b>4.88 /sf</b>	<b>342,480</b>
<b>Floor Construction - Steel Framed</b>	<b>129,939.00 sf</b>	<b>13.70 /sf</b>	<b>1,780,390</b>
<b>Roof Construction</b>			
<b>Structural Steel &amp; Metal Deck</b>			
<b>Perimeter Protection</b>	<b>Incl</b>	<b>/Incl</b>	
Beams & Girders-WF	118.00 ton	1,725.00 /ton	203,550
Misc shapes & connections - 10%	20.00 ton	1,900.00 /ton	38,000
Labor premium @moment connections - Allow	125.00 ea	250.00 /ea	31,250
Galv. Steel Dunnage @Roof Top Equipment	10.00 tons	2,500.00 /tons	25,000
Long Span Open Web Joists	65.00 ton	1,625.01 /ton	105,625
Opening Support Framing - allow	10.00 ton	1,800.00 /ton	18,000
Parapet Support Steel Framing	1.00 Allw	25,000.00 /Allw	25,000
Metal Deck 1-1/2" x 22 Ga. x Composite x Galv - Roof Deck	36,728.00 sf	2.75 /sf	101,004
Metal Deck 3" x 18 Ga. x Composite x Galv - Roof Deck - Conc Walkway Only	2,500.00 sf	3.10 /sf	7,750
Acoustical Deck - Gymnasium	8,775.00 sf	6.00 /sf	52,650
<b>Structural Steel &amp; Metal Deck</b>	<b>223.00 Tons</b>	<b>2,725.69 /Tons</b>	<b>607,830</b>
<b>Spray-on Fireproofing</b>			
<b>Spray Fireproofing roof framing / roof deck</b>	<b>Excl</b>	<b>/Excl</b>	
<b>Slab on Metal Deck</b>			
Slab on Deck at Roof - Walkway	2,500.00 sf	4.50 /sf	11,252
<b>Slab on Metal Deck</b>	<b>129,939.00 sf</b>	<b>0.09 /sf</b>	<b>11,252</b>
<b>Roof Construction</b>	<b>129,939.00 sf</b>	<b>4.76 /sf</b>	<b>619,082</b>
<b>SUPERSTRUCTURE</b>	<b>129,939.00 sf</b>	<b>18.47 /sf</b>	<b>2,399,472</b>
<b>EXTERIOR CLOSURE</b>			
<b>Exterior Wall Construction</b>			
<b>Steel - Facade Support</b>			
Facade Support @Precast veneer - 5# / sf	9.00 ton	2,600.00 /ton	23,400
<b>Facade Support @Mechanical Screen Walls</b>	<b>Excl</b>	<b>/Excl</b>	
<b>Loose Lintels</b>	<b>Excl</b>	<b>/Excl</b>	
<b>Steel - Facade Support</b>	<b>129,939.00 sf</b>	<b>0.18 /sf</b>	<b>23,400</b>
<b>Masonry Veneer</b>			
<b>Masonry Veneer - Excluded - Carry All Precast</b>	<b>Excl</b>	<b>/Excl</b>	



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Precast Concrete</b>			
Architectural Precast Panel Veneer	3,608.00 sf	40.00 /sf	144,309
<b>Precast Sills / Lintels</b>	<b>Excl</b>	<b>/Excl</b>	
<b>Precast Concrete</b>	<b>129,939.00 sf</b>	<b>1.11 /sf</b>	<b>144,309</b>
<b>Metal Cladding Systems</b>			
Metal Panel Veneer - PP-A - 12" coverage spacing, 12" rib spacing	5,536.00 sf	20.00 /sf	110,719
Metal Panel Veneer - PP-B - 16" coverage spacing, 6" rib spacing	11,467.00 sf	20.00 /sf	229,340
Metal Panel Veneer - PP-C - 16" coverage spacing, 2" rib spacing	13,413.00 sf	20.00 /sf	268,260
Metal Panel Veneer - FP - Flat Panel System	11,133.00 sf	40.00 /sf	445,321
Metal Panel Veneer - SP - Solar Wall Panel System	3,327.00 sf	45.00 /sf	149,702
Back-up Panel - Insulated Sandwich Panel System 3"	44,876.00 sf	19.00 /sf	852,644
<b>Metal Cladding Systems</b>	<b>129,939.00 sfwl</b>	<b>15.82 /sfwl</b>	<b>2,055,986</b>
<b>Mechanical Louvers &amp; Screening</b>			
<b>Mechanical Equipment Roof Screening</b>	<b>Excl</b>	<b>/Excl</b>	
Louvers - Allow @Elevator Override	1.00 Ls	2,500.00 /Ls	2,500
<b>Mechanical Louvers &amp; Screening</b>	<b>129,939.00 sf</b>	<b>0.02 /sf</b>	<b>2,500</b>
<b>Exterior Wall Carpentry</b>			
Blocking 2x6 @exterior wall openings	4,550.00 lf	7.50 /lf	34,136
Solid Surface Window Sills - assume at all windows	1,500.00 lf	60.00 /lf	90,001
<b>Exterior Wall Carpentry</b>	<b>129,939.00 sf</b>	<b>0.96 /sf</b>	<b>124,137</b>
<b>Veneer Back-up Partitions - Light Gauge Framing</b>			
<b>Insulation - NA - part of back-up panel system</b>	<b>NA</b>	<b>/NA</b>	
<b>Air Barriers - NA - part of back-up panel system</b>	<b>NA</b>	<b>/NA</b>	
Wall Flashing - bituthene, peel & stick membrane	44,876.00 sf	1.00 /sf	44,876
Exterior Caulking / Vertical Control Joints	44,876.00 sf	0.50 /sf	22,438
Exterior Wall Studs - 8" as back-up to veneer (Brick, Metal Panel, Terra Cotta)	37,001.00 sf	8.00 /sf	296,008
Exterior Wall Studs - 12"@Gym	7,875.00 sf	9.50 /sf	74,813
GWB returns at Windows / CW	3,050.00 lf	2.25 /lf	6,863
GWB @Inside Face of Exterior Wall	44,876.00 sf	1.75 /sf	78,533
<b>Exterior Sheathing</b>	<b>Excl</b>	<b>/Excl</b>	
<b>Veneer Back-up Partitions - Light Gauge Framing</b>	<b>129,939.00 sf</b>	<b>4.03 /sf</b>	<b>523,530</b>
<b>Exterior Wall Construction</b>	<b>129,939.00 sf</b>	<b>22.12 /sf</b>	<b>2,873,862</b>
<b>Exterior Glazing Systems</b>			
<b>Aluminum Windows &amp; Curtainwall</b>			
Aluminum Frame Storefront - J1	754.00 sf	50.00 /sf	37,699
Aluminum Frame Storefront - K1	56.00 sf	50.00 /sf	2,800
Aluminum Frame Storefront - L1	501.00 sf	50.00 /sf	25,049
Aluminum Frame Storefront - N1	487.00 sf	50.00 /sf	24,349
Aluminum Frame Storefront - P1	609.00 sf	50.00 /sf	30,449
Aluminum Frame Storefront - Q1	70.00 sf	50.00 /sf	3,500
Aluminum Frame Storefront - R1	327.00 sf	50.00 /sf	16,350
Aluminum Frame Storefront - S1	108.00 sf	50.00 /sf	5,400
Aluminum Frame Storefront - T1	418.00 sf	50.00 /sf	20,899
Aluminum Frame Storefront - U1	232.00 sf	50.00 /sf	11,600
Aluminum Frame Storefront - W1	531.00 sf	50.00 /sf	26,549
Aluminum Frame Storefront - X1 / X2	350.00 sf	50.00 /sf	17,499
Aluminum Frame Storefront - Y1	99.00 sf	50.00 /sf	4,950
Aluminum Frame Storefront - Z1	893.00 sf	50.00 /sf	44,649
Aluminum Frame Windows, A1-A2	692.00 sf	45.00 /sf	31,140
Aluminum Frame Windows, B1-B2	215.00 sf	45.00 /sf	9,675
Aluminum Frame Windows, C1-C2	1,061.00 sf	45.00 /sf	47,745
Aluminum Frame Windows, D1-D2	317.00 sf	45.00 /sf	14,265
Aluminum Frame Windows, E1-E2	2,185.00 sf	45.00 /sf	98,325



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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Aluminum Windows &amp; Curtainwall</b>			
Aluminum Frame Windows, F1-F2	156.00 sf	45.00 /sf	7,020
- Operable Sash / Hardware	156.00 ea	250.00 /ea	39,000
- Insect screens	156.00 ea	50.00 /ea	7,800
<b>Curtainwall</b>	<b>Excl</b>	<b>/Excl</b>	
<b>Aluminum Windows &amp; Curtainwall</b>	<b>129,939.00 sf</b>	<b>4.05 /sf</b>	<b>526,712</b>
<b>Exterior Glazing Systems</b>	<b>129,939.00 sf</b>	<b>4.05 /sf</b>	<b>526,712</b>
<b>Exterior Door Systems</b>			
<b>Hollow Metal Doors / Fr / Hdwe</b>			
<b>Exterior HM Doors - Non Scheduled (all Aluminum)</b>	<b>NA</b>	<b>/NA</b>	
<b>Overhead Doors</b>			
Overhead Door - Dock	1.00 Ea	10,000.00 /Ea	10,000
Overhead Door - Mech	1.00 Ea	10,000.00 /Ea	10,000
Overhead Door - Outdoor Storage	1.00 Ea	10,000.00 /Ea	10,000
<b>Overhead Doors</b>	<b>129,939.00 Excl</b>	<b>0.23 /Excl</b>	<b>30,000</b>
<b>Aluminum Doors &amp; Storefronts</b>			
Aluminum Doors / Frames / Hardware - Single	4.00 Leaf	4,750.00 /Leaf	19,000
Aluminum Doors / Frames / Hardware - Double	6.00 Pair	8,750.00 /Pair	52,500
<b>Aluminum Doors &amp; Storefronts</b>	<b>129,939.00 sf</b>	<b>0.55 /sf</b>	<b>71,500</b>
<b>Exterior Door Systems</b>	<b>129,939.00 sf</b>	<b>0.78 /sf</b>	<b>101,500</b>
<b>EXTERIOR CLOSURE</b>	<b>129,939.00 sf</b>	<b>26.95 /sf</b>	<b>3,502,075</b>
<b>ROOFING</b>			
<b>Roofing Systems</b>			
<b>Membrane Roof Systems</b>			
PT / FT Roof Blocking @ Perimeter	6,871.00 bdf	7.50 /bdf	51,533
Protection board	55,333.00 Sf	1.50 /Sf	83,000
Roof Insulation	55,333.00 sf	3.50 /sf	193,666
- Add for Tapered Insulation	14,390.00 sf	4.00 /sf	57,560
TPO Roofing Membrane	55,333.00 sf	5.25 /sf	290,498
Walkway Pads	5,500.00 sf	5.00 /sf	27,492
Counter Flashing - @roof to parapet walls	4,500.00 sf	8.00 /sf	36,000
Metal Roof Coping - Tall Parapet	379.00 lf	40.00 /lf	15,160
Metal Roof Coping - Short Parapet	1,355.00 lf	30.00 /lf	40,650
Metal Roof Edge	229.00 lf	35.00 /lf	8,015
Misc Penetration Flashing - drains, vents, fans, curbs, equip posts	1.00 Ls	10,000.00 /Ls	10,000
<b>Membrane Roof Systems</b>	<b>129,939.00 sf</b>	<b>6.26 /sf</b>	<b>813,573</b>
<b>Roofing Systems</b>	<b>129,939.00 sf</b>	<b>6.26 /sf</b>	<b>813,573</b>
<b>Roof Accessories</b>			
<b>Roof Accessories</b>			
Roof Expansion Assemblies	38.00 Lnft	45.00 /Lnft	1,710
<b>Scuppers</b>	<b>Plmb</b>	<b>/Plmb</b>	
Roof Access Hatch - Allow	1.00 Ls	3,500.00 /Ls	3,500
<b>Roof Accessories</b>	<b>129,939.00 sf</b>	<b>0.04 /sf</b>	<b>5,210</b>
<b>Roof Accessories</b>	<b>129,939.00 sf</b>	<b>0.04 /sf</b>	<b>5,210</b>
<b>Skylight Systems</b>			
<b>Skylight Systems</b>			
<b>Skylights</b>	<b>Excl</b>	<b>/Excl</b>	
<b>Misc Roof Items</b>			
<b>Misc Metals</b>			
<b>Roof Guardrail</b>	<b>Excl</b>	<b>/Excl</b>	



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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Misc Metals</b>			
Roof Access Ladders - Allow	30.00 vlf	150.00 /vlf	4,500
<b>Misc Metals</b>	<b>129,939.00 sf</b>	<b>0.04 /sf</b>	<b>4,500</b>
<b>Special Roof Items</b>			
Roof Protection / Patching Allowance During Construction	1.00 Allw	10,000.00 /Allw	10,000
<b>Special Roof Items</b>	<b>129,939.00 sf</b>	<b>0.08 /sf</b>	<b>10,000</b>
<b>Misc Roof Items</b>	<b>129,939.00 sf</b>	<b>0.11 /sf</b>	<b>14,500</b>
<b>ROOFING</b>	<b>129,939.00 sf</b>	<b>6.41 /sf</b>	<b>833,283</b>
<b>SHELL</b>	<b>129,939.00 SF</b>	<b>51.83 /SF</b>	<b>6,734,830</b>

### INTERIORS

#### INTERIOR CONSTRUCTION

##### Partitions

##### Drywall Partitions

Partition = Standard Interior Wall	5,590.00 sf	7.50 /sf	41,927
Partition = Standard Partition - Bathroom	9,049.00 sf	8.00 /sf	72,395
Partition = Standard - Kitchen / Cafe	5,909.00 sf	8.00 /sf	47,274
Partition = Corridor Partitions - unprotected	23,530.00 sf	8.50 /sf	200,014
Partition = Corridor Partitions - protected (behind lockers)	8,029.00 sf	8.25 /sf	66,242
Partition = Demising Partitions	38,492.00 sf	9.40 /sf	361,839
Partition = bathroom chase - 1 sided	3,150.00 sf	5.50 /sf	17,324
Partition = bathroom chase - 2 sided (2 rows mtl studs)	2,927.00 sf	10.50 /sf	30,732
Partition = Shaftwall - Elevator Shaft	1,264.00 sf	13.00 /sf	16,431
Partition = Shaftwall - Stairwells	5,610.00 sf	13.00 /sf	72,930
Partition = MEP Rooms, rated assembly	4,905.00 sf	11.75 /sf	57,634
Partition = Column Enclosure	6,942.00 sf	6.50 /sf	45,122
Partition = Furring	37,070.00 sf	4.50 /sf	166,815
Add for Cement Board Tile Backer	16,456.00 sf	2.25 /sf	37,026
Add for Abuse Resistant GWB	13,944.00 sf	1.75 /sf	24,402
<b>Drywall Partitions</b>	<b>129,939.00 sf</b>	<b>9.68 /sf</b>	<b>1,258,109</b>

##### Masonry Partitions

##### Interior CMU Partitions

	Excl	/Excl	
<b>Partitions</b>	<b>129,939.00 sf</b>	<b>9.68 /sf</b>	<b>1,258,109</b>

##### Doors / Frames / Hardware

##### Aluminum Doors & Storefronts

Aluminum Doors (incl hrdwr) - Single	1.00 leaf	4,250.00 /leaf	4,250
Aluminum Doors (incl hrdwr) - Double	5.00 Pair	8,000.00 /Pair	40,000
Interior Storefront	1,020.00 sqft	48.00 /sqft	48,960
<b>Aluminum Doors &amp; Storefronts</b>	<b>129,939.00 sf</b>	<b>0.72 /sf</b>	<b>93,210</b>

##### Hollow Metal

HM Welded Frames - Single	198.00 ea	225.00 /ea	44,550
HM Welded Frames - Double	31.00 ea	325.00 /ea	10,075
- premium for HM sidelights - 72 ea	756.00 sf	30.00 /sf	22,680

##### HM Borrowed Lites

	sf	/sf	
- Premium @ rated frames - 1 hr	11.00 ea	50.00 /ea	550
- Premium @ rated frames - 2 hr	2.00 ea	75.00 /ea	150
HM Door Leafs - M1 - Flush	42.00 ea	210.00 /ea	8,820
HM Door Leafs - M2 - Narrow Vision Lite	25.00 ea	260.00 /ea	6,500
HM Door Leafs - M3 - Full Glazed	17.00 ea	310.00 /ea	5,270
- Premium @ rated door - 1 hr	11.00 ea	50.00 /ea	550
- Premium @ rated door - 2 hr	2.00 ea	75.00 /ea	150
Install HM Doors & Frms	320.00 mnhr	75.00 /mnhr	24,000

