ROCHESTER SCHOOL DISTRICT
East Rochester Elementary School

August 12, 2013
Joint Building Committee Meeting

LAVALLEE I BRENSINGER ARCHITECTS

CM RFP/RFQ Update:

- REQUEST FOR PROPOSALS & QUALIFICATIONS Issued

- Walk-through held July 31st, 2013
  9 companies in attendance
  Notes (Questions and Answers) distributed to attendees

- Due Wednesday August 14th, 2013

- Schedule Time to Shortlist

- Schedule interview day

Programming

- For East Rochester School's Current Enrollment

- For East Rochester School and Nancy Loud School
  6 new classrooms, 1 MP room, 1 Special Ed/Intervention Classroom

- For Chamberlain Street School
  4 new classrooms, MP room optional (eliminate portables at Chamberlain)

East Rochester Elementary School

August 12, 2013

East Rochester School Program Based on Existing Building Size

Education Program Areas

Course/Subject	Actual (current) # Students		Max Students/ Teaching Space	Utilization (90%)	# of Sections	Required Teaching Spaces (adjusted)	Number of Appropriately sized spaces in existing building	Required additional spaces	Notes
Preschool	190		12	0.90	17.59	**8**	1	7	95 students are in Pre-school now- plus population increase achieve 50% integration. NOTE: See pre-school program on page 98.
ASD Program	12		12	0.90	1.11	**1**	1	0	
Kindergarten	41		18	0.90	2.53	**3**	1	2	Can absorb up to 8-13 kids from other school (Chamberlain or Nancy Loud)
1st Grade	33		20	0.90	1.83	**2**	1	1	Can absorb up to 3-7 kids from other school (Chamberlain or Nancy Loud)
2nd Grade	44		22	0.90	2.22	**2**	1	1	Max capacity
3rd Grade	49		22	0.90	2.47	**3**	1	2	Can absorb up to 11-17 kids from other school (Chamberlain or Nancy Loud)
4th Grade	60		25	0.90	2.67	**3**	1	2	Can absorb up to 9-15 kids from other school (Chamberlain or Nancy Loud)
5th Grade*	51		25	0.90	2.27	**2**	0	2	Need to send 1 kid to Chamberlain or other school
Total Enrollment	278				Total K-5 Classrooms	**15**			

Core Program Areas

Space	Student Access Per week (periods)	# of Students Served	# of Classes/wk	Calculated SF of Space (Per Standards)	Periods per week Offered***	# Spaces Required	Number of Appropriately sized spaces in existing building (or size of existing space)	Required additional spaces	Notes
Computer Lab	1	278	15		30	**0.5**	1	-1	Could be relocated to allow for adequate sized Media Center
Art	1	237	15		30	**0.5**	0	1	
Music	1	237	15		30	**0.5**	0	1	Stage not counted since it is not acoustically sealed for Instruction
Physical Education	1	237	15		15	**1.0**	2952	0	
Media Center	1	278	15	1112	30	**0.5**	750	362	
Cafeteria	5	278	15	1043	15	**1.0**	2952	0	
Special Education Student Areas*	5	64	160		30	**5.3**	6	-1	Calculations assume 2 students/area
Intervention / Small Group Areas**	5	70	116		30	**3.9**	4	0	Calculations assume 3 students/area
Professional Areas								4	(1) Conference Room for 12 , (1) staff break room, (1) Professional Development / Staff room, (1) building sotrage area

* 23% of students identified to receive special services by District Special Education .
** 25% of students identified to receive Tier 2 or Tier 3 Intervention (Title 1) instruction
*** Standard 8 period day, allowing for no specials during first and last periods.

Dept of Ed allowable:	Age Group	Enrollment	SF/Pupil	Utilization	Total Building (NSF)	
For New Construction	Grade 1-5	237	120	0.90	31,600	
Does not include Preschool and ASD programs	Kindergarten - Trans	41	150	0.90	6,833	
					38,433	Total Allowable by NH DOE standards for new construction

Existing Analysis / Capacity

Current Enrollment	**373**	
Current Building Size (gsf)	34,412	Excluding Portables
Estimated Building Capacity Based solely on size of building	248	Based on Average NH School Construction of 120sf/student for Grades 1-5 and 150sf/student in K @ 90% Utilization

	# Classrooms*	Max Seats/ Classroom **	Utilization (90%)	Utilized Seats	Theoretical Student Capacity	
Education Areas Capacity	14	22	0.9	277.2	**277**	
Specialty Classrooms (Art.Music, Cpu, Etc)	1	20	0.9	18		See notes below

Current Utilization / Capacity **134.56%**

*Currently, there are 15 Homerooms. Deduct one each for the following: Art, Music, Media Center
** Averaging K-2 Class Sizes (16 for Kindergarten, 24 for Grades 1 and 2)
*** Standard 8 period day, allowing for no specials during first and last periods.

Core Capacity	Size of Area (sf)	Appropriately Sized?	Seats/persons	Utilization (90%)	Periods per week Offered***	Theoretical Student Capacity	
Art	390	N	22	0.9	30	594	Severly undersized room to fit 22 students
Music	366	N	22	0.9	30	594	Severly undersized room to fit 22 students
Media Center	750	N	ed @ Students x .10 x 40 sf			188	
Gymnasium	2952	Y	44	0.9	15	594	If Gym allows 2 classes/period
CPU Lab	750	Y	22	0.9	30	594	
Cafeteria	2952	Y	164	0.9	15	442.8	Shared Café-Gym

