PROJECT MINUTES

Project:	Peebles Elementary School Feasibility Study	Project No.:	15041
Prepared by:	Joel Seeley	Meeting Date:	12/17/2015
Re:	School Building Committee Meeting	Meeting No:	9
Location:	Bourne Veteran's Memorial Community Center	Time:	6:30pm
Distribution:	School Building Committee Members, Attendees (MF)		

Attendees:

PRESENT	NAME	AFFILIATION	VOTING MEMBER
✓	James L. Potter	Chairman, School Building Committee	**Voting Member**
	Peter J. Meier	Board of Selectmen	**Voting Member**
	Christopher Hyldburg	Chairman, School Committee	**Voting Member**
	Laura Scena	Member, School Committee	**Voting Member**
✓	Natasha Scarpato	Member at Large	**Voting Member**
✓	Richard A. Lavoie	Finance Committee	**Voting Member**
✓	William Meier	Building Trade Expert	**Voting Member**
✓	Mary Jo Coggeshall	Member at Large	**Voting Member**
✓	Frederick H. Howe	Board of Health	**Voting Member**
✓	Steven M. Lamarche	Superintendent of Schools, BPS	**Voting Member**
✓	Edward S. Donoghue	Director of Business Services, BPS	Non-Voting Member
	Thomas M. Guerino	Town Administrator	Non-Voting Member
✓	Jonathan Nelson	Director of Facilities, Town of Bourne	Non-Voting Member
✓	Elizabeth A. Carpenito	Principal, BES	Non-Voting Member
	Kathy Anderson	Elementary/Special Education Secretary	Non-Voting Member
✓	Janey Norton	Principal, PES	
✓	Kent Kovacs	FAI, Architect	
✓	Betsy Farrell Garcia	FAI, Architect	
✓	Joel Seeley	SMMA, OPM	

Item #	Action	Discussion
9.1	Record	Call to Order, 6:30 PM, meeting opened.
9.2	Record	A motion was made by S. Lamarche and seconded by F. Howe to approve the 12/3/15 School Building Committee meeting minutes. No discussion, motion passed unanimous by those attending, two abstentions.
9.3	Record	Warrant No. 3 was reviewed. A motion was made by R. Lavoie and seconded by F. Howe to approve Warrant No. 3. No discussion, motion passed unanimous.
9.4	J. Seeley	J. Seeley distributed and reviewed the updated Committee and Community Meetings Schedule for the PSR Phase, attached. The Committee approves the schedule. J. Seeley to coordinate with Bourne TV and the Community Center Director to have the Committee PSR Phase meetings video-taped.
9.5	Record	J. Seeley distributed and reviewed the fully executed FSA Amendment No. 1, dated 11/30/15 and attached.
9.6	K. Kovacs	J. Seeley indicated that additional Traffic Consultancy may be required, funded out of the Environmental and Site Consultancies budget, for the PSR Phase to assist the Committee in evaluating the final alternatives. K. Kovacs will review the scope with the Committee once the final options for the PSR Phase are selected.
9.7	K. Kovacs	K. Kovacs to provide an update on the engineer's review of the gas service moratorium at the PES site once the engineers receive feedback from NGrid.
9.8	Record	K. Kovacs indicated the engineers have confirmed with NGRID that there is sufficient gas service capacity at BES.
9.9	Record	K. Kovacs distributed and reviewed a pamphlet on Green Building Costs and Financial Benefits, attached, providing information on historical costs against actual savings for LEED elements.
9.10	P. Meier	P. Meier to follow-up with the Moderator on the process to be followed to fill vacant Committee seats in the future.
9.11	Record	K. Kovacs distributed and reviewed summary reports, attached, on the findings contained in the Geotechnical Report, the Hazardous Material Report, the Geo-Environmental Report and the Traffic Report, previously transmitted to the Committee. Committee Discussion: 1. S. Lamarche asked if the geotechnical findings ie: good draining and bearing soils, were consistent for both the Peebles and Bournedale sites? *K. Kovacs indicated yes, both sites were consistent, though some boulders should be anticipated at the Bourndedale site*. 2. J. Norton asked if the additional Traffic Consultancy in the PSR phase would include an analysis of the impact of bridge traffic Options 2A and 3A/3B? *K. Kovacs indicated yes it could. The specific scope will be determined with the Committee at the start of the PSR phase.*

Item #	Action	Discussion
		3. J. Norton asked where is the existing underground fuel oil tank located at Peebles? *K. Kovacs indicated the tank is located in the front landscaped island.* 4. R. Lavoie asked if soil testing at the tank was performed by the geo-environmental consultant? *K. Kovacs indicated soil testing would occur in a future phase.*
9.12	Record	K. Kovacs led a discussion on an overview of Community Forum No. 3, held on 12/8/15. Committee Discussion: 1. J. Norton indicated the tour was beneficial for those community members attending that had not routinely been in the school. 2. N. Scarpato indicated the discussion and feedback was good, but could be improved, maybe break into small discussion groups similar to Community Forum No. 1. 3. E. Carpenito indicated there appeared to be a lot more community members who currently do not have children in the schools, in attendance. 4. S. Lamarche indicated there has been a steady progression of information sharing and discussion with the community. 5. N. Scarpato indicated the child care process was well done.
9.13	Record	K. Kovacs led a discussion on the Evaluation Criteria Matrix for each criteria for each Option. The Committee each expressed their views on each option and listed their individual rankings of each criteria for each option. B. Garcia recorded each ranking in the Evaluation Criteria Matrix, attached. Options reviewed were: 1. PES – New Construction Option 1A – 250 students 2. PES – Renovation/Addition Option 1G – 250 students 3. BES - Renovation/Addition Option 2A – 725 students 4. BES - Renovation/Addition Option 3A – 885 students 5. BES - Renovation/Addition Option 3B – 885 students 6. PES – New Construction Option 4A – 410 students 7. PES – Renovation/Addition Option 4B – 410 students Committee discussion: 1. R. Lavoie expressed that the original Bournedale design was based on a Pods-type layout and when the Bids came in, was significantly overbudget. R. Lavoie expressed concern that the new options need to have an efficient and cost-effective layout. *K. Kovacs indicated the layouts will be refined as the process continues. At the PDP level, the plans are responding to the educational program and site conditions and will be further refined at each phase.* 2. R. Lavoie indicated the last two schools built in Bourne had cost concerns and that this project needs to be cost effective, getting the most value for the town.

Item #	Action	Discussion
		J. Potter indicated that there will be several phases to go thru to get to an efficient and cost effective plan for the preferred solution. At the PDP phase, the committee needs to get to the top 3 or 4 options for further study. 3. R. Lavoie asked if the Middle School was overcrowded today? *S. Lamarche indicated the MS is functional, but it isn't being used as constructed, in that there are many uniquely middle school spaces that aren't being used for the middle school due to repurposing to accommodate the enrollments.* 4. M. Coggeshall asked if the construction durations were the same for Options 2A and 3A/3B? *J. Seeley indicated the construction duration for Options 3A/3B was a few months longer than for Option 2A, shown on the project schedule attached.* A Motion was made by S. Lamarche and seconded by N. Scarpato to select the following options to further develop in the PSR Phase: 1. BES - Renovation/Addition Option 2A – 725 students 2. PES – New Construction Option 4A – 410 students No discussion, voted unanimously. A Motion was made by F. Howe and seconded by N. Scarpato to select the following additional option to further develop in the PSR Phase: 1. PES – Renovation/Addition Option 4B – 410 students No discussion, vote passed with one opposed. A Motion was made by S. Lamarche and seconded by N. Scarpato to select the following additional option to further develop in the PSR Phase: 1. PES – New Construction Option 1A – 250 students No discussion, vote passed with one opposed.
9.14	Record	A Motion was made by F. Howe and seconded by R. Lavoie to approve the PDP Submittal and authorize submission to the MSBA. No discussion, voted unanimously.
9.15	J. Potter	A Motion was made by S. Lamarche and seconded by F. Howe to authorize J. Potter, as Chair of the Committee, to write a letter to the Selectmen indicating the Committee does not support the "Technology use during Open Meeting" policy in whole. No discussion, voted unanimously. J. Potter will send the letter to the Selectmen.
9.16		Community Questions: *1.* A community member wished to emphasize and support R. Lavoie's expression that the original Bournedale design was based on a Pods-type layout and when the Bids came in, was significantly overbudget and that the new options need to have an efficient and cost-effective layout.

Item #	Action	Discussion
9.17	Record	Next **SBC Meeting: January 7, 2016 at 6:30 pm** at the Bourne Veteran's Memorial Community Center.
9.18	Record	A Motion was made by R. Lavoie and seconded by F. Howe to adjourn the meeting. No discussion, voted unanimously.

Attachments: Agenda, Committee and Community Meetings Schedule, Executed FSA Amendment No. 1, Green Building Costs and Financial Benefits, Summary reports for Geotechnical Report, Hazardous Material Report, Geo-Environmental Report and Traffic Report, Evaluation Criteria Matrix

The information herein reflects the understanding reached. Please contact the author if you have any questions or are not in agreement with these Project Minutes

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PROJECT MEETING SIGN-IN SHEET

Project:	Peebles Elementary School Feasibility Study	Project No.:	15041
Prepared by:	Joel Seeley	Meeting Date:	12/17/2015
Re:	School Building Committee Meeting	Meeting No:	9
Location:	Bourne Veterans Memorial Community Center, 234 Main Street, Buzzards Bay, Massachusetts	Time:	6:30pm
Distribution:	Attendees, (MF)		

SIGNATURE	ATTENDEES	EMAIL	AFFILIATION
	James L. Potter	onsetjp@juno.com	Chairman, School Building Committee
	Peter J. Meier	pmeier@townofbourne.com	Bourne Board of Selectmen
	Christopher Hyldburg	chrish@alpha-1.com	Chairman, Bourne School Committee
	Laura Scena	laurascena@yahoo.com	Member, School Committee
	Natasha Scarpato	scarpato4@comcast.net	Member-At-Large
	Richard A. Lavoie	Richl.Lavoie@gmail.com	Member, Bourne Finance Committee
	William Meier	Dusty22752@aol.com	Building Trade Expert
	Mary Jo Coggeshall	mjcoggeshall@bourneps.org	At-Large
	Frederick H. Howe	rickhowe9@gmail.com	Board of Health
	Steven M. Lamarche	slamarche@bourneps.org	Superintendent of Schools, BPS
	Edward S. Donoghue	EDonoghue@bourneps.org	Director of Business Services, BPS
	Thomas M. Guerino	tguerino@townofbourne.com	Town Administrator
	Jonathan Nelson	jnelson@townofbourne.com	Director of Facilities, Town of Bourne
	Elizabeth A. Carpenito	ecarpenito@bourneps.org	Principal, BES
	Kathy Anderson	kanderson@bourneps.org	Elementary/Special Education Secretary
	Janey Norton	jnorton@bourneps.org	Principal, PES
	Kent Kovacs	kkovacs@flansburgh.com	Flansburgh Architects
	Betsy Farrell Garcia	bgarcia@flansburgh.com	Flansburgh Architects
	Joel Seeley	jseeley@smma.com	SMMA

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AGENDA

Project:	Peebles Elementary School Feasibility Study	Project No.:	15041
Re:	School Building Committee Meeting	Meeting Date:	12/17/2015
Meeting Location:	Bourne Veterans Memorial Community Center		
Prepared by:	Joel Seeley	Meeting Time:	6:30 PM
Distribution:	Committee Members (MF)	Meeting No.:	9

1. Call to Order
2. Approval of Minutes
3. Approval of Invoices and Commitments
4. PSR Phase Schedule
5. Community Forum No. 3 Recap
6. Review of Construction Alternatives
7. Selection of Top 3-4 Construction Alternatives
8. Vote to Approve and Submit PDP
9. Technology Use During Open Meeting Policy
10. Old or New Business
11. Public Comments
12. Next Meeting – January 7, 2016
13. Adjourn

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SCHOOL BUILDING COMMITTEE
PEEBLES ELEMENTARY SCHOOL

All meetings held at the
Bourne Veterans Memorial Community Center at 6:30 PM
unless otherwise noted

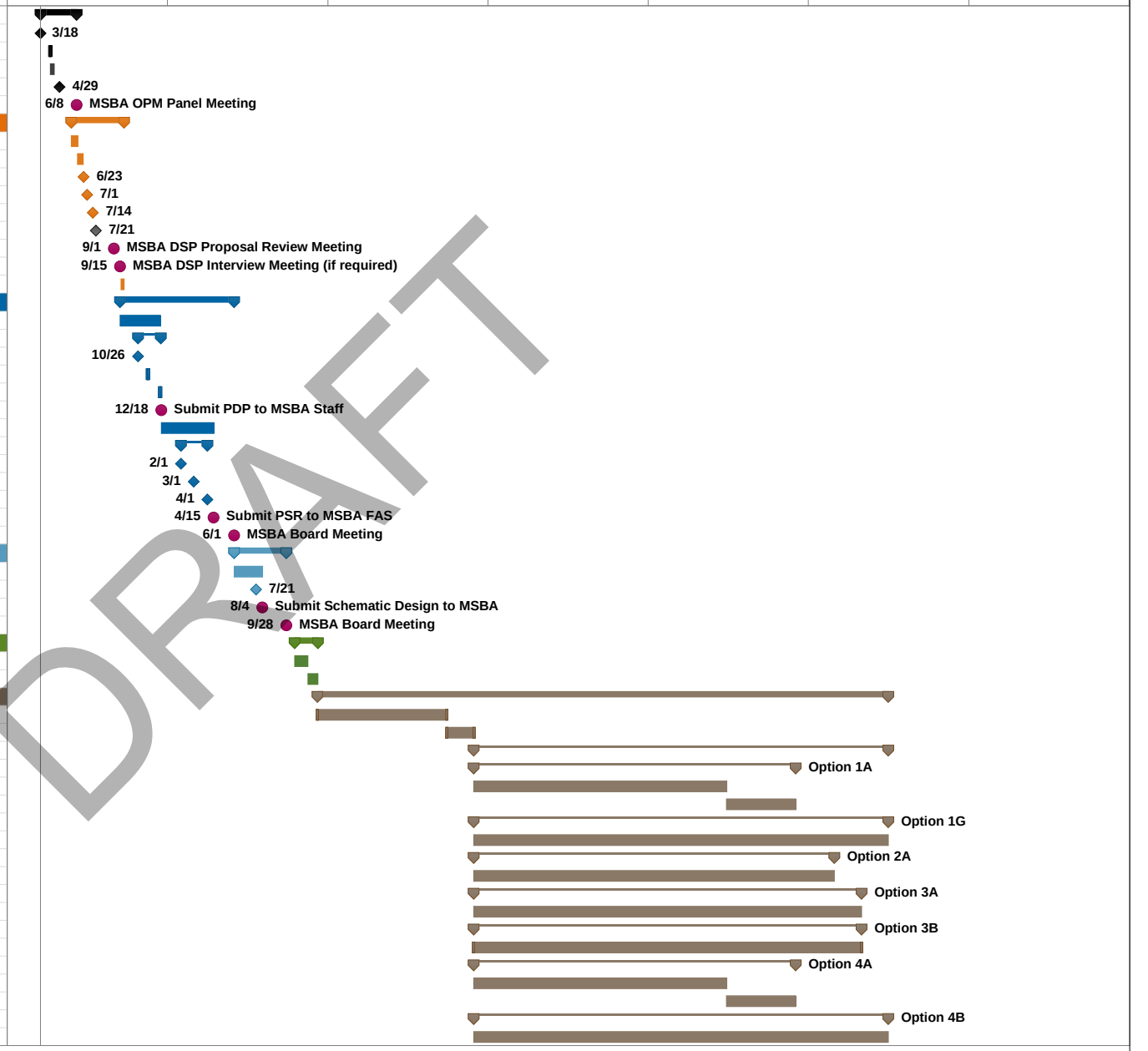
MEETINGS SCHEDULE AND AGENDAS
November 25, 2015 ***Updated December 17, 2015***

DATE	AGENDA
Feasibility Study Phase (PSR)	
January 7, 2016	SCHOOL BUILDING COMMITTEE MEETING
	Review Preferred Alternative Goals
	Prepare for Community Forum
January 21, 2016	COMMUNITY FORUM NO. 4 - 6:00 to 8:00 PM - BOURNEDALE ELEMENTARY SCHOOL CAFETERIA
February 4, 2016	SCHOOL BUILDING COMMITTEE MEETING
	Review Community Forum Comments
	Structural Narrative Review
	MEP Systems Narrative Review
	Update on Construction Alternatives
	Review MSBA Comments on PDP Submission
February 18, 2016	SCHOOL BUILDING COMMITTEE MEETING
	Update on Construction Alternatives
	Prepare for Community Forum
March 3, 2016	COMMUNITY FORUM NO. 5 - 6:00 to 8:00 PM - PEEBLES ELEMENTARY SCHOOL CAFETERIA
March 17, 2016	SCHOOL BUILDING COMMITTEE MEETING
	Review Community Forum Comments
	Update on Sustainable Design Goals
	Update on Construction Alternatives
March 31, 2016	SCHOOL BUILDING COMMITTEE MEETING
	Review Cost Models
	Preliminary Discussion of One Preferred Construction Alternative
	Prepare for Community Forum
April 6, 2016	COMMUNITY FORUM NO. 6 - 6:00 to 8:00 PM - BOURNEDALE ELEMENTARY SCHOOL CAFETERIA
April 14, 2016	SCHOOL BUILDING COMMITTEE MEETING
	Vote to Decide One Preferred Construction Alternative
	Vote to Submit Preferred Schematic Report to MSBA
April 15, 2016	*SUBMIT PREFERRED SCHEMATIC REPORT PACKAGE TO MSBA*
	ADDITIONAL MEETINGS TO BE SCHEDULED