<b>Hollow Metal</b>	<b>129,939.00 sf</b>	<b>0.95 /sf</b>	<b>123,295</b>
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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Interior Coiling Doors</b>			
SS Coiling Doors @Caf	4.00 ea	6,250.00 /ea	25,000
<b>Interior Coiling Doors</b>	<b>129,939.00 sf</b>	<b>0.19 /sf</b>	<b>25,000</b>
<b>Wood</b>			
Install Wood Doors	180.00 mnhr	75.00 /mnhr	13,500
Wood Door - Hardwood Veneer - W1, Flush	175.00 ea	325.00 /ea	56,875
Wood Door - Hardwood Veneer - W3, Full Glazed	1.00 ea	450.00 /ea	450
<b>Wood</b>	<b>129,939.00 sf</b>	<b>0.55 /sf</b>	<b>70,825</b>
<b>Hardware</b>			
Purchase Finish Hardware	260.00 set	360.00 /set	93,600
Recieve / Unload / Install Finish Hardware	800.00 mnhr	75.00 /mnhr	60,000
<b>Hardware</b>	<b>129,939.00 sf</b>	<b>1.18 /sf</b>	<b>153,600</b>
<b>Doors / Frames / Hardware</b>	<b>129,939.00 sf</b>	<b>3.59 /sf</b>	<b>465,930</b>
<b>Interior Caulking</b>			
<b>Interior Caulking</b>			
Interior Caulking Allowance - \$ / sqft	129,939.00 Gsf	0.40 /Gsf	51,976
<b>Interior Caulking - Door Frames, both sides</b>	<b>Incl</b>	<b>/Incl</b>	
<b>Interior Caulking - Borrowed lights / Sidelights</b>	<b>Incl</b>	<b>/Incl</b>	
<b>Interior Caulking - Millwork, exterior window sills</b>	<b>Incl</b>	<b>/Incl</b>	
<b>Interior Caulking - Plumbing Fixtures</b>	<b>Incl</b>	<b>/Incl</b>	
<b>Interior Caulking</b>	<b>129,939.00 sf</b>	<b>0.40 /sf</b>	<b>51,976</b>
<b>Interior Caulking</b>	<b>129,939.00 sf</b>	<b>0.40 /sf</b>	<b>51,976</b>
<b>Interior Glazing Systems</b>			
<b>Glazed Openings</b>			
Glazing in classroom / Admin sidelights	756.00 sf	43.00 /sf	32,508
HM Borrowed Lites	170.00 sf	35.00 /sf	5,950
Mirror	42.00 ea	135.00 /ea	5,670
Glazing in door vision panels - Narrow Lites	25.00 ea	140.00 /ea	3,500
Glazing in door vision panels - Full Glazed	17.00 ea	250.00 /ea	4,250
<b>Glazed Openings</b>	<b>129,939.00 sf</b>	<b>0.40 /sf</b>	<b>51,878</b>
<b>Interior Glazing Systems</b>	<b>129,939.00 sf</b>	<b>0.40 /sf</b>	<b>51,878</b>
<b>Misc. &amp; Ornamental Metals</b>			
<b>Misc Metals</b>			
Elev. Sump Pit Covers-Galv.	1.00 ea	250.00 /ea	250
Elev. Pit Ladders	1.00 ea	900.00 /ea	900
Elev. Hoist Beams	1.00 ton	3,000.00 /ton	3,000
Elev. Sill Angles	3.00 ea	500.00 /ea	1,500
<b>C.M.U. Stabilizer Clips-Galv. @ Interior Partitions</b>	<b>NA</b>	<b>/NA</b>	
Athletic Equipment Support - basketball goals	6.00 Loc	2,500.00 /Loc	15,000
Divider Screen Support	141.00 Lnft	75.00 /Lnft	10,575
Operable Partition Support	63.00 Lnft	125.00 /Lnft	7,875
Cubicle Curtain track Support	60.00 Lnft	5,000.00 /Lnft	300,000
Misc Equipment Support - Allowance	1.00 Allw	5,000.00 /Allw	5,000
Projection Screen Supports	5.00 Loc	750.00 /Loc	3,750
Misc and Ornamental Metals	129,939.00 sf	0.50 /sf	64,970
Floor Expansion Assemblies	330.00 lf	50.00 /lf	16,500
Wall Expansion Assemblies	140.00 vlf	40.00 /vlf	5,600
<b>Misc Metals</b>	<b>129,939.00 sf</b>	<b>3.35 /sf</b>	<b>434,920</b>
<b>Misc. &amp; Ornamental Metals</b>	<b>129,939.00 sf</b>	<b>3.35 /sf</b>	<b>434,920</b>

Specialties



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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Misc Specialties</b>			
Cubicle Curtain / Track @ Nurse	60.00 Lnft	50.00 /Lnft	3,000
Operable Partitions @band - 14' ht	490.00 sf	70.00 /sf	34,300
Operable Partitions @stage proscenium - 50 Lnft x 18' ht	900.00 sf	75.00 /sf	67,500
<b>Misc Specialties</b>	<b>129,939.00 sf</b>	<b>0.81 /sf</b>	<b>104,800</b>
<b>Toilet Partitions</b>			
Toilet Partition	19.00 ea	1,200.00 /ea	22,800
HC Toilet Partition	12.00 ea	1,400.00 /ea	16,800
Changiong Compartment	10.00 ea	1,200.00 /ea	12,000
Urinal Screen	4.00 ea	400.00 /ea	1,600
<b>Toilet Partitions</b>	<b>129,939.00 sf</b>	<b>0.41 /sf</b>	<b>53,200</b>
<b>Lockers</b>			
Lockers @Corridor - Double Tier (Count as per Specs)	926.00 opng	150.00 /opng	138,900
Lockers @Gym - Steel Wire Basket Type (Count as per Specs)	450.00 opng	115.00 /opng	51,750
Locker Benches	106.00 Lnft	75.00 /Lnft	7,950
<b>Lockers</b>	<b>129,939.00 sf</b>	<b>1.53 /sf</b>	<b>198,600</b>
<b>Fire Extinguisher Cabinets</b>			
Fire Extin. / Cabinet - Recessed	1.00 Ls	20,000.00 /Ls	20,000
<b>Fire Extinguisher Cabinets</b>	<b>129,939.00 sf</b>	<b>0.15 /sf</b>	<b>20,000</b>
<b>Toilet Accessories</b>			
Soap Dispensers	42.00 ea	60.00 /ea	2,520
Towel Dispensers	25.00 ea	95.00 /ea	2,375
Waste Receptacles	25.00 ea	280.00 /ea	7,000
Bath Tissue Dispenser Double	43.00 ea	50.00 /ea	2,150
Coat Hooks	56.00 ea	15.00 /ea	840
Grab Bars	50.00 ea	160.00 /ea	8,000
<b>Toilet Accessories</b>	<b>129,939.00 sf</b>	<b>0.18 /sf</b>	<b>22,885</b>
<b>Signage</b>			
Signs - Room ID / Interior Signage - Allow	129,939.00 sf	0.30 /sf	38,982
Signs - Dedication Plaque	1.00 Allo	3,000.00 /Allo	3,000
Signs - pin letters, building mntd	1.00 ls	5,000.00 /ls	5,000
Signs - pin letters, Site Entry	1.00 ls	5,000.00 /ls	5,000
- Site Entry Sign Plinth - Sitework, Concrete, Masonry	1.00 ls	10,000.00 /ls	10,000
<b>Signage</b>		<b>/sf</b>	<b>61,982</b>
<b>Wall &amp; Corner Guards</b>			
Corner Guards	1.00 Allw	4,000.00 /Allw	4,000
<b>Wall &amp; Corner Guards</b>	<b>129,939.00 sf</b>	<b>0.03 /sf</b>	<b>4,000</b>
<b>Specialties</b>	<b>129,939.00 sf</b>	<b>3.58 /sf</b>	<b>465,467</b>
<b>INTERIOR CONSTRUCTION</b>	<b>129,939.00 sf</b>	<b>21.00 /sf</b>	<b>2,728,279</b>
<b>STAIRWAYS</b>			
<b>Stair Construction</b>			
<b>Concrete Fill @Metal Pan</b>			
Concrete @Metal Pan Stairs - - Stair 1	2.00 ft	1,700.00 /ft	3,400
Concrete @Metal Pan Stairs - - Stair 2	3.00 ft	2,200.00 /ft	6,600
Concrete @Metal Pan Stairs - - Stair 3	2.00 ft	1,950.00 /ft	3,900
Concrete @Metal Pan Stairs - - Stair 4	2.00 ft	1,950.00 /ft	3,900
<b>Concrete Fill @Metal Pan</b>	<b>129,939.00 sf</b>	<b>0.14 /sf</b>	<b>17,800</b>
<b>Misc Metals</b>			
Railings - at Mezzanine	45.00 Lnft	250.00 /Lnft	11,250
Railings - Metal Handrails at Ramp	80.00 Lnft	135.00 /Lnft	10,800



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Misc Metals</b>			
Metal Pan Stairs / Rail - Stair 1, 6' wide, open - 2 flights - incl railings	50.00 risr	800.00 /risr	40,000
Metal Pan Stairs / Rail - Stair 2, 4' wide, - 3 flights - incl railings	73.00 risr	540.00 /risr	39,420
Metal Pan Stairs / Rail - Stair 3, 6'-2" wide, - 2 flights - incl railings	50.00 risr	760.00 /risr	38,000
Metal Pan Stairs / Rail - Stair 4, 6'-2" wide, - 2 flights - incl railings	50.00 risr	760.00 /risr	38,000
<b>Misc Metals</b>	<b>129,939.00 sf</b>	<b>1.37 /sf</b>	<b>177,470</b>
<b>Stair Construction</b>	<b>129,939.00 sf</b>	<b>1.50 /sf</b>	<b>195,270</b>
<b>STAIRWAYS</b>	<b>129,939.00 sf</b>	<b>1.50 /sf</b>	<b>195,270</b>
<b>INTERIOR FINISHES</b>			
<b>Wall Finishes</b>			
<b>Wall Finishes</b>			
Laminate Wall Paneling - Lobbies	3,500.00 sf	45.00 /sf	157,500
Wood Wall Paneling - Stage Surround	1,000.00 sf	45.00 /sf	45,000
<b>Wall Finishes</b>	<b>129,939.00 sf</b>	<b>1.56 /sf</b>	<b>202,500</b>
<b>Tile Work</b>			
Ceramic Tile Walls - Corridors & Stairs - to 7' (pnt above) Pattern 1	15,788.00 sf	13.50 /sf	213,138
Ceramic Tile Walls - Pattern 1 - Full Ht	4,904.00 sf	13.50 /sf	66,204
Ceramic Tile Walls - Pattern 2 - Full Ht	10,704.00 sf	13.50 /sf	144,504
Ceramic Tile Walls - Pattern 3 - Full Ht	848.00 sf	13.50 /sf	11,448
<b>Tile Work</b>	<b>129,939.00 sf</b>	<b>3.35 /sf</b>	<b>435,294</b>
<b>Painting</b>			
<b>Vinyl Wall Covering</b>			
	<b>N.A.</b>	<b>/N.A.</b>	
Interior Paint - Wall - GWB	127,500.00 sf	0.65 /sf	82,875
Interior Paint - Wall - GWB - Epoxy Pnt Above Ceramic Tile	4,150.00 sf	1.25 /sf	5,188
Stain Wood Wall Paneling - Stage Surround	1,000.00 sf	2.50 /sf	2,500
<b>Interior Paint - Wall - CMU</b>	<b>NA</b>	<b>/NA</b>	
<b>Painting</b>	<b>129,939.00 sf</b>	<b>0.70 /sf</b>	<b>90,563</b>
<b>Special Wall Treatments</b>			
Accoustical Wall treatment - Allow at Caf	1.00 Allw	6,000.00 /Allw	6,000
Accoustical Wall treatment - Allow at Gymnasium - 5' x 7' panels	40.00 ea	950.00 /ea	38,000
Accoustical Wall treatment - Allow at Music / Practice	1.00 Allw	26,000.00 /Allw	26,000
<b>Special Wall Treatments</b>	<b>129,939.00 sf</b>	<b>0.54 /sf</b>	<b>70,000</b>
<b>Wall Finishes</b>	<b>129,939.00 sf</b>	<b>6.14 /sf</b>	<b>798,357</b>
<b>Floor Finishes</b>			
<b>Tile Work</b>			
Ceramic Tile Flooring	4,700.00 sf	13.25 /sf	62,275
Waterproof floor and flash cove base at Toilet Rooms	4,700.00 sf	6.50 /sf	30,550
Quarry Tile	2,800.00 sf	14.00 /sf	39,210
<b>Tile Work</b>	<b>129,939.00 sf</b>	<b>1.02 /sf</b>	<b>132,035</b>
<b>Painting</b>			
Seal concrete floors	6,500.00 sf	0.50 /sf	3,250
<b>Painting</b>	<b>129,939.00 sf</b>	<b>0.03 /sf</b>	<b>3,250</b>
<b>Resilient Flooring Systems</b>			
VCT Tile Type 1	52,000.00 sf	2.75 /sf	143,000
VCT Tile Type 2	16,000.00 sf	2.75 /sf	44,000
VCT Tile Type 3	4,300.00 sf	2.75 /sf	11,825
Linoleum	11,175.00 sf	7.25 /sf	81,018
Radial rubber tile - Stairs / landings	1,000.00 sf	14.50 /sf	14,500
Rubber Treads / Risers	1,200.00 lf	18.00 /lf	21,600
<b>Resilient Flooring Systems</b>	<b>129,939.00 sf</b>	<b>2.43 /sf</b>	<b>315,943</b>



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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Carpeting</b>			
Carpeting	12,000.00 sf	4.50 /sf	54,001
<b>Carpeting</b>	<b>129,939.00 sf</b>	<b>0.42 /sf</b>	<b>54,001</b>
<b>Wood Floor</b>			
Stage Flooring	1,550.00 sf	13.00 /sf	20,149
Gym Wood Flooring, incl striping	8,700.00 sf	18.00 /sf	156,600
<b>Wood Floor</b>	<b>129,939.00 sf</b>	<b>1.36 /sf</b>	<b>176,749</b>
<b>Misc. Floor System / Finish</b>			
Finished Floor Protection	1.00 Ls	10,000.00 /Ls	10,000
Floor Prep / Leveling	1.00 Ls	25,000.00 /Ls	25,000
Moisture Barrier Allowance	1.00 Allw	125,000.00 /Allw	125,000
Recessed Floor Mat / Frames	1.00 Ls	15,000.00 /Ls	15,000
<b>Misc. Floor System / Finish</b>	<b>129,939.00 sf</b>	<b>1.35 /sf</b>	<b>175,000</b>
<b>Floor Finishes</b>	<b>129,939.00 sf</b>	<b>6.60 /sf</b>	<b>856,978</b>
<b>Base Finishes</b>			
<b>Tile Work</b>			
Ceramic Mosaic Cove Base	1,450.00 lf	12.50 /lf	18,125
Quarry Tile Base	600.00 lf	14.00 /lf	8,400
<b>Tile Work</b>	<b>129,939.00 sf</b>	<b>0.20 /sf</b>	<b>26,525</b>
<b>Resilient Flooring Systems</b>			
Vinyl Cove Base 4"	16,500.00 lf	2.00 /lf	32,931
Vented resilient base - Gym	384.00 lf	10.00 /lf	3,840
<b>Resilient Flooring Systems</b>	<b>129,939.00 sf</b>	<b>0.28 /sf</b>	<b>36,770</b>
<b>Base Finishes</b>	<b>129,939.00 sf</b>	<b>0.49 /sf</b>	<b>63,295</b>
<b>Ceiling Finishes</b>			
<b>Painting</b>			
Interior Paint - Ceiling - GWB - Latex	4,500.00 sf	0.75 /sf	3,375
Interior Paint - Soffit / Fascia's - Latex	2,900.00 sf	0.85 /sf	2,465
Interior Paint - exposed structure - Gym Upper	8,700.00 sf	1.50 /sf	13,048
Interior Paint - exposed structure - Mech / Unfinished	6,500.00 sf	1.50 /sf	9,748
<b>Painting</b>	<b>129,939.00 sf</b>	<b>0.22 /sf</b>	<b>28,637</b>
<b>Drywall Ceilings</b>			
GWB Ceilings	4,500.00 sf	7.25 /sf	32,625
GWB Soffits / Fascia @clg ht transitions	2,900.00 sf	9.25 /sf	26,825
<b>Drywall Ceilings</b>	<b>129,939.00 sf</b>	<b>0.46 /sf</b>	<b>59,450</b>
<b>Acoustical Ceilings</b>			
ACT 2 x 2 Ceiling, Type 1 - Standard	97,000.00 sf	4.10 /sf	397,188
ACT 2 x 2 Ceiling, Type 2 - Washable Vinyl Faced at Kitchen	2,700.00 sf	5.25 /sf	14,167
ACT 2 x 2 Ceiling, Type 3, Gypsum Core = 50% @Band & Music	2,000.00 sf	3.90 /sf	7,800
<b>Acoustical Ceilings</b>	<b>129,939.00 sf</b>	<b>3.23 /sf</b>	<b>419,155</b>
<b>Specialty Ceilings</b>			
8" x8" Magna Grid - Open Cell Ceiling	525.00 sf	20.00 /sf	10,500
Unistrut Grid	500.00 sf	30.00 /sf	15,000
<b>Specialty Ceilings</b>	<b>129,939.00 sf</b>	<b>0.20 /sf</b>	<b>25,500</b>
<b>Ceiling Finishes</b>	<b>129,939.00 sf</b>	<b>4.10 /sf</b>	<b>532,742</b>
<b>Misc. Finishes</b>			
<b>Painting</b>			
Paint HM Frames - Single	198.00 ea	75.00 /ea	14,850



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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Painting</b>			
Paint HM Frames - Double	31.00 ea	75.00 /ea	2,325
Paint HM Borrowed lite / side lite frames	925.00 sf	5.00 /sf	4,625
Paint HM Doors	84.00 ea	100.00 /ea	8,400
Paint Stairs - +railings	9.00 Flt	450.00 /Flt	4,050
Paint Railings at Ramp	125.00 Lnft	15.00 /Lnft	1,875
Misc Interior/exterior Painting	80.00 mnhr	75.00 /mnhr	6,000
<b>Painting</b>	<b>129,939.00 sf</b>	<b>0.32 /sf</b>	<b>42,125</b>
<b>Misc. Finishes</b>	<b>129,939.00 sf</b>	<b>0.32 /sf</b>	<b>42,125</b>
<b>INTERIOR FINISHES</b>	<b>129,939.00 sf</b>	<b>17.65 /sf</b>	<b>2,293,498</b>
<b>INTERIORS</b>	<b>129,939.00 SF</b>	<b>40.15 /SF</b>	<b>5,217,047</b>

### SERVICES

#### CONVEYING SYSTEMS

##### Elevators & Lifts

##### Elevators

Hydraulic Passenger Elevator - 2500# Capacity, 28 VLF Travel, 150 FPM	3.00 Stop	28,500.00 /Stop	85,500
Elevator Cab Allowance	1.00 Allw	15,000.00 /Allw	15,000
<b>Elevators</b>	<b>129,939.00 sf</b>	<b>0.77 /sf</b>	<b>100,500</b>

##### ADA Lifts

Wheelchair Lift	1.00 ea	15,000.00 /ea	15,000
<b>ADA Lifts</b>	<b>129,939.00 sf</b>	<b>0.12 /sf</b>	<b>15,000</b>

<b>Elevators &amp; Lifts</b>	<b>129,939.00 sf</b>	<b>0.89 /sf</b>	<b>115,500</b>
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<b>CONVEYING SYSTEMS</b>	<b>129,939.00 sf</b>	<b>0.89 /sf</b>	<b>115,500</b>
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#### PLUMBING SYSTEMS

##### Plumbing Fixtures

*			
P-1 - Water Closet - Wall Hung	19.00 ea	1,108.08 /ea	21,054
P-1A - Water Closet - Wall Hung (HC)	22.00 ea	1,108.08 /ea	24,378
P-2 - Urinal (Waterless)	8.00 ea	1,097.28 /ea	8,778
P-3 - Lavatory, Wall Hung	13.00 ea	964.44 /ea	12,538
P-3A - Lavatory, Wall Hung (HC)	23.00 ea	872.64 /ea	20,071
P-5 - Lavatory, Countertop	7.00 ea	598.32 /ea	4,188
P-10 - Shower HC	2.00 ea	1,632.96 /ea	3,266
P-4 - Sink, Classroom	58.00 ea	799.20 /ea	46,354
P-7 - Sink, Countertop	3.00 ea	799.20 /ea	2,398
P-8 - Sink, Double Bowl	2.00 ea	1,045.44 /ea	2,091
P-12 - Service Sink, Wall	1.00 ea	1,036.80 /ea	1,037
P-11 - Mop Sink	3.00 ea	1,110.24 /ea	3,331
P-9 - Sink, Art Room	4.00 ea	1,663.20 /ea	6,653
P-6 - Bi-Level Electric Water Cooler	6.00 ea	3,391.20 /ea	20,347
P-13 - Washer Outlet Box	1.00 ea	154.44 /ea	154
*			
<b>Plumbing Fixtures</b>	<b>129,939.00 sf</b>	<b>1.36 /sf</b>	<b>176,636</b>

