Auditor of State
Betty Montgomery

HAMILTON COUNTY ENGINEER'S OFFICE PERFORMANCE AUDIT

OCTOBER 4, 2005

Auditor of State
Betty Montgomery

To the Engineer and Residents of Hamilton County:

In August of 2004, the Hamilton County Engineer's Office contacted the Auditor of State's Office (AOS) to initiate a performance audit. Fieldwork began in November of 2005. Hamilton County had undertaken a series of operational audits to determine efficiency and, as a separately elected public official, the Hamilton County Engineer selected AOS as the auditing organization to conduct a comprehensive examination of the efficiency of his Office's operations. Based on discussions with the Engineer, seven functional areas were selected for assessment: organizational function, human resources management, financial management, administration, infrastructure improvement/project initiation/project management, infrastructure maintenance, and information technology/records management. These areas were selected because they are important components of Office's operations.

The performance audit contains recommendations which identify the potential for cost savings and efficiency improvements. The performance audit also provides an independent assessment of the Office's operations and a framework for strategic and budgetary planning to help continue a high level of public service and safety. While the recommendations contained within the performance audit are resources intended to assist in improving Office operations and performance, the Engineer and his staff are encouraged to assess overall operations and develop other alternatives independent of the performance audit.

An executive summary has been prepared which includes the project history; an Office overview; the scope, objectives and methodology of the performance audit; and a summary of noteworthy accomplishments, recommendations, and financial implications. This report has been provided to the Hamilton County Engineer's Office and its contents discussed with the appropriate officials and Office management. The Office has been encouraged to use the results of the performance audit as a resource in improving its overall operations, service delivery, and financial stability.

Additional copies of this report can be requested by calling the Clerk of the Bureau's office at (614) 466-2310 or toll free at (800) 282-0370. In addition, this performance audit can be accessed online through the Auditor of State of Ohio website at http://www.auditor.state.oh.us/ by choosing the "Audit Search" option.

Sincerely,

Betty Montgomery

BETTY MONTGOMERY
Auditor of State

October 4, 2005

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EXECUTIVE SUMMARY

Executive Summary

Project History

The Hamilton County Engineer's Office (HCEO) engaged the Auditor of State's Office (AOS) in August, 2004 to conduct a performance audit of its operations. Hamilton County had undertaken a series of operational audits to determine efficiency and, as a separately elected public official, the Hamilton County Engineer selected AOS as the auditing organization to conduct a comprehensive examination of the efficiency of his Office's operations. The performance audit was designed to identify areas of strong performance and, in areas where efficiency could be improved, provide recommendations to optimize operational and service levels. Fieldwork on the audit began in early November 2004 and concluded in May of 2005.

Overview of the Hamilton County Engineer's Office

Hamilton County (the County) was formed by proclamation on January 2, 1790. Hamilton County is situated in the extreme southwestern corner of the State of Ohio and covers an area of 414 square miles. Within the County are 37 municipalities, including 21 cities, 16 villages, and 12 townships. Hamilton County is the third largest county in the State in terms of population. The County's urban centers include Cincinnati and several large unincorporated townships. A popularly elected three-member Board of Commissioners (the Commissioners) governs the County which has an estimated population of 814,611.[1-1] Other elected officials manage various segments of County operations, including the Auditor, Treasurer, Recorder, Clerk of Courts, Coroner, Engineer, Prosecuting Attorney, Sheriff, Common Pleas Court Judges, Probate/Juvenile Court Judges, and Municipal Court Judges. Although elected officials manage the internal operations of their respective departments, the Commissioners serve as the taxing and contracting authority for the County and are responsible for approving expenditures and adopting annual operating budgets.

Hamilton County is primarily an urban and suburban community with a significant service and durable goods manufacturing presence. For example, the County is home to several large manufacturing companies, including Procter & Gamble, Johnson & Johnson, and General Electric. In addition, the County's service industries include American Financial Group, Fifth Third Bancorp, and the Kroger Company. The County has a tax base of approximately $14.5 billion. As of May 2005, Hamilton County's unemployment rate was 5.6 percent, which has remained consistent since 2002 (5.1 percent).

[1-1] Ohio Department of Development, Office of Strategic Research: *Ohio County Indicators* (August, 2004)

HCEO serves the citizens of Hamilton County by maintaining roadways, bridges, and other transportation infrastructure, surveying, and assisting with the maintenance of the County's tax map. Specific responsibilities include roadway and bridge design, construction, inspection, maintenance, and study, which result in safety improvements to the roadway infrastructure. HCEO provides survey-related services which include surveying, record keeping, providing tax maps, reviewing deeds, and maintaining necessary data for the Cincinnati Area Geographic Information System (CAGIS), which is used by other stakeholders including the County Auditor.

HCEO employs 178 full-time and 45 part-time and seasonal individuals, or 186.8 full time equivalents (FTE's), including seasonal, part-time, and co-op students, to carry out Department operations. HCEO reduced its staffing level from 260 employees in the 1980s to the current level through early retirement incentives and combining positions. During the period of staff reductions, HCEO was able to add functions to its operations such as additional snow and ice control responsibilities and storm water management.

HCEO is responsible for about 450 bridges, and over 500 miles of public roads within Hamilton County. Compared to other metropolitan county engineer offices, HCEO has a greater scope of responsibilities because of the large amount of infrastructure in townships and unincorporated areas. Also, HCEO has contracted with ODOT to fulfill snow and ice control on State roads within the County's boundaries—a relationship that has benefited both organizations. The Engineer's Office maintains highly collaborative relationships with the small governments it serves and regularly coordinates infrastructure improvement projects between client governments to ensure the greatest value is obtained from improvement efforts. It also provides training to all government employees responsible for snow and ice control within the County and its municipalities through an annual program. Finally, HCEO has actively pursued and obtained internal contracts with other County agencies to maintain their vehicles at HCEO's vehicle maintenance facilities.

Overall HCEO appears to be operating under a number of best practices and seeks to work in concert with other governmental entities. Operations are efficient and effective, and reflect innovative practices within the area of infrastructure improvement and maintenance. New duties, including coordinating the Hamilton County Storm Water District, have created some challenges within the organization, as have stagnant revenues and increased responsibilities related to maintaining an aging infrastructure. Like other engineer's offices within Ohio, HCEO is concerned about its ability to address road and bridge conditions in the future as funding available for replacement and repair projects is not expanding to meet demands.

Objectives, Scope, and Methodology

A performance audit is defined as a systematic and objective assessment of the performance of an organization, program, function, or activity to develop findings, conclusions, and recommendations. Performance audits are usually classified as either economy and efficiency audits or program audits. While economy and efficiency audits consider whether an entity is using its resources effectively; program audits are designed to determine if the entity's activities or programs are effective, if entity goals are proper, suitable, or relevant, and if goals are being achieved. This audit contains elements of both an economy and efficiency audit and a program audit.

This performance audit was conducted in accordance with Generally Accepted Government Auditing Standards. Audit work was conducted between November 2004 and May 2005 and examined 2003 and 2004 data. To complete this report, auditors gathered and assessed data from various areas, conducted interviews with Department staff, and compared requested information with engineer's offices in other counties, including Franklin, Montgomery, and Summit. Best practice information was also collected from the Ohio Department of Transportation (ODOT), as well as the University of Alabama's Department of Industrial Engineering, the Government Accountability Office (GAO), the Government Finance Officers Association (GFOA), the Federal Highways Administration, and the International City/County Management Association (ICMA).

Recommendations contained within this report are intended to streamline and improve the Engineer's Office operations. Specifically, these recommendations seek to assist the Department in achieving its informal mission to "provide efficient, safe, and effective service with respect to the traveling public through cooperation and coordination with various jurisdictions and citizens." Based on discussions with the County Engineer, the following areas were identified for review in this performance audit:

- Organizational Function;
- Human Resource Management;
- Financial Management;
- Administration;
- Infrastructure Improvement, Project Initiation, and Project Management;
- Infrastructure Maintenance; and
- Information Technology and Records Management.

The performance audit process involved significant information sharing with Office personnel, including preliminary drafts of findings and recommendations as they were developed. Throughout the engagement, regular discussions were held and a formal status meeting was conducted to update the Engineer's Office on key issues and recommendations impacting

selected areas. Finally, the Department provided written comments in response to various recommendations which were taken into consideration in the reporting process.

The Auditor of State and staff express appreciation to Hamilton County, the Engineer's Office, and the peers for their cooperation and assistance throughout this audit.

Comparative Statistics

In order to gain a general understanding of HCEO's performance in relation to peer engineers' offices, information has been gathered for comparison in a variety of areas. Statistical data contained within this performance audit is reported on a calendar year basis. **Table 1-1** benchmarks the performance of HCEO against the peers in 2003.

Table 1-1: Engineer's Office and Peer Operating Statistics

	HCEO	FCEO	MCEO	SCEO	Peer Average
General Fund Expenditures [1]	$29,574,225	$46,602,975	$12,160,552	$10,837,221	$23,200,249
Population [2]	514,018	366,846	392,883	325,825	361,851
Lane Miles	1,157	610	726	483	606
Registered Vehicles	765,445	1,100,170	532,604	534,258	722,344
Total FTEs	186.8	192.9	121.4	151.1	155.1
General Fund Expenditures per Lane Mile	$25,561	$76,398	$16,750	$22,437	$38,529
General Fund Expenditures per Registered Vehicle	$38.64	$42.36	$22.83	$20.28	$28.49
Population per FTE	2,752	1,902	3,236	2,156	2,431
Lane Miles per FTE	6.19	3.16	5.98	3.20	4.11

Source: Hamilton County and peer engineers' offices
[1] Due to information availability, 2003 data was used.
[2] Based on Ohio Department of Development population estimates for 2003 less major municipal populations.

HCEO has the second highest General Fund expenditures, registered vehicles, and total FTE's and is approximately 27 percent, 6 percent, and 20 percent higher than the peer average, respectively. HCEO's population per FTE ratio (2,752 persons to 1 FTE) is favorable compared to the peer average (2,431 persons to 1 FTE). Other favorable comparisons are General Fund Expenditures per lane mile and lane miles per FTE. However, HCEO's General Fund expenditures per registered vehicle ($38.64 per registered vehicle) are higher than the peer average ($28.49 per registered vehicle).

Noteworthy Accomplishments

This section of the executive summary highlights specific HCEO accomplishments identified throughout the course of the audit.

- *Organizational Function:* HCEO aggressively identifies opportunities for resource sharing with the State of Ohio's Department of Transportation. HCEO and ODOT have developed an innovative and cost-effective cost-sharing arrangement to fulfill snow and ice control functions on state routes in Hamilton County. HCEO provides snow and ice control functions under contract to ODOT based on a proportional cost of the service.

- *Financial Management*: HCEO coordinates all grant approvals through the HCEO Budget Department. With the improved communication and coordination, the Budget Department will be able to more efficiently account for expenditures and produce a more accurate and effective budget.

- *Human Resources:* HCEO has consistently adjusted staff to match the needs of the organization. In 1985, HCEO had 260 employees. By implementing new technology, operations improvements, and organizational revisions, HCEO has trimmed its staff to 186.8 full time equivalent employees.

- *Infrastructure Maintenance:* Several noteworthy accomplishments have been identified in this area. HCEO has applied multiple strategies to reduce "deadhead" miles on snow routes and increased the efficiency of filling its salt domes through purchase of an automated conveyor. HCEO has developed a best practice to simplify culvert inspections. In addition, it is retrofitting its traffic signals with high efficiency light-emitting diodes (LED), which burn brighter and use 80 percent less electricity. Further, the road striping cost per mile is lower than many other local entities in the County which has allowed HCEO to increase the number of striping contracts with local entities.

Key Recommendations

The performance audit contains several recommendations pertaining to the Hamilton County Engineer's Office operations. The following are the key recommendations from the report.

Organizational Function

- **Develop, implement and monitor performance measures for all departments and functions. HCEO could implement this recommendation using current resources, although it would need to allocate time for the development of the benchmarks and measurement system.**

Financial Management

- **Present a financial budget document that shows its combined sub-funds and provides a beginning and ending fund balance. Employing this format will provide users with financial information on total HCEO operations.**

- **Consider using a performance based budget system to enhance the internal budgeting process. Implementing a performance-based system could aid HCEO in more easily achieving its goals and objectives by allowing the Office to focus on those functions or departments that may not have positive performance feedback.**

- **Develop and maintain a two-year forecast. HCEO's forecast should include detailed assumptions that support its projections and be made available to all office decision makers, as well as the public through its website.**

Human Resources Management

- **Seek to negotiate a reduction in the maximum number of accrued but unused sick leave hours paid out at retirement during the next round of collective bargaining negotiations. Using an average sick leave payout from the last two years of $138,549, HCEO could achieve a cost avoidance of approximately $97,750 per year, depending on the number of retirements during the year.**

  During the course of the audit, HCEO negotiated a reduction in unused sick leave paid out at retirement for new hires.

- **Broaden the staff to supervisor span of control ratio from 2.81:1 to about 7:1 by reclassifying 11 supervisory positions in the Maintenance and Operations/Roads division. If salaries were reduced to the average of the highest annual staff wages, HCEO could save approximately $33,500, annually, including retirement costs.**

  During the course of the audit, HCEO began implementation of this recommendation.

Administration

- **Develop clear and concise mission, vision and value statements. These statements should be developed by a representative group of HCEO staff and management and approved by the County Engineer to ensure adequate inclusion of stakeholder input.**

- **Adopt a formal strategic plan. The plan should include HCEO's mission, vision and value statements, concise and measurable goals and objectives, strategies, action plans, responsible parties, timelines, as well as a process for implementing, monitoring and updating the plan. By developing and implementing a strategic plan, HCEO will clarify the organizations plans and ensure that key leaders are all working towards the same results.**

- **Reform its management structure to support the implementation and execution of a formal strategic plan. HCEO should clarify its departmental designations and streamline the organization into four functional subdivisions; Operations; Engineering; Human Resources; and Administrative Activities. Simplification will ensure that departments do not have conflicting goals and that functions have common benchmarks that reflect the performance of the entire function rather than as segmented tasks.**

- **Adopt a formal plan for the replacement and retirement of vehicles and other capital equipment. This plan should be linked to the strategic budgeting process recommended in the financial operations section and should ensure that capital assets are replaced at the most economical point in their life cycle. Replacement cycles should be clearly established in policy so that related maintenance support can be planned.**

Infrastructure Maintenance

- **Obtain training to fully use the functionality of its automated work order system to enable performance measurement of its maintenance functions. The vendor for HCEO's work order system estimates one-time training costs at $3,000 to $3,500.**

- **Consider adopting a uniform performance index to track the effectiveness of a wide variety of maintenance functions within a central database. This system would compare maintenance efforts to criteria for excellence, and allow HCEO management to monitor progress toward achieving these goals and make necessary adjustments. According to an ODOT consultant, the county could equip one of its vans with the needed technology to capture survey data for approximately $5,000.**

- **Consider reducing its mowing frequency to a level commensurate with the peers and industry practices, resulting in at least one less mowing cycle per season. Based on current contract costs, reducing one mowing cycle would save $30,000 a year.**

- **Eliminate its contract for mowing and trimming vegetation behind its 106 miles of guardrail. The current contract costs three times as much as standard roadside mowing, largely due to the labor and equipment intensive duty of cutting back**

brush and trees behind the guardrails. Even with the up-front capital investment of having to purchase three mowers at –a cost of approximately $75,000 each, it appears the HCEO can recoup these costs from contract savings within two years. It is estimated that eliminating the guardrail vegetation contract could conservatively save $130,000 annually, less the investment in equipment.

- **Prioritize completion of a central database of its 4,350 culverts, including maintenance and operation needs. The completed database would help the Office more effectively flag service needs to maximize the life expectancy of these structures and the surrounding roads, and enhance work scheduling and budgeting. The cost to hire a co-op student for a 3-month period to complete this task is $5,200.**

Information Technology and Records Management

- **Adopt a systematic four-year replacement cycle that is tied to its budgeting process to upgrade its computing equipment. The average annual cost of replacing computers is approximately $25,600.**

- **Consider using new technologies such as personal digital assistants (PDAs), Global Positioning System (GPS) units, and electronic subdivision/survey reviews to make work processes more efficient and generate more accurate data. Assuming HCEO pilots a program using ten PDAs at a cost of $500 each and $35,000 for a fully functional GPS system, it would incur an implementation cost of approximately $40,000.**

- **Develop a disaster recovery plan to prepare the organization for recovery from a breach in security, a natural disaster (fire, flood, etc.), or other catastrophic event as quickly and efficiently as possible.**

- **Accelerate work on converting paper records to electronic format. Converting records to electronic format should allow HCEO staff to search for information quickly and efficiently while providing long-term operational cost savings. The cost to HCEO would be approximately $19,500.**

- **Consider discontinuing the practice of manually updating the tax map. Updating tax maps both manually and electronically adds an extra step to the process, increasing the time and effort it takes to update the maps, as well as decreasing staff productivity. Eliminating the need to update both paper and electronic documents should improve operational efficiency and may result in cost savings.**

Additional Findings and Recommendations

Organizational Function

- Improve coordination between departments by centralizing the location and access to all original agreements. Additionally, HCEO should ensure that all formal relationships and service agreements are documented in writing through a letter of understanding or contract detailing the procedures, duration, and scope of the relationship. Increasing the centralized management of agreements would also assist the departments by having agreements readily accessible in the most up-to-date form. HCEO is currently implementing a digitizing process for its archival documents.

