



INTRODUCTION

This study analyzes the educational adequacy of spaces serving students in grades K through 8. The study includes consideration of capacity, space and quality of space, instructional aides, and features and program support.

The study was stimulated by an unexpected increase in enrollments during the 2008/2009 school year at Lt. Job Lane Elementary School (Lane,) which is near design capacity, and John Glenn Middle School (JGMS), creating the need for additional program spaces there, while early kindergarten registration in 2009 identified the need for another classroom at Lt. Eleazer Davis School (Davis).

The enrollment increase and recent changes to the educational program raised concern that a comprehensive review of educational programs and enrollment was needed. In response to this concern, two studies were initiated; one a comprehensive look at K-12 enrollment through 2019 and this study, a detailed look at capacity, quality of space and educational programs for grades K-8 in Bedford.

This study looks at existing programs and program changes currently being considered. It includes program spaces and that part of any building system located in the space, which might be impacted by any proposed building modifications.

The planning study is intended to provide decision makers with detailed information about future space requirements for current and planned educational programs and projected enrollment. It includes Options to address short-term space needs and maximize use of existing space, with minor changes or adjustments to how programs are being delivered. Proposed changes are intended to be effective, but as low cost as possible. The information provided as part of this study is not intended to be the basis for a construction project, rather it is intended to determine educational need and establish the extent of facilities improvements to meet required anticipated educational needs.

Cost Projections		
DAVIS	LANE	JGMS
•Fall 2010: • \$21,200	•Fall 2010: • \$27,600	•Fall 2010: • \$50,500
•Within 3 years: • \$65,000	•Within 3 years: • \$67,100	•Within 3 years: • \$160,900
•Within 5 years: • \$2,476,000	•Within 5 years: • \$2,921,900	•Within 5 years: • \$684,400
•TOTAL: •\$2,561,700	•TOTAL: • \$3,016,600	•TOTAL: • \$895,800
•ALL SCHOOLS GRAND TOTAL: \$6,474,100		

Executive Summary



PROCESS

The study was undertaken through the following steps:

- District Leadership Team meeting to initiate the study
- Using Space Needs Spreadsheets, school principals evaluated the appropriateness of current sizes of spaces related to programs currently served. This served as base information for subsequent analysis, and opened the discussions to assure that the analysis for each building would be comprehensive
- Tours of the three school buildings, correlating principals' responses with field conditions
- Meetings with principals/assistant principals at each school
- Spaces and space requests were reviewed for reasonable appropriateness relative to functions served and Massachusetts School Building Authority (MSBA) space guidelines
- Preliminary Options for discussion were developed in response to steps noted above
- Enrollment projections were received
- Current and future enrollments were correlated with discussion Options; changes were made
- Options were reviewed by district Leadership Team
- Tours were conducted at the three buildings to review and adjust Options
- Options were adjusted
- Conceptual planning meeting was held with media specialists from all three schools to explore opportunities and future needs related to media and technology
- Cost projections were developed for the Options
- Options were adjusted
- Presentation was made to the School Committee

PARAMETERS

The following were maintained as parameters for the study:

- Incorporate latest enrollment projections
- Consider room reassignments first, simple renovation second, and new construction third
- Identify severity of need and respond to most acute need
- Identify projects as follows

- Immediate: fall 2010
- Within 3 years
- Within 5 years
- Coordinate work with district leadership team
- Investigate space planning opportunities due to deployment of improved technology
- Consider cost savings to district of serving special needs within the district instead of out-sourced
- Bedford houses programs serving several educational collaboratives. These include LABBB and CASE. Needs for collaborative spaces are subject to decisions and approvals of those educational collaboratives
- Improve planning relationships among related functions
- Respect space needs of functions adjacent to those needing improvement
- Maintain current class sizes in typical classrooms
- Maintain quality of educational delivery

EDUCATIONAL CHANGE

All three buildings are less than twenty years old or have had major expansions/renovations within the last twenty years. They are in excellent condition and are providing very good service to the district.

Educational needs and the educational delivery model, both internationally and in Bedford, have changed in several critical respects in that same twenty year time period. Instead of teachers working alone in isolated classrooms and Special Education services delivered separately, the new delivery model calls for inclusion of Special Education, grouping and regrouping of students based on proficiencies in varied subjects, and "Rtl's," response to interventions, with frequent micro testing to determine learning progress and focused support by learning specialists. The spatial consequences of these delivery changes are that a host of small spaces are needed to house tutorials and small group learning auxiliary to regular classrooms.

Additionally, the curriculum at JGMS has changed since the educational specification for the addition and renovation project, completed in 2003, was approved. The need for additional Special Education Space,



1 Executive Summary



expanded reading program, and a change in scheduling have resulted in some spaces being used for purposes for which they were not originally intended.