East Rochester Elementary School

August 12, 2013

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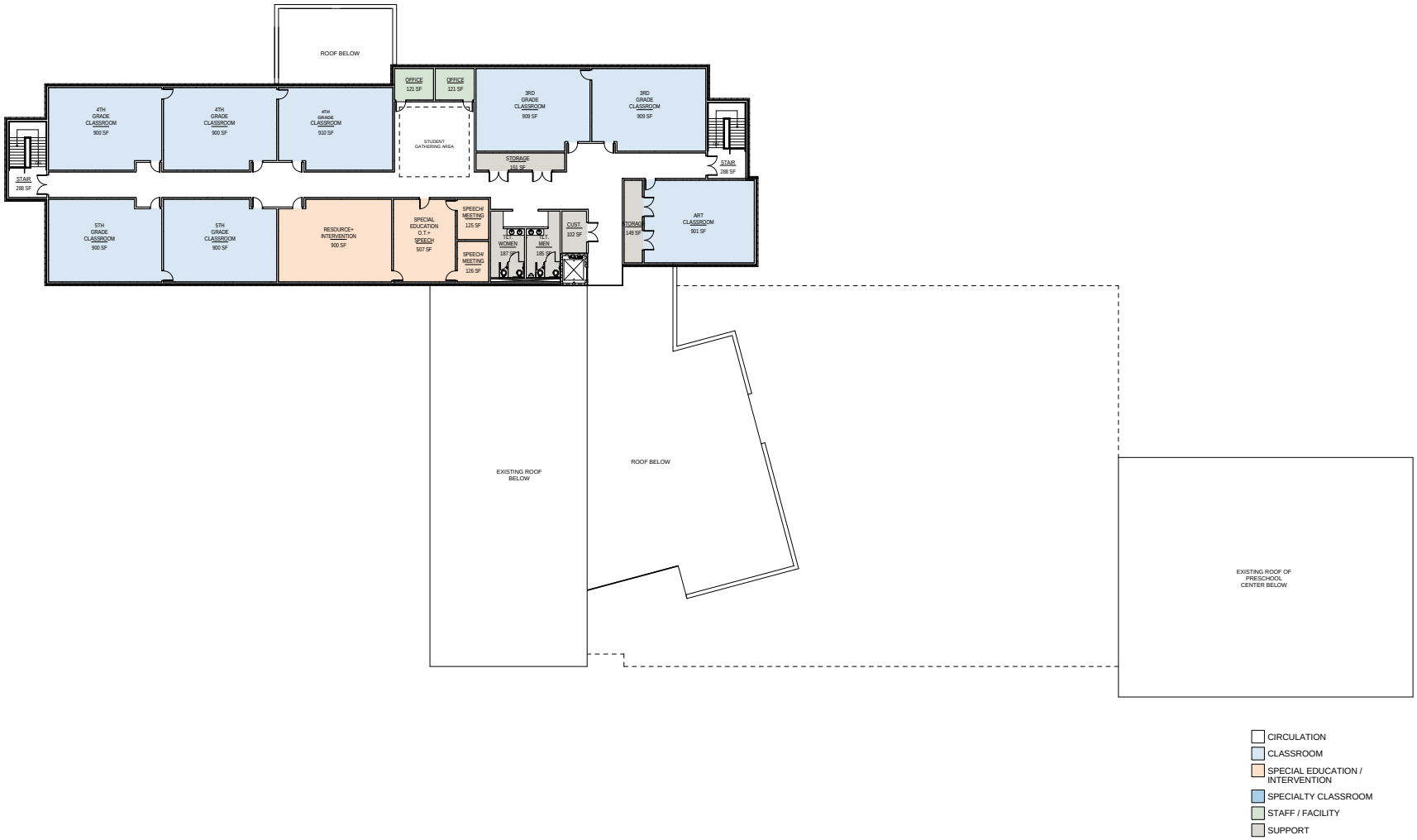

East Rochester Elementary School

August 12, 2013

AERIAL PERSPECTIVE

East Rochester Elementary School

August 12, 2013

East Rochester School Program Combined with Nancy Loud

Education Program Areas

Course/Subject	# Students	Max Students/ Teaching Space	Utilization (90%)	# of Sections	Offered	Required Teaching Spaces (adjusted)	Number of Appropriately sized spaces in existing building	Required additional spaces	Notes
Preschool	190	12	0.90	17.59	Students attend 2.5 days/week	**8**	1	7	95 students are in Pre-school now- plus population increase achieve 50% integration. NOTE: See pre-school program on page 98.
ASD Program	12	12	0.90	1.11	Full Day	**1**	1	0	
Kindergarten	60	18	0.90	3.70	Full Day	**4**	1	3	Can absorb up to 12 kids from other school
1st Grade	56	20	0.90	3.11	Full Day	**3**	2	1	Can absorb up to 4 kids from other school
2nd Grade	77	22	0.90	3.89	Full Day	**4**	2	2	Can absorb up to 11 kids from other school
3rd Grade	69	22	0.90	3.48	Full Day	**4**	2	2	Can absorb up to 19 kids from other school
4th Grade	60	25	0.90	2.67	Full Day	**3**	3	0	Can absorb up to 15 kids from other school
5th Grade	51	25	0.90	2.27	Full Day	**3**	3	0	Can absorb up to 24 kids from other school (or build one less classroom)
Total Enrollment	575				Total K-5 Classrooms	**21**			

Core Program Areas

Space	Student Access Per week (periods)	# of Students Served	# of Classes/wk	Calculated SF of Space (Per Standards)	Periods per week Offered***	# Spaces Required	Number of Appropriately sized spaces in existing building (or size of existing space)	Required additional spaces	Notes
Computer Lab	1	373	21		30	**0.7**	1	0	Could be relocated to allow for adequate sized Media Center
Art	1	313	21		30	**0.7**	0	1	
Music	1	313	17		30	**0.6**	0	1	Stage not counted since it is not acoustically sealed for Instruction
Physical Education	1	313	21		15	**1.4**	2952	0	
Media Center	1	373	21	1492	30	**0.7**	750	742	Net Square Feet - could be restored to adequate size if CPU lab is relocated
Cafeteria	5	373	17	1865	15	**1.1**	2952	0	Net Square Feet
Special Education Student Areas*	5	86	214		30	**7.1**	6	1	Calculations assume 2 students/area
Intervention / Small Group Areas**	5	93	155		30	**5.2**	4	1	Calculations assume 3 students/area
Professional Areas								4	(1) Conference Room for 12 , (1) staff break room, (1) Professional Development / Staff room, (1) building sotrage area

* 23% of students identified to receive special services by District Special Education .