Updated: June 25, 2015
Revised: December 4, 2015

TOWN OF BOURNE, MASSACHUSETTS
PEEBLES ELEMENTARY SCHOOL
PROJECT SCHEDULE

ID	Task Name	Duration	Start	Finish
1	**RETAIN OPM**	**58 days**	**3/18/2015**	**6/8/2015**
2	Submit OPM Proposals	0 days	3/18/2015	3/18/2015
3	OPM Interview	2 days	4/8/2015	4/9/2015
4	Negotiate OPM Contract	7 days	4/9/2015	4/17/2015
5	Submit Documents to MSBA OPM Panel	0 days	4/29/2015	4/29/2015
6	**MSBA OPM Panel Meeting**	**0 days**	**6/8/2015**	**6/8/2015**
7	**RETAIN DESIGNER**	**86 days**	**5/27/2015**	**9/23/2015**
8	Draft Designer RFS and Submit to MSBA	11 days	5/27/2015	6/10/2015
9	MSBA Approve Draft RFS	9 days	6/10/2015	6/22/2015
10	Submit to Central Register	0 days	6/23/2015	6/23/2015
11	Notice in Central Register	0 days	7/1/2015	7/1/2015
12	Briefing Session	0 days	7/14/2015	7/14/2015
13	Submit Designer Proposals	0 days	7/21/2015	7/21/2015
14	**MSBA DSP Proposal Review Meeting**	**0 days**	**9/1/2015**	**9/1/2015**
15	**MSBA DSP Interview Meeting (if required)**	**0 days**	**9/15/2015**	**9/15/2015**
16	Negotiate Designer Contract	5 days	9/17/2015	9/23/2015
17	**FEASIBILITY STUDY (FS)**	**183 days**	**9/15/2015**	**6/1/2016**
18	Develop Preliminary Design Program (PDP)	65 days	9/15/2015	12/15/2015
19	**Community Presentations**	37 days	10/26/2015	12/16/2015
20	Community Forum 1: Visioning	0 days	10/26/2015	10/26/2015
21	Community Forum 2: Existing Conditions	3 days	11/16/2015	11/18/2015
22	Community Forum 3: Options	3 days	12/14/2015	12/16/2015
23	**Submit PDP to MSBA Staff**	**0 days**	**12/18/2015**	**12/18/2015**
24	Develop Preferred Schematic Report (PSR)	84 days	12/18/2015	4/15/2016
25	**Community Presentations**	**44 days**	**2/1/2016**	**4/1/2016**
26	Community Forum 1	0 days	2/1/2016	2/1/2016
27	Community Forum 2	0 days	3/1/2016	3/1/2016
28	Community Forum 3	0 days	4/1/2016	4/1/2016
29	**Submit PSR to MSBA FAS**	**0 days**	**4/15/2016**	**4/15/2016**
30	**MSBA Board Meeting**	**0 days**	**6/1/2016**	**6/1/2016**
31	**SCHEMATIC DESIGN (SD)**	**85 days**	**6/1/2016**	**9/28/2016**
32	Develop Schematic Design	47 days	6/1/2016	8/4/2016
33	Submit Final Budget to MSBA	0 days	7/21/2016	7/21/2016
34	**Submit Schematic Design to MSBA**	**0 days**	**8/4/2016**	**8/4/2016**
35	**MSBA Board Meeting**	**0 days**	**9/28/2016**	**9/28/2016**
36	**LOCAL VOTES**	**39 days**	**10/17/2016**	**12/8/2016**
37	Local Voting	22 days	10/17/2016	11/15/2016
38	Debt Exclusion Votes	17 days	11/16/2016	12/8/2016
39	**DESIGN AND CONSTRUCTION (TBD)**	**929 days**	**12/8/2016**	**6/30/2020**
40	Design Documentation	211 days	12/8/2016	9/28/2017
41	Bidding and Award	44 days	9/29/2017	11/29/2017
42	**Construction**	**675 days**	**11/29/2017**	**6/30/2020**
43	**Option 1A**	**524 days**	**11/29/2017**	**12/2/2019**
44	Building	413 days	11/29/2017	6/28/2019
45	Demo / Site Work	112 days	6/28/2019	12/2/2019
46	**Option 1G**	**675 days**	**11/29/2017**	**6/30/2020**
47	Phased Renovation and Additions	675 days	11/29/2017	6/30/2020
48	**Option 2A**	**588 days**	**11/29/2017**	**2/28/2020**
49	Phased Renovation and Additions	588 days	11/29/2017	2/28/2020
50	**Option 3A**	**632 days**	**11/29/2017**	**4/30/2020**
51	Phased Renovation and Additions	632 days	11/29/2017	4/30/2020
52	**Option 3B**	**632 days**	**11/29/2017**	**4/30/2020**
53	Phased Renovation and Additions	632 days	11/29/2017	4/30/2020
54	**Option 4A**	**524 days**	**11/29/2017**	**12/2/2019**
55	Building	413 days	11/29/2017	6/28/2019
56	Demo / Site Work	112 days	6/28/2019	12/2/2019
57	**Option 4B**	**675 days**	**11/29/2017**	**6/30/2020**
58	Phased Renovation and Additions	675 days	11/29/2017	6/30/2020



Massachusetts School Building Authority

December 14, 2015

Mr. Thomas M. Guerino, Town Administrator
Town of Bourne
Bourne Town Hall, Room 101
24 Perry Avenue
Buzzards Bay, MA 02532

Re: Town of Bourne, James F. Peebles Elementary School

Dear Mr. Guerino:

Enclosed for your records, please find a copy of the fully-executed First Amendment to the Feasibility Study Agreement and Exhibit B for the James F. Peebles Elementary School project in the Town of Bourne.

Please feel free to contact me if you have any questions.

Sincerely,

K. DeCristofaro

Kathryn DeCristofaro
Capital Program Manager

Cc: Legislative Delegation
Stephen F. Mealy, Chair, Bourne Board of Selectmen
Christopher Hyldburg, Chair, Bourne School Committee
Steven Lamarche, Superintendent, Bourne Public Schools
Edward Donoghue, Director of Business Services, Bourne Public Schools
James Potter, Chair, Bourne School Building Committee
Joel Seeley, Owner's Project Manager, Symmes Maini & McKee Associates
Kent Kovacs, Designer, Flansburgh Associates
File: 10.2 Letters (Region 6)

MSBA Project No.: 201400360010
District: Bourne

FIRST AMENDMENT TO THE FEASIBILITY STUDY AGREEMENT BETWEEN THE TOWN OF BOURNE AND THE MASSACHUSETTS SCHOOL BUILDING AUTHORITY

Effective as of December 10, 2015, ("Effective Date"), this First Amendment to the Feasibility Study Agreement between the Town of Bourne ("Town") and the Massachusetts School Building Authority ("Authority"), including all Exhibits and other documents attached hereto and incorporated by reference herein ("Amendment"), hereby amends the Feasibility Study Agreement between the Town and the Authority for the Proposed Project involving the James F. Peebles Elementary School (hereinafter "Agreement"), as more particularly described below. This Amendment contains all of the terms and conditions agreed upon by the Town and the Authority (collectively, "Parties") as amendments to the original Agreement. No other understandings or representations, oral or otherwise, regarding amendments to the original Agreement shall be deemed to exist or bind the Parties.

The Agreement is hereby amended as follows:

1. Exhibit B to the Agreement is deleted in its entirety. Inserted in place thereof is a new Exhibit B which is attached hereto and incorporated by reference herein.

All other terms and conditions of the original Agreement, including Exhibits attached thereto or incorporated by reference therein, that are not hereby deleted or otherwise amended shall remain in full force and effect. The Town warrants and represents that it has read and understands this Amendment. The Town further warrants and represents that its undersigned officer or representative has full legal authority to enter into this Amendment on behalf of the Town and to bind the Town to its terms and conditions.

IN WITNESS WHEREOF, the Parties hereto have executed this Amendment in duplicate originals by their duly authorized officers or representatives.

MASSACHUSETTS SCHOOL BUILDING AUTHORITY
By,

John K. McCarthy
Executive Director

12/10/15
Signature Date

TOWN OF BOURNE

By,

Name

12-1-15
Signature Date

Town Administrator
Title

As of November 24, 2015

EXHIBIT B

SCOPE OF THE FEASIBILITY STUDY

Town of Bourne
James F. Peebles Elementary School

The Scope of the Feasibility Study conducted under this Agreement, which is attached hereto and incorporated by reference herein, shall consist of the development of a feasibility study/schematic design for evaluation of a renovation of the existing school, a renovation of and addition to the existing school, and/or new construction for the James F. Peebles Elementary School in the Town of Bourne (the "District"). Pursuant to the Massachusetts School Building Authority's (the "MSBA") regulations, 963 CMR 2.06, the space allowance for the potential project shall meet all applicable MSBA regulations and guidelines.

The Feasibility Study shall contain all information required by 963 CMR 2.10(8) and any other applicable rules, regulations, policies, guidelines and directives of the MSBA including, but not limited to, a final design program, space summary, budget statement for preferred educational objectives, and a proposed total project budget. The Feasibility Study for this proposed project will examine the following four options: to consolidate the District's grades K-5 population at a District-wide elementary school, which for purposes of the design shall be based on no more than a total of 885 students; to consolidate the District's grades K-4 population at a District-wide elementary school, which for purposes of the design shall be based on no more than 725 students; to consolidate the District's grade 5 population at the James F. Peebles Elementary School and maintain the current facility's grades K-4 population, which for purposes of the design shall be based on no more than a total of 410 students; and to maintain the current James F. Peebles Elementary School grade configuration of grades K-4, which for the purposes of the design shall be based on no more than 250 students. The District will prepare and submit to the MSBA the educational space template for both options for review and acceptance. Upon acceptance of the educational space summary, the District will commence with the evaluation of alternatives. The Schematic Designs that are developed pursuant to this Agreement shall be based upon the final design program which shall be subject to the written approval of the MSBA. The Schematic Design shall include, but not be limited to, the information required by the MSBA's Feasibility Study Guidelines, including, but not limited to, a site development plan, environmental assessment, geotechnical assessment, geotechnical analysis, code analysis, utility analysis, schematic building floor plans, schematic exterior building elevations, narrative building systems descriptions, MA-CHPS scorecard or LEED for Schools checklist, outline specifications, cost estimates, project schedule and proposed total project budget.

In conducting the Feasibility Study and developing the Schematic Design, the District shall, in a sufficient and timely manner as determined by the MSBA, initiate such notification procedures, undertake such review processes, and obtain such determinations and approvals as may be required by 963 CMR 2.03(2)(h) & (i), including, but not limited to, such procedures, reviews, determinations, and approvals as may be required by the Massachusetts Historical Commission ("MHC") and/or the Massachusetts Environmental Policy Act ("MEPA"). At its earliest opportunity, the District shall seek a written determination from MHC as to whether MHC intends to undertake a review of the Proposed Project.

The District shall be responsible for conducting such geotechnical evaluations, site investigations, soils explorations and environmental assessments as are reasonable and necessary to determine whether any significant environmental, geotechnical or other physical conditions exist that may have an impact upon eventual construction on the proposed site. The MSBA may require the District to fully fund certain environmental or geotechnical site testing beyond initial investigatory costs. The MSBA shall bear no responsibility or liability of any sort for the results of any geotechnical evaluations or site testing, soils explorations, environmental assessments, nor for any site remediation, clean-up, or other site remediation services.

The development of the Schematic Design shall be subject to continuing review by the MSBA in accordance with the provisions of this Agreement, the Schedule of Deliverables contained herein, the MSBA's Feasibility Study guidelines and any other applicable rule, regulation, policy, guideline or directive of the MSBA. The District shall be responsible for submitting to the MSBA all documentation that is required to complete the Feasibility Study and Schematic Design and to support the preparation of a Project Scope and Budget Agreement.

Green Building Costs and Financial Benefits

by Gregory H. Kats

Green Building Costs and Financial Benefits

by Gregory H. Kats

Sponsors

Barr Foundation
Environmental Business Council of New England, Inc.
Equity Office Properties
Massachusetts Technology Collaborative
Massport

In co-operation with

The City of Boston Green Buildings Task Force
Greater Boston Real Estate Board
Boston Society of Architects
Western Massachusetts AIA
Green Roundtable & Developers Roundtable
Northeast Sustainable Energy Association
Greater Boston Chamber of Commerce
Real Estate Finance Association
Health Care without Harm
Springfield Chamber of Commerce
New Ecology Inc.

The Massachusetts Technology Collaborative is the state's development agency for renewable energy and the innovation economy. The agency administers the Renewable Energy Trust, which is maximizing the benefits of clean energy and helping to create jobs for the Commonwealth by stimulating new supply and demand for green power. The Trust was created in 1998 through the electric restructuring law and is funded through a monthly surcharge on electric utility bills. For more information, please visit the agency's website www.masstech.org.

Captions for cover photos (top to bottom)

The J.F. Williams Federal Building in Boston includes 30 kW of solar photovoltaics and a 75 kW cogeneration system. Through an MTC grant, a data acquisition system has been installed at the site to monitor the production and savings of these systems.

Artists for Humanity is building a new facility in the Fort Point Channel district of Boston to house its arts education programs. The building has been designed to reduce energy use by 65% and to include significant daylighting and other green building features. Up to 100% of remaining energy needs will be met by the installation of 45 kW of solar photovoltaics funded by MTC.

In its redevelopment of an historic mill building as a mixed-use office and commercial facility, Alternatives Unlimited has focused on the design of green building and energy efficiency features that will best meet occupant needs. The capstone of this project will be the restoration of a hydropower system in Whitinsville's Mumford River adjacent to the mill to provide the facility's electricity.

Published in USA for Massachusetts Technology Collaborative

Green Building Costs and Financial Benefits

Greg Kats, Capital E

Introduction

Massachusetts is a leading state in the rapidly growing green building movement. Buildings consume 70% of the nation's electricity and a large part of the materials, water and waste used and generated in our economy. Buildings have traditionally been viewed as a relatively static sector of the economy experiencing relatively little change in technology or resource consumption patterns. To date there has been a widespread perception that green buildings—though more attractive from an environmental and health perspective—are substantially more costly than conventional design and may not be justified from a cost benefits perspective. This perception has been the single largest obstacle to the more widespread adoption of green design.

The Woods Hole Research Center received a total of $500,000 in MTC awards to install 26.4 kW of solar photovoltaics and a 100 kW wind turbine at the site of its new headquarters. Combined with innovative energy efficiency measures and high-performance design, these renewables will help Woods Hole achieve its goal of a "Zero Energy" facility, producing more energy than it consumes. Pictured here, the Ordway Building.

This paper reviews a major recent report on the issue of green building costs benefits, "The Costs and Benefits of Green Buildings," Kats[1] et al., October 2003 [2] (the Report). Led by Capital E, the Report was prepared in partnership with the US Green Building Council and California's Sustainable Building Task Force for 40+ California state agencies.

What are green buildings?

"Green" or "sustainable" buildings use key resources like energy, water, materials, and land more efficiently than buildings that are just built to code. With more natural light and better air quality, green buildings typically contribute to improved employee and student health, comfort, and productivity. The United States Green Building Council (USGBC), a national non-profit membership organization, developed the Leadership in Energy and Environmental Design (LEED) System™ to provide a guideline and rating system for green buildings.

It is generally recognized that buildings consume a large portion of water, wood, energy, and other resources used in the economy. For example, US buildings alone are responsible for more CO_2. emissions than those of any other entire country in the world except China.[3] If building green is cost effective, a broad shift to green construction offers a potentially promising way to help address a range of challenges facing Massachusetts, including:

- Address growing costs of transmission and distribution congestion. The growth of Time of Use rates (TOU) by Massachusetts utilities, and the creation of congestion pricing in the form of locational marginal pricing [4] allows building owners to capture some of the benefits associated with lower overall and lower peak energy use in green buildings

1 The author is founding Principal of Capital E, a national clean technology deployment and strategy firm. Mr. Kats served from 1996 to 2001as the Director of Financing for the $1.1 billion dollar Office of Energy Efficiency and Renewable Energy at the US Department of Energy - the largest clean technology R&D and deployment program in the US. He is Chair of the Energy And Atmosphere Technical Advisory Group for LEED and serves on the LEED Steering Committee.

2 "The Costs and Benefits of Green Buildings", A Report to California's Sustainable Building Task Force, October 20003. Principal author Greg Kats, For full text and summary slides see www.cap-e.com

3 Kinzey et al., "The Federal Buildings Research and Development Program: A Sharp Tool for Climate Policy," 2002 ACEEE proceedings, Section 9.21.

4 see: http://www.iso-ne.com/iso_news/SMD_Reference_Guide/02_Locational_Marginal_Pricing_(LMP).pdf

- Reduce or slow rise in electricity and gas prices through expanded green construction and building retrofits and reduced energy demand [5]
- Help cut pollution from fossil fuels (Massachusetts fuel mix includes 28% coal as of 1999 - US DOE) including fine particulates in urban areas
- Help Massachusetts meet EPA mandated emissions reductions targets
- Improve quality of educational environment and improve school test scores
- Enhance competitiveness by providing work and living environments characterized by superior health and comfort and work environments

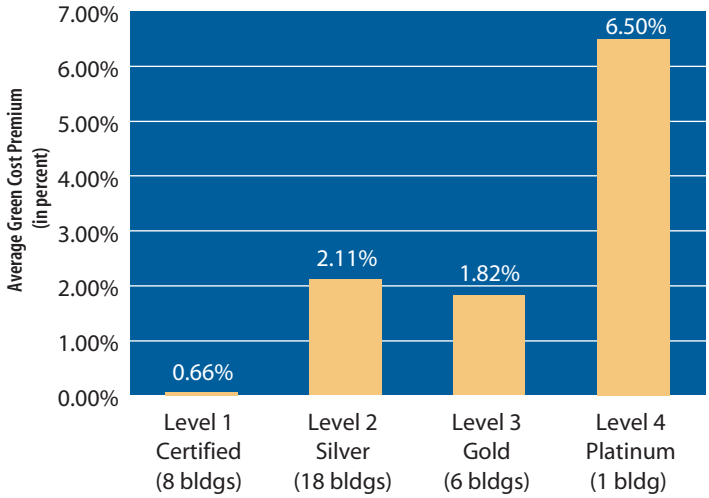
How much more do green buildings cost?