Financial Management

- Combine all contingency funds into one line item and budget all other expenditures at normal levels. Budgeting in this manner will provide HCEO with a more accurate tool to use when attempting to determine superior performing departments.

- Implement formal grant seeking and application policies and procedures. These procedures should require a quarterly review of funding opportunities, a prioritized list of resources and contacts, a review of funding received by similar operations, and criteria for pursuing grant funding. Formal grant seeking and application policies and procedures should significantly improve HCEO's effort to maximize funding support from grant sources.

- Increase efforts to negotiate higher levels of reimbursement from local governments and other sources for services provided.

Administration

- Prepare an annual report of performance in a format which is comprehensible to stakeholders who do not have advanced knowledge of HCEO operations. The report should include performance measures, criteria for evaluation, and broad recommendations or insight into plans for the future. This type of feedback will be useful in defining the strategic direction of the organization and developing a formal strategic plan which adequately addresses the needs of stakeholders.

- Create a formal succession plan to prepare for the potential departure of senior executives and other employees with critical knowledge and skills. This succession plan should be linked to the strategic plan and focus on both current and future organizational needs.

Succession planning ensures that the organization has the right people, with the right skills, at the right time for leadership and other key tasks.

Infrastructure Maintenance

- Adopt policies that define key infrastructure maintenance standards, and develop manuals describing how to complete specific tasks more efficiently and effectively. HCEO largely relies on the institutional knowledge of its staff to direct maintenance. However, there is a short-term risk that during absences of key personnel, some of this critical knowledge may not be conveyed. Moreover, as key management turns over, there is a long-term risk for loss of this institutional knowledge if it is not well-documented. Formally documenting its policy maintenance standards would ensure that activities are performed to maximize infrastructure life while ensuring the safety of staff, contractors and the traveling public.

- Continue maximizing its efforts to extend the county road pavement life-cycle. HCEO should fully use all management data possible to ensure maximum efficiency and effectiveness in its maintenance functions. It should schedule all levels of maintenance activity through its pavement management system.

- Assess data from its work order and pavement management systems to determine optimum criteria and time of year for crack sealing. In addition, it should develop a policy that specifies the type of maintenance to be performed on cracked pavement and when to perform it. If HCEO developed a set of criteria for resealing older pavements by prioritizing these factors, it might be able to cost-effectively retard pavement deterioration prior to repaving a road.

- Develop a salt application chart and/or decision matrix providing general guidance on achieving effective and efficient application rates for various weather conditions. General written guidelines on material application rates and decision trees provide baseline guidance on the balancing of effectiveness and efficiency in snow/ice control.

- Standardize snow and ice control guide books for drivers across its three divisions. Standardizing these booklets would ensure that all drivers, and their substitutes, receive consistent written guidance from HCEO management on the numerous facets of snow and ice control. By not having key procedures, safety precautions, emergency contact information, and other data that is consistent in all regional snow manuals, HCEO increases the risk of ineffectiveness or unsafe conditions.

- Develop an ongoing performance measurement program specifically for its snow and ice control operations given the program's substantial cost and direct impact on customer safety. Outcome measures are even more valuable because they assess how well an

agency preserves or restores a safe level of service on the roadway, but they depend on collecting external data.

- Consider consolidating all of its mowing services into a single contract. HCEO should base payments on uniform project deliverables, such as cost per center lane mile, and allow for documented adjustments for issues such as travel expense. It should also require that potential vendors submit budgets with their submissions to support their service proposals.

- Increase communication with the Hamilton County Purchasing Department to ensure that accurate project scope data is included whenever it issues a request for proposals to avoid vendor confusion, help widen the bidder pool, and potentially reduce contract costs.

- Formalize in writing a vision clearance policy regarding landscaping and foliage abutting the public right of way. A formal policy would educate both HCEO staff and landowners as to the acceptable standards for vision clearance. It could potentially both reduce complaints and the need to revert as often to costly bucket trimming.

- Increase the frequency of routine culvert inspections so that each culvert is formally inspected at least every eight years.

- Include consideration of environmental concerns related to debris and sediment gathered from storm water devices in written guidelines for maintenance activities. Documented guidance is crucial given the environmental regulations that HCEO must adhere to under its storm water permit.

- Coordinate communications between the Hamilton County Storm Water District Oversight Board and the Hamilton County Commissioner's Office and establish an ongoing item on the Commissioners' meeting agenda. This agenda item would allow the advisory board representing more than 40 entities a regular opportunity to brief the full commission and potentially expedite resolutions related to the district.

- Specify whether accidents recorded in its annual crash analysis report took place on roads under state, township or county jurisdiction. This would help traffic engineers from the HCEO, townships and other interested parties more easily analyze crash data and its potential correlation to traffic control devices.

Information Technology and Records Management

- Continue to develop written standards for hardware and software. A standardized software inventory list provides administrators and technology staff a tool to review the

purchase of software applications. This list also helps to ensure that staff needs are met and whether software is available and supported by HCEO's technology staff.

- Document and track quality assurance performance measures for technical support. Documenting and tracking quality assurance performance measures provides a method to measure the customer satisfaction of end-users with technical support services.

- Compile records management policies and procedures in a formalized records manual. A records management policy manual provides a basis for accountability and ensures information contained in records is managed effectively throughout the office. A well-organized filing plan also enables an organization to find information easily.

- Develop records management procedures to ensure all original project file documents are maintained at the CAB location. In addition, scanning documents into an electronic format could reduce costs for copying and the necessity to have paper copies of the same document in several department files. Scanning more documents in electronic format would reduce paper-costs and the necessity for each department to physically make copies of project files.

- Develop performance measures and evaluation criteria to monitor records management practices and document performance levels against the planned performance goals so management can be assured of the on-going effectiveness of the program. Developing evaluation criteria for records managements would improve HCEO's ability to monitor the effectiveness of records management, and provide timely response and feedback to customers.

- Continue to work with Cincinnati Area Geographic Information Service (CAGIS) to integrate databases such as the sign inventory database, signal inventory database and culvert database with the CAGIS system. The integration of HCEO databases with CAGIS should provide productive efficiencies that may result in cost savings.

Financial Implications Summary

The following table is a summary of estimated annual cost savings, cost avoidances, and implementation costs resulting from performance audit recommendations.

Summary of Financial Implications

Recommendations	Annual Cost Savings	Annual Cost Avoidance	Implementation Costs	
			Annual	One-Time
R4.1 Reduce available sick leave paid out upon retirement.		$97,950		
R4.2 Reclassify 11 supervisor positions to staff positions	$33,500			
R7.1 Obtain training on HCEO work order system				$3,500
R7.2 Equip van with touch-screen GPS technology				$5,000
R7.9 Reduce mowing frequency by one cycle.	$30,000			
R7.13 Eliminate guardrail vegetation contract	$130,000			
R7.14 Hire co-op student to complete culvert database				$5,200
R8.2 Implement computer replacement cycle			$25,600	
R8.3 Implement new technology				$40,000
R8.10 Accelerate document conversion to electronic format				$19,500
TOTAL	**$193,500**	**$97,950**	**$25,600**	**$73,200**

The financial implications summarized above are presented on an individual basis for each recommendation. The magnitude of cost savings associated with some recommendations could be affected or offset by the implementation of other interrelated recommendations. Therefore, the actual cost savings, when compared to estimated cost savings, could vary depending on the implementation of the various recommendations.

Matters for Further Study

- **Compensation for the Engineer for duties related to the Hamilton County Storm Water District:** The Board of Commissioners has not yet determined the rate of compensation that should be paid to the Engineer for duties related to the storm water district. The Hamilton County Engineer and the Board of Commissioners should consult with the Hamilton County Prosecutor for interpretation of Ohio Revised Code Section 315.14. If these parties agree to provide additional compensation to the County Engineer, the Board of Commissioners may wish to refer to other similar size storm water districts to establish a benchmark for compensation.

- **Bonding for Employees working on the Hamilton County Storm Water District:** The Hamilton County Engineer should consult with the Hamilton County Prosecutor to determine the potential need for and structure of bonding for HCEO employees related to the Hamilton County Storm Water District.

- **Staffing Levels for Records Management Functions:** As HCEO transcribes more documents into electronic formats, it should review staffing levels and records management functions to determine if reallocation of staff is needed. The process of reviewing staffing levels and responsibilities should ensure that key job functions for each department are performed efficiently and effectively.

ORGANIZATIONAL FUNCTION

Organizational Function

Background

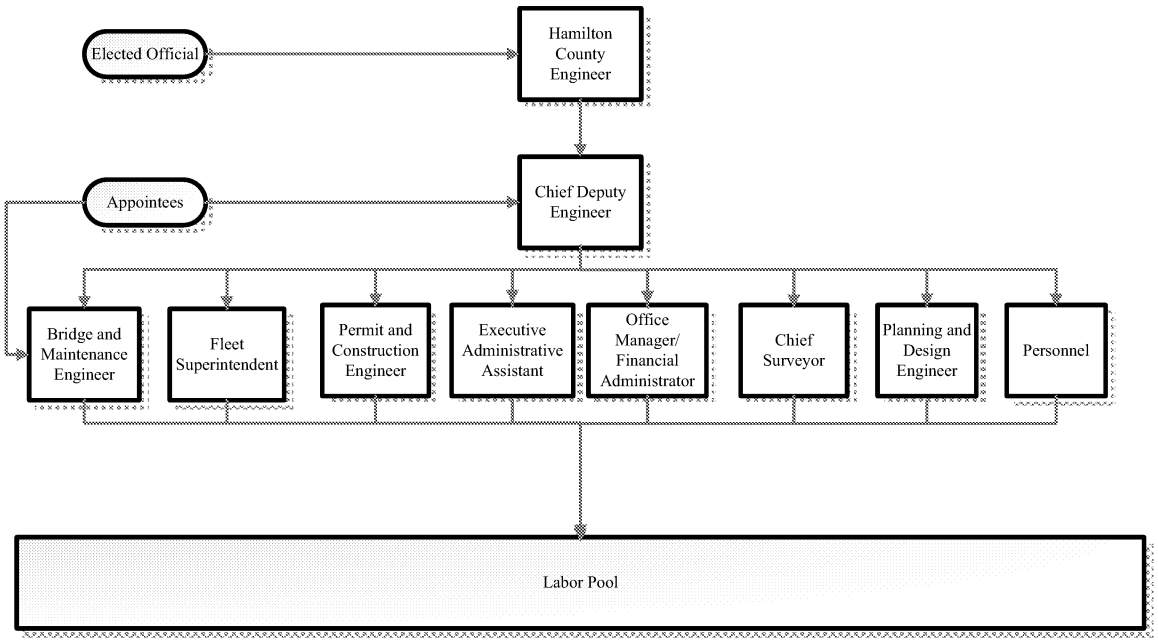
This section focuses on the organizational functions of the Hamilton County Engineers Office (HCEO). The objective is to analyze the organization's scope of activities in the context of the Ohio Revised Code (ORC) requirements and County expectations.

Organizational Structure and Function

HCEO serves the citizens of Hamilton County by maintaining roadways, bridges, and other transportation infrastructure; surveying; and assisting with the maintenance of the County's tax map. Specific responsibilities include roadway and bridge design, construction, inspection, maintenance, and study, which result in safety improvements to the roadway infrastructure. HCEO provides survey-related services that include surveying, record keeping, providing tax maps, reviewing deeds, and maintaining necessary data for the Cincinnati Area Geographic Information System (CAGIS), which is used by other stakeholders including the County Auditor.

Chart 2-1 illustrates HCEO's current organizational structure.

Chart 2-1 Organizational Chart



Source: HCEO

HCEO is best described as a flat organization. Each of the departments operates with a degree of autonomy that leads to a greater level of efficiency in decision-making. While semi-autonomous in operation, each of the department functions fall within the scope of the duties of an engineer's office as defined in Chapters 315 and 5543 of the ORC. Though the departments are decentralized and largely responsible for their own operations, each also shares resources readily and collaborates on overlapping projects.

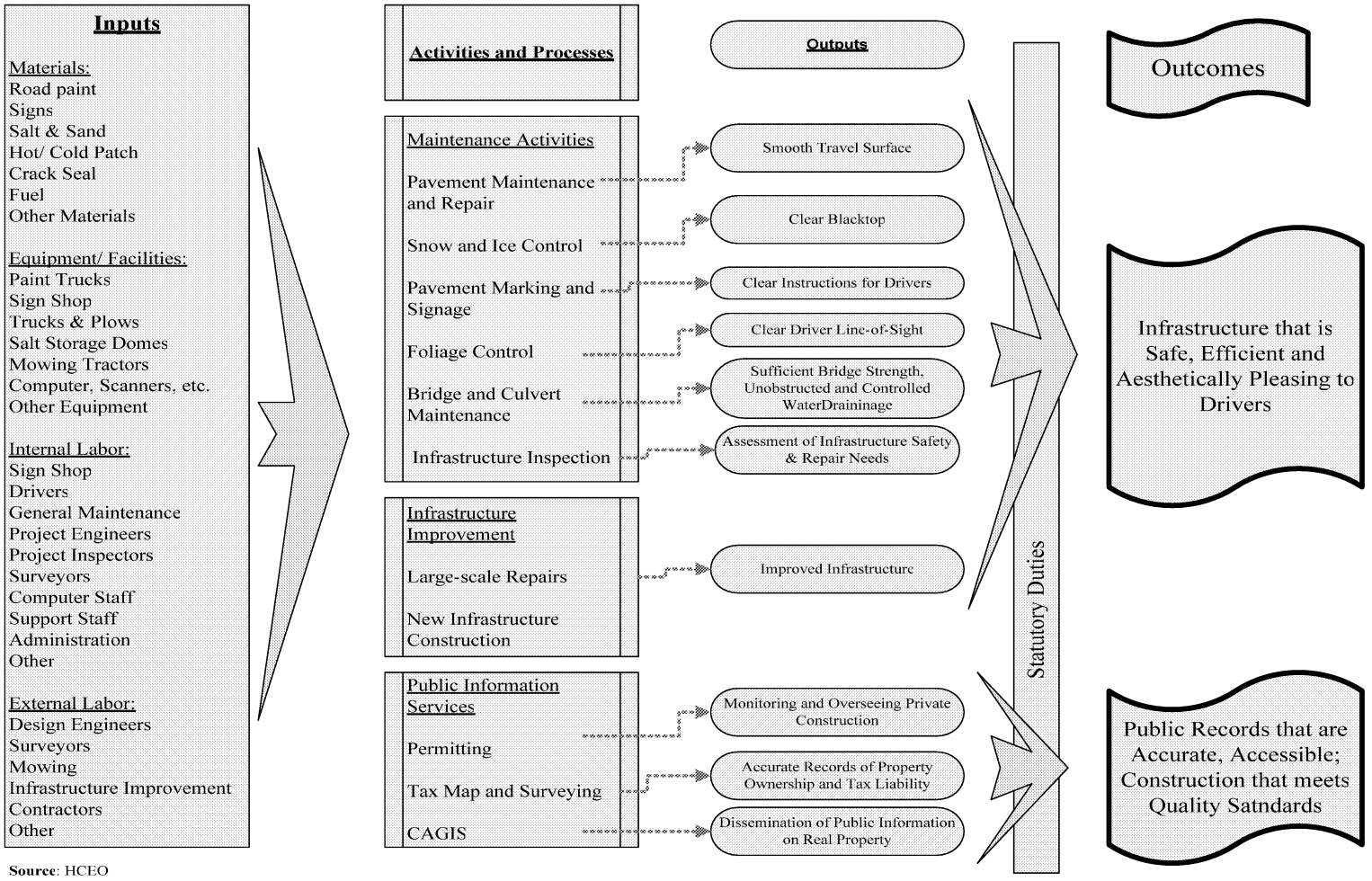
The Hamilton County Engineer applies the collaborative model used within his organization to organizational relationships with the townships, villages and unincorporated areas the Office serves. Through the annual meeting of county and township officials, the Engineer and the governments within his service area identify common goals. Representatives of the other governments and HCEO share their experiences and identify opportunities to cooperate in construction, maintenance, and pavement and foliage management programs. According to the Engineer, cooperation and leverage are the cornerstones of the County's capital improvement program as he seeks to pool the available funding of several entities in order to obtain a higher level of program achievement. By using the pooled road construction and maintenance resources of the small governments, HCEO has been able to establish a construction program that is approximately two and one half times as large as the funding provided from the County

Engineer's Road and Bridge Fund[2-1]. Likewise, the greater degree of teamwork also helps the County better respond to snow and ice, flooding, landslides, and other events.

Although all levels of HCEO have an accurate understanding of the organizational architecture, not all components of the organization understand how that architecture facilitates achieving HCEO's mission. HCEO completes some performance measurement by compiling data and publishing it in its Annual Meeting Report. However, these performance measures focus on capital improvement and largely ignore other components of the mission, such as maintenance of existing infrastructure. Furthermore, the measures mainly address inputs and outputs but they fail to show how these relate to larger outcomes and strategic goals. **Chart 2-2** illustrates the strategic linkage between these inputs, activities, and their outcomes.

[2-1] Generated through the purchase of license plates and by gasoline taxes.

Chart 2-2: Strategic Linkage Model



Source: HCEO

As shown in **Chart 2-2,** the interconnectivity of duties has developed over time to the point where the seven departments operate like independent business units but have similar and overlapping duties. Inputs, including the shared labor pool, are illustrated through distinct organizational activities. The activities support three predominant organizational goals:

- Developing and maintaining safe efficient and aesthetically pleasing infrastructure,
- Maintaining accessible, and accurate public records, and
- Ensuring that construction meets quality standards.

