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Information Technology Review: Prepared for the Ipswich Town-School Collaboration Committee

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INFORMATION TECHNOLOGY REVIEW

Prepared for the Ipswich Town-School Collaboration Committee

OCTOBER 2010

Information Technology Review

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INFORMATION TECHNOLOGY REVIEW: EXECUTIVE SUMMARY

The Town of Ipswich, acting for its Town-School Coordination Committee, contracted with the Edward J. Collins, Jr. Center for Public Management at the University of Massachusetts Boston to undertake a review of the Human Resources, Recreation programming and Information Technology needs of the Town and School Department. The review was undertaken to assess how collaborative approaches might enhance the efficiency and effectiveness of each of these municipal functions. The Collins Center has published a report on each of these topics. The overall Project Manager for the Center was Senior Associate Richard Kobayashi. Associate Sheldon Cohen performed the onsite work reviewing the Town's Information Technology operations and is the principal author of this report.

The Town-School Coordination Committee included the Ipswich Town Manager and School Superintendent, as well as representatives from the School Committee, the Board of Selectmen and the Finance Committee. At the Committee's direction, the Information Technology Review (IT Review) specifically excluded the Police and Fire Departments as well as the Utilities Department.

This IT Review addresses the scope of work in the context of Ipswich as a \$36 million enterprise and in part answers the question: how would a \$36 million business need to plan, invest in, manage and deploy IT if it were to survive and thrive in a competitive environment? The IT Review was conducted during June 2010.

Two factors have an important role in influencing the findings and recommendations of this IT Review:

- **Risk.** Are there elements of IT in Ipswich whose failure or other negative condition could have a significantly adverse impact on the delivery of essential Town or School services?
- **Impact.** What actions related to IT could Ipswich take which would have a relatively broad, positive impact on the delivery of Town or School services?

In many ways, the successful deployment of IT in Ipswich relies primarily on the dedication, interest and ability of its staff. As seen during the site visit for the IT Review, the staff has a good attitude toward its work and should realize quickly how the enhanced deployment of IT in Ipswich can help them every day in their work.

This IT Review took place in the context of the fiscal realities which Ipswich, like many other municipalities and school districts in Massachusetts, faces. Difficult choices will continue to need to be made. This is why the IT Review focused on three major areas -- information technology organization and management, application

systems, and infrastructure -- which present Ipswich with both the greatest risk and the most important opportunities for beneficial impact in the area of IT.

Key findings and recommendations are as follows:

1. Ipswich is fortunate to have strong board and executive leadership in IT from the Town, the School Department and the Finance Committee.
2. Ipswich's leadership will need to take an active role in supporting the implementation of the recommendations of this IT Review.
3. Ipswich should establish a consolidated Information Services Department, headed by the Town's MIS Director, who must have authority and responsibility for IT in the Town, the Schools, the Utilities Department, the Police Department and the Fire Department.
4. Ipswich should outsource various parts of its IT operations and management.
5. Ipswich should formalize a standing Town-School staff Information Services Committee.
6. The IT staff in the Town and Schools should be making full use of the Track-IT! Help Desk software.
7. All position specifications for the IT staff should be reviewed and updated.
8. The MIS Director's compensation should be reviewed to reflect the new and different nature of his responsibilities in the consolidated IT organization.
9. Constraints on staffing limit what Ipswich can do with IT.
10. Ipswich needs to undertake a major review of its deployment of the MUNIS ERP system.
11. Business process reengineering (BPR) needs to be a key focus of what Ipswich does with MUNIS and all other applications.
12. Ipswich needs to have a clear strategy for the rollout of any new applications.
13. Ipswich should examine in detail the possibility of deploying MUNIS's Time and Attendance application.
14. Ipswich should consider decentralizing the MUNIS Accounts Payable and Payroll applications.