** 25% of students identified to receive Tier 2 or Tier 3 Intervention (Title 1) instruction

*** Standard 8 period day, allowing for no specials during first and last periods.

Dept of Ed allowable:	Age Group	Enrollment	SF/Pupil	Utilization	Total Building (NSF)	
For New Construction	Grade 1-5	313	120	0.90	41,733	
Does not include Preschool and ASD programs	Kindergarten - Trans	60	150	0.90	10,000	
					51,733	Total Allowable by NH DOE standards for new construction

Existing Analysis / Capacity

Current Enrollment					**373**	
Current Building Size (gsf)					34,412	Excluding Portables
Estimated Building Capacity Based solely on size of building	Based on Average NH School Construction of 120sf/student for Grades 1-5 and 150sf/student in K @ 90% Utilization				248	

	# Classrooms*	Max Seats/ Classroom **	Utilization (90%)	Utilized Seats	Theoretical Student Capacity	
Education Areas Capacity	12	22	0.9	237.6	**238**	
Specialty Classrooms (Art.Music, Cpu, Etc)	3	20	0.9	54		See notes below

Current Utilization / Capacity **156.99%**

*Currently, there are 15 Homerooms. Deduct one each for the following: Art, Music, Media Center

** Averaging K-2 Class Sizes (16 for Kindergarten, 24 for Grades 1 and 2)

*** Standard 8 period day, allowing for no specials during first and last periods.

Core Capacity	Size of Area (sf)	Appropriately Sized?	Seats/persons	Utilization (90%)	Periods per week Offered***	Theoretical Student Capacity	
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LIBRARY & CPU LAB 1793 SF
RESOURCE+ INTERVENTION 204 SF
RESOURCE+ INTERVENTION 443 SF
KINDERGARTEN CLASSROOM 976 SF
KINDERGARTEN CLASSROOM 977 SF
1ST GRADE CLASSROOM 900 SF
1ST GRADE CLASSROOM 900 SF
STAIR 288 SF
STUDENT GATHERING AREA
1ST GRADE CLASSROOM 900 SF
KINDERGARTEN CLASSROOM 1014 SF
RESOURCE+ INTERVENTION 495 SF
MUSC 780 SF
KINDERGARTEN CLASSROOM 971 SF
FACULTY 178 SF
FACULTY WORK-ROOM OFFICE 255 SF
MECHANICAL ROOM 826 SF
STORAGE 366 SF
CUSTODIAL 188 SF
NURSE/HEALTH 178 SF
GUIDANCE 173 SF
STORAGE 120 SF
STAGE 950 SF
STORAGE 104 SF
PUBLIC VEST. 371 SF
MULTI-PURPOSE ROOM 4154 SF
2ND GRADE CLASSROOM 900 SF
2ND GRADE CLASSROOM 906 SF
MULTI-PURPOSE ROOM 2952 SF
RECEPTION+ WORK ROOM 591 SF
CONFERENCE ROOM 279 SF
PRINC. OFFICE 167 SF
RESOURCE+ INTERVENTION 234 SF
2ND GRADE CLASSROOM 900 SF
2ND GRADE CLASSROOM 906 SF
STORAGE 125 SF
STORAGE 106 SF
KITCHEN 820 SF
REF. 108 SF
ELEC. 76 SF
PRESCHOOL CLASSROOM 799 SF
PRESCHOOL CLASSROOM 814 SF
PRESCHOOL CLASSROOM 814 SF
SECURE ENTRANCE 128 SF
CORRIDOR 774 SF
TESTING 175 SF
OPEN OFFICE 335 SF
PRE-SCHOOL CLASSROOM 885 SF
OT /PT 417 SF
CONFERENCE OBSERVATION 193 SF
COORDINATOR OFFICE 139 SF
VEST. 153 SF
MECH ROOM 314 SF
CIRCULATION
CLASSROOM
SPECIAL EDUCATION / INTERVENTION
SPECIALTY CLASSROOM
STAFF / FACILITY
SUPPORT


ROOF BELOW
OFFICE
121 SF
OFFICE
121 SF
5TH GRADE CLASSROOM
909 SF
CLASSROOM
909 SF
4TH GRADE CLASSROOM
900 SF
4TH GRADE CLASSROOM
900 SF
4TH GRADE CLASSROOM
910 SF
STUDENT GATHERING AREA
STORAGE
151 SF
STAIR
288 SF
STAIR
288 SF
5TH GRADE CLASSROOM
900 SF
5TH GRADE CLASSROOM
900 SF
RESOURCE+ INTERVENTION
692 SF
SPECIAL EDUCATION C.T.+ SPEECH
507 SF
SPEECH/ MEETING
125 SF
SPEECH/ MEETING
126 SF
WOMEN
187 SF
MEN
185 SF
CUST.
102 SF
STORAGE
149 SF
ART CLASSROOM
901 SF
EXISTING ROOF BELOW
ROOF BELOW
OPEN TO BELOW
STAIR
3RD GRADE CLASSROOM
900 SF
3RD GRADE CLASSROOM
906 SF
RESOURCE+ INTERVENTION
234 SF
3RD GRADE CLASSROOM
900 SF
3RD GRADE CLASSROOM
906 SF
STORAGE
199 SF
EXISTING ROOF OF PRESCHOOL CENTER BELOW
CIRCULATION
CLASSROOM
SPECIAL EDUCATION / INTERVENTION
SPECIALTY CLASSROOM
STAFF / FACILITY
SUPPORT