##### Plumbing Equipment

*			
RP-1&2 - Circulating Pump 1/8 HP, 10 GPM	2.00 ea	751.68 /ea	1,503
Grease Interceptor, 35 GPM / 70#	1.00 ea	10,891.80 /ea	10,892
Oil Interceptor, 20 GPM	1.00 ea	6,086.88 /ea	6,087
Wall Hydrant	4.00 ea	249.48 /ea	998
Hose Bibb	8.00 ea	160.11 /ea	1,281
Backflow Preventer (RP) 1"	1.00 ea	1,446.55 /ea	1,447
Backflow Preventer (RP) 4"	1.00 ea	6,077.59 /ea	6,078
Pressure Reducing Station w/Water Meter 4"	1.00 ea	5,228.28 /ea	5,228
WH-1&2 - 100 Gallon, 150 MBH	2.00 ea	17,375.04 /ea	34,750



# Sherwood Middle School Design Development Estimate

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
*			
WH-3 - Tankless Booster Heater	1.00 ea	3,287.52 /ea	3,288
TMV-A - Tempering Valve, 2"	1.00 ea	2,080.08 /ea	2,080
Expansion Tank 15 gal	1.00 ea	950.40 /ea	950
ET-1 - Expansion Tank, 14 Gallon	1.00 ea	1,815.48 /ea	1,815
Trap Primers	5.00 ea	1,550.88 /ea	7,754
			<b>84,151</b>
<b>Plumbing Equipment</b>	<b>129,939.00 sf</b>	<b>0.65 /sf</b>	<b>84,151</b>
<b>Domestic Water Piping</b>			
*			
1/2" & 3/4" Type L Copper	3,835.00 lf	21.60 /lf	82,836
1" Type L Copper	1,525.00 lf	30.24 /lf	46,116
1 1/4" & 1 1/2" Type L Copper	1,560.00 lf	34.56 /lf	53,914
2" Type L Copper	320.00 lf	50.76 /lf	16,243
2 1/2" Type L Copper	200.00 lf	64.80 /lf	12,960
3" Type L Copper	305.00 lf	75.60 /lf	23,058
4" Type L Copper	310.00 lf	86.40 /lf	26,784
Fiberglass Insulation	8,055.00 lf	8.64 /lf	69,595
			<b>331,506</b>
<b>Domestic Water Piping</b>	<b>129,939.00 sf</b>	<b>2.55 /sf</b>	<b>331,506</b>
<b>Sanitary Drain Piping</b>			
*			
CI Pipe Swgt 2"	245.00 lf	34.56 /lf	8,467
CI Pipe Swgt 3"	120.00 lf	45.36 /lf	5,443
CI Pipe Swgt 4"	1,275.00 lf	68.04 /lf	86,751
CI Pipe Swgt 6"	100.00 lf	71.28 /lf	7,128
CI Pipe Swgt 8"	75.00 lf	84.24 /lf	6,318
CI Pipe No Hub 1 1/2"	1,250.00 lf	30.24 /lf	37,800
CI Pipe No Hub 2"	1,185.00 lf	38.88 /lf	46,073
CI Pipe No Hub 3"	625.00 lf	48.60 /lf	30,375
CI Pipe No Hub 4"	780.00 lf	70.20 /lf	54,756
Indirect Waste Piping at Kitchen	150.00 lf	19.44 /lf	2,916
Floor Drains	20.00 ea	664.20 /ea	13,284
Floor Sink	4.00 ea	1,495.80 /ea	5,983
			<b>305,294</b>
<b>Sanitary Drain Piping</b>	<b>129,939.00 sf</b>	<b>2.35 /sf</b>	<b>305,294</b>
<b>Storm Drain Piping</b>			
*			
CI Pipe Swgt 8"	10.00 lf	84.24 /lf	842
CI Pipe Swgt 10"	200.00 lf	95.04 /lf	19,008
CI Pipe Swgt 12"	80.00 lf	105.84 /lf	8,467
6" No Hub Soil Pipe	830.00 lf	70.20 /lf	58,266
8" No Hub Soil Pipe	840.00 lf	84.24 /lf	70,762
Fiberglass Insualtion	1,445.00 lf	12.96 /lf	18,727
Roof Drain 6"	27.00 ea	815.40 /ea	22,016
			<b>198,088</b>
<b>Storm Drain Piping</b>	<b>129,939.00 sf</b>	<b>1.52 /sf</b>	<b>198,088</b>
<b>Natural Gas Piping</b>			
*			
3/4" Sch 40 Screwed CS	365.00 lf	21.60 /lf	7,884
1" Sch 40 Screwed CS	75.00 lf	32.40 /lf	2,430
2" & 2 1/2" Sch 40 Welded CS	325.00 lf	36.72 /lf	11,934
4" Sch 40 Welded CS	15.00 lf	64.80 /lf	972
6" Sch 40 Welded CS	90.00 lf	95.04 /lf	8,554



# Sherwood Middle School Design Development Estimate

## Estimate Detail

Final Reconciled

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
*			<b>31,774</b>
Natural Gas Piping	129,939.00 sf	0.25 /sf	31,774
<b>Plumbing Miscellaneous</b>			
*			
Plumbing Permits & Fees	1.00 ls	5,000.00 /ls	5,000
Coordination Drawings	1.00 ls	6,000.00 /ls	6,000
Pipe/Valve Identification	1.00 ls	3,000.00 /ls	3,000
Sleeving/Firestopping	1.00 ls	1,000.00 /ls	1,000
Test & Sterilize	1.00 ls	5,000.00 /ls	5,000
Vibration Isolation & Siesmic Restraints	1.00 ls	2,000.00 /ls	2,000
Allowance for Kitchen Equipment Connections	1.00 ls	5,000.00 /ls	5,000
*			<b>27,000</b>
Plumbing Miscellaneous	129,939.00 sf	0.21 /sf	27,000
<b>PLUMBING SYSTEMS</b>	<b>129,939.00 sf</b>	<b>8.89 /sf</b>	<b>1,154,450</b>
<b>HVAC SYSTEMS</b>			
<b>HVAC Major Equipment</b>			
*			
Multipurpose Valve 6"	2.00 ea	1,094.00 /ea	2,188
Flex Conn 150# SS Flange 6"	4.00 ea	599.93 /ea	2,400
Thermometer & Well	37.00 ea	197.50 /ea	7,308
Suction Diffuser 5" x 4"	2.00 ea	841.30 /ea	1,683
Strainer Flange Wye 125# 6"	2.00 ea	1,301.52 /ea	2,603
Press Gages	45.00 ea	144.50 /ea	6,503
Pump H.W. 440 gpm, 15 hp, es	2.00 ea	4,918.00 /ea	9,836
Micro Air Separator 8"	1.00 ea	10,467.00 /ea	10,467
Circuit Balance Valve 3/4"	171.00 ea	98.70 /ea	16,878
Circuit Balance Valve 1"	28.00 ea	123.10 /ea	3,447
Circuit Balance Valve 1-1/4"	1.00 ea	176.80 /ea	177
Circuit Balance Valve 1-1/2"	3.00 ea	207.60 /ea	623
Circuit Balance Valve 2"	3.00 ea	283.40 /ea	850
Circuit Balance Valve 2-1/2"	1.00 ea	737.60 /ea	738
Condensing Gas Fired Boiler - HW 1800 mbh Input	3.00 ea	36,632.00 /ea	109,896
Breeching & Stack	1.00 ls	15,000.00 /ls	15,000
AH Unit # 1 to # 4 - HW, VFD	1.00 ls	93,976.00 /ls	93,976
Rooftop AC W/ ERW, HW Coil, VFD	1.00 ls	416,968.00 /ls	416,968
Computer Room Split AC	2.00 ea	8,830.60 /ea	17,661
Curved Radiant Panel	80.00 LF	127.60 /LF	10,208
Fin Tube Radiation	1,410.00 lf	80.80 /lf	113,928
Electric Cabinet Heater	5.00 EA	1,217.00 /EA	6,085
Unit Heater	8.00 ea	804.00 /ea	6,432
Cabinet Unit Heater (ceiling)	17.00 ea	1,108.00 /ea	18,836
Cabinet Unit Heater (floor)	7.00 ea	1,072.00 /ea	7,504
Expansion Tank	2.00 ea	2,735.00 /ea	5,470
VFD for HW Pump 15 HP, 6Pulse	2.00 ea	4,649.00 /ea	9,298
Ceiling Mt. Exh. Fan	13.00 ea	570.00 /ea	7,410
Exh. Fan	1.00 ea	4,680.00 /ea	4,680
Air Intake & Relief Hood	2.00 ea	2,440.00 /ea	4,880
*			<b>913,930</b>
HVAC Major Equipment	129,939.00 sf	7.03 /sf	913,930
<b>Heating Water Piping</b>			
*			
Hot Water Piping	129,939.00 sf	4.85 /sf	630,204
*			<b>630,204</b>
Heating Water Piping	129,939.00 sf	4.85 /sf	630,204

Air Distribution



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
*			
Equipment Insulation	1.00 ls	2,500.00 /ls	2,500
Rigid Board Insulation, 3# 2"	1,500.00 sf	6.47 /sf	9,705
FRK Blanket Insulation, 2"	3,625.16 sf	1.86 /sf	6,743
FRK Blanket Insulation, 2"	7,063.78 sf	1.86 /sf	13,139
FRK Blanket Insulation, 2"	9,656.04 sf	1.86 /sf	17,960
FRK Blanket Insulation, 2"	8,918.45 sf	1.86 /sf	16,588
FRK Blanket Insulation, 2" for Areas not Designed	16,000.00 sf	1.86 /sf	29,760
Galvanized Steel Ductwork for areas not Designed	28,000.00 lb	7.60 /lb	212,800
Welded Black Iron Ductwork	1,000.00 lb	11.30 /lb	11,300
Galv. Steel Straight Duct, 18 Ga.	1,182.64 lbs	4.71 /lbs	5,570
Galv. Steel Straight Duct, 20 Ga.	1,944.98 lbs	5.62 /lbs	10,931
Galv. Steel Straight Duct, 20 Ga.	897.68 lbs	5.62 /lbs	5,045
Galv. Steel Straight Duct, 22 Ga.	2,313.71 lbs	6.81 /lbs	15,756
Galv. Steel Straight Duct, 22 Ga.	3,082.12 lbs	6.81 /lbs	20,989
Galv. Steel Straight Duct, 22 Ga.	5,341.96 lbs	6.81 /lbs	36,379
Galv. Steel Straight Duct, 24 Ga.	2,528.96 lbs	7.86 /lbs	19,878
Galv. Steel Straight Duct, 24 Ga.	4,708.23 lbs	7.86 /lbs	37,007
Galv. Steel Straight Duct, 24 Ga.	7,315.05 lbs	7.86 /lbs	57,496
Galv. Steel Straight Duct, 26 Ga.	241.18 lbs	8.49 /lbs	2,048
Galv. Steel Straight Duct, 26 Ga.	226.56 lbs	8.49 /lbs	1,924
Galv. Steel Spiral, 6" dia	225.00 lf	10.20 /lf	2,295
Galv. Steel Spiral, 8" dia	752.00 lf	11.65 /lf	8,761
Galv. Steel Spiral, 10" dia	1,089.00 lf	15.00 /lf	16,335
Galv. Steel Spiral, 10" dia	462.00 lf	15.00 /lf	6,930
Galv. Steel Spiral, 10" dia	492.00 lf	15.00 /lf	7,380
Galv. Steel Spiral, 12" dia	202.00 lf	17.50 /lf	3,535
Galv. Steel Spiral, 12" dia	44.00 lf	17.50 /lf	770
Galv. Steel Spiral, 14" dia	78.00 lf	20.00 /lf	1,560
Galv. Steel Spiral, 38" dia	50.00 lf	90.50 /lf	4,525
Galv. Steel Spiral, D.W. 12" dia	50.00 lf	65.40 /lf	3,270
Galv. Steel Spiral, D.W. 24" dia	20.00 lf	109.20 /lf	2,184
Galv. Steel Spiral, D.W. 26" dia	20.00 lf	119.40 /lf	2,388
Galv. Steel Spiral, D.W. 28" dia	310.00 lf	132.80 /lf	41,168
Galv. Steel Spiral, D.W. 30" dia	15.00 lf	144.00 /lf	2,160
Galv. Steel Spiral, D.W. 38" dia	30.00 lf	196.00 /lf	5,880
Duct Accessories	1.00 ls	29,500.00 /ls	29,500
Plenum	200.00 sf	28.40 /sf	5,680
Fire/Smoke Damper	1.00 ls	13,000.00 /ls	13,000
VAV Box w/RHC	93.00 ea	930.00 /ea	86,490
Fan Powered VAV Box w/RHC	5.00 ea	1,650.00 /ea	8,250
Diffuser & Register	327.00 ea	142.00 /ea	46,434
Linear Diffuser	140.00 ea	196.00 /ea	27,440
Testing	1.00 ls	7,500.00 /ls	7,500
Shop Drawing & Coordination	1.00 ls	25,000.00 /ls	25,000
Duct Seals	1.00 ls	10,000.00 /ls	10,000
Trucking & Handling	1.00 ls	15,000.00 /ls	15,000
Support for Commissioning	1.00 ls	7,500.00 /ls	7,500
			<b>924,452</b>
<b>Air Distribution</b>	<b>129,939.00 sf</b>	<b>7.12 /sf</b>	<b>924,452</b>
<b>Air &amp; Water Balance</b>			
*			
Testing	1.00 ls	8,500.00 /ls	8,500
Air Balancing	1.00 ls	37,000.00 /ls	37,000
Water Balancing	1.00 ls	18,000.00 /ls	18,000
Report & Misc.	1.00 ls	7,500.00 /ls	7,500
Support for Commissioning	1.00 ls	4,000.00 /ls	4,000
			<b>75,000</b>
<b>Air &amp; Water Balance</b>	<b>129,939.00 SF</b>	<b>0.58 /SF</b>	<b>75,000</b>



# Sherwood Middle School Design Development Estimate

## Estimate Detail

Final Reconciled

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Automatic Temperature Controls</b>			
*			
Automatic Temperature Controls	1.00 ls	475,000.00 /ls	475,000
<b>Hot water Generation</b>	<b>1.00 ls</b>	<b>/ls</b>	
<b>Rooftop Unit</b>	<b>11.00 ea</b>	<b>/ea</b>	
<b>Air Handling Unit</b>	<b>4.00 ea</b>	<b>/ea</b>	
<b>CRU</b>	<b>2.00 ea</b>	<b>/ea</b>	
<b>Exhaust Fan</b>	<b>1.00 ea</b>	<b>/ea</b>	
<b>ECH &amp; CEX</b>	<b>3.00 ea</b>	<b>/ea</b>	
<b>VAV Terminal Unit w/RHC</b>	<b>30.00 ea</b>	<b>/ea</b>	
<b>VAV Terminal Unit w/RHC &amp; FTR</b>	<b>63.00 ea</b>	<b>/ea</b>	
<b>Fan Terminal Unit w/RHC</b>	<b>5.00 ea</b>	<b>/ea</b>	
<b>CUH/UH/ECH</b>	<b>29.00 ea</b>	<b>/ea</b>	
<b>Fin Tube Radiation</b>	<b>1.00 ea</b>	<b>/ea</b>	
<b>Operator Work Station</b>	<b>1.00 ls</b>	<b>/ls</b>	
			<b>475,000</b>
<b>Automatic Temperature Controls</b>	<b>129,939.00 sf</b>	<b>3.66 /sf</b>	<b>475,000</b>
<b>HVAC Misc Items</b>			
*			
Anchor/Guide/Exp. Joint	1.00 ls	3,500.00 /ls	3,500
Sleeve/Caulking/Fire Stopping	1.00 ls	15,000.00 /ls	15,000
Pipe/Valve Identification	1.00 ls	2,500.00 /ls	2,500
Prefilter Replacement	1.00 ls	3,000.00 /ls	3,000
Vibration & Seismic Rest.	1.00 ls	5,000.00 /ls	5,000
Start Up & Instruction	1.00 ls	5,000.00 /ls	5,000
Hydronic System Testing	1.00 ls	3,000.00 /ls	3,000
Gas Trim & Vent Piping	1.00 ls	7,500.00 /ls	7,500
Rigging & Hoisting	1.00 ls	15,000.00 /ls	15,000
Glycol	1.00 ls	10,000.00 /ls	10,000
Water Treatment & Chem. Cleaning	1.00 ls	7,500.00 /ls	7,500
Support for Commissioning	1.00 ls	5,000.00 /ls	5,000
			<b>82,000</b>
<b>HVAC Misc Items</b>	<b>129,939.00 SF</b>	<b>0.63 /SF</b>	<b>82,000</b>
<b>HVAC Cont. General Condition</b>			
*			
Sub Mark-up	1.00 ls	100,000.00 /ls	100,000
<b>Bond</b>	<b>NA</b>	<b>/NA</b>	
			<b>100,000</b>
<b>HVAC Cont. General Condition</b>	<b>129,939.00 SF</b>	<b>0.77 /SF</b>	<b>100,000</b>
<b>HVAC SYSTEMS</b>	<b>129,939.00 sf</b>	<b>24.63 /sf</b>	<b>3,200,586</b>
<b>FIRE PROTECTION SYSTEMS</b>			
<b>Wet Sprinkler System</b>			
*			
Pendant Head	905.00 ea	98.00 /ea	88,690
Upright Head	135.00 ea	41.50 /ea	5,603
Distribution Piping	129,939.00 sf	2.40 /sf	311,854
			<b>406,146</b>
<b>Wet Sprinkler System</b>	<b>129,939.00 sf</b>	<b>3.13 /sf</b>	<b>406,146</b>
<b>Standpipe &amp; Fire Mains</b>			
*			
Double Check Valve 6"	1.00 ea	7,219.64 /ea	7,220