15. Ipswich must monitor closely the dual, simultaneous challenge with MUNIS in 2012 of both (1) changing its operating system from Informix to Microsoft SQL Server and (2) implementing a major new release of the MUNIS application system.
16. Ipswich should try and find an end user Report Generator for use with MUNIS.
17. Ipswich should use the MUNIS user community to identify user created Town and School reports which could be helpful.
18. The MIS Director should be the lead for implementation of all application systems.
19. Ipswich needs to evaluate the further deployment of the Laserfiche document-management system.
20. Ipswich should be sure that it is leveraging the value of the Patriot CAMA system as far as possible.
21. Ipswich needs to monitor the work of MMS in merging the student information systems now in use in the elementary schools with the MMS system, having the MIS Director lending his expertise to this effort.
22. Ipswich should consider whether or how it might enhance services in the Town and Schools through social media.
23. Ipswich requires a detailed, independent review of its current IT infrastructure and infrastructure strategy.
24. Ipswich must establish a backup to the fiber-optic network.
25. Ipswich needs to form a Town-School working group to identify and resolve issues related to the inability to share and store students' files.
26. Ipswich should undertake a full security audit.
27. Ipswich must resolve the issues around the server-based environment for its students' folders.
28. Funding needs to be provided for training for the MIS Director to expand his knowledge of Ipswich's Cisco technologies.
29. Ipswich must make a clear commitment to investing in infrastructure at an appropriate level, applying the principle of strategic positioning.

30. Ipswich should proceed carefully and cautiously in its implementation of virtualization.
31. The MIS Director should be asked to put together a clear, concise business plan for extending virtualization in the Town and Schools.
32. Ipswich needs to incorporate the Schools in the five-year IT upgrade plan.
33. Ipswich should evaluate the deployment of VoIP services.

I. BACKGROUND

The Town of Ipswich, acting for its Town-School Coordination Committee, contracted with the Edward J. Collins, Jr. Center for Public Management at the University of Massachusetts Boston to undertake a review of the Human Resources, Recreation programming and Information Technology needs of the Town and School Department. The review was undertaken to assess how collaborative approaches might enhance the efficiency and effectiveness of each of these municipal functions. The Collins Center has published a report on each of these topics. The overall Project Manager for the Center was Senior Associate Richard Kobayashi. Associate Sheldon Cohen performed the onsite work reviewing the Town's Information Technology operations and is the principal author of this report.

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This IT Review addresses the scope of work in the context of Ipswich as a \$36 million enterprise and in part answers the question: how would a \$36 million business need to plan, invest in, manage and deploy IT if it were to survive and thrive in a competitive environment? The IT Review was conducted during June 2010. Two factors had an important role in influencing the findings and recommendations of this IT Review:

- **Risk.** Are there elements of IT in Ipswich whose failure or other negative condition could have a significantly adverse impact on the delivery of essential Town or School services?
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This IT Review took place in the context of the fiscal realities which Ipswich, like many other municipalities and school districts in Massachusetts, faces. Difficult choices will continue to need to be made. This is why the IT Review focused on three major areas – information technology organization and management, application systems and infrastructure -- which together present Ipswich with both the greatest risk and the most important opportunities for beneficial impact.

II. METHODOLOGY.

This IT Review followed a careful methodology in order to be sure that it responded fully to the scope of work.

1. Review of Background Information

Ipswich's staff was very helpful in gathering information, which provided important background to the IT Review, including budgets, job descriptions and the Long Range IT Strategic Plan. In addition, the Collins Center reviewed additional information on Ipswich's Web site. This background information provided the Collins Center with important knowledge about the current IT situation in the Town and the Schools, significantly informing the interviews and subsequent work.

2. Project Workshop

The first activity the Collins Center undertook on site was an initial meeting, referred to as the Project Workshop, with key staff of the Town and the School Department including the Town Manager, Town MIS Director, Superintendent of Schools, School Director of Finance and Operations, and School IT Director. The Project Workshop had two main purposes:

- To ensure that there was a common understanding between Ipswich and the Collins Center about the goals of the IT Review and how it was to be conducted.
- To establish a basic conceptual vocabulary and develop a sense of common interest among the various participants in this effort. The Project Workshop set the stage for Ipswich to own and act on the recommendations of the IT Review.

The staff of the Town and Schools identified the following goals during the Project Workshop:

- Seeking synergy between Town and School IT
- Pursuing cost savings
- Enhancing effectiveness
- Achieving greater cooperation and collaboration
- Meeting state reporting requirements
- Promoting greater understanding among users of IT resources
- Maximizing the WAN deployment
- Assuring security

- Implementing appropriate plans for business continuity and disaster recovery (BC/DR).
- Integrating better with the Utilities Department
- Supporting training

These goals are addressed at various places in this IT Review.