Green Building Analysis

- NH High Performance Scorecard: How Green will we be?
  Options to consider

- Fitzemeyer and Tocci Presentation/Discussion
  Recommended Systems and Options

- Photovaltaic Installation Option: 3rd Party PV Installation

NH High Performance Schools Scorecard

2006 Interim Version

SCHOOL: East Rochester Elementary School **DATE: 08-12-2013**

PRELIMINARY _____ **FINAL _____** **SAU:** **Rochester School Department**

RATER (Name, Title, Firm):

CONTACT INFORMATION (Phone & Email):

VERIFICATION: REGISTERED PRINCIPAL ARCHITECT (Signature):

(Name, Title, Date):

VERIFICATION: CONSTRUCTION FIRM PROJECT MANAGER (Not required for preliminary application)(Signature):

(Name, Title, Date):

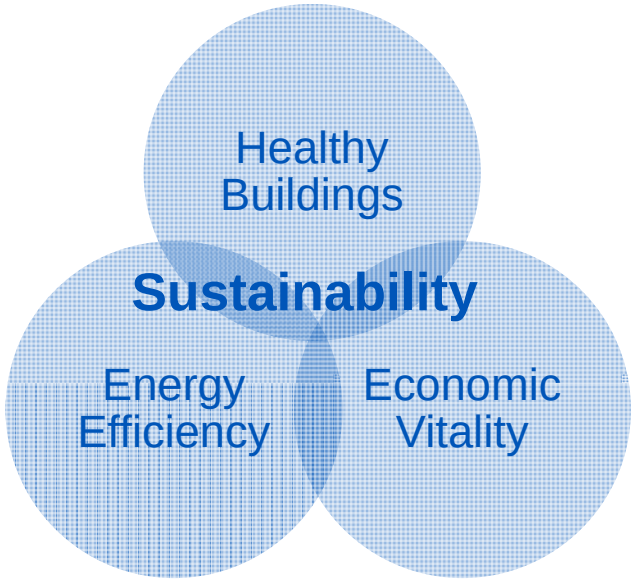
CHPS SECTION	CREDIT NUMBER[1]	POSSIBLE POINTS	CREDIT NAME	SCORE	ACTION	ADDITIONAL CREDIT NOTES
POLICY AND OPERATIONS (1 Prerequisite; 10 possible points; at least 2 points required)						
	PO P1.1	Req	Maintenance Plan	X	By Owner	Inventory of all building systems, and a schedule of preventive maintenance needs
	PO1.2	1	Computerized Maintenance Management System		By Owner	A computerized version of above credit, typically availble with additional features and options.
	PO 2.1	1	High Performance Policies		By Owner	Require all new construction and major renovations to follow high performance standards
	PO3.1	1	Indoor Environmental Management Plan		By Owner	Implement EPA's Tools for Schools indoor air quality management plan
	PO4.1	1	Energy Star Equipment Performance		By Owner	Require all new equipment to be purchased to be Energy Star rated.
	PO5.1	1	Clean Energy		By Owner	Purchase two years worth of renewable energy credits for 25% of energy requirements
	PO5.2	2	Clean Energy		By Owner	Purchase two years worth of renewable energy credits for 50% of building energy requirements
	PO 6.1	1	Alternative Fuels - Buses		By Owner	20% of busses to run on "clean fuel" such as natural gas, biodiesel, hydrogen, etc.
	PO6.2	1	Alternative Fuels - Maintenance equipment		By Owner	50% of cost of maintenance equipment to be used to purchase alternative fueled equipment
	PO7.1	1	Anti-Idling Policy		By Owner	Implement an anti-idling policy for busses waiting at the school
SITE (2 prerequisites; 14 possible points; at least 2 points required)						
Site Selection	S P1.2	Req	Comply with Ed 321.03, NH School Site Rules	X	Yes	Site to comply with department of education requirements
	S 1.1	1	Sustainable Site Selection	1	Yes	Do not develop a site that was previously public parkland, conservation land, etc.
	S 1.2	1	No Development on Flood Plains	1	Yes	Do not develop a site with an elevation lower than the 100 year flood plain
	S 1.3	1	No Development Near Wetlands	0	No	Do not develop within 50 ft of a wetland
	S 1.4	1	No Development on Greenfields	1	Yes	Do not develop land not previously developed or restored to agricultural use
	S 1.5	1	Centrally Located Site	0	Undetermined	Develop a site within 1/4 mile of at least 8 basic conveniences: Supermarket, Commercial office building, convenience grocery, day care, cleaners, fitness center, hair care, hardware, laundry, library, medical/dental svcs, senior care facility, public park, pharmacy, post office, bank , community center.
	S 1.6	1	Reduced Building Footprint	1	Yes	Building footprint to overall area ratio to be at least 1.40
	S 1.7	1	Sustainable Site and Building Layout	1	Probable	
	S 1.8	1	Joint use of school and municipal facilities	1	By Owner	Use of the school for by the greater community
Transportation	S 2.1	1	Public Transit	1	Yes	Nearby public transit
	S 2.2	1	Pedestrian/Bike Access	1	Yes	Provide bike paths and walkways to the end of the school zone
Stormwater Management	S P3.1	Req	Construction Erosion & Sedimentation	X	Yes	Provide measures to control erosion and sedimentation during construction
	S 3.1	1	Post-construction Stormwater Management		By Owner/Civil	Reduce stormwater runoff by 25% of 2yr 24hr and 10yr 24hr storms.