These goals are processed through the statutory framework of HCEO and the expectations and requirements of the County and the small governments it serves.

Defining and evaluating the interrelationship and effectiveness of inputs, activities and outputs in an organization of great complexity is inherently difficult. As a result, institutional knowledge has served as the backbone for informal appraisals of organizational effectiveness. HCEO has made initial strides in developing performance measures, but full implementation of formal measures has not yet been achieved.

Noteworthy Accomplishments

During the course of this performance audit, the following noteworthy accomplishment was noted within Hamilton County Engineer's Office:

- **HCEO aggressively identifies opportunities for resource sharing with the State of Ohio's Department of Transportation (ODOT). HCEO plows all the State highways within the jurisdiction at a cost relative to the proportional mileage of the total roads in the jurisdiction. This enables HCEO to provide snow removal services in a cost effective and fair manner, and offers the State of Ohio an opportunity to complete its snow and ice removal function through a contract, paying only the cost for snow and ice removal from state routes in Hamilton County, exclusive of the interstate.**

  HCEO and ODOT have developed an innovative and cost-effective cost-sharing arrangement to fulfill snow and ice control functions on state routes in Hamilton County. The ORC requires the State Director of Transportation to have a plan to remove snow and ice during inclement weather occurrences on the State highway system, including both state and interstate routes throughout Ohio. HCEO provides snow and ice control functions under contract to ODOT for state routes in the county based on a proportional cost. Unlike its peers, HCEO actively pursued this responsibility, to the benefit of both agencies.

Assessments Not Yielding Recommendations

In addition to the analyses presented in this report, assessments were conducted on several areas which did not warrant changes and did not yield recommendations:

- **ORC Requirements:** *Appendix 2-1* shows the primary functions of an engineer's office as defined by the ORC and the County Engineers Association of Ohio. The appendix also illustrates HCEO's completion of these functions and their status. Areas determined to be in compliance that did not result in recommendations include the following:

  - Submitting a bond and filing a completed inventory;
  - Filing the names of the appointees to unclassified service with the Department of Administrative Services (DAS);
  - Estimating the amount of money for construction and improvement of county roads along with a report describing the improvements;
  - Filing a budget request and personal (appointed) service schedule with the board of county commissioners;
  - Filing an inventory of the ditch maintenance equipment and reporting on the condition of drainage improvements with cost estimates for required repair and maintenance;
  - Filing written recommendations, with estimates, for the purchase of machinery and equipment; and
  - Reporting in an annual meeting the status of construction and repair of roads and bridges in the county

  HCEO was compliant with the primary duties and responsibilities as noted in *Appendix 2-1.*

- **Scope of Activities:** HCEO fulfills ORC required duties. HCEO outsources numerous activities related to road and bridge repairs. Staff in the labor pool at HCEO primarily focus on emergency activities like snow removal and emergency road repairs and are cross-trained to maintain a streamlined operation. HCEO fulfills agreement based activities, like sharing of snow and ice control responsibilities with other entities. In addition, HCEO provides certain services to local governments, such as pro bono consultations, which are outside the requirements of the ORC. HCEO is able to provide a higher level of service to its constituents by leveraging its resources with cooperative agreements and grant funding, which also allows local jurisdictions to benefit from its economies of scale. As HCEO fulfills its statutory duties then, through agreement or leverage, is able to provide additional services without increasing costs to the County, the scope of activities appears appropriate and reasonable.

Recommendations

R2.1 Since HCEO uses its agreements as a basis for billing activities and record keeping, it should improve coordination between departments by centralizing the location and access to all original agreements. Additionally, HCEO should ensure that all formal relationships and agreements for service are documented in writing through a letter of understanding or contract detailing the procedures, duration, and scope of the relationship.

HCEO uses a centralized billing and records archiving arrangement, but contract management is decentralized to the department level. Each department is required to provide the central office a summary of completed activities that are either HCEO billable activities or a review of third-party activities. This process varies slightly by internal department. In some cases, billing information is not highly formalized, particularly in instances where HCEO is fulfilling work for a township or village with which it has had a long-standing relationship. In other instances, lengthy formal contracts form the basis of the relationship. Because the billing information becomes part of the permanent records of the organization, it must be archived and stored. However, since each department is responsible for submitting its agreements, and a uniform methodology has not been developed, this process varies greatly by department and all agreements are not accessible at a central location. Also, as HCEO's organization has grown and the scope of responsibility has expanded, only certain types of agreements have been formalized. Although the decentralization of agreements has not directly affected the billing process at HCEO, it has, in some instances, resulted in unnecessary delays in completing document storage responsibilities due to the decentralized nature of record keeping.

According to the Summit County Engineers Office (SCEO), centralized contract management offers the ability to increase internal control over monitoring and communication. This control over document handling reduces the likelihood of errors in invoices, and results in improvements in the timeliness of response to public document requests. It also reduces the amount of time required to purge duplicate files (between the departments and the central office) prior to archiving records or updating contracts.

Once HCEO centralizes its original agreements, it could evaluate the feasibility of digitizing these documents to make them even more accessible to all departments. Also, if centralized, the billing system could be improved by numbering and cataloguing agreements to ensure that all applicable funds are billed-out to contracting governments and agencies. Increasing the centralized management of agreements would also assist the departments by having agreements readily accessible in their most up-to-date form. HCEO is currently implementing a digitalizing process for its archival documents.

Preparing digital versions up front would have an impact on the eventual archiving costs and streamline the process in future years.

R2.2 HCEO should develop, implement and monitor performance measures for all departments and functions. Performance measures should be used in conjunction with a set of established benchmarks and goals to better monitor the effectiveness of HCEO operations, provide meaningful cost-of-service data for comparison purposes, and facilitate ongoing performance management.

HCEO does not use performance measures to track and evaluate contracting and outsourcing programs, nor does it use formal measures to publicize its accomplishments. General comparisons, usually regarding the collaboration and leveraging of construction efforts, are included in the annual report, but performance measures are not used on a day-to-day basis for decision-making purposes.

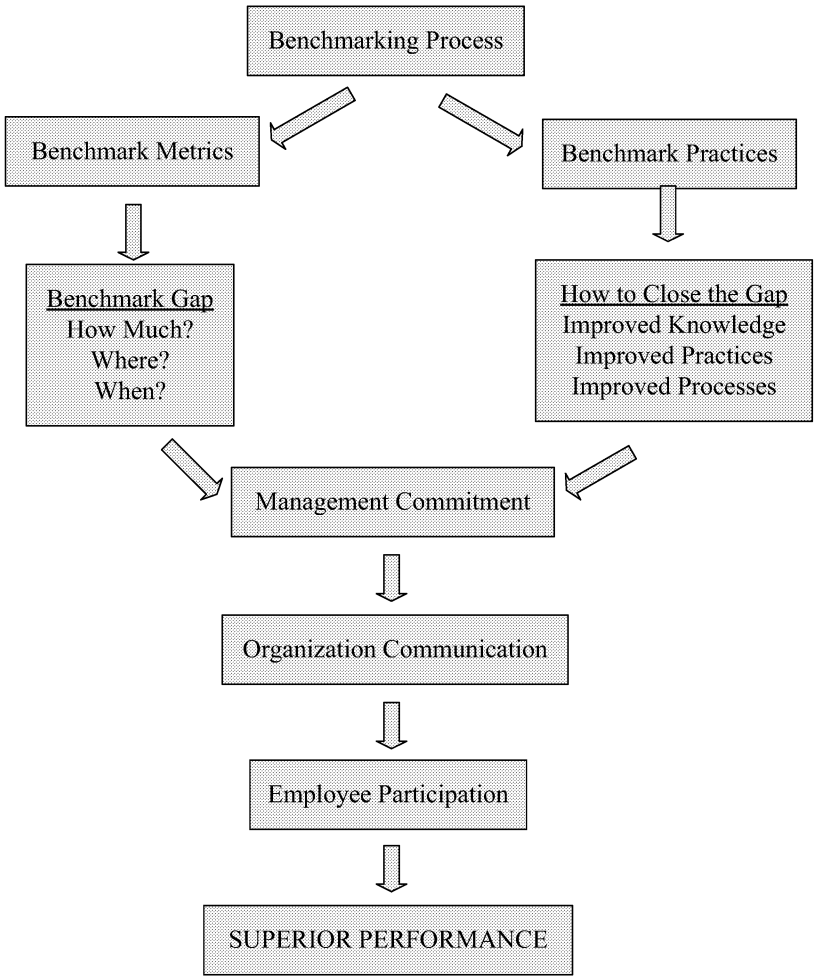
According to the University of Alabama, Department of Industrial Engineering, benchmarking can be defined formally or informally.

- **Formal Benchmarking:** Benchmarking is the continuous, systematic process of measuring products, services, and practices against the toughest competitors or those companies recognized as industry leaders.

- **Working Benchmarking:** Benchmarking is a basis of establishing rational performance goals through the search for best industry practices that will lead to superior performance.

Chart 2-3 illustrates how the benchmarking process should be designed and **Chart 2-4** maps the process by showing the steps necessary to successfully benchmark performance.

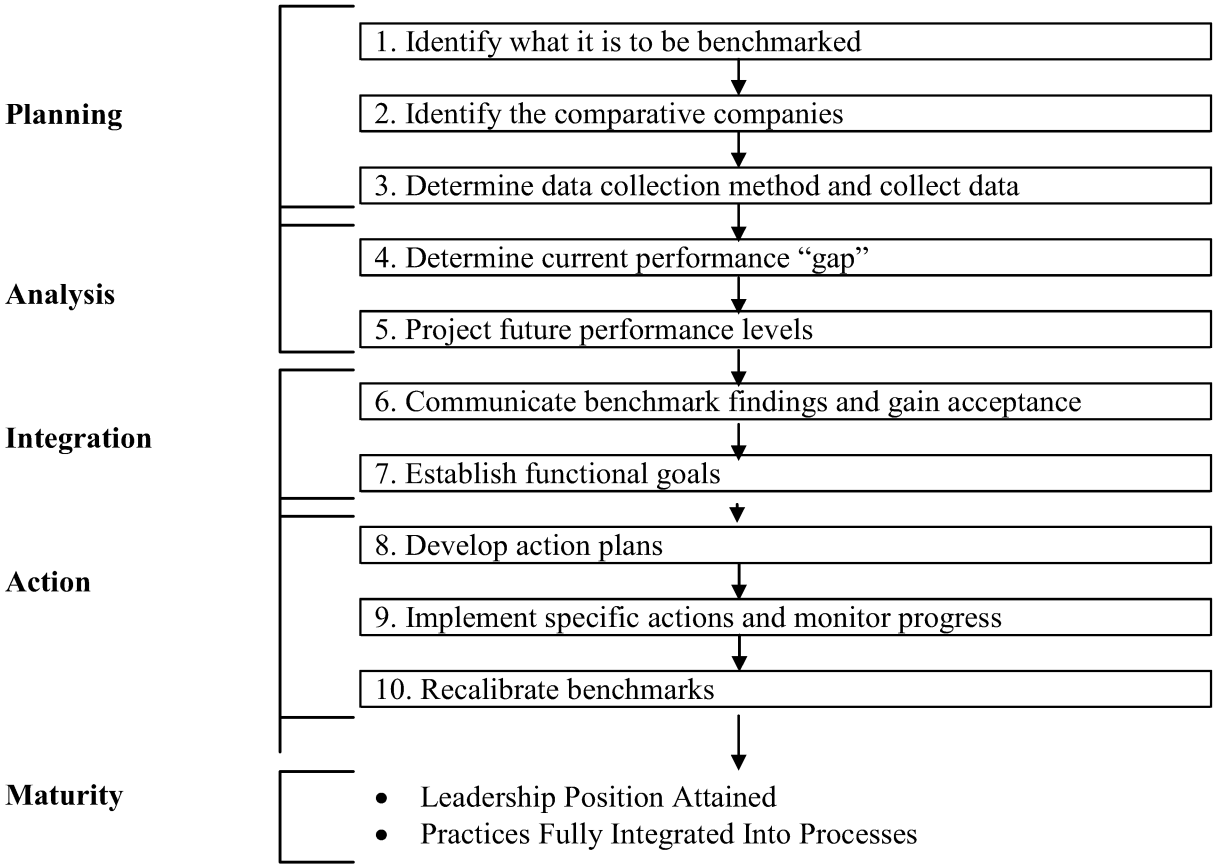
Chart 2-3: Benchmarking Process



Source: Department of Industrial Engineering, University of Alabama

A benchmark practice is any work process made up of (1) an input, (2) a repeatable process based on method or practice, and (3) an output, where the practices deliver the output. It is assumed that, if the practices are the best in the industry, they will most fully satisfy the customer. Quantitative benchmarks or benchmark metrics are the conversion of benchmark practices into operational measures. **Chart 2-4** expands the benchmarking process using a process map to illustrate the application of benchmarks.

Chart 2-4: Benchmarking Process Steps



Source: Department of Industrial Engineering, University of Alabama

Chart 2-4 shows the cyclical process of the benchmarking and performance management application. ODOT has implemented a set of performance measures to gauge its performance. HCEO could use ODOT's measures as a basis for developing its own set of internal performance targets (see **Infrastructure and Maintenance)**. One method of measuring the efficiency of operation is using best practice information from other entities; another approach is to track specific criteria and assess changes over time**.**

HCEO could begin its measurement program by tracking traffic safety and volume and graduate to more sophisticated measures over time. Within HCEO, each department would need to perform benchmarking steps and develop its own set of key indicators. These could then be incorporated into an agency-wide performance management plan. HCEO could implement this recommendation using current resources, although it would need to allocate time to personnel for the development of the benchmarks and measurement system.

Appendix 2-1

Compliance Summary Ohio Revised Code

ORC	Section Summary	Status
§315.03	Bond submitted and approved in a timely manner.	Compliant
§305.18	Inventory completed and filed with the Auditor	Compliant
§124.11 (8, 9)	Submit the names and job titles of appointees in unclassified service to Department of Administrative Services (DAS)	Compliant
§6131.52	Determine the need for a tax to pay for the assessments for ditch projects	NA-Not used in Hamilton County
§5543.02	Prepare an estimate of the amount of money required for construction and improvement of public roads.	Compliant
§5543.02	File report to the County Commissioners on the Condition of the County Roads, Bridges, Culverts, and estimate the funds needed for maintenance and construction of new roads, bridges, or culverts.	Compliant
§102.02	County Engineers must file Financial Disclosure Statements with the Ohio Ethics Commission	Compliant
§6317.08	Property Owners may apply to County Engineers for reduction in ditch Maintenance assessments**.**	Not Applicable
§5705.28	County Engineers file a Budget Request and Personal Service Schedule with the County Commissioners	Compliant
§6137.07	File an inventory of ditch maintenance equipment with the Board of County Commissioners and make recommendations for purchase.	Compliant
§6137.06	File a report to the Board of County Commissioners on the condition of drainage improvements and estimates of costs required for repair and maintenance. Establish a rental rate for ditch maintenance equipment.	Compliant
§6137..03	Ditch Maintenance Assessments last day.	Not Applicable
Federal EEOCC Requirements	County Engineer must file EEO -4 report (Employment and Records) with Federal Equal Employment Coordinating Council by September 30.	Compliant
§5549.01	File written recommendations with the Board of County Commissioners on machinery, tools, and equipment that should be purchased for use during the ensuing year and estimated cost thereof.	Compliant
§5543.06	Requires the County Engineer to call an annual meeting of all township and county authorities having directly to do with the construction and repair of roads and bridges within the county.	Compliant
§5543.20	Requires the County Engineer to make annual inspection of all bridges on the county highway system inside and outside municipalities; on township roads and other bridges where responsible by law or agreement. A report on the condition of all bridges shall be made not later than 60 days after inspection to the Board of County Commissioners**.**	Compliant

Source: ORC and HCEO

FINANCIAL MANAGEMENT

Financial Management

Background

The Hamilton County Engineer's Office (HCEO) receives funds from local, state, and federal sources. In FY 2004, approximately 90 percent of HCEO's tax revenues were generated by State and local motor vehicle license taxes. In addition to these taxes, HCEO also receives revenues from the State gasoline tax, federal and State grants, and municipal court fines.

The Motor Vehicle License Tax was increased in 2003 and is assessed on operators of motor vehicles on the public roads or highways in Ohio when vehicle registrations are obtained or renewed. Hamilton County receives funding from this tax based on the number of vehicles registered in the county, as well as, the ratio of county roads to the state total and an equal distribution provided to all Ohio counties.

HCEO is responsible for the design, construction, inspection, maintenance, and study of 522 bridges, and over 500 miles of public roads within Hamilton County. ORC § 315.08 further expands upon the duties of the county engineer to encompass the preparation of plans, specifications, details, and estimates of cost, including the submission of forms and contracts for the construction, maintenance, and repair of all bridges, culverts, roads, drains, ditches, roads on county fairgrounds, and other public improvements.

HCEO records financial transactions into the following accounts:

- Administrative
- Planning/Design
- Survey/Mapping
- Permit/Construction
- Traffic/Sign
- Garage
- East/Central Maintenance
- West Maintenance

For the purpose of this section, HCEO's services have been divided into five specific categories:

- **Roads and bridges** – includes salary, benefit and supply expenditures related to the construction and maintenance of roads and bridges.
- **Planning and design** – consists of salary and benefit expenditures for personnel related to the planning and design functions of the office.