Green buildings are commonly perceived to be a lot more expensive than conventional buildings and often not worth the extra cost. For example, an early 2003 article in the New York Times was entitled "Not Building Green Is Called a Matter of Economics."

In order to determine the cost of building green compared to conventional design, several dozen building representatives and architects were contacted to secure the cost of 33 green buildings from across the United States compared to conventional designs for those same buildings. The average premium for these green buildings is slightly less than 2%, or $3-5/ft^2, substantially lower than is commonly perceived (See Figure 1). The majority of this cost is due to the increased architectural and engineering (A&E) design time, modeling costs and time necessary to integrate sustainable building practices into projects. Generally, the earlier green building features are incorporated into the design process, the lower the cost.

The cost of green design has dropped in the last few years as the number of green buildings has risen. The trend of declining costs associated with increased experience in green building construction has been experienced in Pennsylvania, as well as in Portland and Seattle. Portland's three reported and completed LEED Silver buildings were finished in 1995, 1997, and 2000. They incurred cost premiums of 2%, 1% and 0% respectively. Seattle has seen the cost of LEED Silver buildings drop from 3-4% several years ago to 1-2% today.

Figure 1
Average Green Cost Premium vs. Level of Green Certification for Offices and Schools



Source: USGBC, Capital E Analysis

Green buildings financial benefits

Green Buildings provide financial benefits that conventional buildings do not. These benefits include energy and water savings, reduced waste, improved indoor environmental quality, greater employee comfort/productivity, reduced employee health costs and lower operations and maintenance costs. This paper will focus on two of these benefits: lower energy costs, and health and productivity benefits.

5 See for example, "Impacts of Energy Efficiency and Renewable Energy on Natural Gas Markets", Elliott et al., ACEEE, Sept, 2003. See: http://aceee.org

Energy

Energy is a substantial and widely recognized cost of building operations that can be reduced through energy efficiency and related measures that are part of green building design. The average annual cost of energy in Massachusetts buildings is approximately $2.00/ft^2. On average, green buildings use 30% less energy than conventional buildings—a reduction, for a 100,000 ft^2 state office building, worth $60,000 per year, with a 20-year present value of expected energy savings at a 5% real discount rate worth about three quarters of a million dollars.

A detailed review of 60 LEED rated buildings, demonstrates that green buildings, when compared to conventional buildings, are:

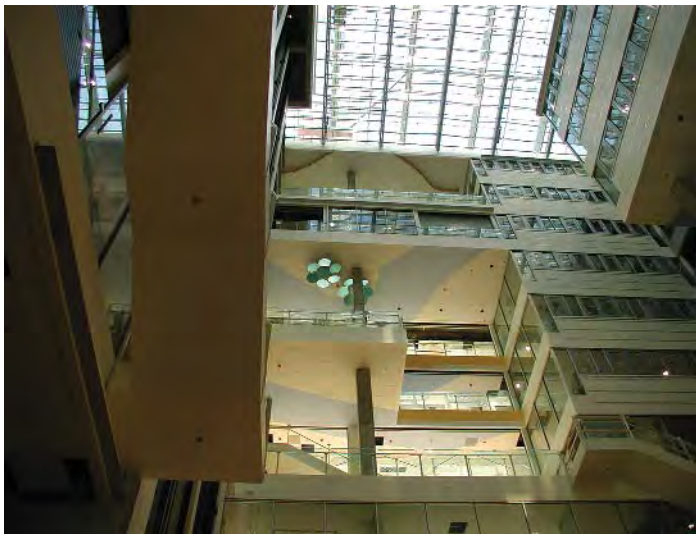
- On average 25-30% more energy efficient
- Characterized by even lower electricity peak consumption
- More likely to generate renewable energy on-site
- More likely to purchase grid power generated from renewable energy sources (green power and/or tradable renewable certificates)

Figure 2
Reduced Energy Use in Green Buildings as Compared with Conventional Buildings

	Certified	Silver	Gold	Average
Energy Efficiency (above standard code)	18%	30%	37%	28%
On-Site Renewable Energy	0%	0%	4%	2%
Green Power	10%	0%	7%	6%
Total	28%	30%	48%	36%

Source: USGBC, Capital E Analysis

Green building energy savings primarily come from reduced electricity purchases and secondarily from reduced peak energy demand. On average, green buildings are 28% more efficient than conventional buildings and generate 2% of their power on-site from photovoltaics (PV). (See Figure 2.) The financial benefits of 30% reduced consumption at an electricity price of $0.08/kWh are about $0.30/ft^2/yr, with a 20-year NPV of over $5/ft^2, equal to or more than the average additional cost associated with building green.



The Genzyme Corporation's recently completed office in Cambridge is a world-class example of green building construction, including advanced daylighting and thermal technologies. In addition to a photovoltaic installation funded by MTC, one of the most prominent features is a combined heliostat and reflective panel system designed to channel daylight deep into the 8-story building.

The environmental and health costs associated with air pollution caused by non-renewable electric power generation and on-site fossil fuel use are generally externalized (not considered) when making investment decisions. The larger Report this paper draws from quantifies two of these benefits: the value of peak power reduction and the value of emissions reductions associated with the energy strategies integrated into green building design. The Report calculates these additional financial benefits are equal to about one third of that provided by energy savings alone.

Productivity and health

There is growing recognition of the large health and productivity costs imposed by poor indoor environmental quality (IEQ) in commercial buildings—estimated variously at up to hundreds of billions of dollars per year. This is not surprising as people spend 90% of their time indoors, and the concentration of pollutants indoors is typically higher than outdoors, sometimes by as much as 10 or even 100 times.[6]

The relationship between worker comfort/productivity and building design/operation is complicated. There are thousands of studies, reports and articles on the subject that find significantly reduced illness symptoms, reduced absenteeism and increases in perceived productivity over workers in a group that lacked these features.[7] For example, two studies of over 11,000 workers in 107 European buildings analyzed the health effect of worker-controlled temperature and ventilation. The Report relies in large part on recent meta-studies that have screened tens or hundreds of other studies and have evaluated and synthesized their findings.

Following are some relevant attributes common in green buildings that promote healthier work environments:

- On average 25-30% more energy efficient
- Much lower source emissions from measures such as better siting (e.g., avoiding locating air intakes next to outlets, such as parking garages, and avoiding recirculation), and better building material source controls (e.g., required attention to storage). Certified and Silver level green buildings achieved 55% and Gold level LEED buildings achieved 88% of possible LEED credits for use of the following:[8] less toxic materials, low-emitting adhesives & sealants, paints, carpets, and composite woods, and indoor chemical & pollutant source control.

Urban Edge is developing a pioneering example of green building opportunities in affordable housing. Through an MTC grant, the non-profit will install 63 kW of solar photovoltaics at the new Egleston Crossing development in Jamaica Plain and Roxbury. This installation, in combination with multiple energy efficiency measures, will reduce the project's electricity needs by 50%.

- Significantly better lighting quality including: more daylighting (half of 21 LEED green buildings reviewed provide daylighting to at least 75% of building space[9]), better daylight harvesting and use of shading, greater occupancy control over light levels and less glare
- Generally improved thermal comfort and better ventilation—especially in buildings that use underfloor air for space conditioning
- Commissioning, use of measurement and verification, and CO_2 monitoring to ensure better performance of systems such as ventilation, heating and air conditioning

Measuring the exact financial impact of healthier, more comfortable and greener buildings is

6 US Environmental Protection Agency, "Indoor Air Quality," January 6, 2003. Available at: http://www.epa.gov/iaq/.

7 Judith Heerwagen, "Sustainable Design Can Be an Asset to the Bottom Line - expanded internet edition," Environmental Design & Construction, Posted 07/15/02. Available at: http://www.edcmag.com/CDA/ArticleInformation/features/BNP__Features__Item/0,4120,80724,00.html.

8 Capital E analysis of USGBC data (based on analysis of points actually achieved in building performance data submitted to USGBC), November and December 2002. For more detail on achievable reductions from some of these indoor emissions sources, please see: Hodgson AT. "Common Indoor Sources of Volatile Organic Compounds: Emissions Rates and Techniques for Reducing Consumer Exposures." University of California, Lawrence Berkeley National Laboratory. 1999.

Prepared for California Air Resources Board.

Available at: http://www.arb.ca.gov/research/apr/past/indoor.htm#Toxic%20Air%20Contaminants.

9 Capital E analysis of USGBC data, November and December 2002.

difficult. The costs of poor indoor environmental and air quality—including higher absenteeism and increased respiratory ailments, allergies and asthma—are hard to measure and have generally been "hidden" in sick days, lower productivity, unemployment insurance and medical costs.

However, four of the attributes associated with green building design—increased ventilation control, increased temperature control, increased lighting control and increased daylighting—have been positively and significantly correlated with increased productivity. Increases in tenant control over ventilation, temperature and lighting each provide measured benefits from 0.5% up to 34%, with average measured workforce productivity gains of 7.1% with lighting control, 1.8% with ventilation control, and 1.2% with thermal control. Additionally, significant measured improvements have been found with increased daylighting.

There are also quantifiable green building gains in attracting and retaining a committed workforce—an aspect beyond the scope of the Report. Attracting and retaining the best employees can be linked to the quality of benefits that workers receive, including the physical, environmental and technological workplace. Green buildings are designed to be healthier and more enjoyable working environments. Workplace qualities that improve the environment of knowledge workers may also reduce stress and lead to longer lives for multi-disciplinary teams.

LEED rated buildings all address some combination of measures that help reduce the pollutants that cause sickness and increase health care costs; improve quality of lighting and increase use of daylighting; and increase tenant control and comfort. LEED Green buildings consistently include a range of material, design and operation measures that directly improve human health and productivity. Gold and Platinum level LEED buildings are more comprehensive in applying IEQ-related measures and therefore should be viewed as providing larger productivity and health benefits than Certified or Silver level green buildings.

Given the studies and data reviewed above, the Report recommends attributing a 1% productivity and health gain to Certified and Silver level buildings and a 1.5% gain to Gold and Platinum level buildings. These percentages are at the low end of the range of productivity gains for each of the individual specific building measures—ventilation, thermal control, light control and daylighting—analyzed above. They are consistent with or well below the range of additional studies reviewed in the Report.

The Blackstone Valley Vocational Regional School District is planning an ambitious 80,000 square foot addition to accommodate four new vocational programs, and will renovate the existing building which has some systems that date back to the 1960's. Daylighting will be accomplished in this project by using light tube technology, which will save over 500 kW a year. Other efficiency measures include efficient air conditioning equipment and variable speed drives for the air handling unit. The school will also incorporate photovoltaic panels mounted on the roof and a solar thermal domestic water preheating system.

A 1% increase in productivity (equal to about 5 minutes per working day) is equal to $600 to $700 per employee per year, or $3/ft^2 per year. A 1.5 % increase in productivity (or a little over 7 minutes each working day) is equal to about $1000 per year, or $4 to $5/ft^2 per year. Over 20 years and at a 5% real discount rate, the present value of the productivity benefits is about $35/ft^2 for Certified and Silver level buildings, and $55/ft^2 for Gold and Platinum level buildings. The relatively large impact of productivity and health gains reflects the fact that the direct and indirect cost of employees is far larger than the cost of construction or energy. Consequently, even small changes in productivity and health translate into large financial benefits. Assuming a longer building operational life, such as 30 or 40 years, would result in substantially larger benefits.

It is worth noting that:

- Nearly one-fifth of Massachusetts' population spend their day inside schools
- Only 43% of high-volume chemicals have been tested for potential human toxicity, and only 7% have been tested for their effect on children's development [10]
- Asthma is the leading cause of admission of urban children into hospitals and the leading cause of days absent from school [11]

Green building improvements—especially for new buildings—appear to be very cost effective compared with other available measures to enhance student performance. Under the recently adopted Federal Education Bill, schools and states stand to lose billions of dollars in federal funding if students do not perform well on annual standardized tests. School and university systems should consider adopting whole building green design at the LEED Gold level or corresponding MASS-CHP scoring as a standard requirement in new school design and school retrofits.

The MITRE Corporation is developing a new state-of-the-art campus center at its Bedford facility to be built according to a comprehensive energy plan and green building standards. With assistance from an MTC grant, the project will incorporate 16.5 kW of rooftop photovoltaics and 12.5 kW of advanced semi-transparent solar photovoltaic panes installed on a covered walkway.

10 Philip Landrigan et al, "Environmental Pollutants and Disease in American Children: Estimates of morbidity, Mortality, and Costs of Lead Poisoning, Asthma, Cancer and Developmental Disabilities," Environmental Health Perspectives, Volume 110, Number 7, July 2002.

Available at: http://ehpnet1.niehs.nih.gov/docs/2002/110p721-728landrigan/abstract.html.

11 Ibid.

Overall costs and financial benefits

Green Buildings provide financial benefits that conventional buildings do not. As indicated in Figure 3 below, the Report concluded that financial benefits of green design are between $50 and $70 per square foot in a LEED building, over 10 times the additional cost associated with building green. The financial benefits are in lower energy, waste and water costs, lower environmental and emissions costs, and lower operational and maintenance costs and increased productivity and health.

Massachusetts already has established national leadership in green buildings, including achieving the first gold rated federal building (at EPA's Chelmsford Lab), and is well positioned to build on this. Doing so will involve developing policies that allow green buildings to capture the financial value of benefits associated with green design. Although this issue is beyond the scope of this paper, two disparate examples are worth noting:

- Accelerated permissioning for the Manulife Financial Headquarters building in South Boston [12] resulting from the perceived benefits associated from its green design suggests one way to make these links more clearly.
- An expected shift from zonal to nodal pricing system for load and generation pricing is a step towards allowing more accurate mapping of real cost into price signals that might allow green buildings to better capture the financial benefits resulting from green construction.

The benefits of building green include cost savings from reduced energy, water, and waste; lower operations and maintenance costs; and enhanced occupant productivity and health. As Figure 3 indicates, the total financial benefits of green buildings are over ten times the average initial investment required to design and construct a green building. Despite data limitations and the need for additional research in various areas, the data demonstrates that building green is cost-effective today, particularly for those projects which start "green" design early in the process.

Figure 3
Financial Benefits of Green Buildings
Summary of Findings (per ft^2)

Category	20-year Net Present Value
Energy Savings	$5.80
Emissions Savings	$1.20
Water Savings	$0.50
Operations and Maintenance Savings	$8.50
Productivity and Health Benefits	$36.90 to $55.30
Subtotal	$52.90 to $71.30
Average Extra Cost of Building Green	(-3.00 to -$5.00)
Total 20-year Net Benefit	$50 to $65

Source: Capital E Analysis

12 See: http://www.bankerandtradesman.com/pub/4_91/commercial/185123-1.html

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Limited Hazardous Building Materials Inspection Report

Fuss & O'Neill EnviroScience, LLC. conducted a Limited Hazardous Building Materials Inspection at the Peebles Elementary School located at 70 Trowbridge Road in Bourne, Massachusetts (the "Site").

Purpose: To perform a lead-based paint (LBP) screening, an inventory of fluorescent light ballasts and mercury-containing equipment, a quantification of presumed polychlorinated biphenyl (PCB)–containing source building materials, and a limited asbestos inspection as part of a feasibility study that anticipates demolishing the Site building.

Tasks Performed: The following areas of focus were evaluated and reviewed as part of this inspection: Review of previously performed Limited Hazardous Building Material Inspection Reports, LBP Screening, Inventory of Fluorescent Light Ballasts and Mercury-Containing Equipment, Quantification of Presumed PCB-Containing Source Building Materials, Asbestos Inspection (mostly visual). Destructive investigative techniques were conducted at the Site building to access materials associated with the brick veneer and ceramic tiles only.

Findings – Peebles School:

- LBP was found associated with Window Supports and Ceramic Wall Tiles.
- Several materials are presumed to contain PCBs including: Window Caulking and Glazing Compound.
- Fluorescent Light Ballasts and Mercury-Containing Equipment were quantified in a previous report.
- Multiple samples were determined to be asbestos-containing materials (ACM) including: Caulking, Glazing Compound, Dampproofing, Plaster Skim Coat, Insulations, Floor Tiles, Boiler Components, Duct Vibration Isolators, Cement Panels, and Soil.

Conclusion:
If disturbed by demolition activities, LBP-coated building components should be segregated from the general demolition waste stream, and be analyzed to determine proper off-site disposal.

Identified PCB-containing materials should be presumed to contain regulated concentrations of PCBs until analysis indicates otherwise. These materials should be removed and disposed at an EPA-approved facility.

DEHP-containing fluorescent light ballasts must be segregated for proper packaging, transporting and disposal. While mercury-containing equipment and fluorescent lamps must be recycled, reclaimed, or disposed as hazardous waste prior to disturbance.

Prior to disturbance ACM that would likely be impacted by the proposed demolition activities must first be abated by a Commonwealth of Massachusetts Department of Labor Standards (MADLS)-licensed Asbestos Abatement Contractor. This is a requirement of MADLS, Commonwealth of Massachusetts Department of Environmental Protection (MassDEP), and the United States Environmental Protection Agency (EPA) National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations governing asbestos abatement.

Due to the date of construction, the Bournedale Elementary School possesses a letter from the architect (Kaestle Boos Associates, Inc.) dated August 11, 2011 stating that "no asbestos-containing building materials were specified for use in, nor to the best of our knowledge installed in, the construction of the Bournedale Elementary School." This letter satisfies the EPA Asbestos Hazard Emergency Response Act (AHERA) regulations governing asbestos in schools; however, prior to renovation or demolition, EPA NESHAP regulations still apply. This regulation requires a thorough asbestos inspection of all areas that will be impacted during renovation or demolition. Once a scope of work is defined, a supplemental inspection should be performed to ensure NESHAP requirements are met.

Geotechnical Engineering Summary

Geotechnical Services Inc. performed geotechnical engineering services associated with the Peebles and Bournedale Elementary School sites in Bourne.

Purpose:
The purpose of the work is provide information on the subsurface soil conditions to determine bearing capacity, foundation design, and other subsurface related information to aid in the future design of a potential addition or new construction option on these sites.