Outdoor Surfaces	S 4.1	1	Design to Reduce heat Islands, Non-roof		By Owner/Civil	Provide landscaping within 5 years to shade at least 30% of all paved surfaces.
	S 4.2	1	Design to Reduce Heat Islands, Roof	1	Yes	Use Energy Star roofing on at least 75% of roof surfaces
Outdoor Lighting	S 5.1	1	Light Pollution Reduction	1	Yes	Provide lighting that minimizes light pollution
WATER (No prerequisite; 7 possible points; no points required))						
Outdoor Systems	W 1.1	1	Reduce Potable Water for Landscaping - non-playing fileds		By Owner/Civil	Do not install permanent landscape irrigation
	W1.2	1	Reduce potable water - playing fields 50%	0	No	Reduce amount of water used for playing field irrigation by 50% below baseline
	W1.3	1	Reduce potable water - plying fields 100%	0	No	Reduce amount of water used for playing field irrigation by 100% below baseline
	W1.4	1	Irrigation system commissioning		By Owner/Civil	Provide an irrigation system commissioning plan
Indoor Systems	W 2.1	1	Water Use Reduction for sewage	0	No	Reduce potable water use for sewerage by 50% below baseline
	W2.2	1	Water use reduction 20%	1	Probable	Reduce potable water use for the entire building by 20% below baseline
	W2.3	1	Water use reduction 50%	0	No	Reduce potable water use for the entire building by 50% below baseline
ENERGY (6 prerequisites; 18 possible points; at least 5 points required)						
Energy Efficiency	E P1.1	Req	Code compliance	X	Yes	Comply with the NH energy code
	E P1.2	Req	Elimination of CFC-Based Refrigerants	X	Yes	Specify equipment with CFC-Free refrigerants
	E P1.3	Req	Minimum Energy Performance	X	Yes	Exceed the NH Energy Code by 20%
	E 1.1	1-10	Superior Energy Performance		Not Calculated	Energy performance levels from 22.5% to 45% better than code minimum
	E 1.2	1	Minimize Air Conditioning	1	Yes	90% of permanent classrooms designed without air conditioning
Alternate Energy Sources	E 2.1	1-4	Renewable Energy		By Owner	Use on-site renewable energy sources
Commissioning & Training	E P3.1	Req	Fundamental Building Systems Testing	X	Owner	
	E P 3.2	Req	Fundamenatl Building Systems training	X	Owner	
	EP4.1	Req	Commisssioning	X	Owner	
	E 4.2	1	Additional Commissioning		Owner	
	E 5.1	1	Energy Management Systems	1	Yes	Computerized energy management system
	E 5.2	1	Sub-metering	0	No	Provided sub-metering for wall outlets so to track miscellaneous electrical loads
MATERIALS (1 prerequisite; 13 possible points; at least 2 points required)						
Waste Reduction & Efficient Material Use	M P1.1	Req	Storage & Collection of Recyclables	X	Yes	
	M 1.1	1	Site Waste Management, 75%	1	Probable	Construction and demolition waste recycling 75%
	M 1.2	1	Site Waste Management, 90%	0	No	Construction and demolition waste recycling 90%
Sustainable Materials	M 2.1	1	Building Reuse, 75%	0	No	
	M 2.2	1	Building Reuse, 95%	0	No	
	M 2.3	1	Building Reuse Interior, 50%	0	Undetermined	
	M 3.1	1	Resource Reuse 0.5%	0	No	Specify salvaged or refurbished materials for 0.5% (by cost) of all building materials
	M 3.2	1	Resource Reuse 1.0%	0	No	Specify salvaged or refurbished materials for 1.0% (by cost) of all building materials
	M 4.1	1	Recycled Content, 25%	1	Owner/Architect	Achieve 25% of building materials to have at least 20% post consumer recycled content.
	M 4.2	1	Recycled Content, 50%	0	No	Achieve 50% of building materials to have at least 20% post consumer recycled content.
	M 5.1	1	Rapidly Renewable Materials	0	No	Specify rapidly renewable materials for 0.5% of all building materials
	M 6.1	1	Certified Wood	0	Owner/Architect	50% minimum of all wood-based materials to be FSC forest certified
	M 7.1	1	Local Materials - 20%	1	Probable	20% of construction materials to be manufactured/fabricated within 500 miles of the project
	M 7.2	1	Local Materials - 50%	0	Undetermined	50% of construction materials to be manufactured/fabricated within 500 miles of the project
INDOOR ENVIRONMENTAL QUALITY (13 prerequisites; 20 possible points; at least 4 points required)						
Daylighting and Views	IEQ P1.1	Req	Access to Views, 70%	X	No	70% of classrooms to have 7% of floor area window glass between 2.5ft and 7.5ft above the floor. (Most classrooms the have higher glass to allow for whiteboards)
	IEQ 1.1	3	Daylighting	0	Undetermined	
	IRQ 1.2	2	Access to Views, 90%	0	No	90% of classrooms to have 7% of floor area window glass between 2.5ft and 7.5ft above the floor. (Most classrooms the have higher glass to allow for whiteboards)
	IEQ 1.3	1	Lighting Quality	1	Yes	Use high quality classroom / admin lighting