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
*			
F.D. Valve Gate 2.5"	11.00 ea	197.44 /ea	2,172
Valve UL-FM OS&Y Gate 6"	5.00 ea	1,918.08 /ea	9,590
Stand Pipe & Main 6"	675.00 LF	77.00 /LF	51,975
Fire Department Connection	1.00 ea	1,008.00 /ea	1,008
Roof Manifold	1.00 ea	1,304.00 /ea	1,304
Wet Alarm Va. w/ Water Gong	2.00 ea	1,363.00 /ea	2,726
Zone Control Valve Assembly	3.00 ea	2,033.00 /ea	6,099
Fire Hose Cabinet	2.00 ea	636.00 /ea	1,272
			<b>83,366</b>
<b>Standpipe &amp; Fire Mains</b>	<b>129,939.00 sf</b>	<b>0.64 /sf</b>	<b>83,366</b>
<b>Fire Protection Misc Items</b>			
*			
Seismic Restriants	1.00 ls	2,000.00 /ls	2,000
Coredrill/Sleeve/Firestop	1.00 ls	1,000.00 /ls	1,000
Fees & Permit	1.00 ls	3,000.00 /ls	3,000
Shop Draw. & Calculation	1.00 ls	4,000.00 /ls	4,000
			<b>10,000</b>
<b>Fire Protection Misc Items</b>	<b>129,939.00 sf</b>	<b>0.08 /sf</b>	<b>10,000</b>
<b>FIRE PROTECTION SYSTEMS</b>	<b>129,939.00 sf</b>	<b>3.84 /sf</b>	<b>499,512</b>
<b>ELECTRICAL SYSTEMS</b>			
<b>Large Power &amp; Distribution</b>			
*			
Medium Generator Pad Layout	1.00 ea	1,060.00 /ea	1,060
Ground Medium Generator Pad	1.00 ea	1,325.00 /ea	1,325
Switchgear budget Quotation and power System Study	1.00 ea	128,707.32 /ea	128,707
150 AMP 120/208 panel board surface mounted composite	12.00 ea	1,520.00 /ea	18,240
100 AMP 120/208 panel board surface mounted composite	5.00 ea	1,520.00 /ea	7,600
225 amp Enclosed Circuit Breaker	1.00 ea	1,321.82 /ea	1,322
225 AMP 120/208 Panel board surface mounted composite unit	3.00 ea	1,713.67 /ea	5,141
100AMP 277/480 Panel board surface mounted composite unit	3.00 ea	1,584.21 /ea	4,753
225 AMP 277/480 Panel board surface mounted composite unit	6.00 ea	1,778.19 /ea	10,669
MDP! Main switchboard	1.00 ea	476.49 /ea	476
15KVA NEMA 1 Transformer composite unit	1.00 ea	1,029.58 /ea	1,030
30 KVA NEMA 1 Transformer composite unit	3.00 ea	1,367.35 /ea	4,102
45 KVA NEMA 1 Transformer composite unit	1.00 ea	1,987.14 /ea	1,987
75 KVA NEMA 1 Transformer composite unit	2.00 ea	2,292.83 /ea	4,586
15 KVA K RATED NEMA 1 Transformer composite unit	1.00 ea	1,071.36 /ea	1,071
45 KVA K RATED NEMA 1 Transformer composite unit	5.00 ea	1,737.01 /ea	8,685
45 KVA K RATED NEMA 1 Transformer composite unit	1.00 ea	1,737.03 /ea	1,737
			<b>202,491</b>
<b>Large Power &amp; Distribution</b>	<b>129,939.00 sf</b>	<b>1.56 /sf</b>	<b>202,491</b>
<b>Large Power Feeder Conduit</b>			
*			
20 AMP EMT Composite feeders	14.00 lf	8.74 /lf	122
60 AMP EMT Composite feeders kiln feeder	100.00 lf	25.28 /lf	2,528
60 AMP EMT Composite feeders	99.00 lf	25.28 /lf	2,503
100 AMP EMT Composite feeders	48.00 lf	28.86 /lf	1,385
150 AMP EMT Composite feeders	57.00 lf	42.03 /lf	2,396
225 AMP EMT Composite feeders	104.00 lf	72.87 /lf	7,578
60 AMP PVC Composite feeder	258.00 lf	17.59 /lf	4,537
100 AMP PVC Composite feeder	699.00 lf	23.77 /lf	16,614
125 AMP PVC Composite Feeder	290.00 lf	35.06 /lf	10,167
225 AMP PVC Composite Feeder	799.00 lf	49.44 /lf	39,500
1600 AMP PVC Composite feeder	152.00 lf	400.42 /lf	60,864



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
			<b>148,195</b>
<b>Large Power Feeder Conduit</b>	<b>129,939.00 sf</b>	<b>1.14 /sf</b>	<b>148,195</b>
<b>Emergency Gen Set W/ATS</b>			
*			
Emergency Gen Set W/ATS Budgetary Quote	1.00 ea	53,011.66 /ea	53,012
Ground Medium Generator Pad	1.00 ea	1,389.66 /ea	1,390
Ground Medium Generator Pad	1.00 ea	1,389.66 /ea	1,390
Generator - annunciator	1.00 ea	967.14 /ea	967
Emergency Generator - 175 kw	1.00 ea	2,715.72 /ea	2,716
Auto Transfer Switch 3P - 100a	1.00 ea	257.97 /ea	258
Auto Transfer Switch 3P - 260a	1.00 ea	475.25 /ea	475
			<b>60,207</b>
<b>Emergency Gen Set W/ATS</b>	<b>129,939.00 sf</b>	<b>0.46 /sf</b>	<b>60,207</b>
<b>Mechanical Equipment Connections</b>			
*			
12/2 MC CABLE COMPOSITE UNIT	7,605.00 lf	2.72 /lf	20,672
10/2 MC CABLE COMPOSITE UNIT	7,605.00 lf	4.13 /lf	31,394
30 AMP EMT Composite feeders	845.00 lf	10.49 /lf	8,866
30 AMP EMT Composite feeders	1,300.00 lf	10.49 /lf	13,641
60 AMP EMT Composite feeders	400.00 lf	25.28 /lf	10,113
100 AMP EMT Composite feeders	300.00 lf	28.86 /lf	8,658
200 AMP EMT Composite feeders	150.00 lf	152.71 /lf	22,906
30 AMP 3 POLE N1 Non fused disconnect 600 volt composite unit	3.00 ea	312.68 /ea	938
CEX with Manual motor rated switch	13.00 ea	312.69 /ea	4,065
CUH with Manual motor rated switch	22.00 ea	312.69 /ea	6,879
VAVwith Manual motor rated switch	94.00 ea	312.69 /ea	29,393
UH with Manual motor rated switch	8.00 ea	312.69 /ea	2,502
FC1 with Manual motor rated switch	2.00 ea	312.69 /ea	625
FVAV with Manual motor rated switch	4.00 ea	312.68 /ea	1,251
ECH-1 POWER CONNECTION TO JBOX	16.00 ea	312.69 /ea	5,003
ECU POWER CONNECTION TO JBOX	4.00 ea	312.68 /ea	1,251
elevator Car and light Disconnect	1.00 ea	312.68 /ea	313
60 AMP 3 POLE N1 Non fused disconnect 600 volt composite unit	1.00 ea	452.09 /ea	452
P1-2 30 AMP 3 POLE NEMA1 Fused disconnect 600 volt composite unit	2.00 ea	334.01 /ea	668
ELV DISC 100 AMP 3 POLE N1 fused disconnect 600 volt composite unit	1.00 ea	747.49 /ea	747
AHU2 30 AMP 3 POLE N3R Fused disconnect 600 volt composite unit	1.00 ea	414.83 /ea	415
AHU1 30 AMP 3 POLE N3R Fused disconnect 600 volt composite unit	1.00 ea	414.83 /ea	415
RTU1 30 AMP 3 POLE N3R Fused disconnect 600 volt composite unit	1.00 ea	414.83 /ea	415
RTU8 30 AMP 3 POLE N3R Fused disconnect 600 volt composite unit	1.00 ea	414.83 /ea	415
RTU9 30 AMP 3 POLE N3R Fused disconnect 600 volt composite unit	1.00 ea	414.83 /ea	415
RTU10 30 AMP 3 POLE N3R Fused disconnect 600 volt composite unit	1.00 ea	414.83 /ea	415
RTU11 30 AMP 3 POLE N3R Fused disconnect 600 volt composite unit	1.00 ea	414.83 /ea	415
CU-1 30 AMP 3 POLE N3R Fused disconnect 600 volt composite unit	1.00 ea	414.83 /ea	415
CU-2 30 AMP 3 POLE N3R Fused disconnect 600 volt composite unit	1.00 ea	414.83 /ea	415
HWB 1-3 30 AMP 3 POLE N3R Fused disconnect 600 volt composite unit	3.00 ea	414.82 /ea	1,244
EF-1 30 AMP 3 POLE N3R Fused disconnect 600 volt composite unit	1.00 ea	414.83 /ea	415
RTU3 60 AMP 3 POLE N3R fused disconnect 600 volt composite unit	1.00 ea	654.87 /ea	655
RTU 4 60 AMP 3 POLE N3R fused disconnect 600 volt composite unit	1.00 ea	654.87 /ea	655
RTU5 60 AMP 3 POLE N3R fused disconnect 600 volt composite unit	1.00 ea	654.87 /ea	655
RTU7 60 AMP 3 POLE N3R fused disconnect 600 volt composite unit	1.00 ea	654.87 /ea	655
100 AMP 3 POLE N3R fused disconnect 600 volts composite unit	1.00 ea	1,017.64 /ea	1,018
AHU4 100 AMP 3 POLE N3R fused disconnect 600 volts composite unit	1.00 ea	1,017.64 /ea	1,018
RTU-2 100 AMP 3 POLE N3R fused disconnect 600 volts composite unit	1.00 ea	1,017.64 /ea	1,018
RTU-6 100 AMP 3 POLE N3R fused disconnect 600 volts composite unit	1.00 ea	1,017.64 /ea	1,018
AHU3 200 AMP 3 POLE N3R fused disconnect 600 volt composite unit	1.00 ea	2,057.51 /ea	2,058
15 HP VFD wioth unistrut support composite unit for pumps connection only	2.00 ea	2,419.12 /ea	4,838
			<b>189,315</b>



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Mechanical Equipment Connections</b>	<b>129,939.00 sf</b>	<b>1.46 /sf</b>	<b>189,315</b>
<b>Solar/Photovoltaic Sytem</b>			
*			
UPS System & Battery Bank - 30 kva	1.00 ea	27,654.13 /ea	27,654
			<b>27,654</b>
<b>Solar/Photovoltaic Sytem</b>	<b>129,939.00 sf</b>	<b>0.21 /sf</b>	<b>27,654</b>
<b>Small Power Devices &amp; Wiring</b>			
*			
12/2 MC Cable composite unit	20,229.00 lf	2.59 /lf	52,308
20 AMP EMT Compoiste feeders	2,477.00 lf	8.16 /lf	20,209
Duplex receptacle composite unit	537.00 ea	49.93 /ea	26,814
Quad receptacle composite unit	303.00 ea	71.34 /ea	21,616
GFI receptacle composite unit	215.00 ea	73.86 /ea	15,879
Special Receptacle	44.00 ea	77.63 /ea	3,416
Floor Box with Quad	12.00 ea	234.17 /ea	2,810
Junction box and power connection for Faucets Sensors	6.00 ea	74.79 /ea	449
ScoreBoard Power Connection	2.00 ea	100.53 /ea	201
Partition Power Connection	1.00 ea	87.78 /ea	88
Lift Power Connection	1.00 ea	87.78 /ea	88
Killn Receptacle	1.00 ea	215.01 /ea	215
Projection Screen Power connection(Projection Screens Excluded)	6.00 ea	110.06 /ea	660
Single pole Projection Screen Raise and Lower Switch(switch for Projection screen excluded)	6.00 ea	46.09 /ea	277
			<b>145,029</b>
<b>Small Power Devices &amp; Wiring</b>	<b>129,939.00 sf</b>	<b>1.12 /sf</b>	<b>145,029</b>
<b>Light Fixtures - Interior</b>			
*			
12/2 MC CABLE COMPOSITE UNIT	24,251.00 lf	2.59 /lf	62,708
20 AMP EMT Compoiste feeders	2,694.00 lf	8.16 /lf	21,980
Single pole switch composite unit	55.00 ea	46.09 /ea	2,535
Single pole dimmer switch composite unit	6.00 ea	46.09 /ea	277
Single pole LV switch composite unit	58.00 ea	46.09 /ea	2,673
S3 3 way switch composite unit	8.00 ea	50.11 /ea	401
S3 3 way switch composite unit	1.00 ea	50.11 /ea	50
S3S3 two 3 way switches composite unit	1.00 ea	73.96 /ea	74
S3S3 two 3 way switches composite unit	1.00 ea	73.96 /ea	74
S3S3S3 three 3 way switches composite unit	1.00 ea	91.91 /ea	92
S3S3S3 three 3 way switches composite unit	1.00 ea	91.91 /ea	92
Wall mounted occupancy sensor composite unit	51.00 ea	196.39 /ea	10,016
Light Fixture Type A8 direct indirect pendant	1.00 ea	452.62 /ea	453
Light Fixture Type A12 direct indirect pendant	18.00 ea	626.88 /ea	11,284
Light Fixture Type A16 direct indirect pendant	198.00 ea	827.01 /ea	163,748
Light Fixture Type A20 direct indirect pendant	16.00 ea	1,027.14 /ea	16,434
Light Fixture Type A24 direct indirect pendant	3.00 ea	1,227.27 /ea	3,682
Light Fixture Type A36 direct indirect pendant	4.00 ea	1,827.65 /ea	7,311
Light Fixture Type A48 direc tindirect pendant	2.00 ea	2,428.04 /ea	4,856
Light Fixture Type B 2x4 basket	98.00 ea	261.03 /ea	25,580
Light Fixture Type B1 2x4 basket	25.00 ea	261.03 /ea	6,526
Light Fixture Type C surface bafflet 4 ft	60.00 ea	250.43 /ea	15,026
Light Fixture Type C1 surface baffle 4 ft	19.00 ea	234.26 /ea	4,451
Light Fixture Type D recessed can led	196.00 ea	197.16 /ea	38,643
Light Fixture Type D1 recesse can led	73.00 ea	197.16 /ea	14,393
Light Fixture Type D2 recessed can led	5.00 ea	197.16 /ea	986
Light Fixture Type E 2x4 vapor tiight	28.00 ea	234.26 /ea	6,559
Light Fixture Type E1 2x4 vapor tight	11.00 ea	266.59 /ea	2,932
Light Fixture Type F 9" dimable compact flourscent	15.00 ea	229.49 /ea	3,442
Light Fixture Type F1 9" dimable compact flourscent	3.00 ea	213.33 /ea	640



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
*			
Light Fixture Type H wall mounted exterior led fixture	9.00 ea	329.02 /ea	2,961
Light Fixture Type J 10" x4 ft stairwell fixture	21.00 ea	264.26 /ea	5,549
6" recessed led fixture	23.00 ea	239.56 /ea	5,510
Light Fixture Type L4 pendant direct indirect	15.00 ea	239.56 /ea	3,593
Light Fixture Type L8 pendant direct indirect	1.00 ea	426.76 /ea	427
Light Fixture Type L12 pendant direct indirect	4.00 ea	626.89 /ea	2,508
Light Fixture Type L16 pendant direct indirect	4.00 ea	827.01 /ea	3,308
Light Fixture Type M elevator pit light	1.00 ea	229.49 /ea	229
Light Fixture Type N exterior wall pack	22.00 ea	436.72 /ea	9,608
Light Fixture Type O 6" round waterproof led shower light	2.00 ea	223.66 /ea	447
Light Fixture Type P1 4" round led emergency fixture	66.00 ea	197.16 /ea	13,013
Light Fixture Type Q High Bay	30.00 ea	338.99 /ea	10,170
Light Fixture Type X1 single sided Exit sign	65.00 ea	225.99 /ea	14,689
Light Fixture Type X1G single sided exit sign with wire guard	4.00 ea	236.59 /ea	946
Light Fixture Type X2 double sided exit sign	10.00 ea	225.99 /ea	2,260
Light Fixture Type Y track head	16.00 ea	181.00 /ea	2,896
Light Fixture Type Y track in linear feet	64.00 lf	63.87 /lf	4,087
Light Fixture Type G not identified on fixture schedule	1.00 ea	197.16 /ea	197
Light Fixture Type Q light lifters for Gym fixtures	30.00 ea	261.82 /ea	7,855
Remote Control For Light Lifter System for gym fixtures	1.00 ea	429.83 /ea	430
SWM-2 Two way Wall Switch	4.00 ea	68.21 /ea	273
wp4 4 way wall plate for 4 single pole switches	2.00 ea	133.56 /ea	267
Wall mounted occupancy sensor composite unit dual circuit	5.00 ea	210.09 /ea	1,050
Ceiling mounted daylight sensor composite unit	59.00 ea	125.08 /ea	7,380
Ceiling mounted occupancy sensor composite unit	87.00 ea	204.58 /ea	17,798
Lighting Control Panel on each floor	3.00 ea	5,824.70 /ea	17,474
Ck4 control Kepper 4 line to low for low voltage switching	56.00 ea	317.47 /ea	17,778
Theater Dimming Panel	1.00 ea	7,673.34 /ea	7,673
Audiovisual interface for Theater dimming	1.00 ea	125.08 /ea	125
fire alarm interface for theatrical Dimming	1.00 ea	125.08 /ea	125
4 Scene Stage Station	1.00 ea	204.58 /ea	205
			<b>588,750</b>
<b>Light Fixtures - Interior</b>		<b>129,939.00 sf</b>	<b>4.53 /sf</b>
			<b>588,750</b>
<b>Fire Alarm System</b>			
*			
Fire alarm manual pull station composite unit	14.00 ea	190.19 /ea	2,663
Fire alarm manual pull station composite unit with wire guard	2.00 ea	190.20 /ea	380
Fire Alarm damper Interlock	1.00 ea	190.23 /ea	190
Smoke detector composite unit	113.00 ea	211.14 /ea	23,858
Smoke detector with relay base composite unit	4.00 ea	236.69 /ea	947
Heat detector composite unit	3.00 ea	199.59 /ea	599
Duct smoke detector with relay base composite unit	26.00 ea	525.21 /ea	13,656
Fire alarm flow switch composite unit	8.00 ea	161.12 /ea	1,289
Fire alarm tamper switch composite unit	12.00 ea	161.11 /ea	1,933
Fire alarm high power speaker composite unit	6.00 ea	211.66 /ea	1,270
Fire alarm strobe composite unit 75cd	16.00 ea	126.78 /ea	2,028
Fire alarm strobe composite unit 115 cd ceiling	6.00 ea	126.79 /ea	761
Fire alarm strobe composite unit 15cd	34.00 ea	126.78 /ea	4,311
Fire alarm wp beacon composite unit	1.00 ea	321.31 /ea	321
Fire alarm speaker strobe composite unit 110 cd	21.00 ea	206.99 /ea	4,347
Fire alarm speaker strobe composite unit 75 cd	17.00 ea	206.98 /ea	3,519
Fire alarm speaker strobe composite unit 15 cd	35.00 ea	206.99 /ea	7,245
Fire alarm speaker strobe ceiling composite unit 75 cd	56.00 ea	206.99 /ea	11,591
Fire alarm speaker strobe ceiling composite unit 110 cd	2.00 ea	206.99 /ea	414
<b>Fire Alarm Permit or Utility fees are excluded</b>		<b>0.00 ea</b>	<b>/ea</b>
Fire Alarm Digital Dialer	1.00 ea	8,519.32 /ea	8,519
Fire alarm control panel composite unit	1.00 ea	10,506.68 /ea	10,507
Fire alarm Supplementary notification panel	3.00 ea	2,571.88 /ea	7,716
Fire alarm batteries	1.00 ea	914.34 /ea	914