- **Survey and mapping** – includes salary and benefit expenses related to surveying, record keeping, providing tax maps, reviewing deeds, and maintaining necessary data for the Cincinnati Area Geographic Information System.
- **Administration** – includes expenditures for administrative personnel, in addition to office supplies, travel, and equipment costs.
- **Other** – consists of salary and benefit expenditures for the permit/construction functions of HCEO.

HCEO's financial reports are the responsibility of the Office's budgeting and financial administrators. HCEO currently produces a master budget report that displays revenues and expenditures by sub-fund, and object code levels. This document is used internally by the HCEO administration and department supervisors to track budgeted amounts throughout the year. HCEO uses the Hamilton County Auditor Performance software system for payroll and some financial reports. The Hamilton County Commissioners approve HCEO's formal budget, which must be submitted to the County Commissioners by November 15 and approved by them no later than December 15.

Peer Comparison

Revenues and Expenditures

Table 3-1 displays HCEO revenues and expenditures for all funds as a percentage of totals in comparison to the peers: Franklin County Engineer's Office (FCEO), Montgomery County Engineer's Office (MCEO), and Summit County Engineer's Office (SCEO).

Table 3-1: FY 2003 Revenues and Expenditures as a Percentage of Total - All Funds

	HCEO	FCEO	MCEO	SCEO	Peer Average
Revenues:					
Permissive Tax	27.6%	14.4%	25.1%	27.3%	**22.3%**
License Tax	50.3%	33.5%	46.2%	51.4%	**43.7%**
Gasoline Tax	6.0%	3.0%	11.0%	10.1%	**8.0%**
Municipal Court	1.8%	1.5%	1.6%	1.1%	**1.4%**
Grants	0.2%	22.5%	0.0%	0.0%	**7.5%**
Other	4.6%	4.9%	2.6%	1.9%	**3.1%**
Reimbursements	9.4%	19.6%	10.0%	8.2%	**12.6%**
Transfers/Advances In	0.0%	0.5%	3.5%	0.0%	**1.3%**
Total Revenues	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**
Expenditures:					
Salaries	46.8%	41.3%	52.5%	58.8%	**50.9%**
Employer Retirement Contributions	5.8%	5.5%	7.1%	8.6%	**7.1%**
Benefits	6.0%	8.6%	10.0%	11.8%	**10.2%**
Purchased Services	17.4%	30.4%	4.5%	8.7%	**14.5%**
Supplies	14.6%	11.1%	14.4%	11.3%	**12.3%**
Capital Outlay- Equipment	4.6%	1.0%	4.4%	0.5%	**2.0%**
Other	4.8%	2.0%	7.0%	0.2%	**3.0%**
Total Expenditures	**100.0%**	**100.0%**	**100.0%**	**100.0%**	**100.0%**

Source: HCEO and peer office financial reports
Note: Capital improvement expenditures were not included.

As shown in **Table 3-1**, HCEO received a large portion (77.9 percent) of its revenues from license and permissive tax distributions in FY 2003, and relies more on these sources of tax revenues when compared to the peer average of 66 percent. HCEO's funding structure is greatly affected by the level of grant funding and reimbursement it receives, as these are the most unpredictable revenue sources. In FY 2003, HCEO received only 0.2 percent of its total funding through grants, which are primarily approved by the Ohio Public Works Commission (OPWC) on an annual basis. HCEO received a smaller percentage of its revenues from reimbursements when compared to the peer average.

As illustrated in **Table 3-1,** HCEO's percentage of total expenditures allotted to salaries and benefits was significantly lower than the peer average. In FY 2003, HCEO salaries, retirement, and benefits constituted only 58.6 percent of total expenditures compared to the peer average of 68.2. HCEO attributes this to relatively low unemployment and worker's compensation payments, as well as an increase in employee insurance contributions to offset rising health care costs. In contrast, HCEO's purchased services and supplies expenditures were higher than the peer average.

Table 3-2 compares HCEO's revenues and expenditures to the peer counties on a per lane mile basis.

Table 3-2: FY 2003 Revenues and Expenditures per Lane Mile All Funds

	HCEO	FCEO	MCEO	SCEO	Peer Average	HCEO to Peer Variance
Lane Miles	**1,157**	**610**	**726**	**483**	**606**	**90.8%**
Revenues per Lane Mile:						
Permissive Tax	$6,011	$11,236	$4,825	$8,530	**$8,197**	**(26.7%)**
License Tax	$10,961	$26,218	$8,883	$16,068	**$17,056**	**(35.7%)**
Gasoline Tax	$1,318	$2,372	$2,109	$3,157	**$2,546**	**(48.2%)**
Municipal Court	$389	$1,161	$316	$344	**$607**	**(35.9%)**
Grants	$53	$17,634	$0	$0	**$5,878**	**(99.1%)**
Other	$1,006	$3,853	$493	$607	**$1,651**	**(39.1%)**
Reimbursements	$2,049	$15,379	$1,924	$2,550	**$6,618**	**(69.0%)**
Transfers/Advances In	$0	$410	$665	$0	**$358**	**(100.0%)**
Total Revenues per Lane Mile	**$21,787**	**$78,263**	**$19,216**	**$31,256**	**$42,911**	**(49.2%)**
Expenditures per Lane Mile:						
Salaries	$6,477	$14,347	$7,023	$13,203	**$11,524**	**(43.8%)**
Employer Retirement Contributions	$797	$1,925	$954	$1,926	**$1,602**	**(50.3%)**
Benefits	$834	$3,001	$1,336	$2,657	**$2,321**	**(64.2%)**
Purchased Services	$2,410	$10,539	$607	$1,961	**$4,369**	**(44.8%)**
Supplies	$2,024	$3,859	$1,926	$2,527	**$2,771**	**(26.9%)**
Capital Outlay- Equipment	$633	$357	$595	$121	**$358**	**77.1%**
Capital Outlay- Permanent Imp.	$11,725	$41,686	$3,376	$0	**$15,020**	**(21.9%)**
Other	$662	$685	$933	$42	**$553**	**19.6%**
Total Expenditures per Lane Mile	**$25,561**	**$76,398**	**$16,750**	**$22,429**	**$38,526**	**(33.7%)**
Operating Gain/(Loss) per Lane Mile	**($3,774)**	**$1,865**	**$2,466**	**$8,827**	**$4,383**	**(186.0%)**

Source: HCEO and peer office financial reports

As shown in **Table 3-2**, HCEO maintains approximately 90 percent more lane miles than the peer average. Although total mileage is the primary driver of expenditures, only a small portion of tax distributions are based on total lane mileage. As a result, comparing HCEO's tax revenues in proportion to its lane mileage will result in ratios significantly lower than the peer average. It should be noted that although HCEO's capital improvement expenditures were 12.9 percent higher than the peer average, this did not result in higher reimbursement levels or grant funding for HCEO.

Table 3-3 displays HCEO's revenues and expenditures per registered vehicle in comparison to the peer counties.

Table 3-3: FY 2003 Revenues and Expenditures per Registered Vehicle

	HCEO	FCEO	MCEO	SCEO	Peer Average	HCEO to Peer Variance
Number of Registered Vehicles	**765,445**	**1,100,170**	**532,604**	**534,258**	**722,344**	**6.0%**
Revenues per Registered Vehicle:						
Permissive Tax	$9.09	$6.23	$6.58	$7.71	**$6.84**	**32.9%**
License Tax	$16.57	$14.54	$12.11	$14.53	**$13.72**	**20.7%**
Gasoline Tax	$1.99	$1.32	$2.88	$2.85	**$2.35**	**(15.2%)**
Municipal Court	$0.59	$0.64	$0.43	$0.31	**$0.46**	**27.4%**
Grants	$0.08	$9.78	$0.00	$0.00	**$3.26**	**(97.5%)**
Other	$1.52	$2.14	$0.67	$0.55	**$1.12**	**35.8%**
Reimbursements	$3.10	$8.53	$2.62	$2.31	**$4.48**	**(30.9%)**
Transfers/Advances In	$0.00	$0.23	$0.91	$0.00	**$0.38**	**NA**
Total Revenues per Registered Vehicle	**$32.93**	**$43.39**	**$26.19**	**$28.26**	**$32.61**	**1.0%**
Expenditures per Registered Vehicle:						
Salaries	$9.79	$7.95	$9.57	$11.94	**$9.82**	**(0.3%)**
Employer Retirement Contributions	$1.20	$1.07	$1.30	$1.74	**$1.37**	**(12.1%)**
Benefits	$1.26	$1.66	$1.82	$2.39	**$1.96**	**(35.7%)**
Purchased Services	$3.64	$5.84	$0.83	$1.77	**$2.81**	**29.4%**
Supplies	$3.06	$2.14	$2.63	$2.28	**$2.35**	**30.2%**
Capital Outlay- Equipment	$0.96	$0.20	$0.81	$0.11	**$0.37**	**156.7%**
Capital Outlay- Permanent Imp.	$17.72	$23.11	$4.60	$0.00	**$9.24**	**91.8%**
Other	$1.00	$0.38	$1.27	$0.04	**$0.56**	**77.6%**
Total Expenditures per Registered Vehicle	**$38.64**	**$42.36**	**$22.83**	**$20.28**	**$28.49**	**35.6%**
Operating Gain/(Loss) per Registered Vehicle	**($5.70)**	**$1.03**	**$3.36**	**$7.98**	**$4.13**	**(238.3%)**

Source: HCEO and peer office financial reports and Ohio BMV

As illustrated in **Table 3-3**, HCEO had 6.0 percent more registered vehicles within the county than the peer average. In addition, HCEO assessed two additional permissive auto taxes pursuant to ORC § 4504.15 and 4504.16. By assessing these additional license taxes, HCEO was able to generate 32.9 percent more permissive auto tax revenue per registered vehicle than the peer average. Although HCEO had fewer registered vehicles than Franklin County, license tax revenues were higher than all the peers and 20.7 percent higher than the peer average due, in part, to the portion of the license tax distribution based on total lane mileage.

Further displayed in **Table 3-3** is HCEO's low level of salary and benefit expenditures per registered vehicle. Although salary expenditures were comparable to the peer average, retirement contributions and benefit expenditures were significantly below the peer average due to low levels of unemployment payments and worker's compensation claims, and increasing employee health care contribution percentages. Purchased services and supply expenditures per registered vehicle, both of which were significantly higher than the peer average, are analyzed in more detail in **Table 3-4b**.

Purchased Services and Supplies

Historically, HCEO has maintained a high level of internal control over purchases, requiring that all major purchases and travel related expenditures are approved by the Chief Deputy Engineer. The office currently has two purchasing agents, one for the field, one for the downtown office. The office uses POs for all purchases and enters them into the county auditor's computer system.

Table 3-4a and **Table 3-4b** show HCEO purchases on a per lane mile basis and per registered vehicle basis, respectively, for FY 2003 and compares them to the peer counties.

Table 3-4a: FY 2003 Purchased Services, Supplies, and Material Expenditures per Lane Mile

	HCEO	FCEO	MCEO	SCEO	Peer Average	HCEO to Peer Variance
Total Lane Miles	**1,157**	**610**	**726**	**483**	**606**	**90.8%**
Purchased Services						
Repair & Maintenance	$424	$1,239	$122	$730	**$697**	**(39.2%)**
Travel	$11	$35	$23	$55	**$37**	**(71.9%)**
Utilities	$302	$316	$276	$309	**$300**	**0.8%**
Rental	$6	$82	$20	$30	**$44**	**(86.6%)**
Contracted Services	$1,647	$2,062	$182	$837	**$1,027**	**60.3%**
Payments to Other Entities	$3	$0	$913	$0	**$304**	**(99.2%)**
Miscellaneous	$659	$749	$20	$42	**$270**	**143.8%**
Total	**$3,051**	**$4,483**	**$1,555**	**$2,003**	**$2,680**	**13.8%**
Materials and Supplies						
Office Supplies	$49	$41	$49	$62	**$51**	**(4.3%)**
Photo Supplies	$3	$3	$0	$0	**$1**	**207.5%**
Janitorial Supplies	$10	$31	$11	$0	**$14**	**(28.3%)**
Other Operating Supplies	$284	$1,217	$245	$477	**$646**	**(56.1%)**
Small Tools & Minor Equipment	$97	$76	$46	$56	**$59**	**64.2%**
Miscellaneous Road Material Supplies	$378	$593	$1,189	$66	**$616**	**(38.6%)**
Salt	$739	$1,479	$0	$1,634	**$1,038**	**(28.8%)**
Coke & Fuel Oil	$430	$374	$371	$231	**$326**	**32.0%**
Building Supplies	$34	$42	$0	$0	**$14**	**143.6%**
Total	**$2,024**	**$3,856**	**$1,911**	**$2,527**	**$2,765**	**(26.8%)**
Total Purchased Services & Supplies	**$5,075**	**$8,339**	**$3,466**	**$4,530**	**$5,445**	**(6.8%)**

Source: HCEO and peer county financial reports

Table 3-4b: FY 2003 Purchased Services, Supplies, and Material Expenditures per Registered Vehicle

	HCEO	FCEO	MCEO	SCEO	Peer Average	Variance
Total Registered Vehicles	**765,445**	**1,100,170**	**532,604**	**534,258**	**722,344**	**6.0%**
Purchased Services						
Repair & Maintenance	$0.64	$0.69	$0.17	$0.66	**$0.55**	**16.0%**
Travel	$0.02	$0.02	$0.03	$0.05	**$0.03**	**(46.3%)**
Utilities	$0.46	$0.18	$0.38	$0.28	**$0.25**	**82.8%**
Rental	$0.01	$0.05	$0.03	$0.03	**$0.04**	**(75.5%)**
Contracted Services	$2.49	$1.14	$0.25	$0.76	**$0.83**	**200.6%**
Payments to Other Entities	$0.00	$0.00	$1.24	$0.00	**$0.31**	**(98.7%)**
Miscellaneous	$1.00	$0.42	$0.03	$0.04	**$0.23**	**339.0%**
Total	**$4.61**	**$2.49**	**$2.12**	**$1.81**	**$2.23**	**106.9%**
Materials and Supplies						
Office Supplies	$0.07	$0.02	$0.07	$0.06	**$0.04**	**75.5%**
Photo Supplies	$0.01	$0.00	$0.00	$0.00	**$0.00**	**450.4%**
Janitorial Supplies	$0.01	$0.02	$0.01	$0.00	**$0.01**	**22.4%**
Other Operating Supplies	$0.43	$0.67	$0.33	$0.43	**$0.53**	**(19.3%)**
Small Tools & Minor Equipment	$0.15	$0.04	$0.06	$0.05	**$0.05**	**198.8%**
Miscellaneous Road Material Supplies	$0.57	$0.33	$1.62	$0.06	**$0.58**	**(1.4%)**
Salt	$1.12	$0.82	$0.00	$1.48	**$0.78**	**43.1%**
Coke & Fuel Oil	$0.65	$0.21	$0.51	$0.21	**$0.28**	**131.0%**
Building Supplies	$0.05	$0.02	$0.00	$0.00	**$0.01**	**335.8%**
Total	**$3.06**	**$2.14**	**$2.60**	**$2.28**	**$2.34**	**30.6%**
Total Purchased Services & Supplies	**$7.67**	**$4.62**	**$4.72**	**$4.10**	**$4.48**	**71.2%**

Source: HCEO and peer county financial reports

As shown in **Table 3-4a**, HCEO total expenditures per lane mile were 6.8 percent less than the peer average. Although HCEO's purchase levels were well below the peer average in most line item categories, a significant variance existed in the contracted services, miscellaneous, photo supplies, small tools, and coke and fuel oil line items. Like Franklin County, HCEO contracts a significant portion of engineering and design services to private contractors. HCEO's contracted services expenditures were lower than FCEO, but approximately 60 percent higher than the peer average.

It should be noted that while displaying expenditures on a per lane mile basis provides a useful performance indicator, some expenditures such as repairs and maintenance, utilities and salt are greatly effected by total lane mileage, while others such as travel and office supplies are not. As a result of the high lane mileage, HCEO had higher expenditures in almost every line item on a per registered vehicle basis as shown in **Table 3-4b**.

Capital Outlay

Table 3-5a and **Table 3-5b** show HCEO's capital outlay expenditures on per lane mile and registered vehicle basis, respectively.

Table 3-5a: FY 2003 Capital Outlay per Lane Mile

	HCEO	FCEO	MCEO	SCEO [1]	Peer Average	Variance
Total Lane Miles	1,157	610	726	483	**606**	**90.8%**
Office Furniture & Equipment	$6	$53	$2	N/A	**$27**	**(76.8%)**
Data Processing Equipment	$29	$120	$50	N/A	**$85**	**(66.4%)**
Vehicles	$401	$138	$514	N/A	**$326**	**23.0%**
Other Equipment	$197	$43	$29	N/A	**$36**	**446.9%**
Land Purchase	$0	$524	$0	N/A	**N/A**	**N/A**
Construction and Improvement	$11,725	$41,164	$3,376	N/A	**$22,270**	**(47.4%)**
Total Capital Outlay	**$12,358**	**$42,042**	**$3,971**	**N/A**	**$23,006**	**(46.3%)**

Source: HCEO and peer financial data
[1] Data from SCEO was not submitted.