Indoor Air Quality	IEQ P2.1	Req	ASHRAE 62-1999	X	Yes	
	IEQ P2.2	Req	IAQ SMACNA Guidelines	X	Yes	
	IEQ P2.3	Req	Walk Off Grills/Mats	X	Yes	
	IEQ P2.4	Req	Condensate Drainage	X	Yes	
	IEQ P2.5	Req	Irrigation requirements	X	Yes	
	IEQ P2.6	Req	Mold Protection and Filters	X	Yes	
	IEQ P2.7	Req	Electric Ignitions for Cooking	X	Yes	
	IEQ P2.8	Req	Air Intake Location	X	Yes	
	IEQ P2.9	Req	Duct Insulation	X	Yes	
	IEQ P2.10	Req	Prohibit Fossil Fuel Powered Equipment Indoors	X	Owner	
	IEQ 2.1	4	Low Emitting Materials	1	Probable	
	IEQ 3.1	1	Polluntant Source Control, Chemical Offgassing	1	Yes	Ventilate specialty spaces (spray booths, janitor's closets, etc)
	IEQ 3.2	1	Polluntant Source Control, Ducted HVAC Returns	1	Yes	Use return air ducts versus open ceiling plenums
	IEQ 3.3	1	Polluntant Source Control, High Efficiency Filters	0	No	No, excessive requirement (MERV 13 filters) that is problematic
	IEQ 4.1	1	Construction IAQ Management, Ventilation VOC's	1	Yes	Thoroughly ventilate areas where VOC's are released during construction
	IEQ 4.2	1	Construction IAQ Management, Duct Protection	1	Yes	Protect ducts from dirt, water, and debris during construction
	IEQ 4.3	1	Construction IAQ Management, HEPA Vacuuming	1	Yes	Use a HEPA vacuum following construction
	IEQ 4.4	2	Construction IAQ Management, Building Flushout	0	No	Not done due to the potential for problems
Acoustics	IEQ P5.1	Req	Comply with ANSI S12.60-2002 (Ed 321.21)	X	Probable	Classroom acoustics
Thermal Comfort	IEQ P6.1	Req	ASHRAE 55-2004 Compliance	X	Yes	Provide thermal comfort within the range specified.
	IEQ 7.1	1	Controllability of Systems, Windows	1	Yes	Provide at least one operable window in 90% of classrooms
	IEQ 7.2	1	Controllability of Systems, Thermal/Light	1	Yes	Provide individual temperature and lighting controls for each room
INOVATION (No prerequisites; 3 possible points; no points required)						
Innovation Credits	I 1.1	1-3	Document additional high performance features			
			TOTAL	25		

Minimum number of points for designation as a high performance school is 30 out of 85 possible

Integrated Sustainability

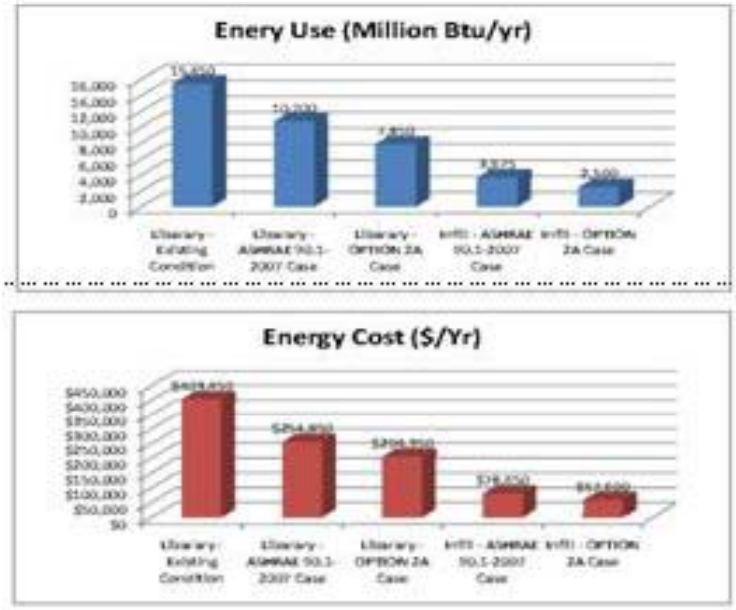


MEP Integration Matrix

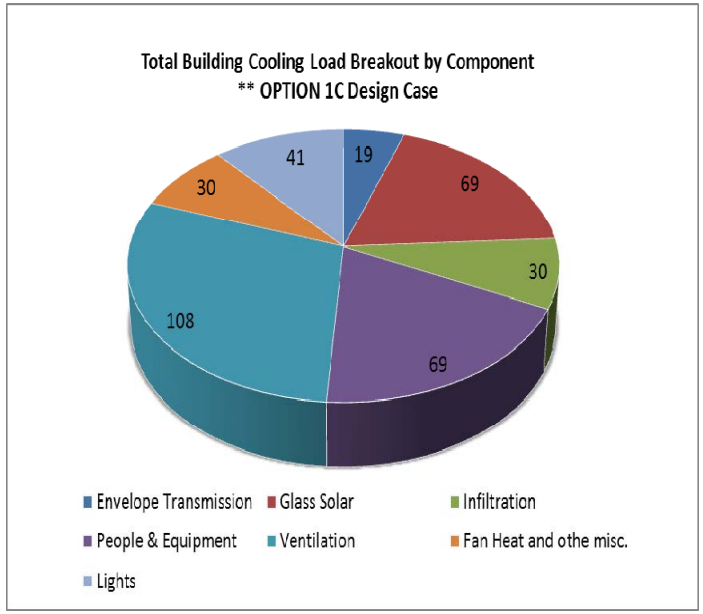
- Typical Systems
- Sustainable System Options
- Energy Efficient Equipment Options
- Renewable Energy

Energy Modeling & Life Cycle Analysis

Energy Modeling



Infrastructure Life Cycle Analysis



- Used to evaluate the energy use of a building & compare alternate schemes
- Evaluate fuel type, task and building component
- Optimize energy consumption
- Level of details is adjustable – Block vs. Room-by-Room