Peebles Elementary School Site

Tasks Performed:

- A total of four test borings were drilled on site and identified as borings B-1 to B-4. The borings were drilled to depths ranging from approximately 18.5-ft to 22-ft below the existing grade.
- Standard Penetration Tests (SPTs) were performed and split-spoon soil samples were retrieved generally at the ground surface and subsequently at 5-ft intervals.
- The finalized logs for the test borings were compiled.

Findings:

- Topsoil was encountered in all the test borings except boring B-4. The thickness of the topsoil encountered varies from about 3-in. to 8-in.
- The naturally deposited Sand Deposits were encountered in all the borings. The Sand Deposits generally consist of medium dense to dense, brown, fine to medium SAND with varying amounts of gravel, coarse sand and silt.
- Very large boulders were observed in the vicinity of boring B-3 and along the hillside in an area just south of the paved area behind the existing school.
- Groundwater levels were measured within each borehole which varied from about 7 to 8-ft below grade at the time the borings were completed.

Conclusion / Recommendations:

1. It is anticipated that the foundations for any new construction will bear upon the Sand Deposits. The naturally deposited Sand Deposits are suitable foundation bearing material (referred to herein as the "bearing strata"). Boulders and bedrock may be encountered and may require rock excavation via drilling and blasting.
2. Building walls, columns and other structural elements be supported by reinforced concrete spread or strip footings bearing directly on the bearing strata.
3. Bottoms of exterior footings bearing on compacted Structural Fill, Crushed Stone or on the undisturbed (prepared) bearing strata should be positioned at least 4-ft below the lowest adjacent ground (finished grade) exposed to freezing temperatures.
4. A permanent foundation perimeter drainage should be provided to collect and drain any infiltrating surface or seepage water which might otherwise become trapped against below-grade walls and seep into the building or exert hydro-static pressures on the walls.
5. Other construction related recommendations, i.e., excavation, compacted, drainage, protection, structural and common fill material, etc. are standard measures the design team will consider in the design of the project.

Bournedale Elementary School Site

Tasks Performed:

- A total of five test borings were drilled on site identified as borings B-1 to B-5. The borings were drilled to depths ranging from approximately 7-ft (Boring B-3) to 22-ft (Boring B-4) below the existing grade.
- Standard Penetration Tests (SPTs) were performed and split-spoon soil samples were retrieved generally at the ground surface and subsequently at 5-ft intervals.

- The finalized logs for the test borings were compiled.

Findings:

- Topsoil was encountered in all the test borings. The thickness of the topsoil encountered varies from about 7-in. to 8-in.
- The naturally deposited Sand Deposits were encountered in all the borings. The Sand Deposits generally consist of medium dense to very dense, brown, fine to medium SAND with varying amounts of gravel, coarse sand and silt.
- Refusal was encountered in all the test boring expect boring B-4 at depths ranging from 7-ft (boring B-3) to 17-ft (boring B-5). The refusal is likely due to cobbles, boulders or bedrock.

  Groundwater levels were measured within each borehole varied from about 8 to 12-ft below grade at the time the borings were completed.

Conclusion:

1. It is anticipated that the foundations for any new construction will bear upon the Sand Deposits. The naturally deposited Sand Deposits are suitable foundation bearing material (referred to herein as the "bearing strata"). Boulders and bedrock may be encountered and may require rock excavation via drilling and blasting.
2. Building walls, columns and other structural elements be supported by reinforced concrete spread or strip footings bearing directly on the bearing strata.
3. Bottoms of exterior footings bearing on compacted Structural Fill, Crushed Stone or on the undisturbed (prepared) bearing strata should be positioned at least 4-ft below the lowest adjacent ground (finished grade) exposed to freezing temperatures.
4. A permanent foundation perimeter drainage should be provided to collect and drain any infiltrating surface or seepage water which might otherwise become trapped against below-grade walls and seep into the building or exert hydro-static pressures on the walls.
5. Other construction related recommendations, i.e., excavation, compacted, drainage, protection, structural and common fill material, etc. are standard measures the design team will consider in the design of the project.

N

NOT TO SCALE

LEGEND:

B-1 TEST BORING I.D. AND APPROXIMATE LOCATION

FIGURE 2–EXPLORATION LOCATION PLAN

PEEBLES ELEMENTARY SCHOOL
BUZZARDS BAY, MA
GSI PROJECT NO. 215256

NOT TO SCALE

LEGEND:

B-1

TEST BORING I.D.AND APPROXIMATE LOCATION

FIGURE 2–EXPLORATION LOCATION PLAN

BOURNEDALE ELEMENTARY SCHOOL
BOURNE, MA
GSI PROJECT NO. 215257

Traffic Summary

Nitsch Engineering conducted traffic analysis at work at the Peebles and Bournedale Elementary School sites in Bourne.

Purpose: To prepare a qualitative assessment of safety, traffic circulation, and traffic access/egress, associated with the feasibility study. Nitsch Engineering also conducted parental pick-up and drop-off counts as part of their site observation.
The proposed design alternatives were evaluated as part of this study to gain understanding on the potential traffic issues unique to the sites being considered.

Traffic counts were taken at the following two major intersections:

- Route 6 at Nightingale Road
- Route 6 at Edge Hill Road

In addition, Automatic Traffic Recorder (ATR) counts were taken at Trowbridge Road and Ernest Valerie Road.

Findings
(Peebles):

- A total of eight buses drop off students at the school
- A total of 93 parental drop-off vehicles were observed
- A total of a 106 vehicles enter the site between 8:30am and 9:30am. 59 vehicles entering the site were travelling eastbound on Trowbridge Road while 47 vehicles were traveling westbound.
- A total of 73 parental pick-up vehicles were observed during afternoon dismissal between 2:00pm and 3:30pm. 47 vehicles entering the site were travelling eastbound on Trowbridge Road while 18 vehicles were traveling westbound.
- There were a total of 66 parking spaces counted with an overall utilization of 78% at the time observed

(Bournedale):

- A total of thirteen buses drop off students at the school
- A total of 69 parental drop-offs were observed during the morning.
- A total of a 128 vehicles enter the site between 8:15 AM through 9:30 AM. 128 vehicles entering the site were travelling westbound on Ernest Valerie Road while 4 vehicles were traveling eastbound.
- 60 vehicles entering the site between 2:30pm and 3:30pm. 59 vehicles entering were travelling westbound on Ernest Valerie Road while 4 vehicles were traveling eastbound.
- A total of 53 parental pick-up vehicles were observed during afternoon dismissal.
- There were a total of 137 parking spaces counted with an overall utilization of 58% at the time observed
- Design Option 3 (PK-5) established a total of 177 vehicles at drop-off and 113 vehicles at pick-up

Conclusion:

1. The Design options at the Peebles School site (Options 1 and 4) will have very little or no impact on Trowbridge Road traffic.
2. Design Option 3 (PK-5) established 258 additional entering/exits trips during the morning and 202 entering/exits trips during the afternoon
3. Design Option 3 (PK-5) established a total of 177 vehicles at drop-off and 113 vehicles at pick-up
4. The intersections at Route 6 at Nightingale will minor increase in traffic volume
5. The intersections at Route 6 at Edge Hill Road will minor increase in traffic volume

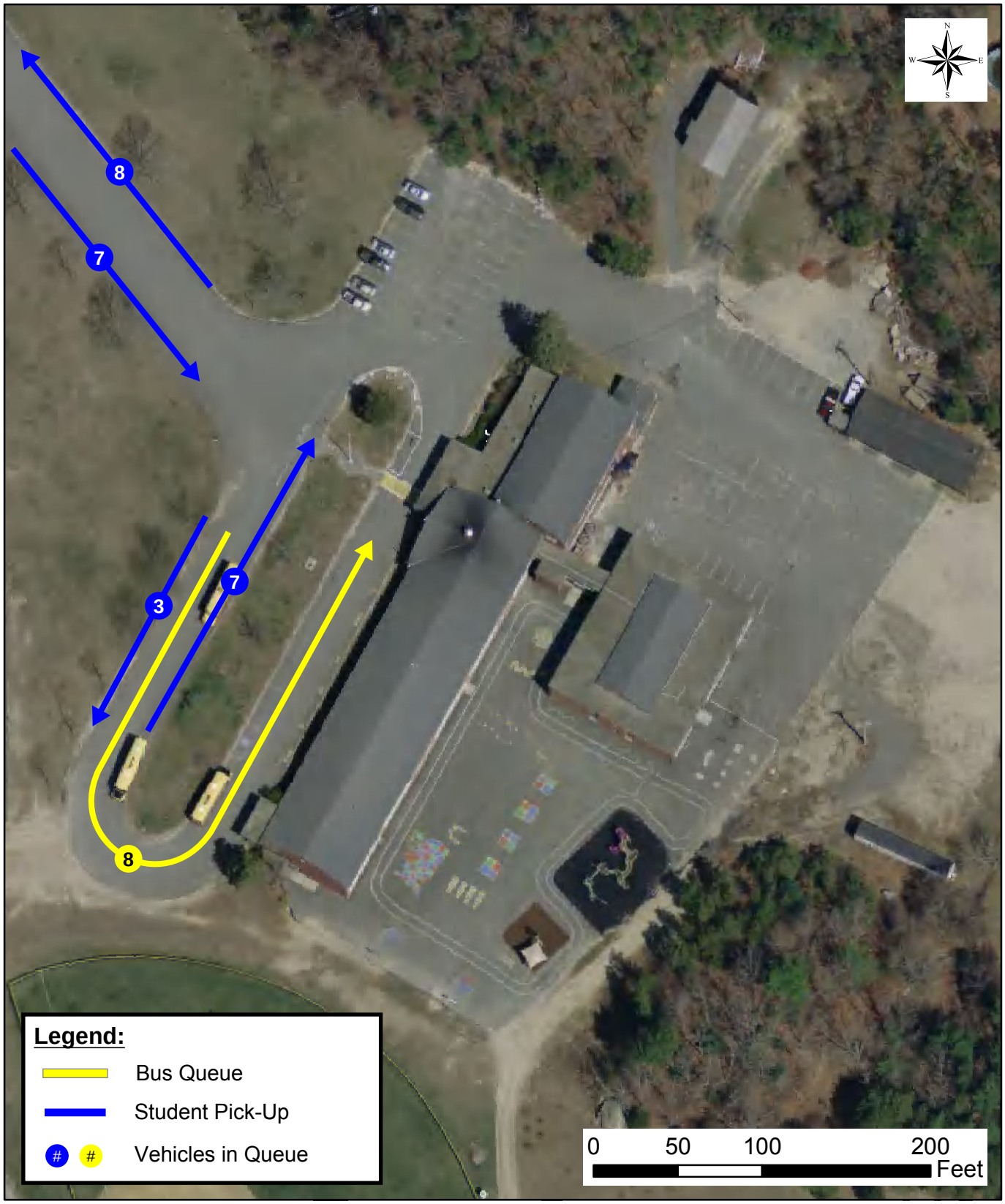


Figure 5: Peebles Elementary School Site Circulation
Peebles Elementary School
Bourne, Massachusetts

Data Source: MassGIS
Nitsch Project #11078

Nitsch Engineering

Figure 6: Peebles Elementary Parking Utilization
Peebles Elementary School
Bourne, Massachusetts

Data Source: MassGIS
Nitsch Project #11078

Nitsch Engineering

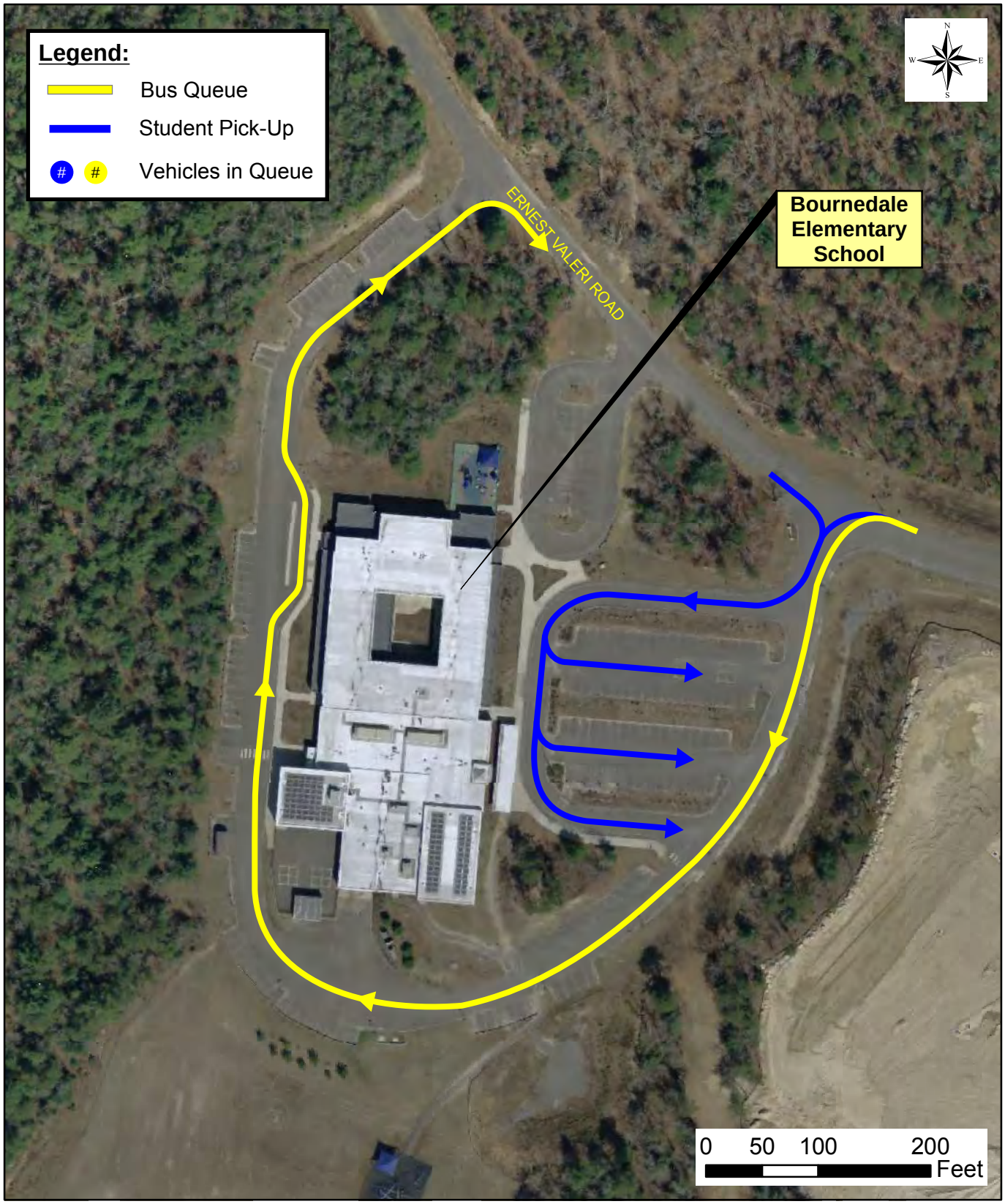


Figure 7: Bournedale Elementary School Site Circulation
Peebles Elementary School
Bourne, Massachusetts

Data Source: MassGIS
Nitsch Project #11078

Nitsch Engineering

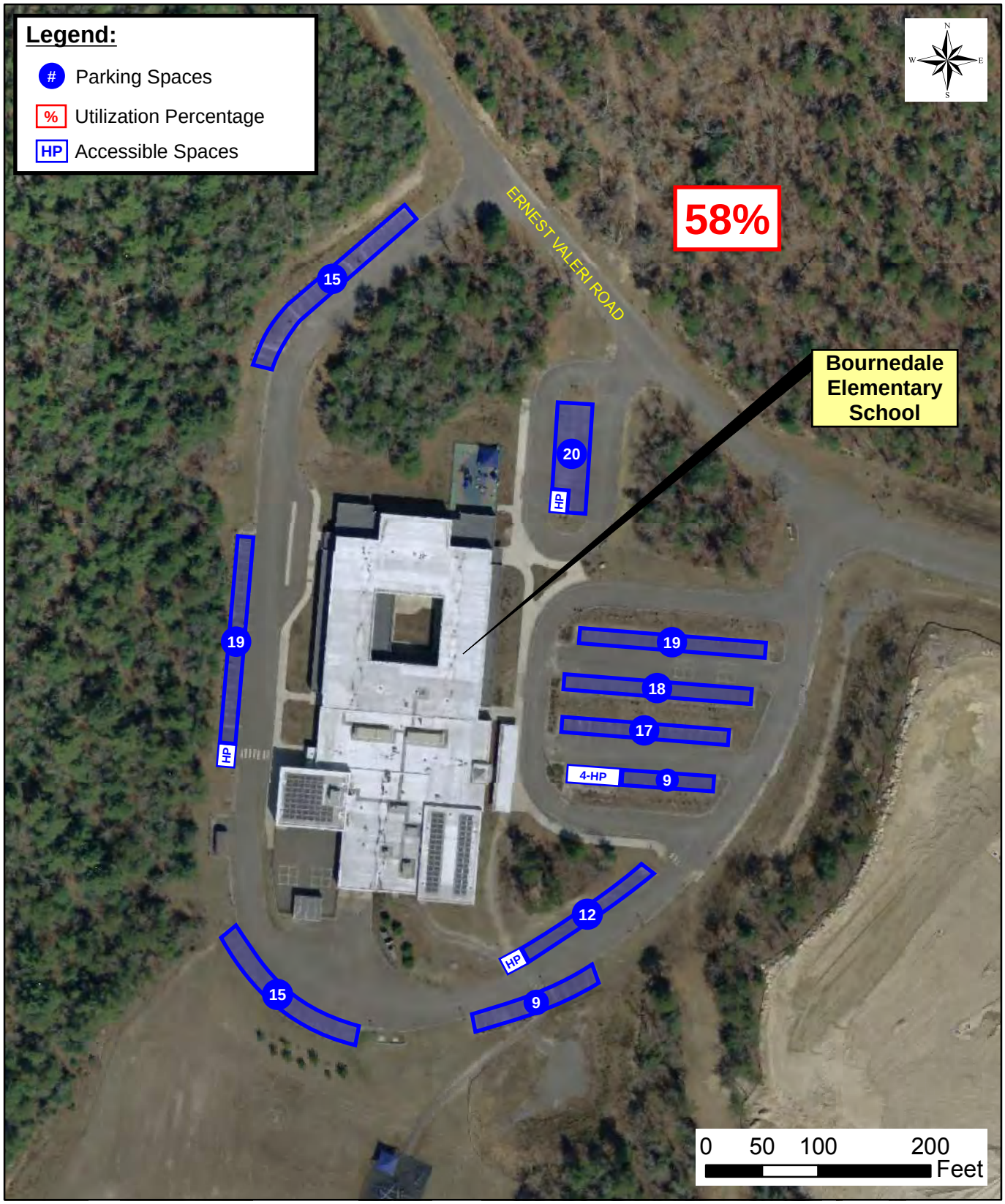


Figure 8: Bournedale Elementary Parking Utilization
Peebles Elementary School
Bourne, Massachusetts