3. Interviews

The Collins Center spent the day of June 2, 2010 on site, interviewing the staff of the Town and Schools, including the following personnel:

- Robert Markel, Town Manager
- Richard Korb, Superintendent of Schools
- Rita Negri, Town Finance Director
- Joanne Cuff, School Director of Finance and Operations
- Gregory Parachojuk, MIS Director
- Christine Burke, School Technology Integration Specialist (interviewed June 8, 2010)
- Thomas Lohnes, School IT Manager
- William Ford, School IT Technician

The interviews were important in providing first-hand views from key Town and School personnel regarding strengths and weaknesses in the current deployment of IT resources, consistent with the scope of the IT Review. Among other things, this process generated ideas from staff about how to enhance IT in Ipswich and what priorities should be set among the various opportunities that exist for strengthening those resources.

III. LEADERSHIP

1. Ipswich is fortunate to have strong board and executive leadership in IT from the Town, the School Department and the Finance Committee.

The strength and visibility of elected and appointed leadership is widely recognized as a critical factor in the success of IT in schools and local governments. Based on the interviews during this IT Review, Ipswich is extremely fortunate to have the two kinds of leadership which are most critical in policy-making, management and deployment of IT:

- Constructive engagement on the part of its three key boards; and
- A strong, positive relationship between the Town Manager and Superintendent of Schools as the chief executives of Ipswich's two main organizational entities.

In recent years, this leadership has taken concrete form in the five-year technology upgrade program which has enabled the Town to maintain a relatively up-to-date inventory of servers, desktops and other assets. While there will always be healthy discussion about the specifics of IT-related issues, the fact that Ipswich has this kind of leadership bodes well for its ability to address IT needs now and in the future.

2. Ipswich's leadership will need to take an active role in supporting the implementation of the recommendations of this IT Review.

This IT Review makes two kinds of recommendations which call for special leadership:

- **Reorganization.** This IT Review recommends the consolidation of the Town-School IT organization. The nature of this recommendation may be expected to generate some controversy within the community.
- **Investment.** This IT Review does not identify direct cost savings which would be shown as reductions in Ipswich's budget. Rather, it identifies fiscally prudent actions which involve indirect cost savings related primarily to such things as significantly enhanced productivity and future cost avoidance. The need for limited, highly targeted additional investment may be expected to meet some resistance.

IV. ORGANIZATION AND MANAGEMENT

- 1. Ipswich should establish a consolidated Information Services Department, headed by the Town's MIS Director, who must have Town-wide authority and responsibility for IT.**

Consolidated town-school IT organizations date at least to the early 1980's and have grown to be more and more common in Massachusetts over the last 25 years. Ipswich has several important reasons to make this move:

- There is no one person employed by the School Department who has comprehensive responsibility for managing the entirety of its deployment of IT and supervising all IT-related personnel.
- This consolidation should maximize cooperation, collaboration, consistency and cost-efficiency between the Town and the Schools.
- The MIS Director has the knowledge, skill and experience to execute these responsibilities fully and well.
- Ipswich has no Town-School standards for hardware, software or other technologies.
- Procurement related to IT is not coordinated between the Town and Schools.

While Ipswich has very dedicated and capable individual personnel who are making their very best efforts to support the respective services of the Town and Schools, the current situation is not serving Ipswich well.

As part of this consolidation, the MIS Director must have clear managerial authority and responsibility for IT in all agencies in Ipswich including the Schools, the Utilities Department, the Police Department and the Fire Department. This truly town-wide role recognizes the pervasive impact of a wide range of technologies and applications in Ipswich from financial management to GIS. The MIS Director, with his new and expanded responsibilities, should participate as a full member of all staff groups involved in resolving Town or School issues which this IT Review identifies. This includes the recommendations made herein regarding concerns with IT infrastructure in the Town or Schools.

2. Ipswich should outsource various parts of its IT operations and management.

The main reason for outsourcing in Ipswich would be to maximize the application of the knowledge, skill, ability and time of its professional IT personnel. Recommendations for outsourcing do not reflect adversely in any way on the ability or dedication of Ipswich's IT personnel. Rather, they come only from a constructive concern with Ipswich's ability to optimize the contribution of these valuable human resources to the Town and Schools. Ipswich has already been using outsourcing in IT in some important ways, including contracting with MUNIS for that vendor's Operating System/Database Administration (OS/DBA) services and its daily remote-backup services. Both of these have been important in reducing the MIS Director's daily burden in system administration.

These recommendations for outsourcing are also intended in part to offload various tasks which the MIS Director now performs with great dedication but which do not need to be among his top priorities. This outsourcing should then provide the MIS Director with the time he needs to carry out priorities for Ipswich for which he is uniquely qualified, including: (1) maximizing the value of the MUNIS system as this IT Review discusses later; (2) working towards full enterprise value from other applications such as the Arc GIS and new Hawkeye systems; and (3) optimizing Town-School cooperation.