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
*			
Fire alarm Monitor module composite unit	3.00 ea	307.88 /ea	924
Fire alarm annunciator composite unit	1.00 ea	623.43 /ea	623
EMT 3/4" 2#14 for initiation loop composite unit	7,720.00 lf	4.92 /lf	37,984
3/4" EMT 2#14 and 18/2 Twisted shielded composite unit	7,720.00 lf	4.92 /lf	37,984
			<b>186,492</b>
<b>Fire Alarm System</b>		<b>129,939.00 sf</b>	<b>1.44 /sf</b>
<b>186,492</b>			
<b>Tel/Data System Equipment - Outlets &amp; Cabling Only</b>			
*			
3/4" EMT Stub up 10 Foot composite unit with blank plate	85.00 ea	56.46 /ea	4,799
1" EMT Stub up 10 foot composite unit for one of AV locations in Class Rooms	42.00 ea	73.96 /ea	3,106
4X8 SHHETS OF FIRE RATED PLYWOOD	10.00 ea	74.88 /ea	749
300 Pair 100 termination Blocks	15.00 ea	75.34 /ea	1,130
96" TELCOM RACK	6.00 ea	328.12 /ea	1,969
96" CABINET RACK IN MDF	8.00 ea	328.13 /ea	2,625
48 PORT PATCH PANEL	4.00 ea	621.86 /ea	2,487
12 PORT FIBER OPTIC PATCH PANEL	5.00 ea	559.85 /ea	2,799
VERTICAL CABLE MANAGERS	12.00 ea	302.39 /ea	3,629
HORIZONTAL CABLE MANAGERS 2RU	18.00 ea	122.58 /ea	2,206
12 STRAND SM FIBER	445.00 ea	3.98 /ea	1,770
4" SLLEVES	27.00 ea	74.88 /ea	2,022
V1 Data jack with 3/4" Stub to accessible ceiling composite unit	6.00 ea	368.71 /ea	2,212
D1 Data jack with 3/4" Stub to accessible ceiling composite unit	115.00 ea	368.70 /ea	42,401
AP Data jack with 3/4" Stub to accessible ceiling composite unit	32.00 ea	368.70 /ea	11,798
Elevator Phones Data jack with 3/4" Stub to accessible ceiling composite unit	1.00 ea	368.73 /ea	369
D2 Data jack with 3/4" Stub up to accessible ceiling composite unit	5.00 ea	590.90 /ea	2,955
V/D Data jack with 3/4" Stub up to accessible ceiling composite unit	48.00 ea	590.90 /ea	28,363
D2 Data jack Floor box with 3/4" pvc and emt Stub up to accessible ceiling composite unit	10.00 ea	590.90 /ea	5,909
D3 Data jack with 3/4" Stub up to accessible ceiling composite unit	1.00 ea	812.39 /ea	812
V/2D Data jack with 3/4" Stub up to accessible ceiling composite unit	127.00 ea	812.40 /ea	103,175
V/2D Data jack Floor box with 3/4" Stub up to accessible ceiling composite unit	5.00 ea	812.40 /ea	4,062
D4 Data jack with 1" stub up to accessible ceiling composite unit	45.00 ea	1,055.70 /ea	47,506
AV Jack	116.00 ea	954.41 /ea	110,711
Cross connect	1.00 ea	650.50 /ea	651
AV Jack removal of 42 AV jacks replace with conduit stub-up above	-42.00 ea	954.41 /ea	(40,085)
			<b>350,130</b>
<b>Tel/Data System Equipment - Outlets &amp; Cabling Only</b>		<b>129,939.00 sf</b>	<b>2.70 /sf</b>
<b>350,130</b>			
<b>Cable Tray</b>			
*			
12" cable tray composite unit	91.00 lf	31.06 /lf	2,826
			<b>2,826</b>
<b>Cable Tray</b>		<b>129,939.00 sf</b>	<b>0.02 /sf</b>
<b>2,826</b>			
<b>Tel/Data Equipment</b>			
*			
HP Proliant Servers 519566-005	3.00 ea	5,068.92 /ea	15,207
HP Server options 500658s21	6.00 ea	305.81 /ea	1,835
HP Server Options 516423-s21	18.00 ea	305.81 /ea	5,505
HP Server Options 418371-b21	6.00 ea	396.44 /ea	2,379
HP Server Options af556c	6.00 ea	78.97 /ea	474
HP Server options 458492-b21	3.00 ea	313.44 /ea	940
HP services ue892e	3.00 ea	418.81 /ea	1,256
config 6	3.00 ea	286.20 /ea	859
vmware licensing vcs-std-a	1.00 ea	2,572.94 /ea	2,573
vmware licensing vcs-std-3p-sss-a	1.00 ea	2,890.62 /ea	2,891
vmware licensing vs4-ent-pl-a	6.00 ea	2,385.00 /ea	14,310
vmware licensing vs4-ent-pl-3p-sss-a	6.00 ea	2,194.20 /ea	13,165
at011a	2.00 ea	64,580.50 /ea	129,161



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
*			
ha110a3	2.00 ea	1,650.63 /ea	3,301
guardian 24x7x4 3cs7906e	1.00 ea	5,278.80 /ea	5,279
guardian 24x7x4 0231a934	2.00 ea	7,210.65 /ea	14,421
guardian 24x7x40231a93a	2.00 ea	2,193.57 /ea	4,387
guardian 24x7x4 0231a931	1.00 ea	6,554.51 /ea	6,555
guardian 24x7x 0231a930	2.00 ea	8,572.33 /ea	17,145
guardian 24x7x4 3csfp92	44.00 ea	906.41 /ea	39,882
Phone support 3crs48g-24p-91	21.00 ea	3,604.42 /ea	75,693
Phone support 3c17767	16.00 ea	463.22 /ea	7,412
Phone support 3c17775	44.00 ea	390.72 /ea	17,192
Phone support 3c17776	2.00 ea	455.59 /ea	911
software application 3cr15800	1.00 ea	8,591.94 /ea	8,592
guardian 3crwx220095a	1.00 ea	6,760.36 /ea	6,760
guardian 3crwe876075	40.00 ea	491.63 /ea	19,665
software application support 3cwxm10a	1.00 ea	2,917.33 /ea	2,917
MGW 1100	1.00 ea	24,189.20 /ea	24,189
MGW 400	1.00 ea	8,925.20 /ea	8,925
MGW 230	1.00 ea	6,063.20 /ea	6,063
MGW FLASH STREAMER	1.00 ea	7,505.86 /ea	7,506
EZ TV PORTAL	1.00 ea	29,913.20 /ea	29,913
EZ TV VOD	1.00 ea	22,281.20 /ea	22,281
			<b>519,543</b>

<b>Tel/Data Equipment</b>	<b>129,939.00 sf</b>	<b>4.00 /sf</b>	<b>519,543</b>
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### Security Access System

*			
CCTV Video Camera exterior	9.00 ea	983.79 /ea	8,854
CCTV Video Camera interior	1.00 ea	665.79 /ea	666
CCTV Monitor 17"	1.00 ea	753.66 /ea	754
intellex 8 channel dvr	1.00 ea	5,959.32 /ea	5,959
MCS-10 Camera Power Supply	1.00 ea	288.32 /ea	288
Intrusion Head end SCS PC 4020nk	1.00 ea	934.92 /ea	935
adac net usb control module	1.00 ea	369.11 /ea	369
Security Door Contacts	23.00 ea	148.03 /ea	3,405
CA Card Access	9.00 ea	175.96 /ea	1,584
Security Door Release	1.00 ea	117.66 /ea	118
AM external contact input module	15.00 ea	138.33 /ea	2,075
Security Glass Break	54.00 ea	144.16 /ea	7,785
Motion Detector	10.00 ea	91.16 /ea	912
security cable	5,600.00 lf	1.34 /lf	7,479
cctv RG59 Cable	2,200.00 lf	1.34 /lf	2,938
security cable	2,200.00 lf	1.09 /lf	2,402

<b>Door hardware by others excluded</b>	<b>0.00 ea</b>	<b>/ea</b>	
Badging Equipment Allowance	1.00 ea	3,710.00 /ea	3,710

			<b>50,232</b>
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<b>Security Access System</b>	<b>129,939.00 sf</b>	<b>0.39 /sf</b>	<b>50,232</b>
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### Scoreboard & Shot Clock

*			
Clock Single Face	42.00 ea	155.29 /ea	6,522
Clock Single Face with wire guard	2.00 ea	169.60 /ea	339
<b>Media System Distribution Excluded need more definition and detail</b>	<b>0.00 ea</b>	<b>/ea</b>	
Clock Speaker Combination(back box, panel clock speaker)	65.00 ea	987.50 /ea	64,187
gym sound Amp	1.00 ea	543.25 /ea	543
Intercom Paging and Clock Head End	1.00 allw	7,284.32 /allw	7,284
Intercom Paging and Clock Power supply	1.00 ea	446.26 /ea	446
Gym ZC Zone control	2.00 ea	320.12 /ea	640
Equipment Rack gym	1.00 ea	415.52 /ea	416
Gym Sound Zone Pro 1260	1.00 ea	1,529.58 /ea	1,530



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
* Gym Sound assistive listening			
	1.00 ea	338.25 /ea	338
Paging Rack			
	1.00 ea	415.52 /ea	416
Paging pzs140-ra paging amplifier			
	2.00 ea	885.79 /ea	1,772
<b>Smart boards short throw project and Speakers, Tablet excluded(42 on architectrual)</b>		<b>0.00 ea</b>	<b>/ea</b>
<b>phone/handsets excluded</b>		<b>0.00 ea</b>	<b>/ea</b>
Speaker Ceiling			
	117.00 ea	160.06 /ea	18,727
paging 5120-9180			
	1.00 ea	140.98 /ea	141
DK Intercom			
	1.00 ea	224.72 /ea	225
Sound System sphere			
	2.00 ea	2,021.95 /ea	4,044
Paging Horn			
	2.00 ea	179.14 /ea	358
WP paging horn			
	13.00 ea	188.68 /ea	2,453
Volume Control			
	47.00 ea	80.03 /ea	3,761
Microphone			
	4.00 ea	80.03 /ea	320
Wireless Microphone & rec gym			
	1.00 ea	80.03 /ea	80
Network Punch Block provided by others			
	4.00 ea	32.33 /ea	129
speaker cable			
	9,400.00 lf	1.05 /lf	9,844
			<b>124,516</b>
<b>Scoreboard &amp; Shot Clock</b>		<b>129,939.00 sf</b>	<b>0.96 /sf</b>
<b>Grounding &amp; Lightning Protection System</b>			
* Ground Wire - CU Bare Stranded # 6			
	157.00 lf	1.02 /lf	160
Lightning Protection System (need Quote)			
	56,000.00 sq/f	1.06 /sq/f	59,360
Ground Wire - CU Bare Stranded #1/0 telcom			
	1,001.00 lf	3.11 /lf	3,111
Compression Lug - # 6 telcom			
	17.00 ea	20.78 /ea	353
Compression Lug - 1/0 telcom			
	7.00 ea	33.09 /ea	232
Copper Ground Bus Bar .25"x 3.0" telcom			
	12.00 ft	36.85 /ft	442
			<b>63,657</b>
<b>Grounding &amp; Lightning Protection System</b>		<b>129,939.00 sf</b>	<b>0.49 /sf</b>
<b>Misc Electrical</b>			
* Electrical Permit			
	2,812.00 ea	6.36 /ea	17,884
Coring & Safing of Work			
	1.00 Lot	11,130.00 /Lot	11,130
Seismic Supports Design Drawings			
	1.00 Lot	9,759.05 /Lot	9,759
Temporary Power(No Consumption) per Square Foot			
	129,939.00 sqft	0.48 /sqft	61,981
Testing and Start-up			
	1.00 Lot	14,840.00 /Lot	14,840
Electric Commissioning (Assitance only)			
	1.00 Lot	10,070.00 /Lot	10,070
Lifts			
	1.00 ea	13,250.00 /ea	13,250
Rigging			
	1.00 ea	11,481.24 /ea	11,481
Labeling Painting , Engraving devices and plates			
	1.00 Lot	4,770.00 /Lot	4,770
Access Panels			
	1.00 Lot	2,650.00 /Lot	2,650
			<b>157,816</b>
<b>Misc Electrical</b>		<b>129,939.00 sf</b>	<b>1.22 /sf</b>
<b>Site Lighting</b>			
* 30 AMP PVC Composite feeder			
	3,552.00 lf	8.79 /lf	31,220
(4) 4" Empty PVC Conduit with pull String composite unit 2 data and 2 primary empty			
	200.00 lf	50.62 /lf	10,124
Light Fxiture Type Z1			
	11.00 ea	1,778.15 /ea	19,560
Light Fxiture Type Z2			
	20.00 ea	1,778.15 /ea	35,563
Light Fxiture Type Z3			
	1.00 ea	1,778.15 /ea	1,778
			<b>98,244</b>
<b>Site Lighting</b>		<b>129,939.00 sf</b>	<b>0.76 /sf</b>
<b>ELECTRICAL SYSTEMS</b>		<b>129,939.00 sf</b>	<b>22.43 /sf</b>
			<b>2,915,098</b>



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>SERVICES</b>	<b>129,939.00 SF</b>	<b>60.68 /SF</b>	<b>7,885,146</b>
<b>EQUIPMENT AND FURNISHINGS</b>			
<b>EQUIPMENT</b>			
<b>Vehicular Equipment</b>			
<b>Dock Equipment</b>			
Rubber Dock Bumpers	1.00 sets	1,500.00 /sets	1,500
<b>Dock Equipment</b>	<b>129,939.00 sf</b>	<b>0.01 /sf</b>	<b>1,500</b>
<b>Vehicular Equipment</b>	<b>129,939.00 sf</b>	<b>0.01 /sf</b>	<b>1,500</b>
<b>Food Service Equipment</b>			
<b>Commercial Kitchen Equipment</b>			
01 - Ice Maker w/Bin	1.00 ea	5,000.00 /ea	5,000
02 - Walk in Cooler / Freezer	1.00 ea	30,000.00 /ea	30,000
<b>03 through 06 - Cooler / Freezer Refrig Equip</b>	<b>Incl</b>	<b>/Incl</b>	
07 - Walk-in Shelving	18.00 ea	600.00 /ea	10,800
08 - Mobile Dry Storage Shelving	13.00 ea	600.00 /ea	7,800
09 - Washer	1.00 ea	750.00 /ea	750
09a - Dryer	1.00 ea	750.00 /ea	750
10 - Mop Sink	1.00 ea	500.00 /ea	500
11 - Janitor Shelving	3.00 ea	500.00 /ea	1,500
12 - Wall Shelf	1.00 ea	250.00 /ea	250
<b>13 - Spare</b>	<b>NA</b>	<b>/NA</b>	
<b>14 - Spare</b>	<b>NA</b>	<b>/NA</b>	
15 - Lockers	7.00 ea	225.00 /ea	1,575
16 - Trash Bin w/Dolly	8.00 ea	125.00 /ea	1,000
17 - Reach in Refrigerator	1.00 ea	3,800.00 /ea	3,800
18 - Prep Table w/Sinks	1.00 ea	7,500.00 /ea	7,500
19 - Garbage Disposer	1.00 ea	4,000.00 /ea	4,000
20 - Overshelf / Utensil / Pot Rack	1.00 ea	1,500.00 /ea	1,500
21 - Reach-in Heated Cabinets	1.00 ea	2,500.00 /ea	2,500
22 - Reach in Refrigerator	1.00 ea	3,800.00 /ea	3,800
23 - Work Table	1.00 ea	2,500.00 /ea	2,500
24 - Buffalo Chopper	1.00 ea	3,100.00 /ea	3,100
<b>25 - Spare</b>	<b>NA</b>	<b>/NA</b>	
<b>26 - Spare</b>	<b>NA</b>	<b>/NA</b>	
27 - Wall Flashing	1.00 Lot	5,000.00 /Lot	5,000
28 - Steamer	1.00 ea	16,500.00 /ea	16,500
29 - Forty Gallon Kettle	1.00 ea	11,500.00 /ea	11,500
30 - Floor Trough	1.00 Ls	2,500.00 /Ls	2,500
31 - Convection Oven	2.00 ea	12,000.00 /ea	24,000
32 - Exhaust Hood	1.00 ea	15,000.00 /ea	15,000
33 - Exhaust Hood	1.00 ea	15,000.00 /ea	15,000
34 - 4 Burner Range w/Convection Oven	1.00 ea	3,500.00 /ea	3,500
35 - Fire Suppression System	1.00 ea	3,000.00 /ea	3,000
36 - Work Table	1.00 ea	2,500.00 /ea	2,500
37 - Wall Shelf	1.00 ea	500.00 /ea	500
<b>38 - Spare</b>	<b>NA</b>	<b>/NA</b>	
<b>39 - Spare</b>	<b>NA</b>	<b>/NA</b>	
40 - Automatic Slicer	1.00 ea	6,000.00 /ea	6,000
41 - Garbage Disposer	1.00 ea	4,000.00 /ea	4,000
42 - Reach in Refrigerator	1.00 ea	3,800.00 /ea	3,800
43 - Work Table	1.00 ea	2,500.00 /ea	2,500
44 - Overshelf	1.00 ea	250.00 /ea	250
45 - Reach-in Heated Cabinets	1.00 ea	2,500.00 /ea	2,500
46 - Reach in Refrigerator	1.00 ea	3,800.00 /ea	3,800
47 - Prep Table w/Sinks	1.00 ea	8,500.00 /ea	8,500
<b>48 - Spare</b>	<b>NA</b>	<b>/NA</b>	
49 - Food Processer	1.00 ea	3,100.00 /ea	3,100
50 - Prep Table w/Sink	1.00 ea	6,000.00 /ea	6,000