Data Source: MassGIS
Nitsch Project #11078

Nitsch Engineering

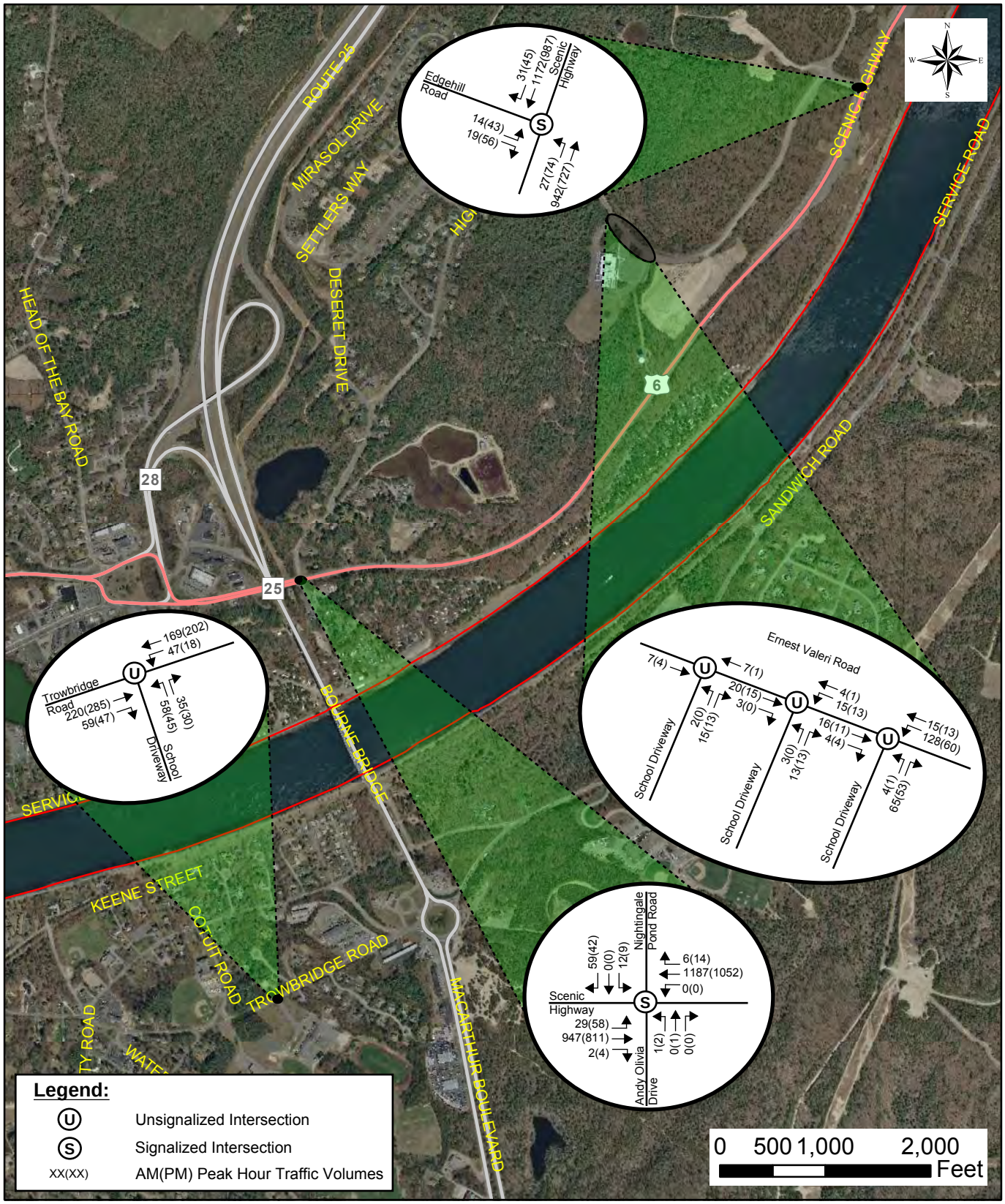


Figure 9: 2015 Existing Traffic Volumes

Peebles Elementary School
Bourne, Massachusetts

Data Source: MassGIS
Nitsch Project #11078

Nitsch Engineering

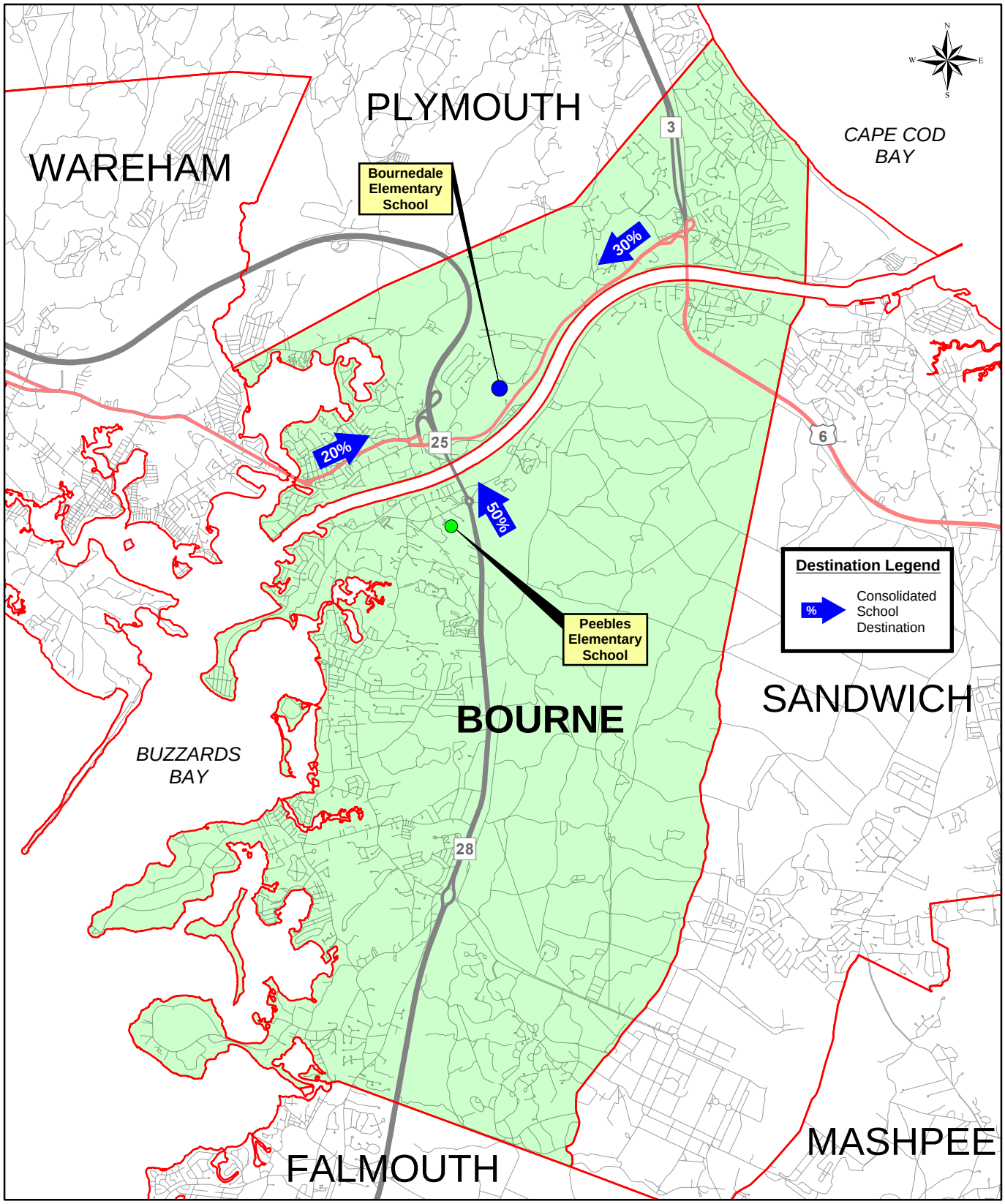


Figure 11: Regional Trip Distribution
Peebles Elementary School
Bourne, Massachusetts

Data Source: MassGIS
Nitsch Project #11078

Nitsch Engineering

Environmental Site Assessment (Phase I)

Fuss & O'Neil Inc. conducted the Phase I Environmental Site Assessment associated with the Peebles and Bournedale Elementary School sites in Bourne.

Purpose: To identify recognized environmental conditions (RECs) present at the site with a focus on hazardous substances and/or petroleum products.

Tasks Performed: The following areas of focus were evaluated and reviewed as part of this study: Site history in regards to previous use and development, various area maps, town records from various departments, interviews and site walkthroughs with school facilities department, owner's site questionnaire, and general hydrological information

Findings (Peebles):

- There is a 10,000-gallon fuel underground storage tank (UST) serving the back-up boiler
- There were documents related to an oil spill in 1995 in connection with the underground tank system. Additional documents, which were requested from the Fire Department, but have not been delivered, may complete the review on this item.
- A spill of 17 gallons of diesel fuel occurred when refueling a bus on site and a solution was achieved
- The nearby Camp Edwards is on the USEPA National Priorities list identifying groundwater contamination. The impact area was studied on the maps and none of the impact area plumes migrated toward the site.
- Nearby businesses, i.e. gas stations, did have incidents and solutions were achieved

Conclusion:

1. There is one identified recognized environmental condition (REC) associated with the subject site. The REC is the currently unresolved history of spills associated with the UST system. This REC item may be re-designated as a "historical REC" (i.e. a closed case addressed to the satisfaction of state environmental standards)_ in this evaluation at a later date pending review of Fire Dept. documentation

2. There are no offsite concerns based on records addressing nearby businesses, i.e. gas stations, Camp Edwards distance from the site, and local hydrological conditions. These conditions should not have a negative impact on the site.

Findings (Bournedale):

- The 2009 Bournedale Elementary School project was greenfield construction
- There are no target sites nearby that would negatively impact the school site
- The eastern portion of the site is located within and adjacent to a medium-yield aquifer. The aquifer map is along the property line and outside proposed project limits.

Conclusion:

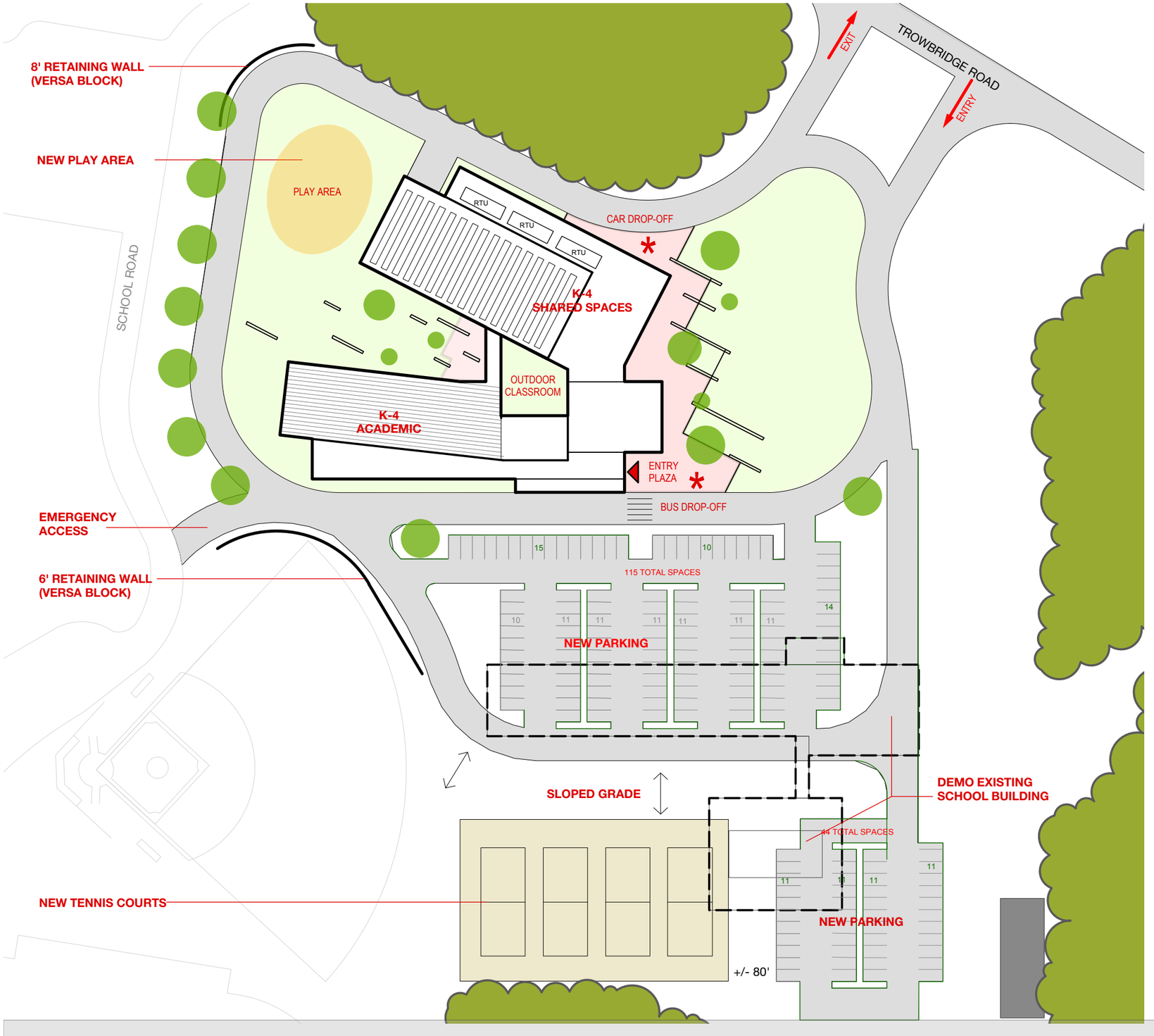
1. There are no identified recognized environmental conditions (REC) associated with the subject site.

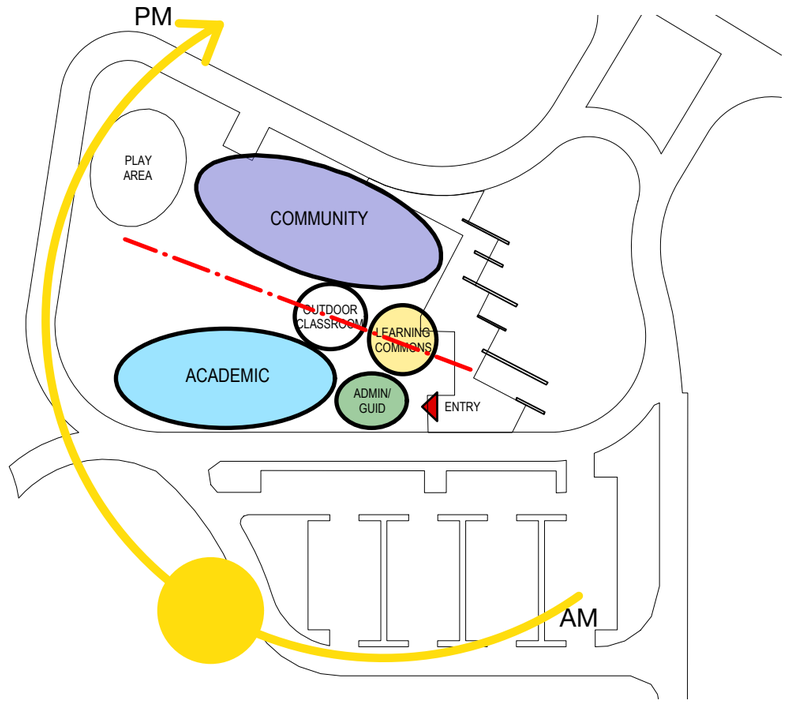
2. There are no offsite concerns based on distance from the site and local hydrological conditions that would have a negative impact on the site.