Table 3-5b: FY 2003 Capital Outlay per Registered Vehicle

	HCEO	FCEO	MCEO	SCEO [1]	Peer Average	Variance
Total Registered Vehicles	765,445	1,100,170	532,604	534,258	**722,344**	**6.0%**
Office Furniture & Equipment	$0.01	$0.03	$0.00	N/A	**$0.02**	**(58.7%)**
Data Processing Equipment	$0.04	$0.07	$0.07	N/A	**$0.08**	**(43.1%)**
Vehicles	$0.61	$0.08	$0.70	N/A	**$0.32**	**91.4%**
Other Equipment	$0.30	$0.02	$0.04	N/A	**$0.03**	**809.7%**
Land Purchase	$0.00	$0.29	$0.00	N/A	**N/A**	**N/A**
Construction and Improvement	$17.72	$22.82	$4.60	N/A	**$19.08**	**(7.1%)**
Total Capital Outlay	**$18.68**	**$23.31**	**$5.41**	**N/A**	**$14.36**	**30.1%**

Source: HCEO and peer financial data
[1] Data from SCEO was not submitted.

As shown in **Table 3-5a** and **Table 3-5b**, HCEO capital expenditures per lane mile and per registered vehicle were significantly lower than the peer average in every category with the exception of vehicles and other equipment.

On an annual basis, HCEO attempts to budget capital expenditures for equipment at approximately $800,000 per year. In FY 2003, HCEO's vehicle expenditures consisted of three

dump truck/snow plows, two foremen trucks, two SUVs, and one van, as well as other equipment. In FY 2004, HCEO decreased vehicle expenditures by approximately $20,000, purchasing three dump truck/snow plows, two foremen trucks, and two SUVs, and other equipment.

For the other equipment classification, HCEO spent approximately $230,000 in FY 2003, purchasing two chippers, a Bobcat with trailer, and other equipment. In FY 2004, HCEO's expenditures for other equipment increased approximately $96,000, to reflect the purchase of one mower, one striper, and one fork lift, as well as other equipment.

Assessments Not Yielding Recommendations

During the course of the performance audit, the following assessments were conducted which did not yield any recommendations:

- *Employee Policy and Procedures:* HCEO's policy and procedures manual, as well as its ethics and travel policy, were analyzed against best practices established by the Society for Human Resources Management (SHRM), the Ohio Employment Commission (OEC), and the Ohio Office of Budget and Management (OBM). HCEO's policies were consistent with practices and standards established by these organizations.

- *Internal Controls:* HCEO's internal controls were compared to best practices established by the Government Accountability Office (GAO). In addition, a sample of documents was analyzed to ensure proper internal control over financial reporting.

- *Budget Detail:* HCEO's budgets were compared to those of the peer counties to determine if the level of detail present was comparable and sufficient. The analysis revealed that HCEO's budget contained more detail that the peer counties, and had a sufficient level of detail to enable HCEO administrators to make sound financial decisions

Noteworthy Accomplishments

This section highlights specific noteworthy accomplishments identified throughout the course of the audit.

- HCEO coordinates all grant approvals through the HCEO Budget Department. Prior to this, grants were being sought and approved on a department-level basis. This information was not being efficiently communicated to the Budget Department, resulting in some instances of incorrect payments. With the improved communication and coordination, the HCEO Budget Department will be able to more efficiently account for expenditures and produce a more accurate and effective budget.

Recommendations

Budgeting

R3.1 HCEO should present a budget document that shows its combined sub-funds and provides a beginning and ending fund balance similar to the format of the financial forecast presented in Table 3-10 of this report. Presenting budget documents in this format will provide users with financial information on total HCEO operations including beginning and ending fund balances.

HCEO currently produces an annual budget that displays revenues and expenditures classified into sub-funds. When aggregated, these sub-funds comprise the HCEO portion of the Hamilton County General Fund. The purpose of this type of budget report is to display revenues and expenditures in accordance with laws and regulations that dictate the proper use of the funds. Because HCEO does not produce a total fund financial report, stakeholders do not have easy access to data that shows the overall fund balance of HCEO. As a result, it is difficult to determine HCEO's overall financial performance on an annual basis. Without this capability, year-to-year comparisons cannot be conducted effectively.

According to the GFOA, State and local governments frequently establish a large number of funds for internal accounting purposes. Often, having these internal funds is useful or necessary to provide the level of detail needed to ensure and demonstrate legal compliance. In this regard, however, the goals of accounting differ somewhat from the objectives of financial reporting. Where an accounting system must collect all of the data needed to ensure and demonstrate legal compliance, financial reporting should be concerned only with those aspects of compliance that are of importance to users of general purpose external financial reports.

GFOA further states that not every internal fund should automatically be classified as a fund for the purposes of external financial reporting. As specifically noted in the authoritative accounting and financial reporting standards, the use of unnecessary funds for financial reporting purposes can result in inflexibility, undue complexity, and inefficient financial administration. Accordingly, those same standards state that only the minimum number of funds consistent with legal and operating requirements should be established. To remedy this problem, the GFOA recommends that every state or local government that uses fund accounting establish clear criteria for determining whether a given internal fund should be classified and reported as an individual fund in the government's financial reports. Whenever it is possible to do so without sacrificing the goals of fund accounting, similar internal funds should be combined into single funds for external financial reporting purposes.

By combining internal finds to simplify public reporting and showing aggregate total revenues and expenditures, HCEO will be able to enhance its external financial reporting and provide a greater level of clarity in its financial data.

R3.2 HCEO should consider using a performance based budgeting system to enhance its internal budgeting process. HCEO's current budgeting process does not provide accurate performance measurement information, which, if developed through performance based budgeting, could aid management in evaluating the efficiency and effectiveness of its functions and departments. Implementing a performance based system could also help HCEO more easily achieve its goals and objectives by allowing the Office to focus on those functions or departments that may not have positive performance feedback.

HCEO should develop a performance based budgeting system that contains, at a minimum, a mission statement and measurement indicators for each program. In order to measure outcomes, HCEO should also use indicators such as those displayed in the peer comparison section of this report. Performance indicators, such as cost per lane mile or registered vehicle would allow HCEO to set established benchmarks in those areas and measure performance in relation to pertinent benchmarks.

HCEO does not currently use performance based budgeting. Instead, it uses a traditional budget format that displays budgeted annual amounts, as well as monthly actual amounts and year-to-date variances. This budget document is created using as a goal the projects that HCEO plans to complete in that year. HCEO segregates its budget by sub-funds, and takes into account all functions and activities that the office provides. Without performance data, HCEO may not be able to determine which organizational functions and departments are performing in a satisfactory manner when comparing the outcomes of each function.

Performance based budgeting is a rapidly expanding budgeting process that was developed to reform public-sector management by measuring governmental program results. This system has gained popularity in recent years with the passage of the federal Government Performance and Results act in 1993. Although this act governs federal agencies only, performance based budgeting has gained popularity on the state government level as well. Currently, more than 30 states have passed legislation requiring performance based budgeting in some form.

An effective performance budget indicates what goals or outcomes have been achieved by displaying the relationship between the funding of a certain function or department and the outcomes and goals of that department. By examining outcomes instead of

inputs, management can more easily determine appropriate resource allocation by analyzing information on the productivity and efficiency of the organization's functions.

The March 18, 2002 report, *Performance Budgeting for Federal Agencies,* produced by AMS (an international business and technology firm) outlines the creation of a performance based budget and describes it as a simultaneous top-down and bottom-up process. Budget planners and policy officials must create and assign program goals and objectives. Management must also outline the levels of resources that the organization anticipates allocating to support those goals and objectives. Additionally, outcome measurements must be identified that help to determine whether goals were met and resources spent effectively; however, the goals, objectives, resource levels, and outcome measures must be developed with, and validated by, lower level management.

It is important for an organization to fully understand what benefits performance based budgeting can provide. The United States General Accounting Office (GAO) has outlined some potential benefits of performance based budgeting in its September 2002 report, *Performance Budgeting: Opportunities and Challenges.* As outlined in this report, performance based budgeting can provide information to help management address a number of issues, such as determining whether programs or functions:

- Are contributing to stated goals;
- Are well coordinated with related initiatives at the county level;
- Are providing information on what outcomes are being achieved;
- Have resource investments which produce benefits that exceed costs; and
- Have managers that have the requisite capacities to achieve promised results.

The Fiscal Research Program at the Andrew Young School of Policy Studies defines performance based budgeting as requiring strategic planning regarding agency mission, goals, and objectives and a process that requests quantifiable data that provides meaningful information about program outcomes. In addition, performance based budgeting may also require an assessment of agency progress toward specified targets.

When instituting a performance based budgeting system, what constitutes performance must be established. Some states that have implemented performance based budgeting, such as Wyoming, specify that performance measures should be based on the Governmental Accounting Standards Board (GASB) definitions for measuring agency accomplishments.

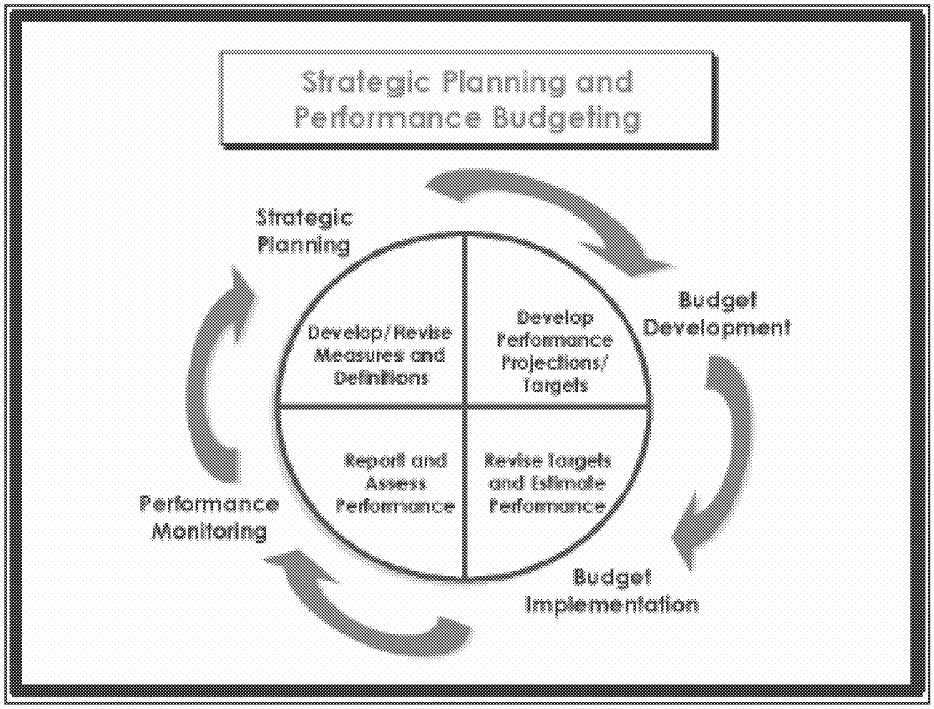
Recently, the City of Denver, Colorado established a Performance Measurement Guide that provides information on how to determine and select performance indicators. This guide establishes two types of performance measures: the measure of the number of a certain outcome or output, and how well the organization is providing a product or

service. Measuring the level of an outcome or output provides some basic information about the demand of an entity's customers and the load on the organization's resources. However, just knowing the level of a certain output, in itself, does not provide sufficient information on performance. Historical data concerning previous levels of output must be included to compare to current levels.

There is no universal method for developing a performance based budgeting process. The ultimate goal of this budgeting system is to determine an agency's performance. Although there is no universal method, all budgeting systems should be created to measure the link between agency activities and its actual outcomes.

The State of Texas has developed comprehensive standards for the strategic planning process, thereby linking the performance measurement process to strategic planning and budgeting. The process used for performance measurement, and its link to budgetary allocations, is shown in **Chart 3-1**.

Chart 3-1: Strategic Planning and Performance Budgeting



Source: State of Texas: Guide to Performance Measure Management, 2000 Edition

According to the Texas State Auditor's standards, a good performance measurement system should be results-oriented, focused on the most important performance indicators, provide useful information for decision-making, and be accessible and reliable. Useful performance measures should also be valid, cost-effective, and relevant to agency goals, objectives, strategies, and functions. Internal performance measures can be used by managers to periodically review agency progress toward operational goals and priorities; evaluate agency staff performance; develop and refine agency rules, policies, and procedures; and communicate with agency employees, customers, and other stakeholders.

The following are the four major types of performance measures:

- **Outcome:** Indicators of the public or customer's benefit from agency actions;
- **Output:** Measures of the number of services an agency produces;
- **Efficiency:** Indicators of productivity expressed in unit costs, units of time, or other units; and
- **Explanatory/input:** Measures of factors, agency resources, or requests that affect an entity's performance.

Table 3-6 shows an example of a performance based budgeting benchmark that HCEO could use when implementing a performance based budgeting system. This table presents HCEO's expenditures per lane mile by line item for all sub-funds for the prior three-year period.

Table 3-6: Expenditure Indicators

	3 Year Average		
Roads & Bridges:	**Total Expenditures**	**Expenditure per Lane Mile**	**Percent of Total**
Salaries	$4,650,906	$4,020	23.4%
Retirement	$597,802	$517	3.0%
Benefits	$638,605	$552	3.2%
Purchased Services	$1,342,530	$1,160	6.7%
Supplies	$1,795,985	$1,552	8.9%
Equipment	$800,615	$692	4.1%
Permanent Improvements	$10,206,336	$8,821	50.7%
Other	$483	$0	0.0%
Total Roads & Bridges	**$20,033,262**	**$17,315**	**100.0%**
Planning & Design:			
Salaries	$397,955	$344	82.7%
Retirement	$51,904	$45	10.8%
Benefits	$31,554	$27	6.6%
Purchased Services	$0	$0	0.0%
Supplies	$0	$0	0.0%
Equipment	$0	$0	0.0%
Permanent Improvements	$0	$0	0.0%
Other	$0	$0	0.0%
Total Planning & Design	**$481,413**	**$416**	**100.0%**
Survey & Mapping:			
Salaries	$470,398	$407	79.9%
Retirement	$62,819	$54	10.7%
Benefits	$55,234	$48	9.4%
Purchased Services	$0	$0	0.0%
Supplies	$0	$0	0.0%
Equipment	$0	$0	0.0%
Permanent Improvements	$0	$0	0.0%
Other	$0	$0	0.0%
Total Survey & Mapping	**$588,452**	**$509**	**100.0%**
Administration:			
Salaries	$761,409	$658	17.0%
Retirement	$102,374	$88	2.3%
Benefits	$56,452	$49	1.3%
Purchased Services	$608,952	$526	13.6%
Supplies	$49,373	$43	1.1%
Equipment	$77,575	$67	1.7%
Permanent Improvements	$2,466,552	$2,132	54.9%
Other	$367,701	$318	8.2%
Total Administration	**$4,490,388**	**$3,881**	**100.0%**

Source: HCEO financial reports

Should HCEO choose to implement a performance based budgeting system, it could formulate data similar to that displayed in **Table 3-6** to set performance benchmarks. For instance, HCEO could set a salary benchmark of 23.4 percent of total road and bridges expenditures. Should a particular sub-fund incur salary expenditures higher than the established benchmark percentage, HCEO budget administrators could determine the reasons behind the poor performance. Performance based budgeting not only provides management with indicators of poor performing functions in the organization; it also enables management to identify areas of high performance.

R3.3 HCEO should attempt to combine all contingency funds (those set-aside for unforeseen events) into one line item, and budget all other expenditures at normal levels. HCEO should create a budget contingency like that contained in R3.4 of this report (financial forecast recommendation). Budgeting in this manner will provide HCEO with a more accurate tool to use when attempting to determine superior performing functions. Additionally, should HCEO decide to implement a performance based budgeting system (R3.2), this budgeting method will allow HCEO to more easily link the budget to its established performance indicators. HCEO may elect to calculate the contingency as shown below.

Table 3-7 displays the historical budget variances for salaries and benefits and total operational expenditures**.**

Table 3-7: Contingency Projection Ratio

	FY 2001	FY 2002	FY 2003	3-year Average
Total Salaries & Benefits	10.6%	11.8%	28.3%	16.9%
Total Operational Expenditures	28.6%	35.3%	32.3%	32.1%

Source: Calculated from HCEO financial reports

As shown in **Table 3-7,** the three year average positive (under budget) variance for salaries and benefits was 16.9 percent and an average positive variance of 32.1 percent for total operational expenditures. The positive variances represent a built-in contingency for the Office. However, this line item contingency may affect HCEO's ability to successfully track this in a performance based budgeting system. Therefore, for its forecast and future budgets, HCEO may elect to include a contingency that is equal to 16.9 percent of its forecasted salaries and benefits and 32.1 percent of total operational expenditures.

Table 3-8 shows budget to actual variances for each revenue category for FY 2001, FY 2002, and FY 2003.

Table 3-8: Budget-to-Actual Variances: Revenues

REVENUES	2001	2002	2003
	Percent Variance		
Permissive Tax	1.5%	1.4%	0.4%
Taxes, license	1.4%	(3.0%)	(4.5%)
Taxes, gasoline	6.6%	2.8%	10.1%
Municipal Courts	(8.5%)	17.0%	10.4%
TOTAL TAX & FINES	**1.5%**	**(0.9%)**	**(1.8%)**
Sale, personal property	N/A	N/A	(100.0%)
Grants	N/A	N/A	N/A
Other receipts	35.2%	(76.4%)	235.9%
Reimbursements	(8.4%)	(19.0%)	(51.6%)
Other non-op revenue	12.1%	(63.0%)	(74.9%)
Capital Outlay	N/A	N/A	N/A
Transfers/Advances In	N/A	N/A	N/A
TOTAL OTHER	**(1.4%)**	**(8.7%)**	**(42.5%)**
TOTAL REVENUE	**1.0%**	**(2.4%)**	**(9.4%)**

Source: Calculated from HCEO financial reports
Note: Negative percentages are unfavorable and indicate actual revenues less than budgeted revenues.