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Commercial Kitchen Equipment</b>			
51 - Wall Shelf	1.00 ea	500.00 /ea	500
52 - Reach-in Heated Cabinets	1.00 ea	2,500.00 /ea	2,500
53 - Reach in Refrigerator	1.00 ea	3,800.00 /ea	3,800
54 - Pot Sink	1.00 ea	1,375.00 /ea	1,375
<b>55 - Wall Shelf w/Pot Hooks</b>	<b>0.00 NA</b>	<b>0.00 /NA</b>	<b>0</b>
56 - Twenty Quart Mixer	1.00 ea	5,500.00 /ea	5,500
57 - Mobile Equipment Stand	1.00 ea	1,500.00 /ea	1,500
<b>58 - not used</b>	<b>NA</b>	<b>/NA</b>	
59 - Mobile Pot Rack	1.00 ea	1,500.00 /ea	1,500
60 - Soiled Roller Table	1.00 ea	2,500.00 /ea	2,500
61 - Wall Shelf w/Pot Hooks	1.00 ea	500.00 /ea	500
62 - Dishmachine	1.00 ea	15,000.00 /ea	15,000
63 - Clean Roller Table	1.00 ea	2,500.00 /ea	2,500
64 - Wall Shelf w/Pot Hooks	1.00 ea	500.00 /ea	500
65 - Hand Sink	1.00 ea	350.00 /ea	350
<b>66 - Spare</b>	<b>NA</b>	<b>/NA</b>	
67 - Booster Heater	1.00 ea	1,800.00 /ea	1,800
68 - Hot Food Service Counter	1.00 ea	4,000.00 /ea	4,000
69 - Cold Food Service Counter	1.00 ea	5,100.00 /ea	5,100
70 - Utility Service Counter with Frost Top	1.00 ea	3,000.00 /ea	3,000
71 - Hand Sink	1.00 ea	350.00 /ea	350
72 - Utility Service Counter with Frost Top	1.00 ea	3,000.00 /ea	3,000
73 - Cold Food Service Counter	1.00 ea	5,100.00 /ea	5,100
74 - Hot Food Service Counter	1.00 ea	4,000.00 /ea	4,000
75 - Hot Food Service Counter	1.00 ea	4,000.00 /ea	4,000
76 - Cold Food Service Counter	1.00 ea	5,100.00 /ea	5,100
77 - Soup Self Service Counter	1.00 ea	3,000.00 /ea	3,000
78 - Soup Wells	2.00 ea	300.00 /ea	600
79 - Utility Service Counter with Frost Top	1.00 ea	3,000.00 /ea	3,000
80 - Cold Food Service Counter	1.00 ea	5,100.00 /ea	5,100
81 - Hot Food Service Counter	1.00 ea	4,000.00 /ea	4,000
<b>82 - Spare</b>	<b>NA</b>	<b>/NA</b>	
83 - Hand Sink	1.00 ea	350.00 /ea	350
<b>84 - Spare</b>	<b>NA</b>	<b>/NA</b>	
85 - Mobile Cashier Unit	1.00 ea	2,500.00 /ea	2,500
86 - Mobile Cashier Unit	1.00 ea	2,500.00 /ea	2,500
87 - Refrigerated Merchandiser	1.00 ea	2,600.00 /ea	2,600
88 - Utility Self Service Counter	1.00 ea	2,400.00 /ea	2,400
89 - Refrigerated Merchandiser	1.00 ea	2,600.00 /ea	2,600
90 - Mobile Condiment Table - Custom, Allow	1.00 ea	2,500.00 /ea	2,500
91 - Mobile Tray Pick-up Counter (spec says salad ctr)	1.00 ea	2,500.00 /ea	2,500
92 - Mobile Cashier Unit	1.00 ea	2,500.00 /ea	2,500
93 - Refrigerated Merchandiser	1.00 ea	2,600.00 /ea	2,600
94 - Utility Self Service Counter	1.00 ea	2,400.00 /ea	2,400
95 - Refrigerated Merchandiser	1.00 ea	2,600.00 /ea	2,600
96 - Mobile Condiment Table - Custom, Allow	1.00 ea	2,500.00 /ea	2,500
97 - Mobile Cashier Unit	1.00 ea	2,500.00 /ea	2,500
<b>98 - Spare</b>	<b>NA</b>	<b>/NA</b>	
99 - Corner Guards	1.00 Lot	1,300.00 /Lot	1,300
<b>100 - Point of Sales System - Vendor</b>	<b>Vend</b>	<b>/Vend</b>	
<b>101 - Scales - Vendor</b>	<b>Vend</b>	<b>/Vend</b>	
102 - Eye Wash Station	1.00 ea	750.00 /ea	750
103 - Fire Extinguisher	1.00 ea	450.00 /ea	450
Adjust to Consult Budget	1.00 Ls	114,200.00 /Ls	114,200
<b>Commercial Kitchen Equipment</b>	<b>129,939.00 sf</b>	<b>3.59 /sf</b>	<b>467,000</b>
<b>Food Service Equipment</b>	<b>129,939.00 sf</b>	<b>3.59 /sf</b>	<b>467,000</b>

Residential Equipment  
Appliances



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Appliances</b>			
Allow for Refrigerator, Microwave @ Teachers Dining	1.00 Ls	2,500.00 /Ls	2,500
<b>Appliances</b>	<b>129,939.00 sf</b>	<b>0.02 /sf</b>	<b>2,500</b>
<b>Residential Equipment</b>	<b>129,939.00 sf</b>	<b>0.02 /sf</b>	<b>2,500</b>
<b>Athletic Equipment</b>			
<b>Athletic Equipment</b>			
Basketball Backstop Ceil. Set, Electric - allow	6.00 ea	7,500.00 /ea	45,000
Wall Padding	1,250.00 sf	10.00 /sf	12,500
Divider Curtain	3,500.00 sf	17.00 /sf	59,500
<b>Athletic Equipment</b>	<b>129,939.00 ls</b>	<b>0.90 /ls</b>	<b>117,000</b>
<b>Athletic Equipment</b>	<b>129,939.00 sf</b>	<b>0.90 /sf</b>	<b>117,000</b>
<b>Other Equipment</b>			
<b>Stage Equipment</b>			
Stage curtains	1.00 Allw	20,000.00 /Allw	20,000
<b>Stage Equipment</b>	<b>129,939.00 sf</b>	<b>0.15 /sf</b>	<b>20,000</b>
<b>Projection Screens</b>			
Projection Screens - Manual @Common	5.00 Loc	800.00 /Loc	4,000
Projection Screens - Electric	1.00 Allw	4,000.00 /Allw	4,000
<b>Projection Screens</b>	<b>129,939.00 sf</b>	<b>0.06 /sf</b>	<b>8,000</b>
<b>Other Equipment</b>	<b>129,939.00 sf</b>	<b>0.22 /sf</b>	<b>28,000</b>
<b>Fixed Seating</b>			
<b>Fixed Seating</b>			
<b>Choral Risers</b>	<b>EXCL</b>	<b>/EXCL</b>	
Bleachers at Gym = 92' x 10 rows	920.00 Lnft	80.00 /Lnft	73,600
<b>Fixed Seating</b>		<b>/sf</b>	<b>73,600</b>
<b>Fixed Seating</b>		<b>/sf</b>	<b>73,600</b>
<b>EQUIPMENT</b>	<b>129,939.00 sf</b>	<b>5.31 /sf</b>	<b>689,600</b>
<b>FURNISHINGS</b>			
<b>Specialties</b>			
<b>Markerboards &amp; Tackboards</b>			
Markerboards - 8' & 4' L x 4' Ht	3,264.00 sf	20.00 /sf	65,280
<b>Smartboards - FFE, Wiring and Pathways w/Div16</b>	<b>0.00 Excl</b>	<b>0.00 /Excl</b>	<b>0</b>
<b>Markerboards &amp; Tackboards</b>	<b>129,939.00 sf</b>	<b>0.50 /sf</b>	<b>65,280</b>
<b>Specialties</b>	<b>129,939.00 sf</b>	<b>0.50 /sf</b>	<b>65,280</b>
<b>Millwork</b>			
<b>Cabinetry &amp; Millwork</b>			
Blocking, Misc Rough Carpentry for casework / millwork	3,650.00 bdft	7.50 /bdft	27,391
Built In Display Cases	4.00 Ea	3,500.00 /Ea	14,000
Shelving / Open Cubbies incl Metal Grill - Classroom Outside Wall	1,278.00 Lnft	210.00 /Lnft	268,379
Mailbox Units	24.00 Lnft	500.00 /Lnft	12,000
Reception Desk	41.00 Lnft	750.00 /Lnft	30,750
Check out Desk	21.00 Lnft	750.00 /Lnft	15,750
Base Cab w/PLam Top	877.00 Lnft	240.00 /Lnft	210,480
Wall Cab	509.00 Lnft	190.00 /Lnft	96,710
Tall Storage Cabinets	118.00 Ea	800.00 /Ea	94,400
<b>Cabinetry &amp; Millwork</b>	<b>129,939.00 sf</b>	<b>5.93 /sf</b>	<b>769,860</b>
<b>Millwork</b>	<b>129,939.00 sf</b>	<b>5.93 /sf</b>	<b>769,860</b>
<b>Blinds &amp; Other Window Treatments</b>			
<b>Blinds &amp; Drapes</b>			
Interior Horizontal Blinds Aluminum - admin	1.00 ls	5,000.00 /ls	5,000



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## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Blinds &amp; Drapes</b>			
Geared Roller Shades, Typical Classroom, manual	1.00 ls	50,000.00 /ls	50,000
Roller Shades, Caf (electric) - Allow	1.00 ls	25,000.00 /ls	25,000
<b>Blinds &amp; Drapes</b>	<b>129,939.00 sf</b>	<b>0.62 /sf</b>	<b>80,000</b>
<b>Blinds &amp; Other Window Treatments</b>	<b>129,939.00 sf</b>	<b>0.62 /sf</b>	<b>80,000</b>
<b>FURNISHINGS</b>	<b>129,939.00 sf</b>	<b>7.04 /sf</b>	<b>915,140</b>
<b>EQUIPMENT AND FURNISHINGS</b>	<b>129,939.00 SF</b>	<b>12.35 /SF</b>	<b>1,604,741</b>

### OTHER BUILDING CONSTRUCTION

#### BUILDING DEMOLITION

##### Existing Building Demolition

##### Demolition / Abatement

Demo Existing School, Including Foundation Removal	119,000.00 sf	3.15 /sf	374,850
<b>Demolition / Abatement</b>	<b>129,939.00 sf</b>	<b>2.89 /sf</b>	<b>374,850</b>
<b>Existing Building Demolition</b>	<b>129,939.00 sf</b>	<b>2.89 /sf</b>	<b>374,850</b>

##### HAZMAT Abatement

##### HAZ/MAT Abatement

Flooring and Mastic	60,000.00 sf	3.00 /sf	180,000
Pipe and Joint Insulation	3,500.00 lf	20.00 /lf	70,000
Ceiling and Wall selective demo for access	1.00 Allw	25,000.00 /Allw	25,000
Transite Panels over doors	20.00 loc	100.00 /loc	2,000
Interior Windows	275.00 ea	100.00 /ea	27,500
Blackboards	320.00 ea	100.63 /ea	32,200
Light Fixtures	950.00 ea	30.00 /ea	28,500
Misc Abatement Not Identified	1.00 Allw	25,000.00 /Allw	25,000
Transite Lab Tops	5.00 ea	500.00 /ea	2,500
Duct Insulation @Gym	120.00 sf	50.00 /sf	6,000
Wood Fire Doors @Kitchen	5.00 ea	100.00 /ea	500
Boiler Rm - Duct Insulation	300.00 sf	20.00 /sf	6,000
Boiler Rm - Tank Insulation	250.00 sf	20.00 /sf	5,000
Boiler Rm - Pipe and Hard Joint Insulation	500.00 lf	20.00 /lf	10,000
Boiler Rm - Boilers	2.00 ea	7,500.00 /ea	15,000
Boiler Rm - Ceiling Paint	1,900.00 sf	10.00 /sf	19,000
Various Locations - Thru Wall Flashing	1.00 Allw	25,000.00 /Allw	25,000
Exterior Windows, Doors, Unit Vents	470.00 loc	100.00 /loc	47,000
Underground Oil Tank	1.00 Ls	15,000.00 /Ls	15,000
Construction Monitoring & Air Sampling	1.00 Ls	58,800.00 /Ls	58,800
<b>HAZ/MAT Abatement</b>	<b>129,939.00 ls</b>	<b>4.62 /ls</b>	<b>600,000</b>
<b>HAZMAT Abatement</b>	<b>129,939.00 sf</b>	<b>4.62 /sf</b>	<b>600,000</b>
<b>BUILDING DEMOLITION</b>	<b>129,939.00 SF</b>	<b>7.50 /SF</b>	<b>974,850</b>
<b>OTHER BUILDING CONSTRUCTION</b>	<b>129,939.00 SF</b>	<b>7.50 /SF</b>	<b>974,850</b>

### SITWORK

#### SITE PREPARATION

##### Erosion Control

##### Erosion Control

Install / Maintain Wheel Wash Stations	1.00 Locs	5,000.00 /Locs	5,000
Erosion Control - Haybales / Silt Fence	2,726.00 Lnft	6.00 /Lnft	16,356
Erosion Control - Inlet Barriers	11.00 Locs	500.00 /Locs	5,500
Erosion Control - Maintain	1.00 Ls	5,000.00 /Ls	5,000
<b>Erosion Control</b>	<b>129,939.00 sf</b>	<b>0.25 /sf</b>	<b>31,856</b>
<b>Erosion Control</b>	<b>129,939.00 sf</b>	<b>0.25 /sf</b>	<b>31,856</b>

##### Site Demolition

##### Demo Site Components

R&D Fence	1,554.00 Lnft	3.50 /Lnft	5,439
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# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Demo Site Components</b>			
R&D Utilities - Storm Lines	1,556.00 Lnft	8.00 /Lnft	12,448
R&D Utilities - Storm Structures	8.00 Ea	375.00 /Ea	3,000
R&D Utilities - Light Poles / Bases	4.00 Ea	600.00 /Ea	2,400
R&D Utilities - San Lines	630.00 Lnft	10.00 /Lnft	6,300
R&D Utilities - San Structures	4.00 Ea	450.00 /Ea	1,800
R&D Utilities - Gas Lines	416.00 Lnft	5.00 /Lnft	2,080
Misc Site Removals	1.00 Ls	5,000.00 /Ls	5,000
<b>Demo Site Components</b>	<b>129,939.00 sf</b>	<b>0.30 /sf</b>	<b>38,467</b>
<b>Demo Site Paving</b>			
Remove Existing Asphalt - pulverize for reuse as base	170,000.00 sf	0.45 /sf	76,500
<b>Demo Site Paving</b>	<b>129,939.00 sf</b>	<b>0.59 /sf</b>	<b>76,500</b>
<b>Site Demolition</b>	<b>129,939.00 sf</b>	<b>0.89 /sf</b>	<b>114,967</b>
<b>Site Earthwork</b>			
<b>Site Excavation</b>			
Strip Topsoil to Stockpile	7,500.00 cy	4.25 /cy	31,875
Site Cut - Bulk Cut	21,500.00 cy	3.00 /cy	64,500
Site Fills from Onsite Stockpile - common fill outside footprint	10,500.00 cy	2.50 /cy	26,250
Remove and Dispose Offsite Excess Material	10,000.00 cy	10.00 /cy	100,000
Proof Roll / Compact Entire Site	800,000.00 sf	0.08 /sf	60,000
Ledge Blasting & Removal - Trench Excavation - Allow	500.00 cy	65.00 /cy	32,500
Dewatering open excavations	1.00 Ls	5,000.00 /Ls	5,000
Provide level compacted surface for crane operations	1.00 Ls	10,000.00 /Ls	10,000
<b>Site Excavation</b>	<b>129,939.00 sf</b>	<b>2.54 /sf</b>	<b>330,125</b>
<b>Site Earthwork</b>	<b>129,939.00 sf</b>	<b>2.54 /sf</b>	<b>330,125</b>
<b>SITE PREPARATION</b>	<b>129,939.00 sf</b>	<b>3.67 /sf</b>	<b>476,948</b>
<b>SITE IMPROVEMENTS</b>			
<b>Site Earthwork</b>			
<b>Paving Bases - Gravel</b>			
Compacted Gravel @Bit Paving, Conc. Sidewalks, Pavers	8,000.00 cuyd	16.00 /cuyd	128,000
Rough Grade @Bit Paving, Sidewalks, Pavers	25,400.00 sy	0.85 /sy	21,515
Fine Grade @ Bituminuous Paving	190,000.00 sf	0.35 /sf	65,601
Fine Grade @ Bit Sidewalks	16,360.00 sf	0.35 /sf	5,649
Fine Grade @ Concrete Sidewalks	12,100.00 sf	0.35 /sf	4,179
Fine Grade @ Unit Pavers	9,756.00 sf	0.35 /sf	3,370
Fine Grade @Conc Pads & Stairs	800.00 sf	0.35 /sf	276
<b>Paving Bases - Gravel</b>		<b>/sf</b>	<b>228,591</b>
<b>Site Earthwork</b>		<b>/sf</b>	<b>228,591</b>
<b>Parking Lots &amp; Drives</b>			
<b>Bituminous Paving</b>			
Bitum Paving - Roads & Drives	21,100.00 sy	17.00 /sy	358,700
Patch Existing Bit Pavement - Utility Tie-ins	1.00 Ls	5,000.00 /Ls	5,000
<b>Bituminous Paving</b>	<b>129,939.00 sf</b>	<b>2.80 /sf</b>	<b>363,700</b>
<b>Striping</b>			
Striping - Sub	1.00 Ls	25,000.00 /Ls	25,000
<b>Striping - Parking Spaces</b>	<b>lf</b>	<b>/lf</b>	
<b>Striping - Misc Lane Markings</b>	<b>Ls</b>	<b>/Ls</b>	
<b>Painted Crosswalks</b>	<b>sf</b>	<b>/sf</b>	
<b>Painted Handicap Symbol</b>	<b>ea</b>	<b>/ea</b>	
<b>Striping</b>	<b>129,939.00 sf</b>	<b>0.19 /sf</b>	<b>25,000</b>
<b>Parking Lots &amp; Drives</b>	<b>129,939.00 sf</b>	<b>2.99 /sf</b>	<b>388,700</b>