OPTION 1A (K-4)

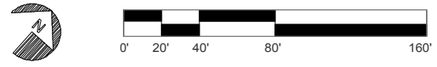
New Construction

Square Footage: 57,248sf





Organizational Diagram



Peebles Elementary School

Bourne, Massachusetts

Flansburgh Architects

OPTION 1A (K-4)

New Construction

Square Footage: 57,248sf

FIRST FLOOR PLAN

KEY

1. Arts & Innovation Studio:
   -Grouped with Arts,Music,Makers Space & Learning Commons to promote collaboration, shared resources
2. Outdoor Classroom:
   - Limits distraction to academic classrooms
   -project area with water, power
3. Community:
   - Stage open to gym & cafe to support larger venue to support greater community events on this side of the canal
4. Academic:
   -Neighborhood collab/display
5. Play Area:
   -Adjacent to Gymnasium to limit distraction to academic classrooms
6. Campus Resource:
   - Adjacent to Middle School and High School,Historic Village, Canal
7. Entry Plaza connects separate car and bus zones

SECOND FLOOR PLAN

0' 25' 50' 100'

Peebles Elementary School

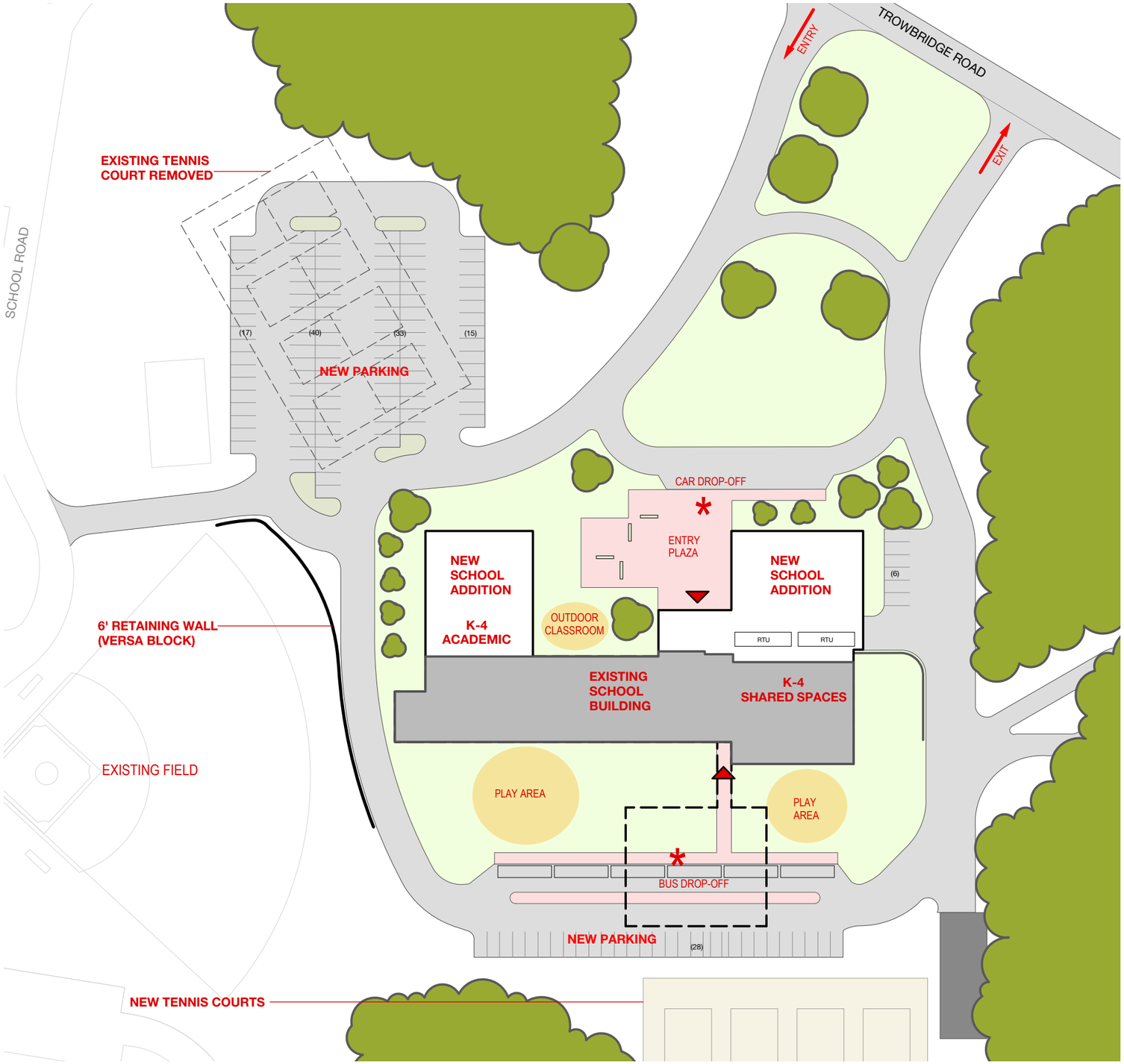
Bourne, Massachusetts

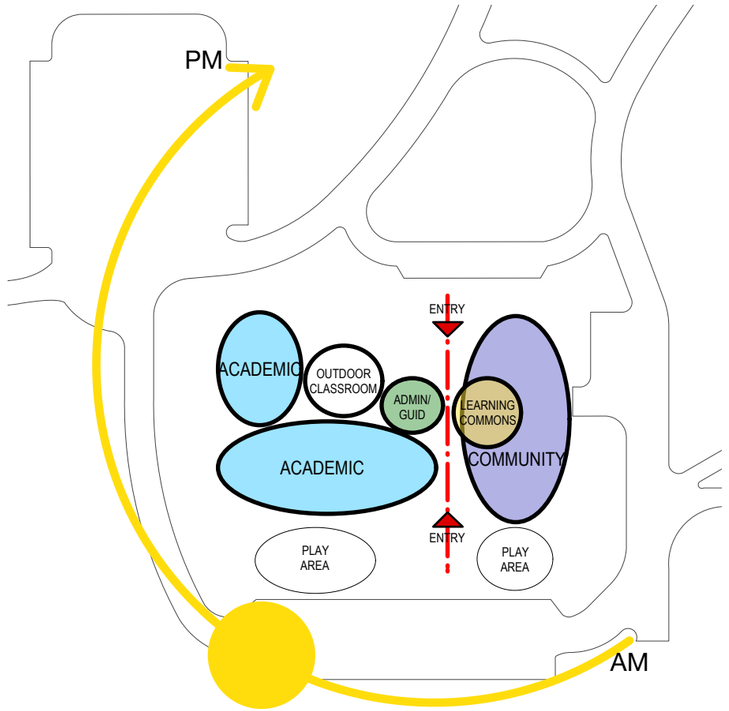
Flansburgh Architects

OPTION 1G (K-4)

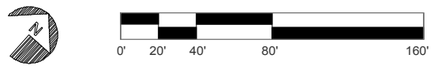
Addition/Renovation

Square Footage: 57,248sf





Organizational Diagram



Peebles Elementary School

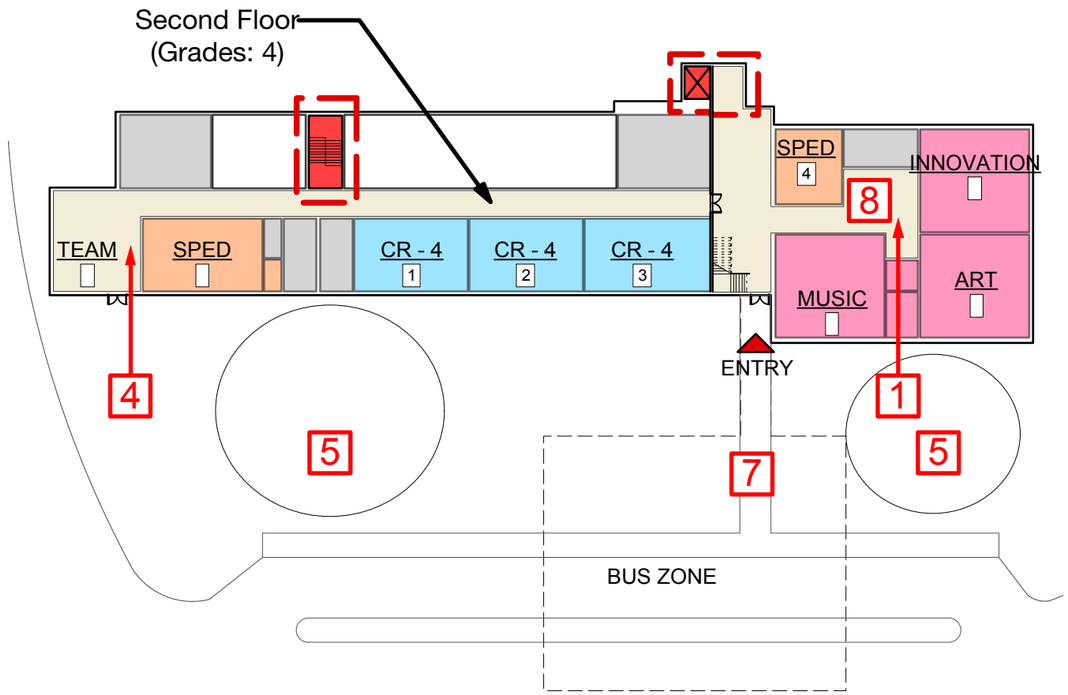
Bourne, Massachusetts

Flansburgh Architects

OPTION 1G (K-4)

Addition/Renovation

Square Footage: 57,248sf



FIRST FLOOR PLAN

KEY — New Addition: - - - - - -

1. Arts & Innovation Studio:
   -Grouped with Arts,Music,Makers Space & Learning Commons to promote collaboration, shared resources (tucked away on lower level)
2. Outdoor Classroom:
   - Adjacent to classroom wing, may limit use do to distraction
3. Community:
   - Larger venue to support greater community events on this side of the canal
4. Academic: Neighborhood collab/display
   -Existing Bldg. has limited opportunity for larger Team Areas
5. Play Area: Remote from gymnasium
6. Campus Resource:
   - Adjacent to Middle School and High School, Historic Village,Canal
7. Separate car and bus drop-off entry locations
8. Potential noise concerns from proximity of gym to admin & Arts/Innovation area to Cafeteria Above

SECOND FLOOR PLAN

0' 25' 50' 100'

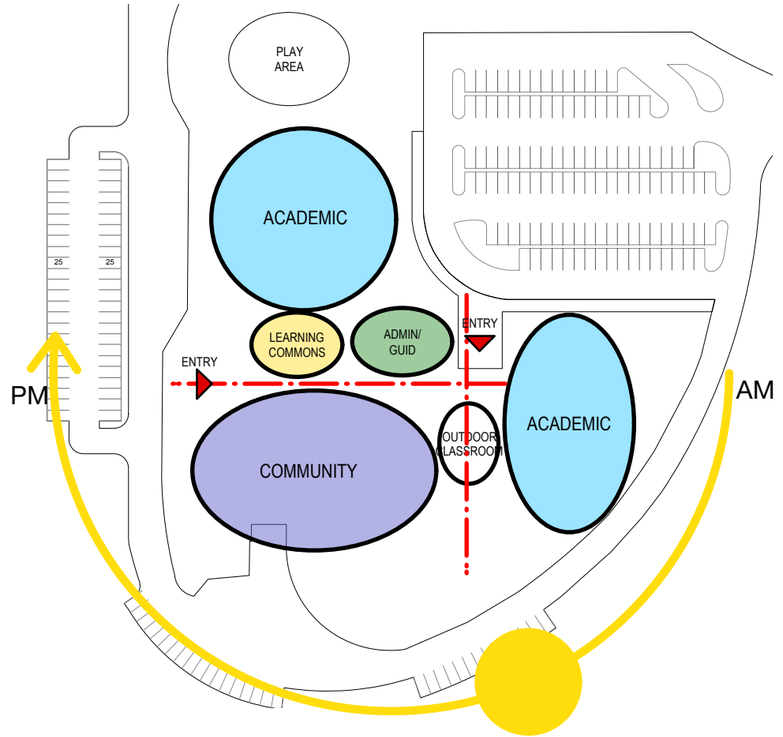
Peebles Elementary School
Bourne, Massachusetts

Flansburgh Architects

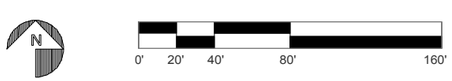
OPTION 2A (PK-4)

Addition/Renovation

Square Footage: 114,593sf



Organizational Diagram



Bournedale Elementary School

Bourne, Massachusetts

Flansburgh Architects

OPTION 2A (PK-4)

Addition/Renovation

Square Footage: 114,593sf

FIRST FLOOR PLAN

SECOND FLOOR PLAN

KEY

New Addition: - - - - - -

1. Arts & Innovation Studio:
   -Grouped with Arts to promote collaboration, shared resources
   -Remote from Learning Commons
2. Outdoor Classroom:
   - Limits distraction to academic classrooms
   -project area with water, power
3. Community:
   -Larger venue to support greater community events

4A. Academic: Neighborhood collab/display

4B. Academic: Existing building limits opportunity for Team Areas

5. Play Area: Remote from gymnasium
6. Separate car and bus drop-off entry locations
7. Distinct academic neighborhood:
   Existing Wing: Pk-2, New Addition: 3-4

N

0' 25' 50' 100'

Bournedale Elementary School

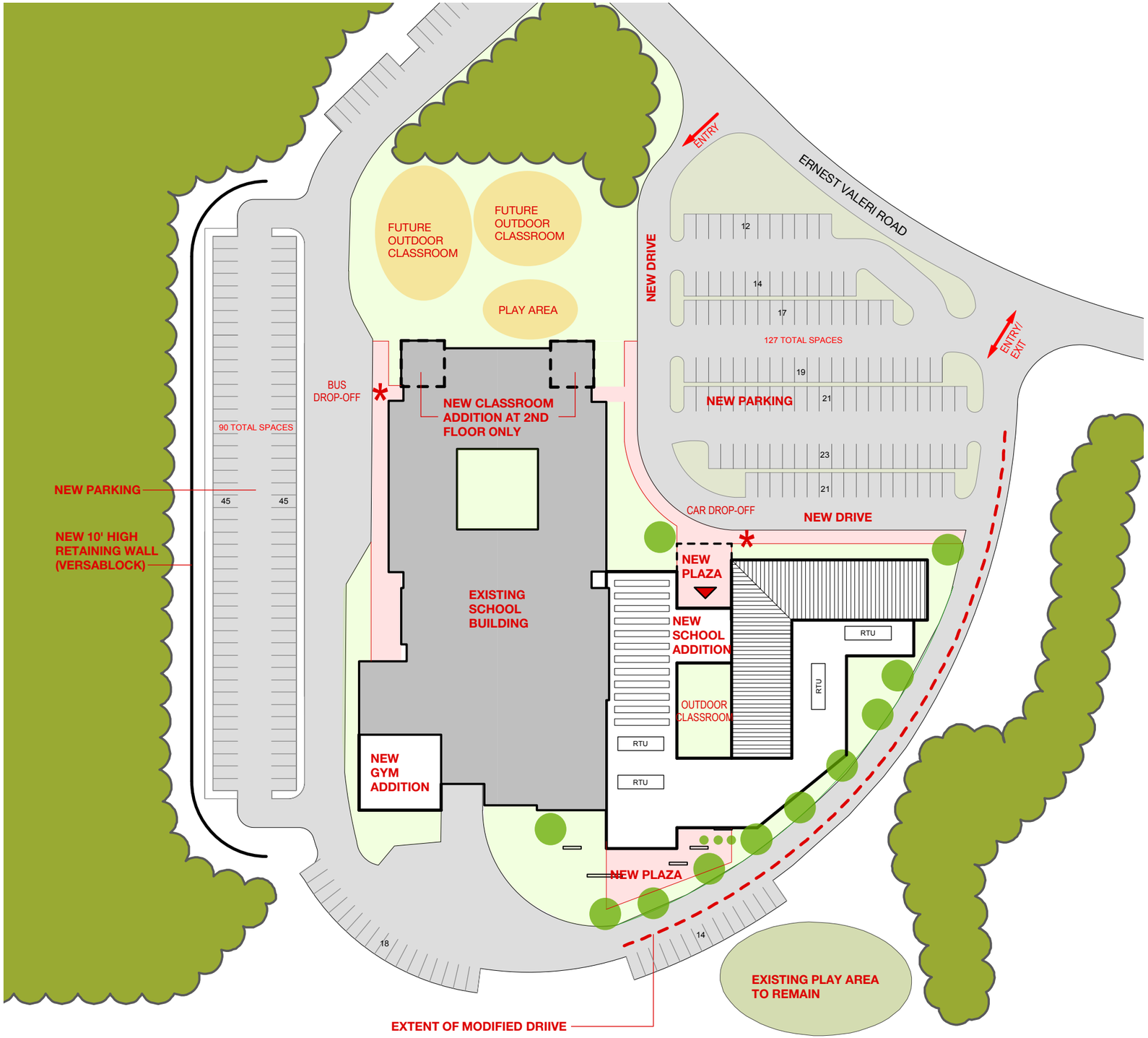
Bourne, Massachusetts

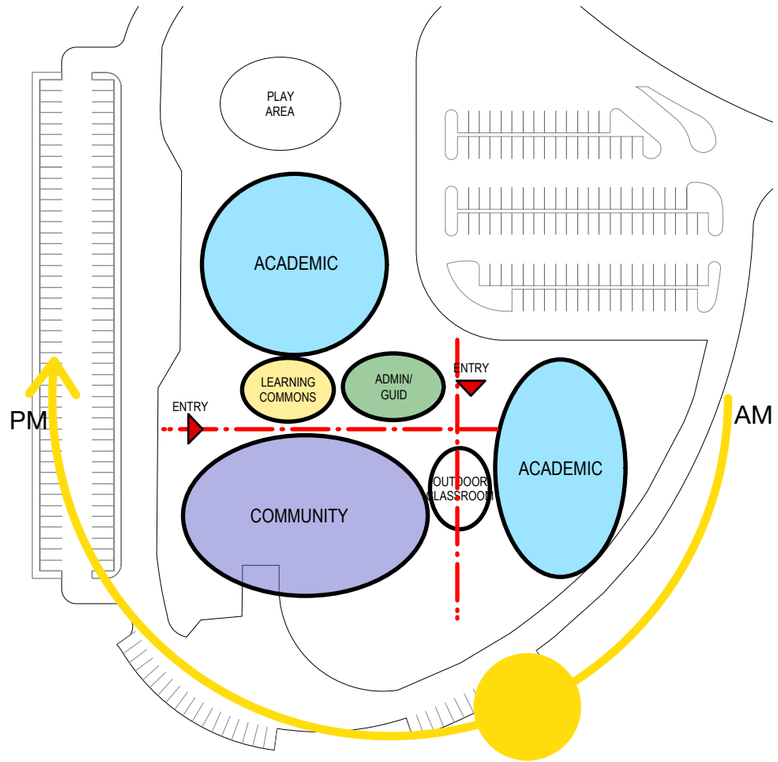
Flansburgh Architects

OPTION 3A (PK-5)