Option Description	Life Cycle Considerations	Pros	Cons
Opportunity 1 – VAV Air Handling Systems • Variable volume commercial grade air handlers serving terminal boxes with hot water reheat. • Systems served by DDC controls • All fans supplied with variable speed drives controlled to optimize duct pressure	Initial: 40-50 $/sf Operating: Moderate Maintenance: Moderate Life Expectancy: 25-30 yrs Flexibility: High	• Proven for full range of both heating and cooling loads as required • Good zoning control and flexibility for future changes • High efficiency since outside air and supply air modulate to meet load • Can utilize air-side economizing • Perimeter radiation is not always required for internal space heating (with efficient glazing and envelope)	• Air mixing reduces air quality. • Conventional technologies perceived as not green • Larger supply air ductwork required • Medium pressure ductwork increases fan horsepower.
Opportunity 2 – Variable Refrigerant Volume (VRV) Heat Pump Units with Dedicated Ventilation System • Central, large, condensing units • Energy recovery VRV allows simultaneous heating and cooling. • Several interior unit options (concealed, wall console, ceiling cassette, etc.) • Refrigerant distribution piping throughout to multiple in-space heat pump style fan-coil units • Dedicated energy recovery ventilation air system with gas-fired or fuel fired heating	Initial: 35-45 $/sf Operating: Low Maintenance: Moderate Life Expectancy: 15-20 yrs Flexibility: Moderate	• Efficiency of heating/cooling is high • Lower first cost than all air systems • Reduced on-site fuel storage • No in-space mechanical room required • Fairly easy to add sub-zoning to tenant spaces. • Low noise • Ceiling space requirements are reduced; small piping and smaller ductwork systems	• Refrigerant piping throughout space. • More complex maintenance and repair • Expansion requires reconfiguration of refrigerant piping. • Constant volume fan systems are less efficient than variable volume • Requires fuel supply for ventilation air system (gas). • System must be specified as single vendor throughout
Opportunity 3 – Chilled Beams with Displacement Ventilation • Chilled beams provided for classroom and office type spaces. • Chilled beams for space cooling support, required air change support and ventilation supply. • Perimeter radiation provided for space heating support.	Initial: 30-40 $/sf Operating: Low Maintenance: Low Life Expectancy: 20 yrs Flexibility: High	• Required regular equipment maintenance is minimal. • Operating noise is minimal. • No condensate drainage system is required. • No additional fan is required for air recirculation (improved energy efficiency). • Good ventilation effectiveness due to the displacement ventilation • Ductwork systems are considerably smaller (primary air requirements are ventilation only).	• Primary air ductwork is required to be insulated. • Chilled water service must be dedicated to the chilled beam system (system required temperature is higher). • Windows cannot be operable. • Perimeter radiation is required for space heating support. • A larger ceiling footprint is required for HVAC equipment. • Regular chilled beam cleaning is required. • More complex controls are required (humidity/dewpoint).

Opportunity 4 – Closed Loop Geothermal Primary Heating/Cooling • Exterior, closed loop ground coupled heat exchangers (loops) • Water-to-water heat pump units within facility produce hot or chilled water via exchange with ground loop. • Typical air handlers and hydronic terminal units within facility for support of air distribution and space heating and cooling.	Initial: 45-55 $/sf Operating: Low Maintenance: Low Life Expectancy: 20 yrs Flexibility: High	• No water transfer from ground. Less Environmental concern. • Space terminal units do not have compressors - lower noise • Fewer compressors in one central location for easier maintenance • Easy integration of the existing chilled and hot water systems. • Easier integration of control between boiler plant and geothermal plant than with the use of water-to-water heat pumps and standard terminal units. • Lower operating costs than typical fuel oil heating and air-cooled cooling systems.	• Less thermally efficient than standing column type • More wells required than standing column. • Higher well cost than standing column. • Simultaneous heating and cooling requires multiple heat pumps in different modes; additional heat pumps (above actual load may be required). • Higher installed costs vs. traditional heating/cooling systems • Significant site area required for wellheads (can be flush).
Opportunity 5 – Standing Column Well Geothermal Primary Heating/Cooling • Exterior recirculating deep wells (standing column) for ground heat exchange. • Water-to-water heat pump units within facility produce hot or chilled water via exchange with ground loop. • Typical air handlers and hydronic terminal units within facility for support of air distribution and space heating and cooling.	Initial: 40-50 $/sf Operating: Low Maintenance: Moderate Life Expectancy: 20 yrs Flexibility: High	• Lower cost than closed loop systems • Higher thermal efficiency than closed/ground loop systems • Space terminal units do not have compressors - lower noise • Fewer compressors in one central location for easier maintenance • Easy integration of the existing chilled and hot water systems. • Easier integration of control between boiler plant and geothermal plant than with the use of water-to-water heat pumps and standard terminal units. • Lower operating costs than typical fuel oil heating and air-cooled cooling systems.	• Utilize a “bleed” system to ensure thermal performance. Bleed system draws 12 Gallons/Hour – 20 Gallons/hour. • Environmental concerns on a small lot so close to ocean. • Simultaneous heating and cooling requires multiple heat pumps in different modes; additional heat pumps (above actual load may be required). • Higher installed costs vs. traditional heating/cooling systems

Option Description	Life Cycle Considerations	Pros	Cons
Opportunity 6 – High Efficiency Water-Cooled Chiller Systems • High efficiency, indoor mounted, liquid cooled, centrifugal or rotary screw chillers, • Exterior mounted cooling towers for heat rejection. • Pumping systems distribute chilled water to air handler coils or fan coil units.	Initial: 500-600 $/ton Operating: Low Maintenance: Moderate Life Expectancy: 25-30 yrs Flexibility: High	• High cooling system efficiencies are possible • Good system control performance with chilled water (vs. DX systems) • Green refrigerant available (R-134a) • Utility incentives typically available for increased efficiency machine costs • Long chiller lifespans • Smaller exterior roof footprint • Chiller room need not be close to exterior tower location. • Winter “free-cooling” via waterside economizer option is available	• Higher equipment first costs • Cooling tower maintenance is more involved/costly • Heavier roof equipment if cooling tower is roof mounted • Taller roof equipment (cooling tower), may warrant architectural screening
Opportunity 7 – High Efficiency Condensing Hot Water Boiler Systems • High thermal efficiency gas-fired boilers produce heating hot water for typical air handler coils and/or space terminal units (baseboard, radiant panels, etc). • Hot water pumping systems distribute hot water to loads.	Initial: 12-15 $/MBH Operating: Very low Maintenance: Moderate Life Expectancy: 20 yrs Flexibility: Moderate	• Very high efficiency heating from gas source (propane or natural) • Good controllability from hot water systems (vs. steam). • Available as sealed combustion systems; large, open combustion air intake louver to boiler room not required. • Small boiler room footprints • Flexible for expansion via modular design	• More expensive boilers than standard efficiency type. • Flue systems more costly (stainless steel is typical). • Humidification steam requires additional steam generator(s). • Highest efficiency is at low water temps; if winter only heating realized efficiency is lower.
Opportunity 8 – Biomass Fueled Heating Water Systems • Biomass fueled boilers produce heating hot water for typical air handler coils and/or space terminal units (baseboard, radiant panels, etc). • Hot water pumping systems distribute hot water to loads.	Initial: 40-50 $/MBH (boiler only) Operating: low Maintenance: High Life Expectancy: 15-20 yrs Flexibility: Low	• Cost of fuel lower than fossil fuels • System integrates with typical secondary and terminal heating systems • Semi-renewable resource used for fuel	• More expensive boilers than standard efficiency type. • Flue systems more costly; particulate capture required. • Airside emissions are significantly higher. • Larger boiler room and fuel storage footprint required. • Higher cost and more specialized maintenance