Curbs / Rails / Barriers



# Sherwood Middle School Design Development Estimate

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Curbing</b>			
Granite Planter Edging	1,161.00 Inft	29.00 /Inft	33,669
Undefined Edging	672.00 Inft	26.00 /Inft	17,472
Vertical Granite Curb	2,303.00 lf	26.00 /lf	59,878
Flush and Transition Curb	100.00 lf	30.00 /lf	3,000
Bituminous Sloped Curb	4,312.00 lf	4.00 /lf	17,248
<b>Curbing</b>	<b>129,939.00 sf</b>	<b>1.01 /sf</b>	<b>131,267</b>
<b>Curbs / Rails / Barriers</b>	<b>129,939.00 sf</b>	<b>1.01 /sf</b>	<b>131,267</b>
<b>Pedestrian Paving</b>			
<b>Bituminous Paving</b>			
Bituminuous Paving - Walkways	16,360.00 sf	2.30 /sf	37,628
<b>Bituminous Paving</b>	<b>129,939.00 sf</b>	<b>0.29 /sf</b>	<b>37,628</b>
<b>Concrete Paving</b>			
Concrete Paving - Pedestrian Sidewalks	12,100.00 sf	5.50 /sf	66,550
- EVO - ADA Curb Cuts, Detectable Strips	8.00 Locs	500.00 /Locs	4,000
Unit Pavers	9,756.00 sf	15.00 /sf	146,340
<b>Concrete Paving</b>	<b>129,939.00 sf</b>	<b>1.67 /sf</b>	<b>216,890</b>
<b>Pedestrian Paving</b>	<b>129,939.00 sf</b>	<b>1.96 /sf</b>	<b>254,518</b>
<b>Site Formed Concrete</b>			
<b>Concrete Pads</b>			
Concrete Pad - Mech Equip	250.00 sf	30.00 /sf	7,500
Concrete Pads Outside Building Egress	150.00 sf	30.00 /sf	4,500
<b>Concrete Pads</b>	<b>129,939.00 sf</b>	<b>0.09 /sf</b>	<b>12,000</b>
<b>Concrete Stairs &amp; Ramps</b>			
Concrete Stairs	2.00 Loc	35,000.00 /Loc	70,000
<b>Concrete Stairs &amp; Ramps</b>	<b>129,939.00 sf</b>	<b>0.54 /sf</b>	<b>70,000</b>
<b>Site Formed Concrete</b>	<b>129,939.00 sf</b>	<b>0.63 /sf</b>	<b>82,000</b>
<b>Site Walls</b>			
<b>Fences</b>			
2 Rail Wood Fence	815.00 lf	45.00 /lf	36,675
5' Chain Link Fence	38.00 lf	26.00 /lf	988
5' Chain Link Fence Gate	1.00 ea	500.00 /ea	500
6' Chain Link Fence	233.00 lf	30.00 /lf	6,990
6' Chain Link Fence Gate - 16' Wide	1.00 ea	2,000.00 /ea	2,000
<b>Fences</b>	<b>129,939.00 sf</b>	<b>0.36 /sf</b>	<b>47,153</b>
<b>Stone Walls</b>			
Field Stone Wall - Reconstruct Existing	161.00 Inft	300.00 /Inft	48,300
<b>Stone Walls</b>	<b>129,939.00 sf</b>	<b>0.37 /sf</b>	<b>48,300</b>
<b>Misc Site Concrete</b>			
Concrete Base for Signage, Poles	1.00 Ls	7,500.00 /Ls	7,500
Concrete Footing / Wall - ave 5' ht	76.00 Inft	150.00 /Inft	11,400
Concrete Footing / Wall - ave 8' ht	91.00 Inft	150.00 /Inft	13,650
<b>Misc Site Concrete</b>	<b>129,939.00 sf</b>	<b>0.25 /sf</b>	<b>32,550</b>
<b>Site Walls</b>	<b>129,939.00 sf</b>	<b>0.99 /sf</b>	<b>128,003</b>
<b>Site Furnishings</b>			
<b>Misc Site Items</b>			
Bike Racks	1.00 Ls	3,000.00 /Ls	3,000
Benches	1.00 Ls	5,000.00 /Ls	5,000
Trash Receptacles	1.00 Ls	2,500.00 /Ls	2,500
Flagpole / Base	1.00 Ls	4,000.00 /Ls	4,000



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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Misc Site Items</b>			
<b>Site Light Pole Bases (Pole by EC)</b>	<b>ea</b>	<b>/ea</b>	
Basketball Goal	2.00 ea	2,000.00 /ea	4,000
Relocate Benches	1.00 Ls	7,500.00 /Ls	7,500
Backstop / foulpoles	1.00 Allw	10,000.00 /Allw	10,000
<b>Misc Site Items</b>	<b>129,939.00 sf</b>	<b>0.28 /sf</b>	<b>36,000</b>
<b>Site Furnishings</b>	<b>129,939.00 sf</b>	<b>0.28 /sf</b>	<b>36,000</b>
<b>Misc Site Improvement Items</b>			
<b>Misc Site Items</b>			
Bollards - painted steel	12.00 ea	500.00 /ea	6,000
<b>Tree Grates</b>	<b>Excl</b>	<b>/Excl</b>	
Street Signs - Permanent	1.00 ea	5,000.00 /ea	5,000
Street Signs - Temporary	1.00 Allw	5,000.00 /Allw	5,000
Handrail / Guardrail at Stairs - Painted Metal	375.00 Lnft	150.00 /Lnft	56,250
<b>Misc Site Items</b>	<b>129,939.00 sf</b>	<b>0.56 /sf</b>	<b>72,250</b>
<b>Misc Site Improvement Items</b>	<b>129,939.00 sf</b>	<b>0.56 /sf</b>	<b>72,250</b>
<b>Topsoil / Seed / Sod</b>			
<b>Topsoil &amp; Seeding</b>			
Spread Loam, stockpiled mat'l	7,500.00 cy	7.00 /cy	52,500
Spread Loam, borrowed mat'l	2,500.00 cy	25.00 /cy	62,500
Hydroseeding, General Areas	132,000.00 sf	0.15 /sf	19,800
Seed Athletic Fields	347,000.00 sf	0.20 /sf	69,400
Skinned Infield	11,150.00 sf	1.75 /sf	19,513
<b>Topsoil &amp; Seeding</b>	<b>129,939.00 sf</b>	<b>1.72 /sf</b>	<b>223,713</b>
<b>Topsoil / Seed / Sod</b>	<b>129,939.00 sf</b>	<b>1.72 /sf</b>	<b>223,713</b>
<b>Plantings</b>			
<b>Trees &amp; Plantings</b>			
Mulch - Bark	1.00 Ls	10,000.00 /Ls	10,000
Guying & Maintenance	1.00 Ls	10,000.00 /Ls	10,000
<b>Trees &amp; Plantings</b>	<b>129,939.00 sf</b>	<b>0.15 /sf</b>	<b>20,000</b>
<b>Deciduous Trees</b>			
Trees - Red Sunset Maple, 3"-3-1/2" cal	6.00 ea	850.00 /ea	5,100
Trees - October Glory Red Maple, 3"-3-1/2" cal	8.00 ea	850.00 /ea	6,800
Trees - Green Mountain Sugar Maple, 3"-3-1/2" cal	8.00 ea	750.00 /ea	6,000
Trees - Heritage Riverbirch, 12' - 14' Ht	7.00 ea	850.00 /ea	5,950
Trees - Skyline Honeylocust, 3"-3-1/2" cal	25.00 ea	850.00 /ea	21,250
Trees - Aristocrat Flowering Pear, 3-1/2 - 4" cal	5.00 ea	1,000.00 /ea	5,000
Trees - Kwanzan Cherry, 3"-3-1/2" cal	10.00 ea	850.00 /ea	8,500
Trees - Red Oak, 3 - 3-1/2" cal	1.00 ea	850.00 /ea	850
<b>Deciduous Trees</b>	<b>129,939.00 sf</b>	<b>0.46 /sf</b>	<b>59,450</b>
<b>Evergreen Trees</b>			
Trees - Austrian Pine - 7-8' ht	15.00 ea	700.00 /ea	10,500
Trees - Eastern White Pine - 9-10' ht	9.00 ea	750.00 /ea	6,750
Trees - Emerald Green Arborvitae - 7'-8' ht	13.00 ea	700.00 /ea	9,100
Trees - Green Giant Arborvitae - 8'-9' ht	6.00 ea	725.00 /ea	4,350
<b>Evergreen Trees</b>	<b>129,939.00 sf</b>	<b>0.24 /sf</b>	<b>30,700</b>
<b>Deciduous Shrubs</b>			
Shrubs - Allow	1.00 Allw	5,000.00 /Allw	5,000
<b>Deciduous Shrubs</b>	<b>129,939.00 sf</b>	<b>0.04 /sf</b>	<b>5,000</b>
<b>Perennials</b>			
Ground Cover - Allow	1.00 Allw	5,000.00 /Allw	5,000



# Sherwood Middle School Design Development Estimate

## Estimate Detail

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Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Perennials</b>	<b>129,939.00 sf</b>	<b>0.04 /sf</b>	<b>5,000</b>
<b>Plantings</b>	<b>129,939.00 sf</b>	<b>0.93 /sf</b>	<b>120,150</b>
<b>Irrigation System</b>			
<b>Irrigation Systems</b>			
Irrigation Systems	1.00 Allw	175,000.00 /Allw	175,000
<b>Irrigation Systems</b>	<b>129,939.00 sf</b>	<b>1.35 /sf</b>	<b>175,000</b>
<b>Irrigation System</b>	<b>129,939.00 sf</b>	<b>1.35 /sf</b>	<b>175,000</b>
<b>SITE IMPROVEMENTS</b>	<b>129,939.00 sf</b>	<b>14.16 /sf</b>	<b>1,840,191</b>
<b>SITE UTILITIES</b>			
<b>Site Earthwork</b>			
<b>Site Excavation</b>			
<b>Excavate at Grease Trap</b>	<b>cy</b>	<b>/cy</b>	
<b>Excavate at Underground Detention</b>	<b>cy</b>	<b>/cy</b>	
<b>Building Earthwork</b>			
Trench @Underslab Utilities within Bldg Footprint	1,250.00 Lf	25.00 /Lf	31,250
<b>Building Earthwork</b>	<b>129,939.00 sf</b>	<b>0.24 /sf</b>	<b>31,250</b>
<b>Site Earthwork</b>	<b>129,939.00 sf</b>	<b>0.24 /sf</b>	<b>31,250</b>
<b>Water Distribution Systems</b>			
<b>Water</b>			
New Water Domestic Service Line - 8" CLDI	257.00 lf	85.00 /lf	21,845
New Water Fire Service 8" CLDI	365.00 lf	85.00 /lf	31,025
Fire Loop - 6" CLDI	198.00 lf	75.00 /lf	14,850
Fire Hydrant +6" Run-out	3.00 ea	5,000.00 /ea	15,000
Connect to Existing / gate valves	3.00 loc	3,500.00 /loc	10,500
Flush out, Test	1.00 Ls	10,000.00 /Ls	10,000
<b>Water</b>	<b>129,939.00 sf</b>	<b>0.79 /sf</b>	<b>103,220</b>
<b>Water Distribution Systems</b>	<b>129,939.00 sf</b>	<b>0.79 /sf</b>	<b>103,220</b>
<b>Sanitary Sewer System</b>			
<b>Sanitary Drainage</b>			
Trench Excavation / Backfill @ Sanitary	1,551.00 lf	40.00 /lf	62,040
Manhole @ Sanitary Sewer	1.00 Ea	4,000.00 /Ea	4,000
Grease Trap	1.00 each	7,500.00 /each	7,500
Sanitary Sewer Line - 6" SDR	437.00 lnft	25.00 /lnft	10,925
Sanitary Sewer Line - 8" SDR	1,081.00 lnft	35.00 /lnft	37,835
Sanitary Sewer Line - 8" CPI	33.00 lnft	40.00 /lnft	1,320
Connect to Existing	1.00 loc	1,500.00 /loc	1,500
<b>Sanitary Drainage</b>	<b>129,939.00 sf</b>	<b>0.96 /sf</b>	<b>125,120</b>
<b>Sanitary Sewer System</b>	<b>129,939.00 sf</b>	<b>0.96 /sf</b>	<b>125,120</b>
<b>Storm Sewer System</b>			
<b>Storm Drainage</b>			
Manhole @ Site Drainage	15.00 ea	4,000.00 /ea	60,000
CB @ Site Drainage	15.00 ea	4,000.00 /ea	60,000
Stormceptor / Oil Water Separator	2.00 ea	12,500.00 /ea	25,000
Underground Detention - Stormtech	5,684.00 sf	20.00 /sf	113,680
Adjust Rim Exist MH / CB	15.00 Loc	850.00 /Loc	12,750
Perforated Underdrain - 4" (@Retaining wall)	167.00 lf	30.00 /lf	5,010
Storm Drainage Line - 8" CPP	105.00 lf	45.00 /lf	4,725
Storm Drainage Line - 12" RCP	2,533.00 lf	60.00 /lf	151,980
Flared End	1.00 ea	500.00 /ea	500
Trench Drain	25.00 lf	75.00 /lf	1,875
Connect to Existing	1.00 Ls	2,500.00 /Ls	2,500
Headwall	2.00 Loc	3,500.00 /Loc	7,000



# Sherwood Middle School Design Development Estimate

## Estimate Detail

Final Reconciled

August 2010

8-1-10

Description	Takeoff Quantity	Total Cost/Unit	Total Amount
<b>Storm Drainage</b>	<b>129,939.00 sf</b>	<b>3.43 /sf</b>	<b>445,020</b>
<b>Field Underdrain</b>			
Strip Topsoil - Fields	6,500.00 cuyd	7.15 /cuyd	46,475
Backfill Sand / Subgrade drainage fill layer	13,000.00 cuyd	21.75 /cuyd	282,750
Underfield Drainage - both fields	11,525.00 lf	18.00 /lf	207,450
Spread Topsoil from Stockpile	6,500.00 cuyd	9.75 /cuyd	63,375
<b>Field Underdrain</b>	<b>129,939.00 sf</b>	<b>4.62 /sf</b>	<b>600,050</b>
<b>Storm Sewer System</b>	<b>129,939.00 sf</b>	<b>8.04 /sf</b>	<b>1,045,070</b>
<b>Other Site Mechanical Utilities</b>			
<b>Gas</b>			
Trench Excavation / Backfill @ Gas	108.00 lf	25.00 /lf	2,700
<b>Gas Service Piping</b>	<b>Excl</b>	<b>/Excl</b>	
<b>Gas</b>	<b>129,939.00 sf</b>	<b>0.02 /sf</b>	<b>2,700</b>
<b>Other Site Mechanical Utilities</b>	<b>129,939.00 sf</b>	<b>0.02 /sf</b>	<b>2,700</b>
<b>Electrical Distribution</b>			
<b>Electrical</b>			
Trench Excavation @Ductbank @ U/Ground Elec - CATV / Phone (Type A)	220.00 lf	25.00 /lf	5,500
Trench Excavation @Ductbank @ U/Ground Elec - Secondary (Type B)	40.00 lf	25.00 /lf	1,000
Trench Excavation @Ductbank @ U/Ground Elec - Emergency (Type C)	68.00 lf	25.00 /lf	1,700
Trench Excavation @Ductbank @ U/Ground Elec - Primary (Type D)	195.00 lf	25.00 /lf	4,875
<b>Elec / Telecom Manholes</b>	<b>Excl</b>	<b>/Excl</b>	
Trench Excavation @ U/Ground Elec - Site Lighting	2,500.00 lf	18.00 /lf	45,000
<b>Concrete Encase Ductbanks - Excluded - Direct Bury</b>	<b>Excl</b>	<b>/Excl</b>	
<b>Electrical</b>	<b>129,939.00 SF</b>	<b>0.45 /SF</b>	<b>58,075</b>
<b>Electrical Distribution</b>	<b>129,939.00 sf</b>	<b>0.45 /sf</b>	<b>58,075</b>
<b>SITE UTILITIES</b>	<b>129,939.00 sf</b>	<b>10.51 /sf</b>	<b>1,365,435</b>
<b>SITWORK</b>	<b>129,939.00 SF</b>	<b>28.34 /SF</b>	<b>3,682,574</b>
<b>SITE SERVICES</b>			
<b>SITE SERVICES</b>			
<b>Site Services</b>			
Site Services / General Requirements - Detailed List to Follow	1.00 Ls	1,028,725.00 /Ls	1,028,725
<b>Site Services</b>	<b>129,939.00 sf</b>	<b>7.92 /sf</b>	<b>1,028,725</b>
<b>Site Services</b>	<b>129,939.00 sf</b>	<b>7.92 /sf</b>	<b>1,028,725</b>
<b>SITE SERVICES</b>	<b>129,939.00 sf</b>	<b>7.92 /sf</b>	<b>1,028,725</b>
<b>SITE SERVICES</b>	<b>129,939.00 SF</b>	<b>7.92 /SF</b>	<b>1,028,725</b>



**Sherwood Middle School  
Design Development Estimate**

*Estimate Detail*

*Final Reconciled*

*August 2010*

**8-1-10**

**Estimate Totals**

Description	Amount	Totals	Rate	Cost per Unit
<b>Trade Cost Total</b>	<b>28,912,958</b>	<b>28,912,958</b>		<b>222.51 /Sqft</b>
Estimate Contingency	1,445,648		5.000 %	11.13 /Sqft
Escalation	433,694		1.500 %	3.34 /Sqft
CM Contingency	1,445,648		5.000 %	11.13 /Sqft
- Subtotal	3,324,990	32,237,948		248.10 /Sqft
		32,237,948		248.10 /Sqft
CM Preconstruction Services	90,000			0.69 /Sqft
CM General Conditions	2,806,715			21.60 /Sqft
Builders Risk Insurance (Incl)				
CM Liab Insurance (Incl)				
CM Bond (Incl)				
CM Fee	407,000			3.13 /Sqft
- Subtotal	3,303,715	35,541,663		273.53 /Sqft
<b><u>Total</u></b>		<b><u>35,541,663</u></b>		<b>273.53 /Sqft</b>

**Sherwood Middle School**  
Sherwood Avenue, Shrewsbury, MA 01545

**DESIGN DEVELOPMENT**

**10. SPACE SUMMARY TEMPLATE**

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Proposed Space Summary - Middle Schools