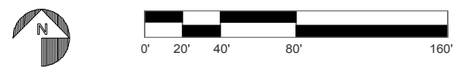
Addition/Renovation

Square Footage: 131,382 sf





Organizational Diagram



Bournedale Elementary School

Bourne, Massachusetts

Flansburgh Architects

OPTION 3A (PK-5)

Addition/Renovation

Square Footage: 131,382 sf

FIRST FLOOR PLAN

SECOND FLOOR PLAN

KEY

New Addition: - - - - - - -

1. Arts & Innovation Studio:
   - Remote from Arts,Music & Learning Commons
2. Outdoor Classroom:
   - Limits distraction to academic classrooms
   -project area with water, power
3. Community:
   -Larger venue to support greater community events

4A. Academic: Neighborhood collab/display

4B. Academic: Existing building limits opportunity for Team Areas

5. Play Area: Remote from gymnasium
6. Separate car and bus drop-off entry locations
7. Distinct academic neighborhood:
   Existing Wing: Pk-2, New Addition: 3-4

N

0' 25' 50' 100'

Bournedale Elementary School

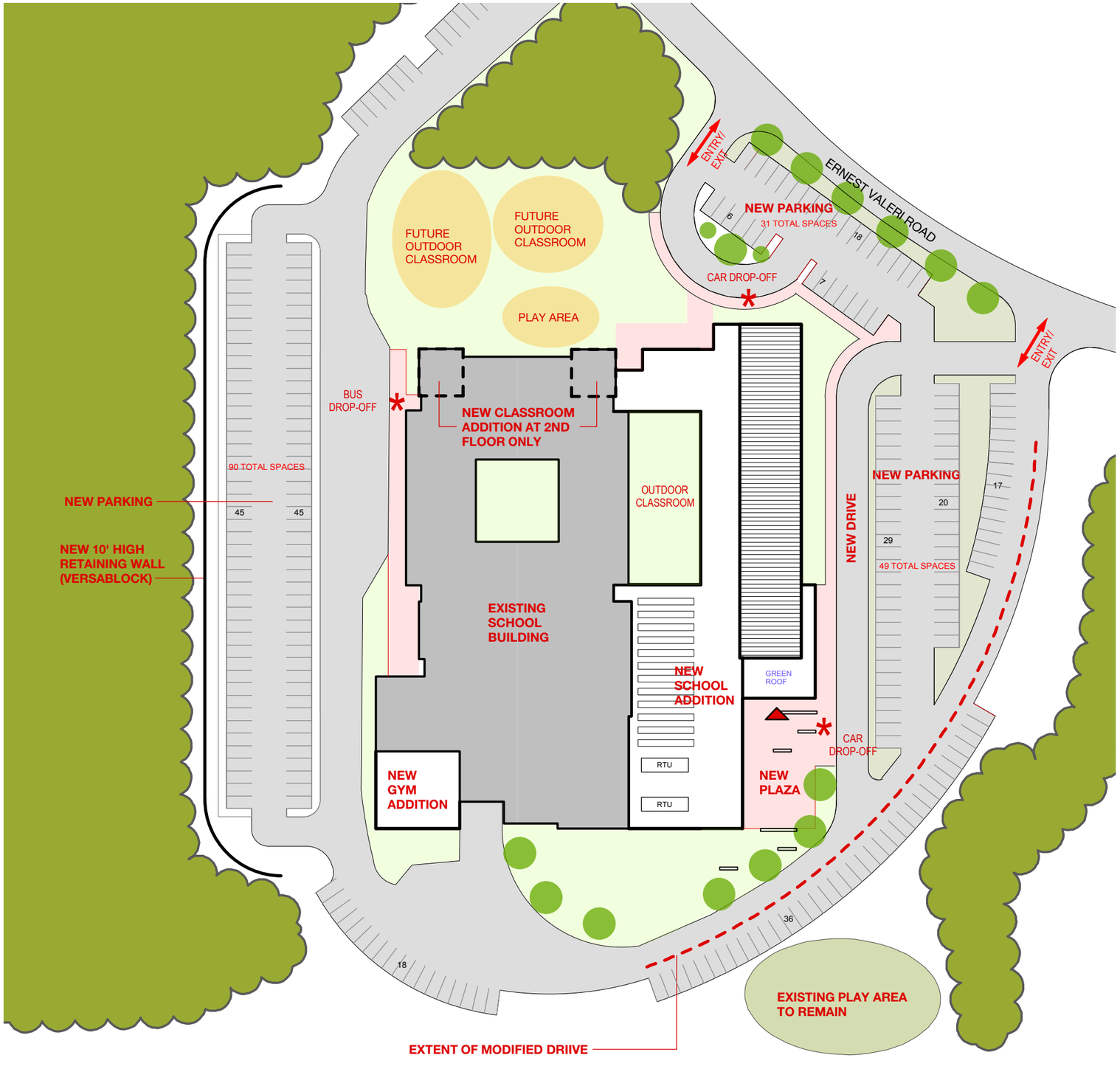
Bourne, Massachusetts

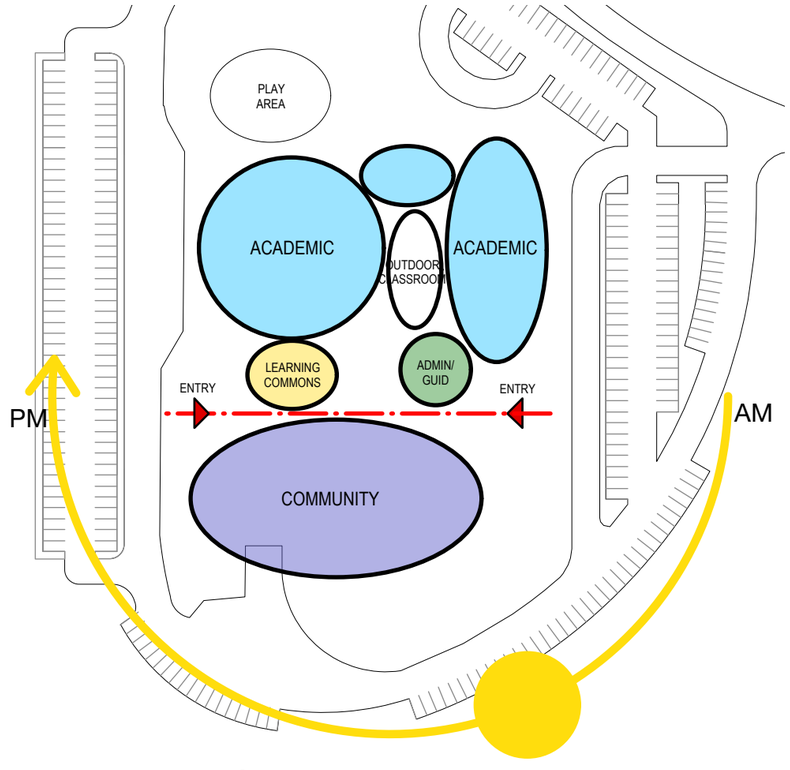
Flansburgh Architects

OPTION 3B (PK-5)

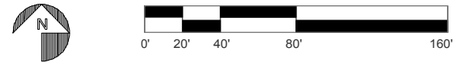
Addition/Renovation

Square Footage: 131,382 sf





Organizational Diagram



Bournedale Elementary School

Bourne, Massachusetts

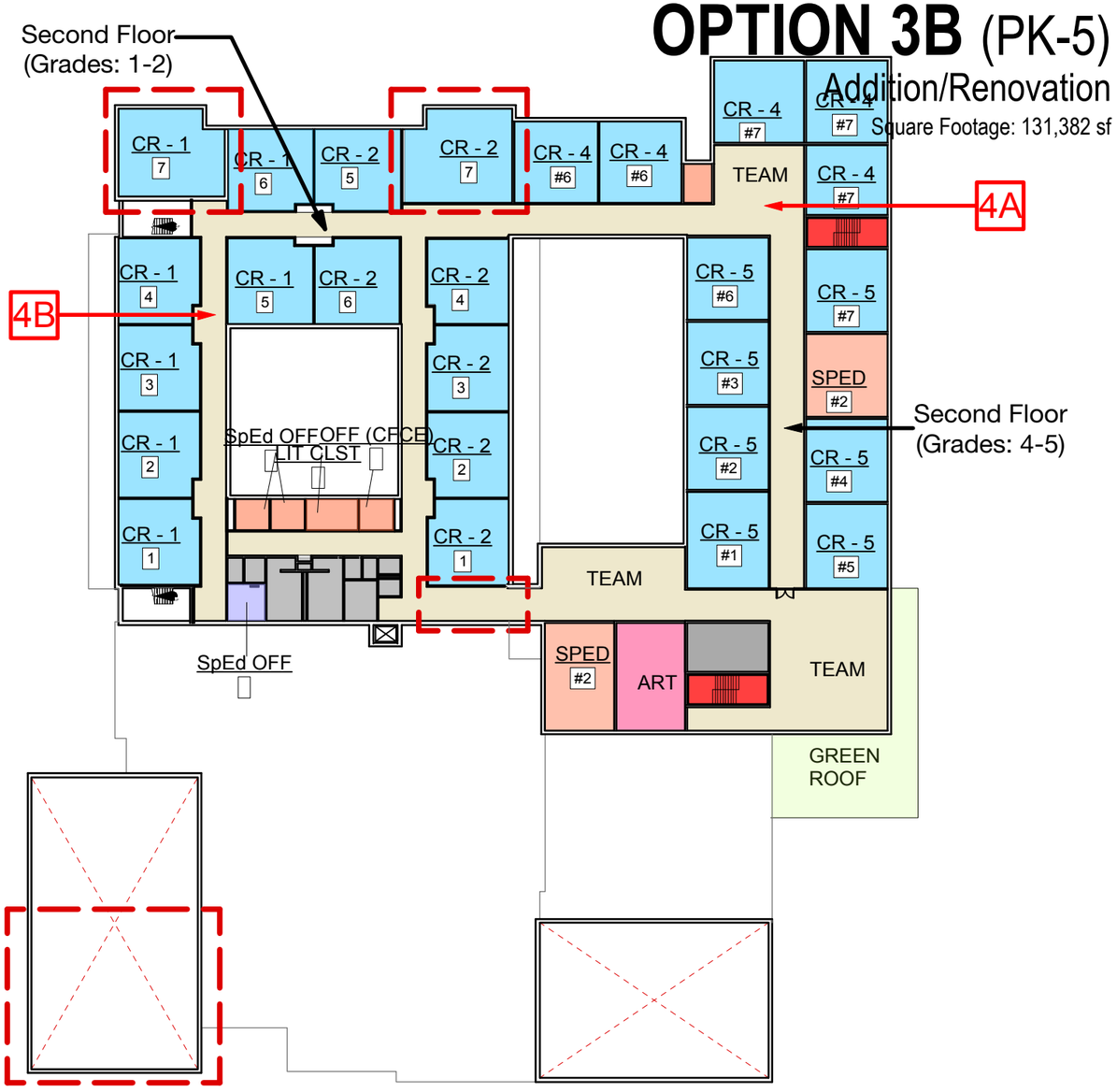
Flansburgh Architects

OPTION 3B (PK-5)

Addition/Renovation

Square Footage: 131,382 sf

FIRST FLOOR PLAN



SECOND FLOOR PLAN

KEY — New Addition:

1. Arts & Innovation Studio:
   -Grouped with Arts to promote collaboration, shared resources
2. Outdoor Classroom:
   - Embedded within classroom wings, may disrupt learning in academic classrooms
3. Community:
   -Larger venue to support greater community events

4A. Academic: Neighborhood collab/display

4B. Academic: Existing building limits opportunity for Team Areas

5. Play Area: Remote from gymnasium
6. Separate car and bus drop-off entry locations

N

0' 25' 50' 100'

Bournedale Elementary School

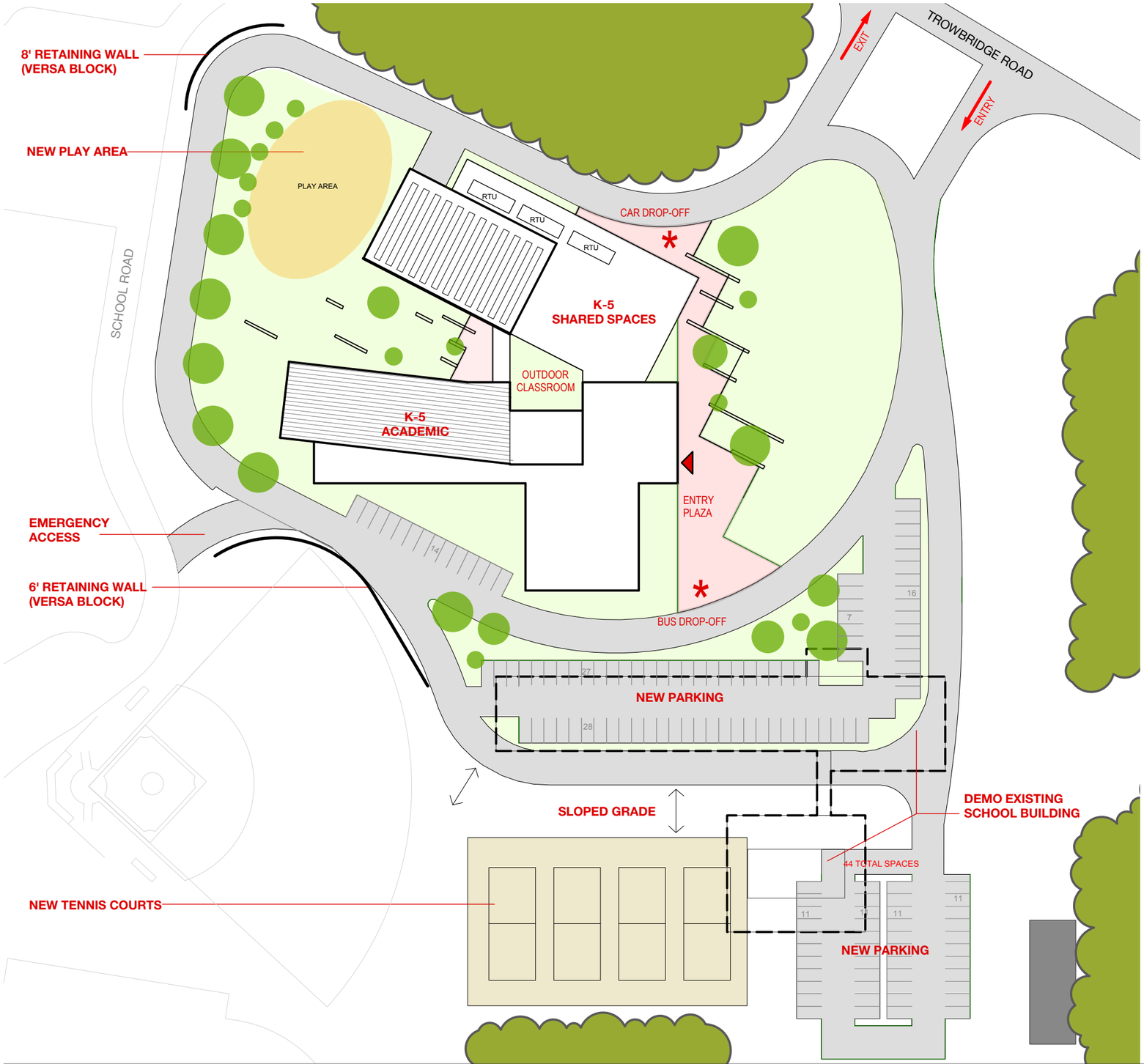
Bourne, Massachusetts

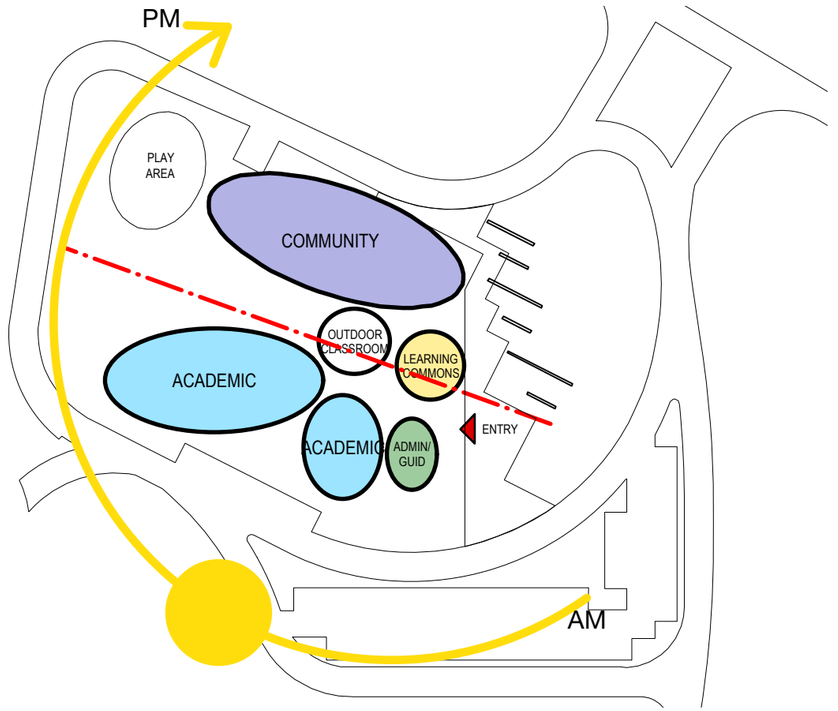
Flansburgh Architects

OPTION 4A (K-5)

New Construction

Square Footage: 72,473 sf





Organizational Diagram

0' 20' 40' 80' 160'