TECHNOLOGY CHANGE

In the years since the three buildings were built or expanded and remodeled, information and communication technology has evolved considerably. It promises to continue rapid evolution into the foreseeable future. The most significant changes are:

- Development of wireless infrastructure
- Readily available laptop hardware
- Laptop carts with recharging capability
- Availability of electronic books
- Interactive whiteboards
- Distance communication through computers
- Hand-held devices: PDA's, smart phones

The role of teachers is changing. All of these are incremental steps in the general progression away from teachers as holders of information to that of facilitators of discovering and discerning information.

Similarly, Library/Media Centers are shifting from being depositories for books to places of information access. The next decade promises to further change the place of Library/Media Centers in our schools. A workshop with district Library/Media Center staff was held as a part of this study. Potential operational changes were discussed but were premature at this time. The issue of continued Library/Media Center change as a component of technology change should be kept as an open issue, and should be reconsidered in a few years, certainly before any additions are considered within the five year plan outlined below.

ENROLLMENT PROJECTIONS

Enrollment projections were developed by the New England School Development Council for each school for the next ten years. In general they show minor drops, with the exception of the small "bulge" which is currently moving through the grade levels, and is now evident in Davis Elementary.

Current, peak, year 2014/15, and year 2019/20 enrollments are as follows:

DAVIS ELEMENTARY

CURRENT	PEAK	2014/15	2019/20
506	2009: 506	480	447

LANE ELEMENTARY

CURRENT	PEAK	2014/15	2019/20
564	2012/13: 571	524	496

JOHN GLENN MIDDLE SCHOOL

CURRENT	PEAK	2014/15	2019/20
559	2014/15: 610	610	538

Projected Enrollment in Grade Combinations*									
Year	PK-2	K-2	3-5	K-8	K-5	6-8	7-8	7-12	9-12
2009-10	539	506	564	1629	1070	559	383	1154	771
2010-11	529	496	551	1618	1047	571	374	1178	804
2011-12	546	513	535	1616	1048	568	375	1208	833
2012-13	538	505	564	1660	1069	591	392	1227	835
2013-14	565	532	552	1661	1084	577	394	1248	854
2014-15	555	522	571	1653	1093	560	384	1246	862
2015-16	513	480	565	1636	1045	591	361	1227	866
2016-17	501	468	591	1637	1059	578	408	1279	871
2017-18	509	476	578	1651	1054	597	402	1248	846
2018-19	516	483	532	1607	1015	592	367	1260	893
2019-20	516	483	520	1622	1003	619	422	1280	858

Projected Percentage Changes			
Years	K-12	Diff.	%
2009-10	2400	0	0.0%
2010-11	2422	22	0.9%
2011-12	2449	27	1.1%
2012-13	2495	46	1.9%
2013-14	2515	20	0.8%
2014-15	2515	0	0.0%
2015-16	2502	-13	-0.5%
2016-17	2508	6	0.2%
2017-18	2497	-11	-0.4%
2018-19	2500	3	0.1%
2019-20	2480	-20	-0.8%
K-12 Change		80	3.3%

Source: Bedford Enrollment Projections, NESDEC November 2009



BUILDING CAPACITY

Building capacity has been evaluated as base information to understand the relative degree of overcrowding, if any, caused by the shifts in enrollment, and to determine whether any existing classrooms could be converted to other uses, now or in the future.

Capacities have been developed based on classroom count correlated with district preferred grade level class sizes, and MSBA class size guidelines. The district has no guidelines. District preferred class sizes are:

- K-2: 18
- 3-5: 22-23
- 6-8: 25

MSBA uses a class size of 23 regardless of grade level.

Capacity calculations are as follows:

DAVIS ELEMENTARY

DISTRICT CAPACITY: 504 students

MSBA CAPACITY: 666 students

Capacity is based on 28 classrooms, with the capacity difference entirely due to class size.

LANE ELEMENTARY

DISTRICT CAPACITY: 540 students

MSBA CAPACITY: 552 students

Capacity is based on 24 classrooms, with the capacity difference entirely due to class size.

JOHN GLENN MIDDLE SCHOOL

DISTRICT CAPACITY: 450-620 students

MSBA CAPACITY: 414-570 students

Determining capacity for JGMS is more involved than elementary school capacity, as middle school capacity is a consequence of scheduling models. There are two "classic" models used in the United States:

- Middle school model, in which only core classrooms (English language arts, social studies, math, and science) are used to calculate capacity
- Junior high school model, in which all teaching stations used for instruction are used to calculate capacity, with a utilization factor of 75% to 85% applied to the subtotal to account for scheduling needs

JGMS uses a blended model, placing it between the Jr High model and the Middle School model.

The Middle School model would result in a capacity of 414 using MSBA guidelines of 23 students per class, or 450 using district practices of 25 students per class.

The Jr High Model would result in a capacity of 570 using MSBA guidelines of 23 students per class, or 620 using district practices of 25 students per class.

JGMS has 18 full sized classrooms used for core instruction. It has 30 full sized teaching stations for core and elective instruction. The LABBB collaborative classroom has not been counted towards capacity.