MIDDLE SCHOOL	Existing Conditions		
	ROOM NFA <sup>1</sup>	# OF RMS	area totals
<b>CORE ACADEMIC SPACES</b>			<b>0</b>
<i>(List classrooms of different sizes seperately)</i>			
Classroom - Health			
Classroom - Foreign Language			
Classroom - General			
Classroom - General			
Classroom - General			
Small Group Seminar (20-30 seats)/ Resource			
Small Group Seminar (20-30 seats)/ Resource			
Science Classroom / Lab			
Prep Room			
Prep Room			
Prep Room			
<b>SPECIAL EDUCATION</b>			
<i>(List classrooms of different sizes seperately)</i>			
Self-Contained SPED			
Self-Contained SPED - Lifeskills			
Self-Contained SPED - O.P./ P.T.			
Self-Contained SPED Toilet			
Resource Room			
Resource Room			
Resource Room			
Small Group Room / E.L.L.			
Small Group Room / Speech - Language			
Small Group Room / Speech - Language			
Small Group Room / Reading			
<b>ART &amp; MUSIC</b>			
Art Classroom			
Art Workroom w/ Storage			
Art Workroom w/ Storage & kiln			
General Music Classroom			
Band / Orchestra - 100 seats			
Music Practice / Ensemble			
Music Office			
Music Storage			
<b>VOCATIONS &amp; TECHNOLOGY</b>			
Tech. Clrm. - (E.G. Drafting, Business)			
Tech. Shop - (E.G. Consumer, Wood)			
<b>HEALTH &amp; PHYSICAL EDUCATION</b>			
Gymnasium			
Gym Storeroom			
Gym Storeroom			
Health Instructor's Office w/Shower & Toilet			
Changing Rooms - Girls w/Toilets			
Changing Rooms - Boys w/Toilets			

PROPOSED								
Existing to Remain/Renovated			New			Total		
ROOM NFA <sup>1</sup>	# OF RMS	area totals	ROOM NFA <sup>1</sup>	# OF RMS	area totals	ROOM NFA <sup>1</sup>	# OF RMS	area totals
		<b>0</b>			<b>39,190</b>			<b>0</b>
			890	1	875			
			890	2	1,750			
			890	12	10,680			
			895	25	22,375			
			992	1	992			
			332	2	664			
			550	1	550			
			154	1	154			
			250	2	500			
			325	2	650			
		<b>0</b>			<b>7,714</b>			<b>0</b>
			890	1	890			
			992	1	992			
			430	1	430			
			60	2	120			
			642	1	642			
			622	2	1,244			
			636	2	1,272			
			544	1	544			
			544	1	544			
			518	1	518			
			518	1	518			
		<b>0</b>			<b>6,408</b>			<b>0</b>
			1,114	2	2,228			
			122	1	122			
			175	1	175			
			1,225	1	1,225			
			2,412	1	2,412			
			246	1	246			
		<b>0</b>			<b>2,580</b>			<b>0</b>
			1,290	2	2,580			
		<b>0</b>			<b>11,299</b>			<b>0</b>
			8,510	1	8,510			
			440	1	440			
			350	1	350			
			80	2	160			
			1,057	1	1,057			
			782	1	782			

MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM NFA <sup>1</sup>	# OF RMS	area totals	Comments
		<b>42,590</b>	
950	33	31,350	850 SF min - 950 SF max
500	2	1,000	
1,200	8	9,600	1 period / day / student
80	8	640	
		<b>9,560</b>	
950	6	5,700	assumed 8% of pop. in self-contained SPED
60	6	360	
500	5	2,500	1/2 size Genl. Clrm.
500	2	1,000	1/2 size Genl. Clrm.
		<b>4,800</b>	
1,200	2	2,400	assumed use - 50% population 2 times / week
150	2	300	
1,500	1	1,500	assumed use - 50% population 2 times / week
200	3	600	
		<b>6,400</b>	
1,200	2	2,400	Assumed use - 25% Population - 5 times/week
2,000	2	4,000	Assumed use - 25% Population - 5 times/week
		<b>8,400</b>	
6,000	1	6,000	
150	1	150	
250	1	250	
1,000	2	2,000	

Proposed Space Summary - Middle Schools

MIDDLE SCHOOL	Existing Conditions		
	ROOM NFA <sup>1</sup>	# OF RMS	area totals
ROOM TYPE			
<b>MEDIA CENTER</b>			
Media Center/Reading Room			
Media - Work Room			
<b>DINING &amp; FOOD SERVICE</b>			
Cafetorium/Dining			
Stage - Drama Classroom			
Stage - Drama Storage			
Chair/Table/Equipment Storage			
Kitchen			
Staff Lunch Room			
<b>MEDICAL</b>			
Medical Suite Toilet			
Nurses' Office/Waiting Room			
Rest Area - (4 Beds )			
Examination Room / Resting			
<b>ADMINISTRATION &amp; GUIDANCE</b>			
General Office / Waiting Room/Toilet			
Teachers' Mail and Time Room			
Duplicating Room			
Records Room			
Principal's Office w/ Conference Area			
Principal's Secretary / Waiting			
Assistant Principal's Office - AP1			
Assistant Principal's Office - AP2			
Supervisory / Spare Office			
Conference Room			
Guidance Office			
Guidance Office			
Guidance Office			
Guidance Waiting Room			
Guidance Storeroom			
Teachers' Work Room			
Teachers' Work Room			
<b>CUSTODIAL &amp; MAINTENANCE</b>			
Custodian's Office			
Custodian's Workshop			
Custodian's Storage			
Recycling Room / Trash			
Receiving and General Supply			
Storeroom			
Network/Telecom Room			
<b>OTHER</b>			
Other (specify)			
Total Building Net Floor Area (NFA)			
Proposed Student Capacity/Enrollment			
Total Building Gross Floor Area (GFA) <sup>2</sup>			
Grossing factor (GFA/NFA)			

PROPOSED								
Existing to Remain/Renovated			New			Total		
ROOM NFA <sup>1</sup>	# OF RMS	area totals	ROOM NFA <sup>1</sup>	# OF RMS	area totals	ROOM NFA <sup>1</sup>	# OF RMS	area totals
		0			3,264			0
			3,144	1	3,144			
			120	1	120			
		0			10,957			0
			5,352	1	5,352			
			1,500	1	1,500			
			232	1	232			
			315	1	315			
			3,142	1	3,142			
			416	1	416			
		0			1,001			0
			60	1	60			
			394	1	394			
			435	1	435			
			112	1	112			
		0			3,973			0
			1,214	1	1,214			
			126	1	126			
			126	1	126			
			94	1	94			
			198	1	198			
			120	1	120			
			120	1	120			
			145	1	145			
			445	1	445			
			106	2	212			
			120	2	240			
			145	1	145			
			220	1	220			
			284	2	568			
		0			2,093			0
			178	1	178			
			210	1	210			
			385	1	385			
			380	1	380			
			800	1	800			
			140	1	140			
		0			0			0
		0			88,479			
					900			
					130,000			
					1.47			

MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM NFA <sup>1</sup>	# OF RMS	area totals	Comments
		5,555	
5,555	1	5,555	
		11,375	
6,750	1	6,750	1/2 Enrollment @ 15 SF/Seat
1,600	1	1,600	
500	1	500	
2,200	1	2,200	1600 SF for first 300 + 1 SF/student Add'l
325	1	325	20 SF/Occupant
		710	
60	1	60	
250	1	250	
100	4	400	
		3,850	
550	1	550	
100	1	100	
200	1	200	
200	1	200	
375	1	375	
125	1	125	
150	1	150	
150	1	150	
150	1	150	
350	1	350	
150	5	750	
100	1	100	
50	1	50	
600	1	600	
		2,375	
150	1	150	
250	1	250	
375	1	375	
400	1	400	
400	1	400	
600	1	600	
200	1	200	
		0	
		95,615	
		900	
		144,000	
		1.51	

## Proposed Space Summary - Middle Schools

MIDDLE SCHOOL	Existing Conditions		
<u>ROOM TYPE</u>	ROOM NFA <sup>1</sup>	# OF RMS	area totals

PROPOSED								
Existing to Remain/Renovated			New			Total		
ROOM NFA <sup>1</sup>	# OF RMS	area totals	ROOM NFA <sup>1</sup>	# OF RMS	area totals	ROOM NFA <sup>1</sup>	# OF RMS	area totals

MSBA Guidelines (refer to MSBA Educational Program & Space Standard Guidelines)			
ROOM NFA <sup>1</sup>	# OF RMS	area totals	Comments

<sup>1</sup> **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.

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

<b>Architect Certification</b>	<p>I hereby certify that all of the information provided in this "Proposed Space Summary" is true, complete and accurate and in accordance with the rules, regulations and policies of the Massachusetts School Building Authority to the best of my knowledge and belief. A true statement, made under the penalties of perjury.</p> <p style="text-align: center;"><b>Name of Architect Firm:</b> <u>Lamoureux, Pagano &amp; Associates, Inc.</u></p> <p style="text-align: center;"><b>Name of Principal Architect:</b> <u>Michael A. Pagano, AIA</u></p> <p style="text-align: center;"><b>Signature of Principal Architect:</b> _____</p> <p style="text-align: center;"><b>Date:</b> <u>19-Jul-10</u></p>
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**Sherwood Middle School**  
Sherwood Avenue, Shrewsbury, MA 01545

**DESIGN DEVELOPMENT**

11. MA-CHPS SCORECARD UPDATE

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# Massachusetts Collaborative for High Performance Schools (MA-CHPS)

**Project:** Sherwood Middle School  
**Date:** June 10, 2010

**Point Thresholds**  
**30 points - 1.5% Financing of Maximum Allowable Cost**  
**34 points - 2.0% Financing of Maximum Allowable Cost**

 Requirement for all schools  
 Requirement for green schools only

## 40 Total Project Score

9	2	5	Points	SITE	Associated LEED Credit	Responsibility
			--	SP 1 <b>Joint Use of Facilities</b>	SSc10	School
			--	SP 2 <b>Joint Use of Parks</b>	SSc10	School
1			1	SC 1.1 <b>Sustainable Site Selection</b>	SSc1	LPA
1			1	SC 1.2 <b>No Development on Floodplains</b>	SSc1	LPA
		1	1	SC 1.3 <b>No Development Near Wetlands</b>	SSc1	
1		1	1-2	SC 1.4 <b>No Development on Greenfields</b>	SSc1	
1			1	SC 1.5 <b>Centrally Located Site/Smart Growth</b>	SSc2	TGE
1			1	SC 1.6 <b>Reduced Building Footprint</b>	none	LPA
1			1	SC 1.7 <b>Sustainable Site and Building Layout</b>	none	LPA
	1		1	SC 2.1 <b>Locate Near Public Transit</b>	SSc4.1	TGE
	1		1	SC 2.2 <b>Pedestrian/Bike Access</b>	SSc4.2	LPA/School
		1	1	SC 2.3 <b>Minimize Parking</b>	SSc4.3	
		1	1	SC 3 <b>Post-Construction Stormwater Management</b>	SSc6.1&6.2	
		1	1	SC 4.1 <b>Design to Reduce Heat Islands, Non-Roof</b>	SSc7.1	
1			1	SC 4.2 <b>Design to Reduce Heat Islands, Roof</b>	SSc7.2	LPA
2			2	SC 5 <b>Exterior Light Pollution Reduction</b>	SSc8	ART

4	0	1	Points	WATER	Associated LEED Credit	Responsibility
			--	WP 1 <b>Indoor Water Use Reduction, 20% Reduction</b>	WEc3	AKAL
1			1	WC 1.1 <b>Indoor Water Use Reduction, 30% Reduction</b>	WEc3	AKAL
		1	1	WC 1.2 <b>Reduce Water Used for Sewage Conveyance</b>	WEc2	AKAL
1			1	WC 2.1 <b>No Permanent Irrigation For Landscaping</b>	WEc2	WL
1			1	WC 2.2 <b>Water Reduction and Sports Turf Management</b>	WEc1	WL
1			1	WC 2.3 <b>Irrigation System Commissioning</b>	none	WL

5	2	20	Points	ENERGY	Associated LEED Credit	Responsibility
			--	EP 1 <b>Elimination of CFC-based Refrigerants</b>	EAp3	Seaman
			--	EP 2 <b>Commissioning</b>	EAc3	
			--	EP 3 <b>Fundamental Building Systems, Training</b>	EAc3	School
			--	EP 4 <b>Exceed Energy Code by 20%, Prescriptive Approach</b>	EAc1	
			--	EP 4 <b>Exceed Energy Code by 20%, Performance Approach</b>	EAc1	Seaman
2			1-2	EC 1 <b>Superior Energy Performance, Prescriptive Approach</b>	EAc1	Seaman/ART
		10	1-10	EC 1 <b>Superior Energy Performance, Performance Approach</b>	EAc1	
	2		2	EC 2 <b>Minimize Air Conditioning</b>	none	Seaman
2		9	2-11	EC 3 <b>Renewable Energy</b>	EAc2	LPA/Seaman
1			1	EC 4.1 <b>Energy Management Systems</b>	none	Seaman
		1	1	EC 4.2 <b>Submetering</b>	none	

4	0	9	Points	MATERIALS	Associated LEED Credit	Responsibility
			--	MP 1 <b>Storage &amp; Collection of Recyclables</b>	MRp1	LPA
			--	MP 2 <b>Site Waste Management, 75% Diversion</b>	MRC2	
1			1	MC 1 <b>Site Waste Management, 90% Diversion</b>	MRC2	
		4	1-4	MC 2.1 <b>Building Reuse, Maintain 50-95% of Existing Shell</b>	MRC1	
		1	1	MC 2.2 <b>Building Reuse, Maintain 50% Interior</b>	MRC1	
3		4	1-7	MC 3 <b>Combined Materials Attributes</b>	MRC4, 6, 7	

14	5	3	Points	IEQ	Associated LEED Credit	Responsibility	
			---	IEQP 1	<b>ASHRAE Standard 62.1-2004 Compliance</b>	EQp1	
			---	IEQP 2	<b>SMACNA IAQ Guidelines</b>	EQc3.1	
			---	IEQP 3	<b>Construction IAQ, Duct Protection</b>	EQc3.1	Contractor
			---	IEQP 4	<b>Pollutant Source Control, Off-gassing</b>	EQc5	LPA/Seaman
			---	IEQP 5	<b>Walk-Off Mats</b>	EQc5	LPA
			---	IEQP 6	<b>Drainage</b>	none	Nitsch
			---	IEQP 7	<b>Irrigation Design</b>	none	WL
			---	IEQP 8	<b>Mold Protection</b>	EQc3.1	Seaman
			---	IEQP 9	<b>Electric Ignitions, Gas-Fired Equipment</b>	none	Seaman
			---	IEQP 10	<b>Air Intake Location</b>	none	Seaman
			---	IEQP 11	<b>Duct Liners</b>	none	Seaman
			---	IEQP 12	<b>Prohibit Fossil Fuel Burning Equipment, Indoors</b>	none	Seaman
			---	IEQP 13	<b>Filter Requirements for HVAC Equipment</b>	EQc5	Seaman
			---	IEQP 14	<b>ASHRAE Standard 55-2004 Compliance</b>	EQc7.1	Seaman
			---	IEQP 15	<b>Access to Views, 70%</b>	EQc8.2	LPA
2			2	IEQC 1.1	<b>Access to Views, 90%</b>	EQc8.2	LPA
2		2	1-4	IEQC 1.2	<b>Daylighting in Classrooms</b>	EQc8.1	TGE
4			1-4	IEQC 2.1	<b>Low-Emitting Materials</b>	EQc4	Marty
1			1	IEQC 2.2	<b>Pollutant Source Control, Ducted HVAC Returns</b>	none	Seaman
1			1	IEQC 2.3	<b>Pollutant Source Control, High Efficiency Filters</b>	EQc5	Seaman
1			1	IEQC 2.4	<b>Construction IAQ, HEPA Vacuuming</b>	none	Seaman
	2		2	IEQC 2.5	<b>Construction IAQ, Building Flushout</b>	EQc3.2	Seaman
1			1	IEQC 3.1	<b>Acoustical Performance in Classrooms, Max 40 NC</b>	EQc9	Acoust. Consult
	1		1	IEQC 3.2	<b>Acoustical Performance in Classrooms, Max 35 NC</b>	EQc9	Seaman
	2		2	IEQC 3.3	<b>Acoustical Performance in Classrooms, Max 30 NC</b>	EQc9	
		1	1	IEQC 3.4	<b>Reducing Sound Transmission</b>	EQc9	
1			1	IEQC 4.1	<b>Controllability of Systems, Operable Windows</b>	none	LPA
1			1	IEQC 4.2	<b>Controllability of Systems, Temperature/Light Control</b>	EQc6.1 & 6.2	Seaman

4	2	2	Points	POLICY & OPERATIONS	Associated LEED Credit	Responsibility	
			---	P&OP 1	<b>Maintenance Plan</b>	none	School
			---	P&OP 2	<b>Anti-Idling Measures</b>	none	School
		1	1	P&OC 1	<b>Maintenance Plan, CMMS</b>	none	
1			1	P&OC 2	<b>Indoor Environmental Management Plan</b>	none	School
1			1	P&OC 3	<b>Energy Star Equipment Performance</b>	none	School
	1		1	P&OC 4.1	<b>Clean Energy, 50%</b>	EAc6	School
	1		1	P&OC 4.2	<b>Clean Energy, 100%</b>	EAc6	School
2		1	1-3	P&OC 5	<b>Innovation</b>	IDc1	TGE/School

Yes	?	No
40	11	40

# Sherwood Middle School

Sherwood Avenue, Shrewsbury, MA 01545

## DESIGN DEVELOPMENT

## 12. INTERIOR DESIGN CONCEPT

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For the new construction, Sherwood Middle School, our intent is to develop an interior design that reflects the contemporary, sleek design of the exterior. Just as each program space is evident from the exterior fenestration, the interior spaces will be designed to appropriately express the scale and function of the spaces. It is our intent to provide a welcoming, easily navigated, intuitive interior appropriate for both community and middle school constituencies.

The Sherwood interior design concept is based on reinforcement of the “school within a school” design tenet of the project. Each classroom wing is arranged to form a community around the flexible use common room area supported by lockers, support spaces, and toilet rooms. It is our intent to develop an interior design to give each of these areas a distinct identity. In general, we plan to specify wood doors and millwork of the same color and species throughout the school, but use other materials such as flooring, paint, and possibly lockers to lend distinction to each area. In this way, the 900 student school can be an intimate atmosphere appropriate for grades 5 and 6 students and also help with orientation throughout the school.

Surface materials in the corridor and lobby areas are specified as durable and low maintenance products including ceramic tile, resilient flooring, and laminate wall panels. We plan to develop classic color schemes for these materials so that they will not appear dated after several decades of occupancy.

The interior and exterior color palette will be considered in tandem with each other for a cohesive aesthetic throughout.

Careful attention will be given to specifying locally available materials, low v.o.c. products, and acoustical properties in order to meet or exceed our sustainable design goals as outlined in the MA-CHPS scorecard.