Peebles Elementary School

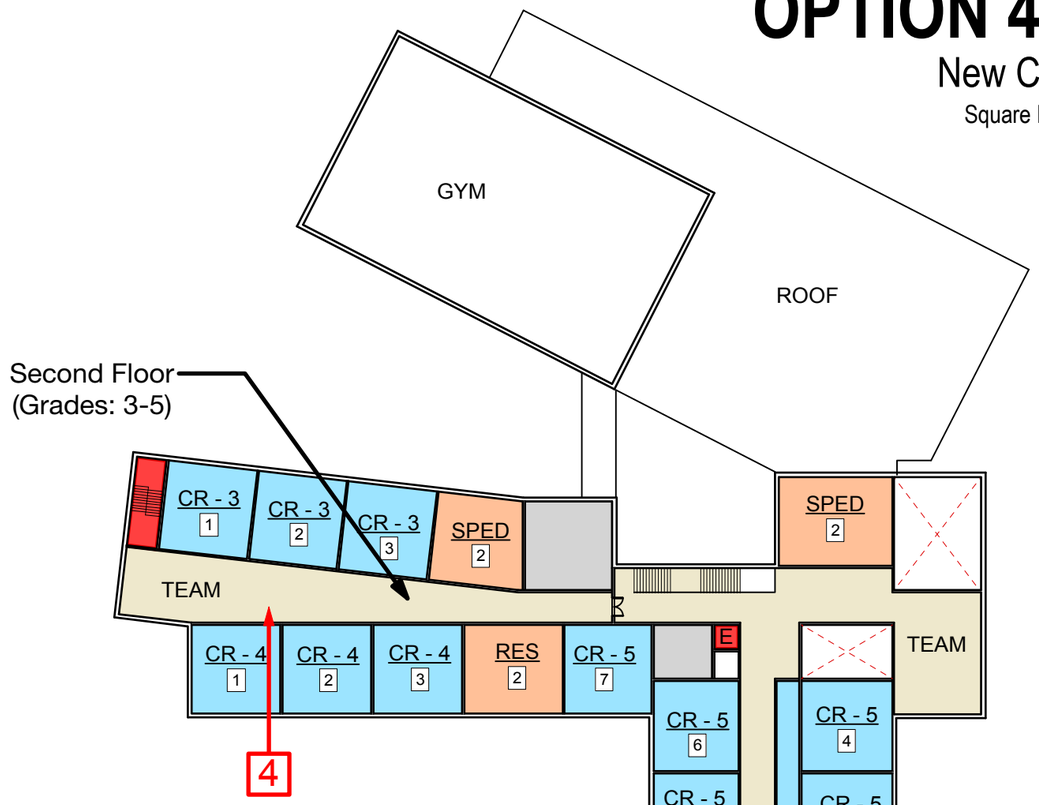
Bourne, Massachusetts

Flansburgh Architects

OPTION 4A (K-5)

New Construction

Square Footage: 72,473 sf



FIRST FLOOR PLAN

SECOND FLOOR PLAN

KEY

1. Arts & Innovation Studio:
   -Grouped with Arts,Music,Makers Space & Learning Commons to promote collaboration, shared resources
2. Outdoor Classroom:
   - Limits distraction to academic classrooms
   -project area with water, power
3. Community:
   - Stage open to gym & cafe to support larger venue to support greater community events on south side of the canal
4. Academic:
   -Neighborhood collab/display
5. Play Area:
   -Adjacent to Gymnasium to limit distraction to academic classrooms
6. Campus Resource:
   - Adjacent to Middle School and High School,Historic Village, Canal
7. Entry Plaza connects separate car and bus zones

0' 25' 50' 100'

Peebles Elementary School

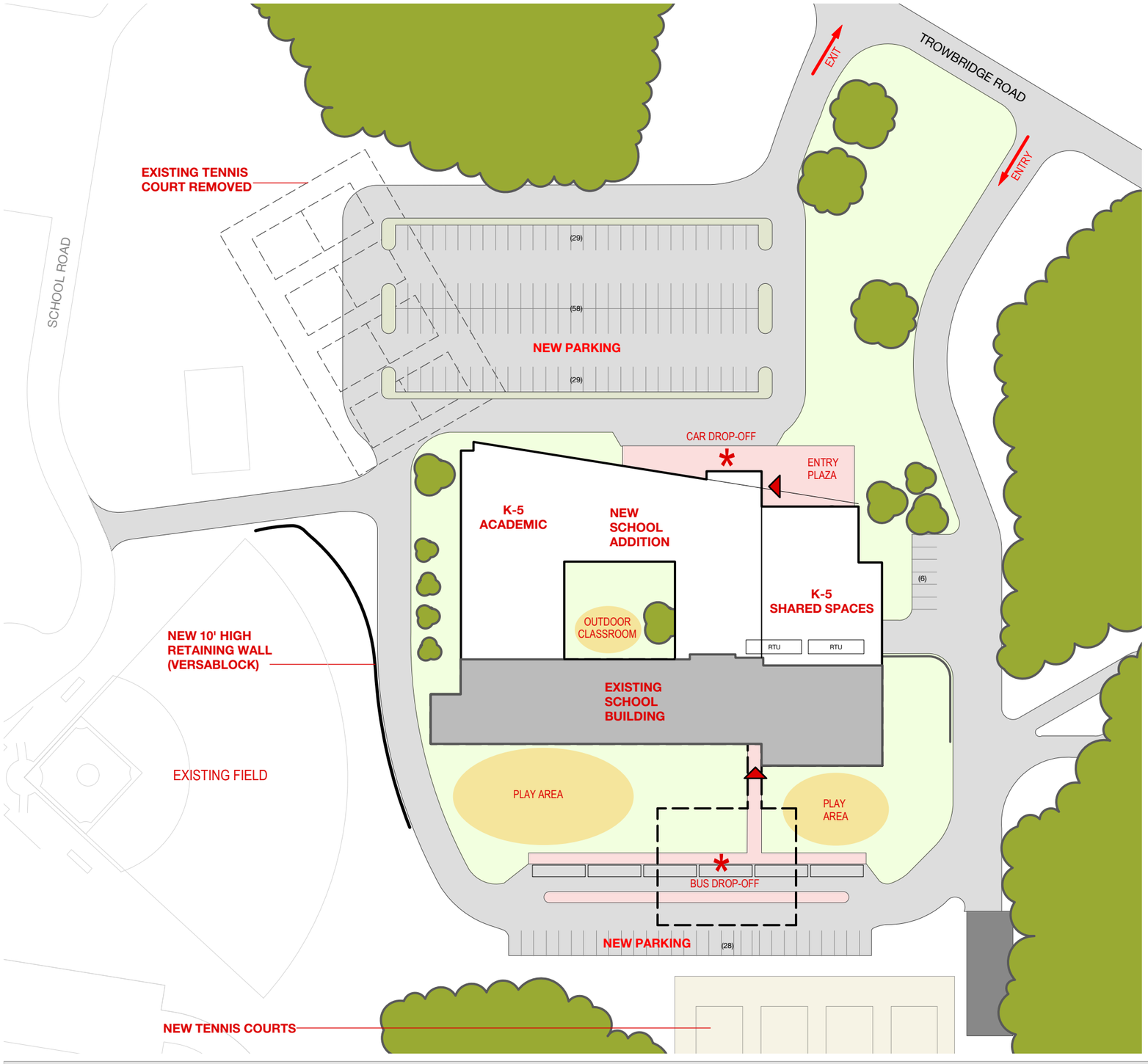
Bourne, Massachusetts

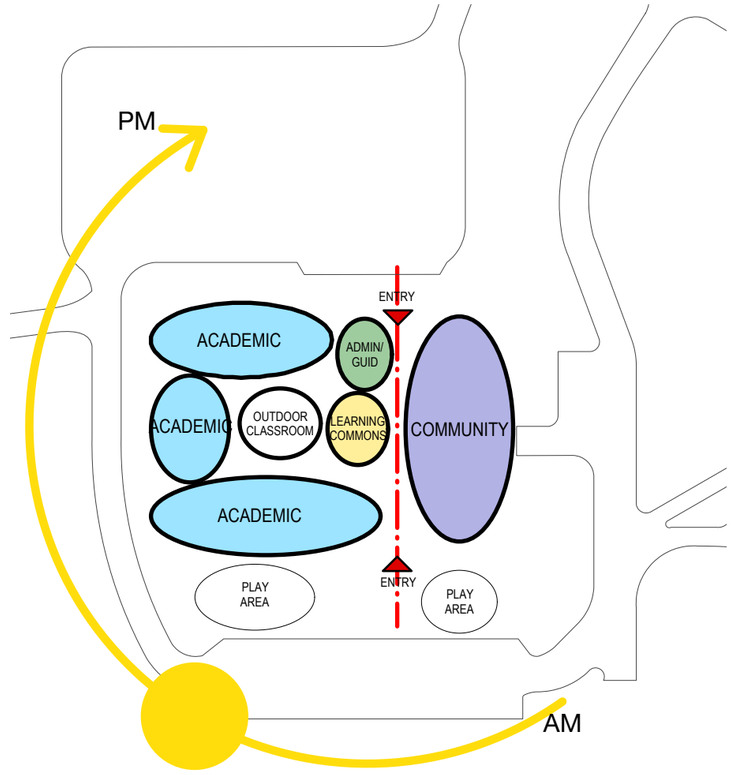
Flansburgh Architects

OPTION 4B (K-5)

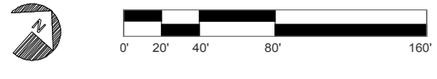
Addition/Renovation

Square Footage: 72,473 sf





Organizational Diagram



Peebles Elementary School

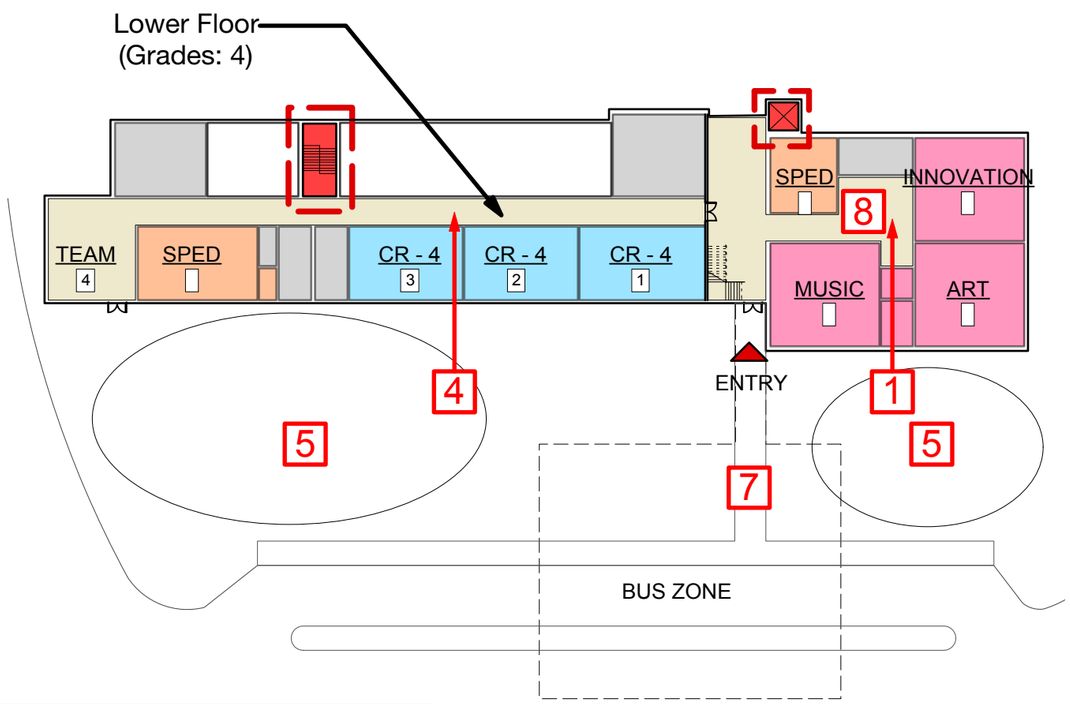
Bourne, Massachusetts

Flansburgh Architects

OPTION 4B (K-5)

Addition/Renovation

Square Footage: 72,473 sf



FIRST FLOOR PLAN

KEY — New Addition: - - - - - -

1. Arts & Innovation Studio:
   -Grouped with Arts,Music,Makers Space & Learning Commons to promote collaboration, shared resources (tucked away on lower level)
2. Outdoor Classroom:
   - Embedded within classroom wings may disrupt learning
3. Community:
   - Larger venue to support greater community events on this side of the canal
4. Academic: Neighborhood collab/display
   -Existing Bldg. has limited opportunity for larger Team Areas
5. Play Area: Remote from gymnasium
6. Campus Resource:
   - Adjacent to Middle School and High School, Historic Village,Canal
7. Separate car and bus drop-off entry locations
8. Potential noise concerns from proximity of gym to admin & Arts/Innovation area to Cafeteria Above

SECOND FLOOR PLAN

0' 25' 50' 100'

Peebles Elementary School

Bourne, Massachusetts

Flansburgh Architects

Preliminary Cost Models

		Option 1 (K-4) 250 students		Option 2 (PK-4) 725 students	Option 3 (PK-5) 885 students		Option 4 (K-5) 410 students		Base Repair Only
		1A New	1G Add/Reno	2A Add/Reno	3A Add/Reno	3B Add/Reno	4A New	4B Add/Reno	
Gross SF		**57,248 SF**		**114,593 SF**	**131,382 SF**		**72,473 SF**		**55,190 SF**
***Construction Cost $ (Hard Cost)**	Building	$23.25M	$23.15M	$25.63M	$30.63M	$30.03M	$26.96M	$27.46M	$10.53M
	Hazmat/Demo	$1.71M	$1.24M	$0	$0	$0	$1.7M	$1.21M	$1.16M
	Sitework	$4.05M	$4.17M	$4.65M	$4.78M	$4.75M	$4.34M	$4.29M	$.38M
	Total	**$29.01M**	**$28.56M**	**$30.28M**	**$35.41M**	**$34.78M**	**$32.99M**	**$32.96M**	**$12.07M**
Soft Cost $	Fees & Expenses	$5.9M	$5.47M	$5.61M	$6.38M	$6.28M	$6.5M	$6.13M	$2.8M
	FF&E	$.75M	$.75M	$1.02M	$1.5M	$1.5M	$1.23M	$1.23M	$.25M
	Contingencies	$2.32M	$2.57M	$2.42M	$2.83M	$2.78M	$2.64M	$2.97M	$1.68M
Other Town Costs		no cost	no cost	TBD	TBD	TBD	no cost	no cost	no cost
TOTAL		**$37.98M**	**$37.35M**	**$39.34M**	**$46.12M**	**$45.35M**	**$43.36M**	**$43.28M**	**$16.8M**

* Estimated Cost subject to change as project is refined

Evaluation Criteria		Option 1A (250 Students)	Option 1G (250 Students)	Option 2A (725 Students)	Option 3A (885 Students)	Option 3B (885 Students)	Option 4A (410 Students)	Option 4B (410 Students)
1	Size of School							
2	Grade Separation Issues							
3	Reinforces Campus Feel							
4	Opportunity for Collaboration & Mentoring							
5	District-wide Culture and Advantages							
6	Traffic Impact							
7	Separation of Community / Academic Uses							
8	Creation of Community Space							
9	Limits Disruption to Students							
10	Cost Effectiveness: Operation / Construction							
11	Maximum Building Efficiency							
12	Least Environmental Impact							
13	Most Beneficial Construction Schedule							
14	Best Site Option for Neighborhood Schools							
15	Adequate Play & Parking Areas							
16	Continued Use of Athletic Resources							
17	Maximum Score for NE-CHPS / LEED							
18	Best Space Adjacencies							
19	Best Separation of Parent / Bus / Service Circulation							
20	Resolves Geographic Separation by Canal							
21	Centralized Elementary Resources							
22	Centralized Campus Resources							
23	Advantages to Middle School							
24	Maximize MSBA Reimbursement							
	TOTAL	**0**	**0**	**0**	**0**	**0**	**0**	**0**
Ranking:								
	3 for most favorable:	0	0	0	0	0	0	0
	2 for acceptable:	0	0	0	0	0	0	0
	1 for least favorable:	0	0	0	0	0	0	0

Evaluation Criteria	
1	Size of School
2	Grade Separation Issues
3	Reinforces Campus Feel
4	Opportunity for Collaboration & Mentoring
5	District-wide Culture and Advantages
6	Traffic Impact
7	Separation of Community / Academic Uses
8	Creation of Community Space
9	Limits Disruption to Students
10	Cost Effectiveness: Operation / Construction
11	Maximum Building Efficiency
12	Least Environmental Impact
13	Most Beneficial Construction Schedule
14	Best Site Option for Neighborhood Schools
15	Adequate Play & Parking Areas
16	Continued Use of Athletic Resources
17	Maximum Score for NE-CHPS / LEED
18	Best Space Adjacencies
19	Best Separation of Parent / Bus / Service Circulation
20	Resolves Geographic Separation by Canal
21	Centralized Elementary Resources
22	Centralized Campus Resources
23	Advantages to Middle School
24	Maximize MSBA Reimbursement

	Total Score by Option*						
Committee Member	Option 1A (250 Students)	Option 1G (250 Students)	Option 2A (725 Students)	Option 3A (885 Students)	Option 3B (885 Students)	Option 4A (410 Students)	Option 4B (410 Students)
Natasha Scarpato	39	24	44	38	38	57	41
Mary Jo Coggleshall	47	24	45	40	40	61	49
Janey Norton	58	50	44	41	44	65	46
Elizabeth Carpenito	48	24	65	48	41	65	54
Steven Lamarche	50	41	47	45	45	58	48
Frederick Howe	33	30	43	40	40	54	43
James Potter	54	42	57	54	56	55	42
Edward Donoghue	49	41	41	40	42	54	47
Richard Lavoie	53	24	50	43	43	56	24
William Meier	37	37	55	44	44	53	44
Jonathan Nelson	48	40	42	32	31	59	52
AVERAGE	**47**	**34**	**48**	**42**	**42**	**58**	**45**

Ranking:

3 for most favorable
2 for acceptable
1 for least favorable

** Committee members ranked each of the 24 evaluation critera with a 3, 2, or 1 and totaled these rankings by option.*