Class sizes at JGMS currently range from low- to mid-twenties, but the school reports insufficient classrooms. It is currently using a number of spaces for classrooms that were not intended for this purpose, such as the Multi-Purpose Room and subject-specific rooms such as cooking and technology education. Part of the current overcrowding lies in the nature of the Middle School educational model, which organizes students into grade-based groupings and subject-based groupings. While a relatively large school it operates like most other Middle Schools, as three small schools within the overall school.

JGMS has rich elective offerings and many special programs, all of which bring pressure on the facilities due to the different types of spaces needed to meet these program offerings.





FACILITIES CONDITIONS

The school buildings serving grades K through 8 in Bedford are in very good condition. Most school districts across the country would be pleased to own such facilities. All three buildings represent prudent decision making at the time of their construction. They are nevertheless showing the strains of the variety of excellent educational programs, and changes to those programs in recent years.

ANALYSIS

The analysis presented here interweaves issues of changing enrollments, shifts in educational delivery and program offerings, constantly evolving educational technology, existing spatial conditions, preferred functionally appropriate relationships among spaces, cost-conscious assessment of educational needs, and consideration of the sequence of steps needed to logically reassign spaces and deploy construction projects within each building.

The Options presented here were developed over a period of several months, with consideration and subsequent reconsideration of the possibilities. This is a study that represents collective thinking of the district Leadership Team in concert with the educational planner.

OPTIONS

Options presented here for each school are organized space-by-space in three phasing scenarios:

- Changes of most critical need, to be carried out immediately, by Fall 2010
- Changes to be carried out within three years
- Changes to be carried out within five years

Generally speaking the first phase includes room reassignments and minimal but critical renovations. The second phase includes more extensive renovations and room reassignments made possible by the renovations. The third phase includes new construction, additional renovations, and related room reassignments.

New construction, the most expensive solution to meeting educational needs, was determined to be appropriate only after the less expensive Options of room reassignments and renovations were deemed not feasible for meeting educational needs. The process of successive review of Options by the Leadership Team resulted in the reduction of proposed new construction by approximately 50% over the initial amounts proposed in the Space Needs Survey.

Technology

The Options rely heavily on a shift in technology at each building from desktop based computing to laptop based. This shift, which is evident in school districts across the country, allows space currently used as Computer Labs to be reassigned to other functions, thus avoiding the construction of space to serve educational needs. In general terms the construction cost of a space the size of a Computer Lab is \$250,000 or more, while the cost of laptops for a classroom is closer to \$30,000, plus wireless infrastructure costs. Commensurate with this shift is an ability to deploy computers in classrooms, where their use can be more integrated with curriculum delivery, rather than the detachment of the "go to" Computer Lab. Carts are available to store and recharge the laptops. The shift will require professional staff development, training of students in laptop use, and a fail-safe system of monitoring and recharging computer batteries in order to be fully effective. While gaining popularity, this approach is not without controversy, particularly related to developmentally based issues if students' ability to effectively use the laptops. Research on laptop deployment in schools, including districts near Bedford, should be conducted before this approach is confirmed. If continuation of current Computer Labs is desired, the consequence will be to increase the amount of additional space needed in the last phase of Options.

Collaboratives

Some of the proposed programs are run by educational collaboratives, operated in conjunction with other school districts. Commitment by those collaborative will be necessary before any space commitment could be made.





Cost Benefit Analysis

Some Bedford students with special needs are currently served by programs outside the district. Some of the Options in the third phase (within five years) call for the expenditure of funds to house those programs within the district. Doing so is expected to annually save the district significant operating costs. It will be necessary to analyze the cost of construction and operations in-district with the expected costs of continuing to send student out of district for services.

Chapters on each school building outline the Options in detail.

PROJECTED COSTS

Costs were projected for the Options of each school based on current construction costs, escalated to projected costs of up to five years to cover work proposed for later phases. Cost projections include these considerations:

- Costs are escalated 5% per year for 3 to 5 years
- Construction "within 5 years" will require related renovation not feasible to predict
- Costs are project costs, and include fees and contingency
- Costs will vary based on how contracted, scale of projects, timing, limitations on contractor procedures, and whether adjacent spaces are occupied
- Costs of technology upgrades and furnishings are additional

There will be additional, unpredictable costs in phase three, within five years, related to renovations necessary to correlate with the proposed additions to achieve a proper functional arrangement on each floor of each building.

Costs are projected as follows:

DAVIS ELEMENTARY

- Fall 2010: \$21,200
- Within 3 years: \$65,000
- Within 5 years: \$2,476,000
- TOTAL: \$2,561,700

LANE ELEMENTARY

- Fall 2010: \$27,600
- Within 3 years: \$67,100
- Within 5 years: \$2,921,900
- TOTAL: \$3,016,600

JOHN GLENN MIDDLE SCHOOL

- Fall 2010: \$50,500
- Within 3 years: \$160,900
- Within 5 years: \$684,400
- TOTAL: \$895,800

TOTALS BY PHASE:

- 2010: \$99,300
- Within 3 years: \$293,000
- Within 5 years: \$6,082,300

GRAND TOTAL:

- All schools: \$6,474,100

As was noted, the notable rise in costs for the third phase, five years out, is due to its inclusion of new construction.