Opportunities for outsourcing include the following, among others:

- a. Website development and maintenance.** There is no need for Ipswich's IT staff to be doing this work. The two most obvious alternatives are (1) commercial organizations which provide Web services specifically for local governments and (2) contractors with related experience. In both of these cases, Ipswich will want to evaluate prospective vendors thoroughly and assure itself of their longer-term viability. Where the MIS Director reports that he now spends about 25 per cent of his time on Web-related tasks, this would free a significant amount of his time for tasks for which he is more uniquely qualified.
- b. System Backup.** Ipswich lacks a consistent, comprehensive approach to backup its multiple systems in the Town and Schools. In fact, the School IT Director reports that there is no automatic backup for the MMS Student Information System and that he must manually execute this in several steps every day. Again, there is no need for the Town and School staff to be spending time every day on these tasks, involving multiple systems and locations as well as imprudent risk. Established commercial firms provide daily, offsite storage. These include, among others, www.vaultusa.com; www.mozy.com, a division of www.emc.com; and www.carbonite.com. These websites are provided by the Collins Center for informational purposes only, with no endorsement intended or implied.

3. Ipswich should formalize a standing, Town-School Information Services Committee.

The need for this Committee reflects the pervasive presence of IT throughout the Town and Schools. Further, it reflects the town-wide nature of applications from financial management and payroll/human resources to office automation, GIS and land records. A few guiding principles will help the Committee be as effective as possible:

- It should be comprised of those personnel in various Town and School offices who have the greatest interest in and dedication to the deployment of IT to enhance services in Ipswich. This Committee is not intended to be only a group of department heads. Rather, it ought to include a rich mix of department heads, managers, supervisors and support-staff personnel.
- Meetings of the Committee should be scheduled regularly every month with formal agendas and minutes.
- The Committee should report each month through the Town Manager and Superintendent of Schools to the Selectmen, School Committee and Finance Committee.
- Where appropriate from time to time, the Committee should form subcommittees on particular subjects such as GIS, land records or payroll/human resources.

4. The IT staff in the Town and Schools should be making full use of the Track-IT! Help Desk software.

The Town already has Track-IT! but the School Department has no comparable product, instead using an Excel spreadsheet only to track assets. Track-IT! has several virtues:

- It keeps track of all services delivered by IT staff to end-users. This is critical in answering questions about what the IT staff does and how they spend their time.
- It records the time required to complete a service from call to completion.
- It enables end-users to submit requests for service electronically, without requiring a support staff member to take calls for service by telephone.

- It establishes a universal inventory of all assets including such things as hardware, software and networking components with related information such as date and cost of procurement as well as all dates and costs of servicing.
- When requests for replacement of an asset occur, there is a ready record of the age, original cost, and frequency and cost of service.

IT personnel often object to the time required for them to enter their service-related information into a package like Track-IT! However, the greater value for them and Ipswich is in the increased understanding among Ipswich's elected officials, appointed officials and voters about what the IT staff does and the value of what they contribute to the organization's high-performance IT environment.

5. All position specifications for the IT staff should be reviewed and updated.

The reorganization of the IT function in Ipswich makes this task necessary. Most obviously, the duties of the MIS Director will change when he has explicit, comprehensive responsibility and accountability for both Town and School IT. As an example of the outdated job descriptions being used, the current position specification for the MIS Director continues to refer to the previous VAX/ADMINS environment which was replaced many years ago.

6. The MIS Director's compensation should be reviewed to reflect the nature of his responsibilities in the consolidated IT organization.

The expansion of his role and responsibilities calls for a full review of the basis for his compensation.

7. Constraints on staffing limit what Ipswich can do with IT.

Ipswich can only implement successfully what it can staff. And Ipswich can't implement successfully what it can't staff. This means that Ipswich may need to make some difficult choices about the range of applications or technologies which it is able to deploy. Two examples illustrate this point:

- **Educational technology.** Ipswich has less than one technology support person per school. There are three technicians for four schools, not including the Technology Integration Specialist, who has very different responsibilities. This does not meet any accepted standard either for repairing broken PCs and printers or for technology integration.
- **Social media.** While social media currently have a very high profile in the world of IT (and, indeed, in the world at large), their use doesn't happen by themselves. The use of social media requires IT staff with the time, knowledge and ability to make sure that they are secure and serve the purposes for which they were intended.