For the last two fiscal years, HCEO's actual revenues have come short of budgeted amounts. FY 2001 revenues were 1 percent higher than the budgeted amount; however, revenues came in 2.4 percent short in FY 2002 and 9.4 percent short in FY 2003. For the purpose of this analysis, HCEO's revenues were divided into two categories: total taxes and fines, and total other revenues.

Total Taxes & Fines – Total tax revenues have been budgeted accurately for the previous three-year period. The greatest variance from budget-to-actual occurred in FY 2003 when actual revenues fell 1.8 percent short of budgeted levels. Total taxes and fines consist of the following revenue classifications:

- **Permissive auto tax –** This revenue consists of the county's portion of the vehicle license tax (47 percent), as well as, any additional license taxes that are assessed on the countywide level. HCEO has been accurate in its budgeting of these revenues for the three-year period, experiencing no more than a 1.5 percent variance in any of the three years.

- **Taxes – License -** This revenue is generated by a statewide tax on licenses for passenger and commercial vehicles, as well as buses and trailers. This tax is distributed to the counties by the State, after certain deductions for the highway fund. Counties receive 47 percent of the license fee for the county in which the vehicle owner resides, and an additional portion based on the ratio of the number of miles of

county roads to the State total. HCEO has over-budgeted license tax revenues for the previous two years.

- **Taxes – Gasoline –** This revenue is generated by a statewide tax of $0.24 per gallon imposed on fuel distributors. This tax is collected and distributed by the State. After certain distributions are made, 10.5 percent of this tax is allocated evenly to all counties in Ohio. For the three year historical period, HCEO has under-budgeted this tax revenue by an average of 6.5 percent.

- **Municipal Courts –** This category consists of revenues from the forfeiture of traffic court bail and municipal court fines. This was the most volatile area for HCEO to budget as variances ranged from a negative (over-budget) 8.5 percent in FY 2001 to a positive (under-budget) 17 percent in FY 2002.

Total Other Revenues – HCEO has experienced increasingly greater negative (over-budgeting) variances in the total other revenues category from FY 2001 through FY 2003. This is primarily due to significant budgetary variances in the reimbursements and other non-operating revenue classifications. Total other revenues consist of the following:

- **Sale of Personal Property and Grants –**With the exception of FY 2003, HCEO did not budget any revenues for these categories for the three-year period analyzed. In FY 2003, HCEO budgeted $20,000 for the sale of personal property. Despite forecasting no revenues in these classifications, HCEO obtained federal grants and proceeds from the sale of property every year from FY 2001 to FY 2003.

- **Reimbursements –** This revenue line item consists of reimbursements for road funds, labor and materials. In addition, refunds of other expenditures are included in this classification. Reimbursements fell 19 percent short of budgeted levels in FY 2002 and 51.6 percent short in FY 2003. For the three year period, HCEO under-budgeted reimbursements by an average of 26.3 percent.

- **Other Non-Operating Revenues –** Non-operating revenues consist of interest revenues generated on cash deposits. Other non-operating revenue was 63 percent short of the budgeted amount in FY 2002 and 74.9 percent short in FY 2003.

- **Capital Outlay and Transfers/Advances –** HCEO did not budget any revenues in these two classifications for the historical three-year period. In FY 2001, HCEO had capital outlay revenues of approximately $2,000 and in FY 2002, it had a one-time advance of approximately $2 million.

Table 3-9 shows budget-to-actual variances for each expenditure category for FY 2001, FY 2002, and FY 2003.

Table 3-9: Budget-to-Actual Variances: Expenditures

EXPENDITURES	FY 2001	FY 2002	FY 2003
	Percent Variance		
Salary	7.2%	9.7%	(14.3%)
Overtime	55.0%	47.5%	0.9%
Holiday	76.1%	96.9%	94.6%
Temporary Employees	31.0%	28.5%	59.4%
Elected Official	0.0%	(2.6%)	(1.5%)
Vacation	60.0%	(8.4%)	36.9%
Sick	(50.8%)	(109.1%)	10.1%
Compensatory Pay	N/A	(4,245.8%)	(10,613.3%)
Worker's Comp	100.0%	54.4%	(11.6%)
Unemployment/Disability	N/A	N/A	82.4%
Medicare	15.0%	13.4%	82.6%
PERS	10.0%	13.4%	22.4%
Medical	9.0%	11.4%	(66.8%)
Dental	9.0%	11.7%	71.6%
Life Insurance	(0.4%)	1.1%	98.3%
Employee Assistance	(2.1%)	(1.2%)	99.9%
TOTAL SALARIES & BENEFITS	**10.6%**	**11.8%**	**28.3%**
Supplies	2.7%	35.1%	(4.6%)
Repair & Maintenance	46.5%	38.5%	29.5%
Travel	8.2%	15.5%	(28.2%)
Public Utilities	10.0%	27.5%	23.1%
Rental	57.2%	(35.0%)	33.0%
Contractual Services	43.3%	45.8%	56.5%
Payments to Other Entities	25.4%	25.4%	25.4%
Miscellaneous Expenses	13.7%	6.9%	14.3%
TOTAL OPERATIONAL EXPENDITURES	**28.6%**	**35.3%**	**32.3%**
Equipment	47.0%	24.9%	52.4%
Permanent Improvements	42.9%	51.9%	48.7%
TOTAL CAPITAL OUTLAY	**43.1%**	**50.3%**	**48.9%**
TOTAL EXPENDITURES	**32.4%**	**38.5%**	**40.6%**

Source: Calculated from HCEO financial reports
Note: Negative percentages are unfavorable and indicate actual expenditures more than budgeted expenditures.

HCEO experienced significant positive variances (over-budgeting) in a majority of the expenditure categories from FY 2001 to FY 2003. For the purpose of this analysis, expenditures were classified into three categories: salaries, operational expenditures, and capital outlay.

Total Salaries – Total salaries include all wages, benefits, and other salary related payments to employees. It is important that HCEO budgets total salaries accurately as this line item comprises approximately 35 percent of total expenditures. For the three-year period, HCEO budget-to-actual expenditures for total salaries averaged a positive variance (actual expenditures less than budgeted expenditures) of 16.9 percent. In particular, HCEO budgets an annual salary adjustment, which was only partially expended in FY 2003. Bargaining unit employees did not receive salary adjustments until they signed the contract in November 2003. HCEO also budgets overtime and holiday pay for almost every program function, but has been able to minimize overtime and vacation pay in the three- year period. As a result, HCEO has experienced favorable budget variances in this line item. In contrast, HCEO has not accurately budgeted sick pay and compensatory pay. From FY 2001 through FY 2003, sick pay has exceeded the budget in two of the three years, while compensatory pay has exceeded the budget every year. According to Office administrators, this issue is being addressed.

HCEO's budget for employee benefit payments has not been accurate in the previous three years. PERS employer contributions, Medicare payments, and dental insurance have all been over-budgeted. Medical insurance was significantly under budgeted for FY 2003.

Total Operational Expenditures – Total operational expenditures include supplies, repairs, rentals, contractual services, travel, public utilities and all other expenditures for office operations. As with employee salaries, HCEO has significantly over-budgeted operational expenditures. On average, HCEO over-budgeted 32.1 percent per year for the three-year period.

As shown in **Table 3-8**, HCEO's revenue budgeting for the previous three years has resulted in an average negative variance of 3.6 percent. In contrast, HCEO's expenditure budgets, as shown in **Table 3-9,** for this same period had a positive variance of 37.2 percent. This large variance is primarily due to the uncertainty over the available funding for capital improvement projects. However, even when taking capital outlay budgeting out of the analysis, salary and operational expenditures had average positive variances of 16.9 percent and 32.1 percent respectively.

The large positive variances that HCEO experienced in the prior three years budgets were a result of providing a contingency for expenditure line items to ensure that HCEO can operate with out further funding requests in the event of an unforeseen occurrence (e.g. tornado, flood, snow storm). While HCEO should budget for the worst-case scenario, this practice impedes management's ability to differentiate expenditure functions that are operating at a high level of efficiency from those are not.

R3.4 HCEO should implement formal grant seeking and application policies and procedures. These procedures should require a quarterly review of funding opportunities, a prioritized list of resources and contacts, a review of funding received by similar operations, and criteria for pursuing grant funding. Criteria for pursuing grant opportunities should include how well the grant's purpose corresponds with HCEO's mission, strategic plan, financial forecast, and capital improvement plan, as well as the probability of receiving the grant funding. Formal grant seeking and application policies and procedures should significantly improve HCEO's effort to maximize funding support from grant sources.

HCEO seeks out and obtains numerous grants to support its programs. However, it has not developed a formal internal process or procedures to support the grant-seeking process. The Ohio Department of Transportation identified the following grant funding programs that provide funding to Ohio counties:

- **County Surface Transportation Program –** This program has two components, a regular construction funding program for eligible roadway improvements and a program administered by the Ohio Department of Public Safety (ODPS) for safety studies. The County Engineers Association of Ohio (CEAO) serves as the program manager and is responsible for project selection, funding criteria and program priorities.

- **County Local Bridge Program –** This program provides federal funds to counties for bridge replacement or rehabilitation. The County Engineers Association of Ohio (CEAO) serves as the program manager and is responsible for project selection, funding criteria and program priorities.

- **Major Bridge Program –** This program provides federal funds to counties and municipalities for bridge replacement or major bridge rehabilitation projects.

- **Transportation Enhancement Program –** The Transportation Equity Act directs that at least 10 percent of a state's Surface Transportation Program funds must be set aside for this program. These funds are allocated on a fiscal year basis. Selected projects are spaced throughout the six-year life because of funding availability. Transportation enhancement projects must have a direct relationship to the inter-modal transportation system. These projects provide a means of stimulating additional activities that go beyond the customary cultural or environmental mitigation required when developing a transportation improvement project. The intent of the program is to integrate, in a creative way, transportation facilities into their surrounding communities and the natural environment.

- **Federal Highway Emergency Relief -** This program provides emergency funds to the State and counties for the repair or reconstruction of Federal-aid highways and roads on federal lands that have suffered serious damage due to natural disasters or catastrophic failures from an external cause.

- **Metro Park Program –** This program provides State funds for park drives or park roads within the boundaries of township or county parks, together with roads leading from State highways to any into such park. The Ohio Parks and Recreation Association serves as the program manager.

In addition to the grant programs listed above, information regarding available grants and their eligibility requirements can be found in the following sources:

- **Grant Source** – a newsletter published the Auditor of State on a bi-monthly basis that provides specific grant opportunities, as well as, grant research information.
- **Federal Register** – contains all current grant solicitation notices issued by federal agencies.
- **Catalog of Federal Domestic Assistance** – provides a searchable database of federal grant programs.
- **Office of Budget and Management** circulars.

Possibly the largest provider of potential funding is the OPWC. The OPWC provides approximately $180 million in funding to Ohio governments annually. **Table 3-11** displays OPWC funding for HCEO and the peers for FY 2004.

Table 3-10: FY 2004 OPWC Grant Funding by County

	Private Contractor Funding	County Engineer Funding
Hamilton County	$2,956,989	$12,000
Franklin County	$3,658,135	$3,801,960
Montgomery County	$2,075,466	$145,093
Summit County	$501,657	$425,618

Source: OPWC FY 2004 Disbursements

As shown in **Table 3-10**, HCEO received $12,000 in OPWC grants in FY 2004, compared to approximately $3.8 million for the FCEO. In comparison to the peers, HCEO received significantly less OPWC grant funding than all the peers.

From FY 2001 to FY 2004, HCEO has received a low level of funding from other State and Federal grant funding sources. However, funding from these sources is largely dependent on project need. HCEO currently has four individuals that actively seek and apply for grants. This level of staffing in the grant acquisition area exceeds that of the

peer counties. FCEO and SCEO each have a staff of one, and MCEO has two staff with grant responsibilities.

HCEO has four individuals that are involved in seeking and applying for grants. The four individuals include the chief deputy engineer, as well as corresponding department heads. It should be noted that none of the individuals charged with grant acquisition at the peer counties or at HCEO have sole responsibility for dealing with grants. In every instance, this was an additional job duty and did not constitute a measurable portion of the individuals' day.

Currently, grant identification and application duties are performed by the specific department head that would benefit from the grant, as well as the chief deputy engineer. Despite the absence of a full-time grant administrator, HCEO may be able to efficiently seek and maintain grants if it can adequately perform the duties that a grant administrator would provide. The Basic Handbook of Grants Management identifies the following six functions that (grant) administrators perform:

- Understand and respond to requirements that are imposed by host agencies and by funding agencies in order to assure that the flow of resources and the integrity of the project and its operations can be maintained;
- Organize the project's staff, activities, and processes in a manner that will expedite the implementation of the substantive programmatic or research activities of the project and its management;
- Lead, direct, and control the project's programmatic, administrative, and financial activities and processes so that they are efficiently and effectively carried out and completed;
- Communicate and report on performance to funding agencies, the host agency, project staff, project participants, and external groups;
- Resolve internal and external crises and problems in ways that reduce interference with the pursuit of the project's activities and goals; and
- Develop plans for future funding of the project or related activities, its incorporation into other activities, or its termination.

Although, HCEO routinely seeks grant and private funding for every project, it currently has no formal grant identification and application policy that contains the characteristics listed above. The lack of a formal grant seeking and management policy may result in HCEO not receiving the maximum grant funding available to help offset expenditures.

R3.5 HCEO should increase its efforts to negotiate higher levels of reimbursements from local governments and other sources. HCEO's higher lane mileage results in a higher level of capital expenditures. This should correspond with a higher level of reimbursement and grant funding, much like Franklin County. This did not occur,

as illustrated by HCEO's reimbursements which were 60.9 percent lower than the peer average on a per lane mile basis, and 30.9 percent lower when compared by registered vehicle.

HCEO reimbursements are primarily dictated by the nature of the project and the ability of the corresponding local government (if applicable) to contribute funding. HCEO's reimbursements are classified into the following object codes:

- **Reimbursement Road Fund** – This is reimbursement from cities and townships for repaving, construction and maintenance projects. Reimbursements vary depending on agreements between HCEO and the township.
- **Township projects** – These are reimbursements received from townships for engineering services performed by HCEO.
- **Reimbursement of Labor and Material** – These are reimbursements for funds HCEO expends to repair and replace homeowner sidewalks and driveway aprons.
- **Other reimbursements** – This is for reimbursements that do not fit into any other category.
- **Refund of expenses** – These are reimbursements for maps, guardrail damage and repair of any other damage to county property.

In FY 2003, HCEO received $896,988 in reimbursements that were classified in the reimbursement road fund and the township projects fund. In comparison, Franklin County received $7,686,196 from similar reimbursements. As shown in **Table 3-2**, HCEO reimbursements per lane mile were comparable to Montgomery County – the lowest of the peer counties, despite having a higher level of capital improvement costs per lane mile than two of the peers. HCEO's low level of reimbursements is a contributing factor to the decreasing ending fund balance as shown in **Table 3-11**.

R3.6 HCEO should create and maintain a two-year forecast similar to the one presented in Table 3-11. Although GFOA states that a forecast should extend at least three years, HCEO should initially restrict itself to a two-year forecast due to the uncertainty of capital improvement projects beyond the two-year time frame. HCEO's forecast should include detailed assumptions that support its projections. Additionally, HCEO should make this document available to all office decision makers, as well as the public through its website.

HCEO should continually monitor and update the forecast as more timely and accurate financial data becomes available. In addition, HCEO should perform a variance analysis comparing forecast to actual amounts. The analysis should attempt to identify the factors that contribute to any significant variances in revenues or expenditures to improve future financial forecasting. Finally, HCEO should reference the two-year financial forecast in its formal budget document.

HCEO does not currently develop a formal forecast document. The absence of such a document leaves HCEO without an effective planning tool that would allow it to assess the long-term financial implications of current and proposed policies, programs, and assumptions or develop appropriate strategies to achieve its goals. The Government Finance Officers Association (GFOA) recommends that governments at all levels forecast major revenues and expenditures. A properly created financial forecast would allow HCEO to:

- Gain an enhanced understanding of available funding;
- Evaluate financial risk;
- Assess the likelihood that services can be sustained;
- Assess the level at which capital investments can be made;
- Identify future commitments and resource demands; and
- Identify the key variables that cause changes in the level of revenue.

GFOA further recommends that the forecast should extend at least three years beyond the budget period and should be regularly monitored and periodically updated as more timely data becomes available. A properly formulated forecast contains underlying assumptions and methodology, and should be clearly stated and made available to participants in the budget process, as well as the public.

Financial Forecast Model

The financial projections presented in **Table 3-11** present the expected revenues, expenditures and fund balances in the HCEO General Fund for each of the fiscal years ending December 31, 2005 and 2006. The assumptions disclosed herein are based on information obtained from HCEO and other documented sources. Because circumstances and conditions assumed in projections are constantly changing, there will usually be differences between projections and actual results.