Opportunity 9 – Heat Recovery Ventilation/Exhaust Air Systems • Air-to-air or glycol-to-air (run around) heat recovery heat exchanger systems recover energy from the exhaust air systems for preheating/precooling ventilation air.	Initial: 10-15% increase over air systems without Operating: Low Maintenance: Moderate Life Expectancy: 20 yrs Flexibility: Moderate	• Recovering energy lowers operating cost of ventilation systems. • Systems available to transfer both heat and moisture; lowers humidification and dehumidification requirements • Use of heat recovery can provide better freeze protection of downstream preheat coils • Recovered heat/cooling can reduce requirements (size) of downstream systems.	• Additional system first costs for recovery equipment. • Recovery heat exchangers add static pressure loss to air systems; required analysis to confirm payback. • Optimal systems require exhaust and ventilation ductwork to be physically close (limits system design flexibility)
Opportunity 10 – Rainwater Harvesting • Rooftop rainwater is captured by roof drain and piping systems for diversion to (and storage) in tanks. • Tanks may be at or below grade and include pumps to resupply water to some building uses; irrigation, water closets, cooling towers, process uses, etc.	Initial: 3-5 $/SF Operating: Low Maintenance: Moderate Life Expectancy: 20 yrs Flexibility: Moderate	• Integrates with existing facility infrastructure. • Advances facilities goals, objectives, and master plan • Meets the requirements of the facility standards. • Meets all user criteria	• Additional first costs for the system • Additional maintenance of tank and pump systems
Opportunity 11 – Photovoltaic Energy Systems • Installation of photovoltaic panels outside the facility (roof or grade) to absorb solar energy and convert to electrical energy • Electrical energy from photovoltaics are best paralleled into utility service grid	Initial: high; generally requires incentive funding Operating: Low Maintenance: Low Life Expectancy: 10-15 yrs Flexibility: Moderate	• Takes advantage of renewable energy resource to lower building's use of fossil fuel powered electricity • Solar generated electricity directly lowers the electrical operating costs of the facility • Publicity of renewable energy use can be beneficial to overall organizations sustainability goals	• First cost of photovoltaics is high; creative financing methods, grants, or utility incentives are required to produce payback • Significant roof or grade areas are required to mount panels • Incorporation requires more complex electrical infrastructure

Opportunity 12 – High Efficiency LED Lighting Systems • Use of LED technology for interior and exterior lighting fixtures	Initial: 5-10% increase over conventional lighting Operating: Low Maintenance: Very Low Life Expectancy: 30 yrs + Flexibility: High	• LED fixtures have better energy efficiency than standard incandescent, halogen, metal halide, etc. • LED fixtures have much longer operating lifespan than other technologies (including fluorescent) • LED fixtures are inherently dimmable • Utility incentives are now becoming available for LEDs • LEDs have “quick start” performance; better than fluorescent	• First cost of LED fixtures is higher than others (i.e. fluorescent) • LED fixture style selections are more limited than other traditional technologies

Intent of this matrix is an early-stage comparative analysis tool.
Pros or cons that are common to each system are not listed in comparative analysis.
Costs are order of magnitude for comparison only and should not be used for budgeting, etc. Costs common to all options are not included.

3rd Party Photovaltaic Installation

- Company to Contract and Team with School District to allow school to host solar PV systems that are contracted, owned, and operated by Third Party Company in exchange for a long term agreement to purchase the generated electricity at a negotiated rate.
- Over the life of the agreement, electricity will cost less than that supplied by the utility. There is no cost to the host organizations for these systems.
- Services and maintains the equipment to ensure the maximum generating efficiency.
- Removes the equipment at the end of the contract term and repairs any damage to the property caused by the installation - or offers the system to the host for a deeply discounted price.

Why?

- Non-profits/Schools offer the best opportunity to leverage the impact of the renewable energy system. Whether they are students, faculty, and parents at a school or neighbors at a community center, nonprofit stakeholders become aware of the benefits of solar power.
- Non-profits/Schools are typically long term occupants of their campus buildings and can therefore enter into the 15 year agreements with confidence that they will be the beneficiaries of the clean power for the long term.
- As tax exempt organizations, non-profits/schools are unable to take advantage of some of the tax benefits available to producers of clean renewable energy. Partnership with a for-profit entity provides the logical link to these incentives.

- Requires Contract Negotiation (15 year agreement) between School Department and Third Party PV Provider.

Information Courtesy of Star Power LLC

Optional Sub-committees:

Exterior Materials / Entry Aesthetics

MEP Systems

Interior Design

Site Planning

Free Furnishings and Equipment (led by School Department)