V. APPLICATION SYSTEMS

1. Ipswich needs to undertake a major review of its deployment of the MUNIS ERP system.

An Enterprise Resource Planning (ERP) system in a town like Ipswich typically includes four major application systems: financial management, payroll/human resources, tax billing and collection and utility billing and collection. For many years, the town and schools in Ipswich together have used the MUNIS ERP system from Tyler Technologies.

More complete deployment of the MUNIS system should be able to provide relatively substantial gains in productivity in both the Town and the School Department. Ipswich faces two key issues with the MUNIS system today: (1) a lack of knowledge and understanding among end-users of the capabilities of the system; and (2) inadequate training in MUNIS among its end-users. Currently, Ipswich has no budget for training of MUNIS users. With the exception of the Town's MIS Director, key personnel in Ipswich simply have never had the opportunity to become well versed in what MUNIS can or can't do. For example:

- The absence of the MUNIS Time and Attendance application is the main cause of inefficiencies in the School's payroll operations, which the School Director of Finance and Business Operations reports is her most redundant business process. The Town has the same issue.
- Decentralized input of Payroll and Accounts Payable has never been implemented in the Town or Schools. With thousands of payables and paychecks processed throughout Town and School offices in Ipswich each year, this lack of decentralization is another major inefficiency.

These two processes themselves likely cause the effective loss of dozens of productive hours per week or, put another way, a thousand hours or more per year among the entirety of the operations of the Town and School Department.

2. Business process reengineering (BPR) needs to be a key focus of what Ipswich does with its portfolio of MUNIS and other applications.

Reengineering for Ipswich at this point in time has two major aspects which apply both to MUNIS and all other applications:

- For applications which Ipswich currently is using, such as MUNIS, BPR needs to be a constant in the review of their deployment.
- For new applications such as MUNIS Time and Attendance, Hawkeye or the decentralization of existing applications such as MUNIS Payroll and Accounts Payable, BPR must be a core element in their implementation.

This effort involving BPR will be a new undertaking for Ipswich. At the same time, the interviews conducted during this IT Review found the staff of the Town and Schools open to the deployment of these applications.

3. Ipswich needs to have a clear strategy for the rollout of any new applications.

While the following points apply most immediately to the additional MUNIS applications, this same implementation model also pertains to any other new applications which Ipswich may deploy:

- The full range of personnel involved potentially as users--support staff, supervisors and managers--should be involved in thorough demonstrations of the products in order to assess how the applications might be used by various departments in Ipswich.
- Reengineering of business processes, supported by the new application, should be emphasized from the beginning.
- Ample time should be provided for pre-implementation tasks such as conversion and training.
- Funds in ample quantity should be provided for training.
- The contract for the new application should provide a 30-working-day acceptance period before not less than 50 per cent of the one-time license fee is due and payable.
- Ipswich's user group for each application should meet at least monthly during the pre-implementation period to be sure that issues in the implementation are identified and resolved quickly and well.

The user-group for each application should do a formal, written post-evaluation of the implementation of each new application.

4. Ipswich should examine in detail the possibility of using MUNIS's Time and Attendance application.

As the previous recommendation observed, this application has the potential to save many hours of work every week throughout the Town and Schools. Ipswich has not yet licensed this application. Funds for the procurement of, training in and support of this application will need to be provided by the Town.

5. Ipswich should consider decentralizing the MUNIS Accounts Payable and Payroll applications.

Because the Town and the Schools together process thousands of invoices and payroll transactions per year, decentralization should save substantial time and effort for personnel in offices throughout Ipswich. Decentralizing Accounts Payable and Payroll transactions in the Town and the Schools would bring the same kinds of productivity gains which Ipswich has realized for many years with the decentralization of the Requisition application at the beginning of the procurement process. This is especially true because MUNIS has an exception-based Payroll application and a large number of Accounts Payable transactions are related to purchase orders already in the system. Thus, for example:

- The person entering the invoice into the Accounts Payable system will only need to enter the information specific to that particular payment, not a full record containing such information as the vendor and commodity.
- Payroll entry will only need to be done for those individual employees having an exception in that pay period such as overtime or sick day usage, vacation or personal leave: the record for all others receiving their standard pay won't even need to be called up by the person doing the decentralized entry.