Table 3-11: HCEO Two Year Financial Forecast

	Actual 2001	Actual 2002	Actual 2003	Actual 2004	Projected 2005	Projected 2006
Permissive Tax	$6,942,594	$6,993,578	$6,955,228	$6,911,073	$6,911,073	$6,911,073
Taxes, license	$13,177,343	$13,099,582	$12,681,519	$12,311,340	$11,885,122	$11,473,659
Taxes, gasoline	$1,385,531	$1,387,402	$1,524,662	$1,773,449	$1,773,449	$1,773,449
Municipal Courts	$414,407	$471,373	$450,536	$432,066	$442,095	$442,095
Tax Revenues	**$21,919,875**	**$21,951,935**	**$21,611,945**	**$21,427,929**	**$21,011,739**	**$20,600,276**
Sale, personal property	$22,882	$39,978	$$20,705	$95,722	$44,822	$44,822
Grants	$2,597	$527,829	$61,531	$51,714	$160,918	$160,918
Other receipts	$199,818	$311,015	$872,885	$902,172	$879,666	$1,206,435
Reimbursements	$2,881,018	$1,568,986	$2,371,213	$2,569,092	$3,346,718	$5,654,548
Interest	$1,176,774	$418,507	$268,855	$199,229	$109,576	$60,267
Other Revenues	**$4,283,089**	**$2,866,314**	**$3,595,190**	**$3,817,928**	**$4,541,699**	**$7,126,989**
Transfers/Advances In	$0	$2,003,301	$0			
Total Revenues	**$26,202,963**	**$26,821,550**	**$25,207,135**	**$25,245,857**	**$25,553,438**	**$27,727,265**
Salaries	**$7,227,694**	**$7,490,489**	**$7,493,693**	**$7,805,472**	**$8,230,941**	**$8,594,557**
Benefits	**$1,806,328**	**$1,886,171**	**$1,887,000**	**$2,262,033**	**$2,416,090**	**$2,582,835**
Supplies	$1,974,995	$1,219,307	$2,341,783	$2,327,260	$2,076,977	$2,128,763
Repair & Maintenance	$322,970	$421,723	$490,492	$541,041	$444,057	$444,057
Travel	$9,638	$8,869	$12,181	$11,922	$12,592	$13,511
Public Utilities	$332,239	$309,775	$349,821	$323,678	$333,432	$342,156
Rental	$7,953	$18,901	$46,197	$29,809	$25,715	$25,715
Contractual Services	$2,244,570	$1,886,838	$1,889,220	$1,431,871	$1,863,125	$1,863,125
Payments to Other Entities	$2,930	$2,930	$2,930	$3,285	$3,285	$3,285
Miscellaneous Expenses	$575,574	$1,097,215	$762,813	$180,535	$655,565	$655,565
Operational Expenditures	**$5,470,869**	**$4,965,560**	**$5,895,436**	**$4,849,401**	**$5,414,748**	**$5,476,176**
Equipment	$707,496	$1,194,384	$732,691	$925,381	$889,988	$800,000
Permanent Improvements	$12,634,726	$11,818,457	$13,565,946	$11,076,002	$13,281,138	$13,441,138
Capital Outlays	**$13,342,222**	**$13,012,841**	**$14,298,636**	**$12,001,382**	**$14,171,126**	**$14,241,138**
Total Expenditures	**$27,847,113**	**$27,355,060**	**$29,574,766**	**$26,918,288**	**$30,232,905**	**$30,894,707**
Results of Operations	**$(1,644,150)**	**$(533,510)**	**$(4,367,631)**	**$(1,672,431)**	**$(4,679,466)**	**$(3,167,441)**
Beginning Cash Balance	**$34,431,723**	**$32,787,573**	**$32,254,063**	**$27,886,432**	**$26,214,000**	**$21,534,534**
Ending Cash Balance	**$32,787,573**	**$32,254,063**	**$27,886,432**	**$26,214,000**	**$21,534,534**	**$18,367,093**
Contingency					*$4,035,881*	*$4,138,188*
Performance Audit Recommendations						*$193,050*
Ending Fund Balance	**$32,787,573**	**$32,254,063**	**$27,886,432**	**$26,214,000**	**$17,498,654**	**$14,228,905**

Source: HCEO financial reports, AOS financial implications and projections.

HCEO's revenues and expenditures are largely dependent on the level of capital projects it undertakes in a given year, as well as, the possibility of any unforeseen natural occurrences. As the level of projects fluctuates greatly from year to year, many revenue and expenditure line items were best forecast using the four-year historical average. If more accurate information or a sustainable trend was determined, this information was used in the projections and is included in the assumptions below.

Revenue Assumptions

Permissive Auto Tax (P.A.T.) - P.A.T. revenues have not fluctuated in the four-year historical period. P.A.T. revenues have not experienced more than a .07 percent increase or decrease in this period. Due to the relative stability in this revenue line item, P.A.T. revenues have been forecast to remain constant for FY 2005 and FY 2006 at $6,911,073.

License Tax – These revenues have been steadily declining since FY 2001 at an annual rate of 3.5 percent. For the forecast period, revenues from license taxes have been forecast to continue the historical decline of 3.5 percent annually.

Gasoline Tax – Historically, revenues from the State gasoline tax have experienced significant volatility. This volatility, as well as the potential decline in gasoline use due to record high gasoline prices, leaves no accurate methodology available to predict future revenues. As a result, gasoline tax revenues have been projected to remain constant at the FY 2004 level.

Municipal Court Fines – Past volatility of these revenues, as well as the lack of an accurate methodology to predict future fines make this line item difficult to project. Unlike Gasoline Tax Revenues, fines and fees are not affected by any outside factors. Therefore FY 2005 and FY 2006 revenues from municipal court fines have been kept constant at the four year average of $442,095.

Sale – Personal Property – Due to historical volatility and the absence of an accurate methodology, revenues from the sale of property have been forecast at the four-year historical average.

Grants – Historically, the largest grant provider on the state level is the Ohio Public Works Commission (OPWC). The OPWC District 2 Integrating Committee, made up of several local officials[3-1], is charged with approving OPWC grants received by local

[3-1] The District #2 Integrating Committee consists of a nine member board. Currently, the Engineer is the Chairman of this board. The organizations conforms to the required make-up stated in the Ohio Revised Code and includes one representative from the Hamilton County Engineer's Office, one representative from the Board of Hamilton County Commissioners, two representatives from the Hamilton County Municipal League, two representatives from the Hamilton County Township Association, and three representatives from the City of Cincinnati.

governments in District 2. The Integrating Committee approves grants using a published rating system that ranks all projects submitted for grant funding. Grant funding for FY 2005 was approved in FY 2004. As such, FY 2005 grant funding amounts are known and published in HCEO's Annual Meeting Report and included in the forecast. Due to the uncertainty of this process, it is impossible to forecast, with any great degree of accuracy, the level of grant funding that HCEO may receive in FY 2006. As a result, using a conservative approach, a flat amount has been forecast for FY 2006.

Other Receipts – This line item represents receipts for services preformed and fees assessed by HCEO. Historically, the majority of fees have been for water quality and engineering services. Engineering service fees have been forecast to increase at the historical growth rate of 4.2 percent. Water quality fees, which were initiated in FY 2003, have been forecast to increase at an inflationary rate of 3 percent due to the lack of historical data. All other receipts, which include engineering permits, sidewalk assessments and inspection fees have been forecast at the respective four-year historical averages for these line items.

Reimbursements – Reimbursement revenues are a result of services provided to townships within Hamilton County. Although it is difficult to accurately predict future reimbursements due to the uncertainty of project size and type, AOS forecast reimbursements using a historic ratio methodology of reimbursements to capital improvement projects (road and bridge projects). From FY 2001 to FY 2004, reimbursements were received at an approximate rate of 9.2 percent of road and bridge improvements. Of this 9.2 percent, 43.7 percent was projected for the reimbursement of road funds, 52.5 percent was projected for townships reimbursements, and 3.7 percent was projected for the reimbursement of labor and materials, which all represent the historic, four-year average.

Interest – Interest income has decreased at an annual rate of 45 percent per year from FY 2001 to FY 2004 due to the decrease in the ending general fund balance of HCEO. For the forecast period, it is projected that this line item will continue at the historical trend of 45 percent.

Transfers/Advances In – In 2002, HCEO received an advance of $2,003,301 from Hamilton County Water Works. This advance was for water works projects that HCEO was planning to complete in 2002. Due to the unusually large volume of waters works projects for this year, HCEO required an advance to cover these projects, which differed from HCEO's normal procedure of completing the projects and then receiving payment from the local entity. For the two-year forecast period, there have been no transfers or advances projected, based on historical data.

Expenditure Assumptions

Salaries – Regular employee compensation has been forecast to increase using FY 2005 salary step schedules. For FY 2006, a 3 percent COLA has been included. For non-classified employees, a 3 percent increase has been projected for FY 2005 and FY 2006 based on historical increases.

Due to historical volatility, overtime, holiday, temporary employee, vacation, sick pay, and comp time expenditures have been forecast to remain constant at the four-year historical average.

Elected official salaries have been forecast to increase at the historical rate of 2.1 percent. Salaries for county engineers in the State are outlined in ORC § 325.18.

Benefits – PERS and Medicare contributions have been forecast at the historical ratio of 13.55 percent and 2.0 percent of employee salaries respectively. Insurance rates (medical, dental, and life) have been projected to increase at 9.6 percent annually based on an historical increase of 12 percent as determined in previous AOS audits adjusted for a 20 percent increase in employee contribution (12 percent increase, 20 percent of which will be absorbed by employee contributions).

Worker's compensation, unemployment contributions, and Employee Assistance Payments (EAP) are projected to remain steady at the four-year historical average. In addition, law enforcement retirement payments, which began in FY 2004, were projected to increase at a three percent inflationary rate.

Supplies – Supplies primarily consist of road materials, building supplies, salt, coke and fuel oil. In recent years, road material and building supply prices have increased significantly (annual increases of 8.4 percent and 20.1 percent respectively). For the forecast period, road materials and building supply expenditures have been forecast to continue this annual increase. Salt, coke and fuel expenditures have fluctuated greatly in the past four years and are difficult to forecast as these expenditures are largely dependent on unforeseen events. As a result, these expenditures have been forecast to remain constant at the four-year average. All other expenditures in this category, including office, photo, and janitorial supplies and small tool purchases have been forecast at the four-year average.

Repair and Maintenance – Repair expenditures include payments for radio, television, vehicle, equipment, and building repairs. In addition, all maintenance contracts are included in this line item. Repair expenditures are made on an as-needed basis. As a result, the four-year average was used to forecast this line item.

Travel – Regular employee travel has been forecast to increase at the historical annual growth rate of 14.9 percent for the two-year forecast period. Travel expenditures for elected officials and employee mileage have been projected at the four year historical averages.

Public Utilities – Expenditures for telephone, water, and waste removal have been forecasted to increase at an annual inflationary rate of 3 percent due to the lack of any documentation attesting to future projections in these areas. Natural gas has been projected to decrease .56 percent in FY 2005 and increase 6.19 percent in FY 2006, and electricity has been forecasted to increase 3.25 percent in FY 2005 and 2.18 percent in FY 2006 as documented in the Department of Energy's Short-Term Energy Outlook.

Rentals – In FY 2005, HCEO implemented a procedure that allowed it to enter into annual rental contracts that establish pricing and decrease the time between the need for rental equipment and the actual receipt of the equipment. Although this process will improve HCEO's efficiency, it will not have a major impact on total expenditures for rental equipment. Rental equipment expenditures are dictated by type of project, and are difficult to project for future years. As a result, the four-year historical average was used to forecast this line item.

Contractual Services – Contractual services primarily represent engineering services provided to townships. These expenditures have experienced significant volatility from FY 2001 to FY 2004. As a result, the four-year historical average has been used to project contractual services for the two-year forecast period.

Payments to Other Entities – Payments to other entities include payments for employee parking. Prior to FY 2004, these expenditures remained constant at $2,930. In FY 2004, payments to other entities increased $3,285. For FY 2005 and FY 2006, this line item has been projected to remain constant at $3,285.

Miscellaneous Expenditures – Subscriptions and memberships, judgment claims, indirect costs, reimbursement of current charges, and other miscellaneous expenditures were all forecast at the respective four-year historical averages. In addition, annual training expenditures of $1,552 and attorneys fees of $1,000 have been included in this line item.

Capital Outlay – Capital outlay expenditures represent expenditures for equipment and infrastructure expenditures. HCEO produces a two-year capital equipment plan that details future equipment purchases. For FY 2005, HCEO has planned purchases for approximately $890,000. For FY 2006, HCEO plans to spend $800,000 on capital equipment.

Expenditures for building improvements have been forecast at $300,000 and $600,000 for FY 2005 and FY 2006, respectively, as detailed in HCEO's Buildings Capital Improvement Plan Report. Projections for roads and bridges are detailed in the 2005 HCEO Annual Meeting Report.

Contingency – A contingency for unforeseen expenditures has been included based on historical budget data. For FY 2005 and 2006, the contingency was created using 13.8 of salaries and benefits, and 47.4 percent of operational expenditures. See **R3.3.**

HCEO should use the information in its forecast to determine its future project capacity and communicate critical funding needs to County residents. As shown in the forecast, HCEO will need an additional influx of funding to maintain current service levels in 2006. **Table 3-12** shows the financial implications contained in this report and reflected in the forecast in **Table 3-11.**

Financial Implications Summary

The following table is a summary of estimated annual cost savings, cost avoidances, and implementation costs resulting from performance audit recommendations.

Summary of Financial Implications

Recommendations	Annual Cost Savings	Annual Cost Avoidance	Implementation Costs	
			Annual	One-Time
R4.1 Reduce available sick leave paid out upon retirement.		$97,950		
R4.2 Reclassify 11 supervisor positions to staff positions	$33,500			
R7.1 Obtain training on HCEO work order system				$3,500
R7.2 Equip van with touch-screen GPS technology				$5,000
R7.9 Reduce mowing frequency by one cycle.	$30,000			
R7.13 Eliminate guardrail vegetation contract	$130,000			
R7.14 Hire co-op student to complete culvert database				$5,200
R8.2 Implement computer replacement cycle			$25,600	
R8.3 Implement new technology				$40,000
R8.10 Accelerate document conversion to electronic format				$19,500
TOTAL	**$193,500**	**$97,950**	**$25,600**	**$73,200**

The financial implications summarized above are presented on an individual basis for each recommendation. The magnitude of cost savings associated with some recommendations could be affected or offset by the implementation of other interrelated recommendations. Therefore, the actual cost savings, when compared to estimated cost savings, could vary depending on the implementation of the various recommendations.

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Human Resources

Background

This section of the report focuses on various human resources operations within the Hamilton County Engineer's Office (HCEO). Peer data comparisons were conducted using information from the Franklin County Engineer's Office, Montgomery County Engineer's Office, and Summit County Engineer's Office. HCEO dedicates 3.0 full-time equivalent employees (FTE) to human resources functions. The primary human resources responsibilities are performed by the personnel director, personnel office supervisor, and personnel officer and include:

- Maintaining personnel files;
- Reporting payroll to the County;
- Administering employee benefits, workers compensation, and leave issues;
- Managing discrimination, civil rights, and drug testing issues;
- Managing collective bargaining agreements and civil service appeals;
- Developing and maintaining current job descriptions; and
- Administering Americans with Disabilities Act (ADA) compliance efforts.

Staffing and Compensation

HCEO employs 178 full-time and 45 part-time and seasonal individuals, or 186.8 full-time equivalents (FTE's) including seasonal, part time, and co-op students, to carry out Office operations. HCEO reduced its staffing level from 260 employees in the 1980s to the current level through early retirement incentives and combining positions. During the period of staff reductions, HCEO was able to add functions to its operations such as additional snow and ice control responsibilities and storm water management.

Table 4-1 shows HCEO's staffing compared to the peers in relation to the unincorporated population and lane mile responsibility for each.

Table 4-1: Staffing Levels, HCEO and Peers (By Lane Miles and Population)

	HCEO	FCEO	MCEO	SCEO	Peer Average
Lane Miles	**1,157**	**610**	**726**	**483**	**606**
Population [1]	**514,018**	**366,846**	**392,883**	**325,825**	**361,851**
Infrastructure Planning					
Infrastructure Planning FTEs	28.90	37.27	26.45	31.10	31.60
Lane Miles per Infrastructure Planning FTE	40	16	27	16	19
Population per Infrastructure Planning FTE	17,783	9,843	14,855	10,478	11,449
Maintenance/Operations					
Maintenance/Operations FTEs	126.24	114.73	71.92	91.37	92.67
Lane Miles per Maintenance/ Operations FTE	9	5	10	5	7
Population per Maintenance/ Operation FTE	4,072	3,198	5,463	3,566	3,905
Organization Support					
Organization Support FTEs	31.66	40.90	23.00	28.65	30.85
Lane Miles per Organization Support FTE	37	15	32	17	20
Population per Organization Support FTE	16,238	8,970	17,082	11,374	0 11,730
Total FTEs	**186.80**	**192.90**	**121.37**	**151.12**	**155.12**
Lane Miles per FTE	**6**	**3**	**6**	**3**	**4**
Population per FTE	**2,752**	**1,902**	**3,237**	**2,156**	**2,333**

Source: HCEO and peers

[1] Total census less amount for largest incorporated city.

Although HCEO employs more FTEs than the peer average, **Table 4-1** shows that HCEO has more lane miles per staff FTE and more population per staff FTE when compared to the peer averages. This dichotomy appears, in part, because HCEO has significantly more lane miles and population than the peers. In addition, HCEO has more population and lane miles per FTE in each of the three categories (Infrastructure Planning, Maintenance/Operations, and Organization Support) than the respective peer averages.

Table 4-2 compares compensation levels per FTE for HCEO and the peers.