This implementation of decentralization should begin with a prototype involving one Town department. After two months, the rollout should be extended to one school. Presuming success, an additional Town department or School building should be added every two months thereafter. Following this model, decentralization for these functions should be completed in approximately two years.

This IT Review emphasizes the need for all appropriate security in the decentralization of these (and all other) applications.

6. Ipswich must monitor closely the dual, simultaneous challenge with MUNIS in 2012 of both (1) changing its relational database management system from Informix to Microsoft SQL Server and (2) implementing a major new release of the MUNIS application system.

The MIS Director is well aware of what will be involved in these projects and has requested funds from the Town for this purpose. The Finance Director reported that some user-security profiles were lost in previous upgrades with MUNIS which involved a change in version or release, not even involving the potentially more complex issue of changing operating systems, as Ipswich will be facing in 2012. Facing both of these changes successfully at the same time will require extra time and effort on the MIS Director's part and the full support of the Town's leadership and voters.

7. Ipswich should try and find an end-user Report Generator for use with MUNIS.

As one key official stated, “Crystal is horrible.” This comment refers to Crystal Reports, the main Report Generator supported by MUNIS. Especially with the forthcoming change to SQL Server, Ipswich should work with MUNIS and its user-group to identify a Report Generator which can be used independently by non-technical personnel without needing assistance from an IT staff person. Having this kind of product could make an enormous difference in increasing the value of MUNIS to Ipswich.

8. Ipswich should use the MUNIS user community to identify user created Town and School reports which could be helpful.

MUNIS offers a report-sharing capability for its customers on its Web site. Key officials in Ipswich have identified reports which could be very helpful to them. Some of these reports are particular to Massachusetts, while others address requirements of the U.S. Government. Personnel in Ipswich, supported by the MIS Director, should become familiar with how to use this customer portal most effectively.

9. The MIS Director should be the lead manager for implementation of all application systems.

The MIS Director brings a special set of skills to the implementation of applications. His technical expertise and experience in deploying enterprise applications are especially important in this connection.

Ipswich is now about to “Go Live” with the Hawkeye land records application but the MIS Director has had little involvement. He should be playing a central role in this deployment. Likewise, no one in Ipswich is actively coordinating the further deployment of GIS, a role played formerly by an employee in the Utilities Department.

10. Ipswich needs to evaluate the further deployment of the Laserfiche document management system.

The Laserfiche document management system has great potential to support the Town and Schools in many ways. However, deploying Laserfiche from the outset so that it meets Ipswich’s longer-term needs will be a challenging proposition. The challenge will be to develop a taxonomy for classifying documents which maximizes their value to Ipswich while at the time same time providing appropriate security.

Ipswich currently has a very small two-user Laserfiche system, intended at the time of its procurement to serve only the Town Clerk’s Office. As a result, this system as currently configured does not have the capability to serve Ipswich more broadly. Ipswich has two decisions to make regarding the Laserfiche system:

- Where does it fit into Ipswich’s overall priorities both in IT and more generally as an enterprise?

- What financial, human and other resources will be required to deploy and support the Laserfiche system?

Should Ipswich decide to proceed with a broader implementation of Laserfiche, it should consult with other local governments and school districts which have had long and successful experience with this system.

11. Ipswich should be sure that it is leveraging the value of the Patriot CAMA system as far as possible.

The Town's Computer-assisted Mass Appraisal (CAMA) system from Patriot Properties is Ipswich's most complete and detailed repository of property-related information. Almost every agency in the Town uses property-related information. This ranges from Utilities and the Town Clerk to Police and Fire, Building, Planning, Conservation, Public Works and many others.

Ipswich's Information Services Committee should be charged with taking the broadest and deepest view possible of how the information in the Patriot CAMA system can be used most productively by the Town and Schools. The main costs associated with the expanded use of the Patriot CAMA system may be: (1) the licensing of additional seats for users, possibly involving the Patriot applications themselves, the operating system (OS) and relational database management system (RDBMS); (2) the associated increases in annual support for the applications, OS and RDBMS; and (3) training for new users. Since the Board of Assessors is the key player in maintaining property records in Ipswich and has statutory responsibility for this function in Massachusetts, the Assessors and their staff will play a critical role in this work.

12. Ipswich needs to monitor the work of MMS in merging the student information systems now in use in the elementary schools with the MMS system, having the MIS Director lending his expertise to this effort.

MMS is the vendor of the application software which the School Department uses for maintaining student information, scheduling of classes, attendance and grade reporting.

This merger is scheduled to take place during summer, 2010 and the School Department's IT staff reports that MMS is under contract for this work. Having a single K-12 system for all student information represents the only responsible approach to this element of data management. Nonetheless, merging the database from the two elementary schools with the MMS system is not necessarily an easy undertaking. Ipswich should take two actions in order to be sure that this merger is as successful as possible.

- The School Department and MMS, with the full participation of the MIS Director, should jointly develop a detailed, written workplan which specifies exactly how this will be done. This needs to include such things as: (1) when and how Ipswich reviews MMS's translation tables in order

to be sure, before the conversion actually takes place, that data of importance to Ipswich is not being omitted; and (2) how each iteration of the conversion will be tested by Ipswich and MMS.

- The MIS Director should participate fully in this process from the very beginning since he has more experience in this kind of work than anyone else in Ipswich. His participation should help to assure that this effort achieves the highest possible degree of success.

13. Ipswich should consider whether or how it might enhance services in the Town and Schools through social media.

Platforms for social media like Twitter and Facebook are being used increasingly by schools and local governments in Massachusetts and around the United States. Their growth reflects the value they can have in enhancing communication with various constituencies and interested individuals. At the same time, social media present two significant challenges to organizations like Ipswich:

- Their use requires the specific time and attention of a skilled IT professional to assure their productive deployment.
- They present major challenges to security.

This will not be an easy decision for Ipswich, especially given the limitations of its IT staffing.

VI. INFRASTRUCTURE

1. Ipswich requires a detailed, independent review of its current IT infrastructure and infrastructure strategy.

The Town and Schools rely continuously on this infrastructure to support a very wide range of their respective services. Two critical areas of infrastructure require detailed and urgent attention:

- **Fiber-optic wide area network (WAN).** There is no consensus among key personnel in the Town and the School Department regarding the capabilities and deployment of this critical infrastructure. The absence of this consensus undercuts the everyday work of both organizations.
- **School Department Wireless Networks.** The lack of reliability of this infrastructure is having a significantly adverse impact on the delivery of educational services in all School buildings on a daily basis. One key employee described this as a “horrific issue.”

In order to resolve these issues and establish a clear, cost-effective strategy for the future, Ipswich should retain the services of an independent consultant with strong experience in municipal and school infrastructure, specifically related to both fiber-optic and wireless technologies.

2. Ipswich must establish a backup to the fiber-optic network.

No such backup exists today. In part, this is due to the construction of the Town’s network using a Star topology rather than a ring topology, which would provide two connections to every location. The Star topology provides only a single connection to each location, leaving it completely vulnerable to accident or intent. The risk to the system is also made greater by the fact that the fiber-optic network provides only two strands to each location. Should either strand become inoperable, the location would lose connectivity. Given how critical the fiber-optic network is to Town and School operations, this absence of backup represents an unacceptable risk by any measure.

Providing a specific solution for this problem goes beyond the scope of this IT Review. However, some obvious possibilities include such things as microwave technology. The issue of backup should be included in the scope of work for the independent consultant as recommended previously in this section.

3. Ipswich needs to form a Town-School working group to identify and resolve issues related to the inability to share and store students’ files.

Having this capability among all schools is critical to the educational environment in Ipswich. The specific nature of the technical constraint preventing this functionality

from being available is not clear. This issue should be incorporated into the scope of work for the independent consultant recommended at the beginning of this section.

4. Ipswich should undertake a full security audit.

The MIS Director has expressed his strong desire for this kind of independent review. Funding of this effort should be an immediate, top priority.

5. Ipswich must resolve the issues around the server-based environment for its students' folders.

This could be viewed either as an application or infrastructure issue. Based on what this IT Review has found, it appears that infrastructure lies at the heart of the problems in this area and solving the infrastructure issues would resolve the functionality of the application-related issues.

The School Department has a LINUX server which hosts various work done by students in grades 6 through 12. This includes mainly Microsoft Office applications (primarily PowerPoint, Word and Excel) as well as video and audio work products. There is a basic question as to why the LINUX server, rather than a Microsoft Windows server, is being used, putting the issue of available funds aside.

Similar to the concerns with the fiber-optic and wireless network specified in the first recommendation in this section, the problems with this system have been perplexing to the staff. One of the key issues here is the inability of teachers and supervisors to view the work of individual students in order to be able to offer the student the best possible advice on how they can advance their educational achievement. This limitation has resulted in the School Department's having to create wasteful and inefficient workarounds which collectively cost Ipswich hundreds of hours of productive time per year among its teachers and staff.

Ipswich should form an internal working group, including the MIS Director and School IT staff, and be prepared to engage an independent specialist if necessary. The charge to this group should be to: (1) solve the immediate problems; and also (2) rethink the overall strategy for achieving these educational goals and objectives. This issue is so pervasive and significant that it must be resolved forthwith. One possible solution may be the procurement and implementation of a commercial off-the-shelf product specifically designed for the educational environment which provides this functionality out of the box.

6. Funding needs to be provided for the MIS Director to expand his knowledge of Ipswich's Cisco technologies.

Ipswich uses various products from Cisco Systems. Training in these technologies would enable the MIS Director to support these technologies more efficiently and effectively for the Town and the Schools.

7. Ipswich must make a clear commitment to investing in infrastructure at an appropriate level, applying the principle of strategic positioning.

While the Town has had a five-year plan and the Schools have a plan on paper to meet State requirements, investing in IT has been uneven. This pattern has had specific, adverse consequences for Ipswich. A few examples noted elsewhere in this IT review make this point:

- The LINUX server, which is now causing serious limitations on the provision of education in all schools, was implemented because of a shortage of funds.
- The Schools' wireless network likewise was a lower cost-induced solution.
- The fiber-optic network has only two strands to each location; it should have more.
- Multiple classrooms either have no PCs or are still using 10-year-old Windows 98 machines which provide a useless operating environment for teachers and students.

The principle of strategic positioning may be summarized as “buy smart, not cheap.” It embodies the understanding that what may at first appear to be less costly acquisitions often turn out to have higher lifecycle costs because of lack of quality and reliability. Ipswich should establish and commit to meeting an appropriate replacement cycle for each type of asset, respectively, in order not to continue to have the adverse impact on direct services which it is now experiencing.

This IT Review appreciates the fiscal constraints which Ipswich faces, as observed previously. However, adequate and reliable IT infrastructure is a critical, universal necessity for the delivery of Town and School services: any decisions not to meet these essential requirements must be considered fully and their ramifications understood well.

8. Ipswich should proceed carefully and cautiously in its implementation of virtualization.

Virtualization is the use of a single base resource to support multiple images or computing resources like servers or operating systems. Among the key advantages to virtualization are: (1) lower costs of providing hardware resources; (2) simplified system administration by having fewer discrete, physical systems to manage; (3) energy savings by requiring less electricity and air conditioning; and (4) space savings from having to have fewer physical devices. With desktop virtualization, security can also be strengthened. It must be remembered, however, that the deployment of

virtualization will require a higher level of technical knowledge on the part of the IT staff and the additional cost of virtualization-related resources.

The Town is in the initial stages of server virtualization but the Schools have not yet taken any steps in this direction.

9. The MIS Director should be asked to put together a clear, concise business plan for extending virtualization in the Town and Schools.

The business plan should identify specifically the time and effort required on his part for this project as well as other costs and resources involved both on a one-time and on an annualized basis.

This IT Review must issue a cautionary note here with respect to the need for close cooperation between the Town and Ipswich's vendors of commercial-off-the-shelf software like MUNIS and MMS in the Schools. As one example, the forthcoming mandated move to Microsoft SQL Server with MUNIS may involve technical decisions and costs to implement and support virtualization with that vendor.

10. Ipswich needs to incorporate the Schools in the five-year IT upgrade plan.

The Superintendent reports that the Schools have not had any funds for replacement of hardware in the last three years. Ipswich should follow the same policy universally for the Town and Schools in terms of replacement cycles for various types of hardware as appropriate.

11. Ipswich should evaluate the deployment of VoIP services.

VoIP, which is the acronym for Voice over Internet Protocol, replaces traditional technologies for telephony. The evaluation of the feasibility of VoIP must be particular to Ipswich. Among other things, the evaluation must consider the existing and planned infrastructure in Ipswich, one-time and lifecycle costs, staffing requirements, security and reliability. As one example, the School IT Director reports that the switches now deployed in the School Department cannot support VoIP and would need to be upgraded or replaced. This evaluation of VoIP should be incorporated in the scope of work for the infrastructure review identified as the first recommendation in this section.

VII. CONCLUSION

This IT Review identifies important opportunities to use IT in supporting more efficient and effective services throughout the Town and School Department.

Achieving these goals and objectives will require the active role of Ipswich's elected and appointed leadership, as well as the support of its residents.