Table 4-2: Compensation Levels, HCEO and Peers (in 000's)

	HCEO		FCEO		MCEO		SCEO		Peer Average	
	Total	Per FTE	Total	Per FTE	Total	Per FTE	Total	Per FTE	Total	Per FTE
Managerial/Supervisory	$254	$64	$807	$73	$423	$70	$322	$64	$517	$71
Staff	$1,090	$45	$1,229	$49	$800	$42	$1,146	$48	$1,058	$47
Infrastructure Planning [1]	**$1,366**	**$47**	**$2,075**	**$56**	**$1,290**	**$49**	**$1,554**	**$50**	**$1,639**	**$52**
Adjusted for Cost of Doing Business (CODB)	**$1,271**	**$44**	**$1,956**	**$52**	**$1,234**	**$47**	**$1,474**	**$47**	**$1,555**	**$49**
Managerial/Supervisory	$1,353	$48	$1,076	$60	$613	$51	$624	$48	$771	$54
Staff	$3,274	$36	$3,167	$38	$2,194	$38	$2,473	$35	$2,611	$37
Maintenance/Operations [1]	**$4,751**	**$38**	**$4,553**	**$40**	**$2,863**	**$40**	**$3,294**	**$36**	**$3,382**	**$36**
Adjusted for CODB	**$4,420**	**$35**	**$4,292**	**$37**	**$2,739**	**$38**	**$3,125**	**$34**	**$3,385**	**$37**
Managerial/Supervisory	$460	$57	$598	$66	$183	$61	$306	$61	$362	$64
Staff	$830	$42	$1,018	$41	$653	$44	$515	$37	$729	$40
Organization Support [1]	**$1,461**	**$46**	**$1,849**	**$45**	**$1,026**	**$45**	**$1,221**	**$43**	**$1,365**	**$44**
Adjusted for CODB	**$1,359**	**$43**	**$1,743**	**$43**	**$981**	**$43**	**$1,158**	**$40**	**$1,296**	**$42**
Total Compensation	**$7,578**	**$41**	**$8,477**	**$44**	**$5,179**	**$43**	**$6,069**	**$40**	**$6,275**	**$42**
Adjusted for CODB	**$7,050**	**$38**	**$7,991**	**$41**	**$4,955**	**$41**	**$5,757**	**$38**	**$6,234**	**$40**

Source: HCEO and peers
Note: Adjusted for local cost of doing business factor
[1] Includes part-time and seasonal employees

As shown in **Table 4-2**, HCEO's per-FTE compensation is less than the peer average on a functional and FTE basis for all areas except organization support. However, compensation per FTE, when adjusted for the cost of doing business (CODB) factor, is similar to two of the peers (FCEO and MCEO). HCEO and MCEO include a chief deputy county engineer, positions the other peers do not have. However, MCEO's deputy engineer was included in infrastructure planning instead of organization support because he oversees the planning function while HCEO's chief deputy oversees the entire Office. The HCEO chief deputy engineer's higher rate of compensation slightly inflates HCEO's overall expenses in this area but is appropriate considering the larger scope of responsibilities. Overall, HCEO's compensation per FTE compares favorably with the peer average.

Within certain operations, leave usage can effect the cost of operations. **Table 4-3** shows leave usage rates by HCEO and the peers for 2004.

Table 4-3: HCEO and Peer Sick Leave Usage

	HCEO	FCEO	MCEO	SCEO	Peer Average
Department Days Used	1,350.7	1,616.3	741.7	1,423.0	1,260.3
Number of Employees[1]	178.0	176.0	117.0	139.0	144.0
Average Days Per Employee	7.6	9.2	6.3	10.2	8.6
State Average Per Employee					7.3

Source: HCEO, Peers and SERB
[1] Total employees per staffing report

In 2004, HCEO employees used fewer sick leave days than the peer average, although they used slightly more than the State average. HCEO has a wellness incentive similar to that used by MCEO. Both organizations reward good attendance with additional personal days. HCEO provides one-half personal day per year. One additional day for every four months of perfect attendance can be earned for a total of three personal days for perfect attendance each year. MCEO provides two personal days and one additional half day for each three months of perfect attendance. FCEO provides five personal days per year and SCEO provides two per year. FCEO provides a sick leave pay out at year end. (See the negotiated agreement **Table 4-4**.)

Collective Bargaining Agreements

The Hamilton County Engineer's Office manages one collective bargaining agreement with the American Federation of State, County, and Municipal Employees (AFSCME), Ohio Council 8, which covers highway maintenance workers, mechanics and mechanics helpers, equipment operators, mechanic stores clerk, sign workers, route markers, and traffic technicians. The current agreement is effective through August 31, 2006. Two of the peers, FCEO and SCEO, also have agreements with AFSCME locals that are effective through March 31, 2007 and March 31, 2006, respectively. MCEO's collective bargaining agreement is with the Truck Drivers, Chauffeurs, Warehousemen, and Helpers Union and is in effect though December 31, 2006.

Table 4-4 compares HCEO's collective bargaining agreement with peer agreements. The International Union of Operating Engineers represents SCEO's heavy equipment operators under a second collective bargaining agreement in effect through March 31, 2006. However, the agreement is similar to the AFSCME agreement and is not shown separately in this table.

Table 4-4: Comparison of County Engineer Union Contracts

	Hamilton County Engineer and AFSCME	Franklin County and ASCME Local 954	Montgomery County and Truck Drivers, Chauffeurs, Warehouses and Helpers # 957	Summit County and AFSCME
Contract expiration	8/31/2006	3-31-2007	12-31-2006	3-31-2006
Length of work week and day	40 hours per week – unpaid lunch	40 hours per week with unpaid lunch	40 hours per week with unpaid lunch	40 hours per week with unpaid lunch
Actual time worked	8 hours	8 hours	8 hours	8 hours
Probationary Period	180 days Promotion – 120 days	180 days	120 days	180 days
Step Schedule/Wage increase	Approximately 4%- promotion only.	Dependant upon merit	Step increases vary between 1.7% and 3.9%	NA
COLAs	3% per year	NA	2% per year	3% increase with "me too clause" if raises are > 3.5%
One time lump sum payment	NA	NA	4-1-2004 - $1,700	NA
Overtime	Time plus 1/2 after 40 hours. Double time for Sunday or holiday.	Time plus ½ over 40 hrs. Holiday OT pay is 1 ½ plus regular pay. Comp time accumulation up to 120 hours.	Time plus ½ after 40 hours. Holiday OT pay is 1 1/2 times plus regular pay.	Time plus ½. Christmas is pay plus 2 times.
Minimum Call-In Hours Paid	2 hours	4 hours	4 hours	2 hours
Sick Leave Accrual	.0575 per hour (15 days per year)	4.6 hours per pay period (15 days per year)	0575 per hour (15 days per year)	4.6 hours per pay period (15 days per year)
Maximum number of sick days paid out at retirement ***Assume a 25 year employee with 1,650 hours of accumulated sick time.***	After 10 years employment, upon retirement, payment of 50% for each hour accumulated up to 1,440 hrs. Maximum of 720 (1/2 of 1,440) hours per State law. Remaining hours are paid 25% for each hour. For employees hired after 10/19/03, no payout after 720 hours. *772.5 hours*	After 8 years but less than 15 years, payment is ¼ of accrued sick leave up to 360 days (2880 hours). If more than 15 years, payment is ½ of accrued sick leave *810 hours*	Retirement with 10 years and age 55 or more, first 240 hours convert from one day's pay for 3 days of accumulated sick leave. 2nd 120 hours convert one day for every 2 days of accumulated sick leave. In excess of up to 740 hours converted 1 day for 1 day. Maximum cash payment is not to exceed 520 hours or 65 days. *740 hours*	After 9 years – 50% of accumulated sick leave up to 720 hours. *720 hours*
Sick leave Conversion/ incentive	Not applicable per negotiated agreement. Per employee handbook though, employees receive a personal day up to 3 per year for perfect attendance for each 4 month period, starting from last sick day.	Amount used- up to 8 hrs -40 hrs. max conversion Used 8.25-16 hrs – 32 hrs. max conversion Used 16.25-24 hrs – 24 hrs. conversion Used 24.25-32 hrs – 16 hrs. conversion Used 32.25-40 hrs- 8 hrs. conversion	Receive ½ personal day for every 3 months (calendar quarter) of unused sick leave up to maximum of 2 days per year.	Receive one personal day for perfect attendance. Receive 8 hours of pay if used under 8 hours.
Vacation time accumulation No vacation for less than one year.	1-7 yrs: 80 hrs 8-14 yrs: 120 hrs 15-24 hrs: 160 hrs After 25 yrs: 200 hrs	1-8 years 80 hrs Max Accrual: 240 hours 8-15 years 120 hrs 360 max accrual. 15-25 years – 160 hours 480 hours max accrual	1-5 years – 80 hrs 6-11 years 120 hrs 12-17 years – 160 hrs After 17 years 200 hrs[1]	1-6 years 80 hours 7-12 years 120 hours 13-17 years 160 hrs After 17 years 200 hrs[1]

		Over 25 years 200 hrs up to 600 hours accrued.[1]		
Personal Days	½ day (election day or to be used as floating day) Per employee Policy Manual: additional days (up to 3) are available for perfect attendance in any 4 month period.	40 hours – no carryover, but is paid out at year end	16 hours accumulated up to 40 hours.	2 days after one year. No carryover
Number of Holidays	10 days per year	10 days per year	12 days per year	13 days per year
Paid Union Leave for Union Functions	100 hrs max for all 4 stewards	10 hours per month	Last ½ hour of work day. Can attend meetings – no time limit.	10 days to attend union conferences for union president per year and 10 days total for other union reps.
Life Insurance	Per County	Per County	$25,000	$20,000
Hospitalization Co-pay	Per County	Per County	Per County 10% of premium up to $80 per month for family coverage for 2004, 05 and $100 for 2006. $40 cap for single coverage	10% of premium cost.

Source: Hamilton County and peer Collective Bargaining Agreements
[1]Contract language is in hours per pay period.

Many of the collective bargaining provisions are similar or result in similar costs to HCEO and the peers using different processes and methodologies.

Noteworthy Accomplishments

The performance audit report identifies the following noteworthy accomplishment made by the Hamilton County Engineer's Office in the area of human resources management.

- *Staffing Adjustments*: HCEO has consistently adjusted staff to match the needs of the organization. In 1985, HCEO had 260 employees. With the implementation of new technologies and methods, such as computerization and organizational revisions, HCEO has trimmed its staff to 186.8 full time equivalent employees.

Assessments Not Yielding Recommendations

In addition to the analyses in this report, assessments were conducted on several areas within this section that did not warrant changes and did not yield any recommendations.

- *Staffing:* Although HCEO has more FTE's than two of the peers and the peer average, the ratios of lane miles per FTE and population per FTE are well above all the peers and the peer average. See **Table 4-2**.

- *Compensation:* Compensation per FTE ratios compared favorably to the peers. **Table 4-2** shows HCEO compensation compared to the peers.

- *Payroll*: The County processes all payroll on an exception basis. Overtime sheets and premiums for working out of classification are filled out and submitted by supervisors. The County does not have a time and attendance system.

- *Benefits:* Since HCEO benefits are controlled by the County and the union agreement, no assessments were made outside the negotiated agreements section.

- *Worker's Compensation:* Hamilton County carries all county employees on their worker's compensation policy. While the County verified this information, they did not provide information specific to the Hamilton County Engineer's Office.

- *Employee Leave:* Leave analysis compared favorably to the peers. Supervisors and the HR Department review and approve leave time. In 2004, HCEO experienced 7.6 days of sick leave per employee compared to the peer average of 8.59 sick leave days per employee. The State average is 7.30 sick leave days per employee.

- As shown in **Table 4-4**, the collective bargaining agreements between the various county Engineer offices have many similarities that do not yield recommendations:

    - Length of workweek (40 hours with an unpaid lunch);
    - Actual time worked (8 hours per day);
    - Probationary period (180 days);
    - Overtime pay (time and one half for over 40 hours);
    - Sick leave accrual (15 days per year);
    - Call in pay (2 hour minimum);
    - Sick leave incentive (varies by county);
    - Vacation time accumulation (maximum of 200 days);
    - Personal days (varies by county);
    - Holidays (10 per year); and
    - Life insurance and hospitalization (varies by county).

Findings and Recommendations

R4.1 During the next round of collective bargaining negotiations, HCEO should seek to negotiate a reduction in the maximum number of accrued but unused sick leave paid out at retirement. HCEO offers a more costly sick leave payout benefit than the average peer payout (756 hours), which could potentially increase the long-term financial risk to the County.

Table 4-4 uses an example to calculate the affect of HCEO's and each of the peers' collective bargaining agreements. A fictitious employee was assumed to have worked for the county for 25 years and accrued 1,650 sick leave hours. HCEO sick leave severance payout is 7.3 percent (52.5 hours) higher than the peer average. If three such employees retired with 1,650 sick hours accumulated, the cost to HCEO would be approximately $3,000. However, HCEO and the peers' sick leave payout limits are all significantly greater than the minimum required by State law.

The minimum sick leave payout stated in Ohio Revised Code (ORC) § 124.39 (B) is 25 percent of the value of the employee's accrued but unused sick leave not to exceed 30 days (240 hours). HCEO may be able to avoid costly sick leave payouts that could help minimize future expenditures by renegotiating the terms of sick leave payout to a level closer to the state minimums.

In FY 2004, HCEO paid $154,581 in sick leave severance pay with the retirement of eight employees, and has paid $122,516 for six employees as of May 31, 2005. If the maximum payout for sick leave accrued at retirement was at the ORC standard, the payout would have been $40,674 and $36,845, respectively, or approximately a 72 percent cost avoidance. According to the personnel director, the engineer has recently negotiated this issue and new hires will receive a reduced benefit.

Financial Implication: Using an average sick leave payout from the last two years of $138,549, HCEO could realize a cost avoidance of approximately $97,750 per year. Actual costs would be dependent on the number of retirements during the year.

R4.2 The Hamilton County Engineer's Office should broaden its span of control ratio from 2.81-to-1 to 7-to-1 staff to supervisor by reclassifying 11 supervisory positions in the Maintenance and Operations/Roads Division.

Table 4-5 shows HCEO's span of control ratios compared to the peer ratios across common functionalities.

Table 4-5: HCEO and Peers Span of Control Comparison

	HCEO	FCEO	MCEO	SCEO	Peer Average
Infrastructure Planning					
Management/Supervisory	4.00	11.00	6.00	5.00	7.33
Staff	24.00	25.00	19.00	24.00	22.67
Span of Control Ratio	6.00-to-1	2.27-to-1	3.17-to-1	4.80-to-1	3.09-to-1
Maintenance/Operations					
Management/Supervisory	28.00	18.00	12.00	13.00	14.33
Staff	91.00	84.00	57.00	71.00	70.67
Span of Control **Ratio**	3.25-to-1	4.67-to-1	4.75-to-1	5.46-to-1	4.93-to-1
Organization Support					
Management/Supervisory	10.00	11.00	4.00	8.00	7.67
Staff	21.00	27.00	19.00	18.00	21.33
Span of Control	2.10-to-1	2.45-to-1	4.75-to-1	2.25-to-1	2.78-to-1
Total Organization					
Management/Supervisory	**42.00**	**40.00**	**22.00**	**26.00**	**29.33**
Staff	**136.00**	**136.00**	**95.00**	**113.00**	**114.67**
Span of Control	**3.24-to-1**	**3.40-to-1**	**4.32-to-1**	**4.35-to-1**	**3.91-to-1**

Source: HCEO and peers

Compared to the peers, HCEO has the narrowest overall span of control ratio (3.24 staff to 1 supervisor). The infrastructure planning function has a significantly broader span of control, but does not compensate for the narrow span of control ratios of the maintenance/operations or organization support functions.

Table 4-6 shows the Maintenance and Operations/Roads Division (Operations/Roads Division), and the effect on the total organization by restructuring this Division so that the staff to supervisor ratio is similar to the peer average.

Table 4-6: Restructured HCEO and Peers Span of Control for the Operations/Roads Divisions

	HCEO	FCEO	MCEO	SCEO	Peer Average
Before Adjustment					
Management/Supervisory	21.00	7.00	4.00	7.00	6.00
Staff	59.00	56.00	25.00	42.00	41.00
Span of Control	2.81-to-1	8.00-to-1	6.25-to-1	6.00-to-1	6.83-to-1
After Recommended Adjustment					
Management/Supervisory	10.00	7.00	4.00	7.00	6.00
Staff	70.00	56.00	25.00	42.00	41.00
Span of Control	7.00-to-1	8.00-to-1	6.25-to-1	6.00-to-1	6.83-to-1
Total Organization After Adjustment					
Management/Supervisory	**31.00**	**40.00**	**22.00**	**26.00**	**29.33**
Staff	**147.00**	**136.00**	**95.00**	**113.00**	**114.67**
Span of Control	**4.74-to-1**	**3.40-to-1**	**4.32-to-1**	**4.35-to-1**	**3.91-to-1**

Source: AOS and peers

Table 4-6 shows that the Operations/Roads Division has 350 percent more management/supervisor positions than the peer average. Since they have the highest division staffing level, adjusting the Operations/Roads Division classifications will improve the span of control for the Division and the Office as a whole, making it more comparable to the peers.

According to the Texas State Auditor's Office, a broad span of control has a direct link to:

- Greater employee empowerment;
- Faster decision making processes;
- Improved communications;
- Greater organizational flexibility;
- Reduced personnel and overhead costs; and,
- Increased delegation resulting in improved job satisfaction.

Financial implication: A re-classification of 11 supervisory positions in Operations/Roads Division, would result in 70 staff to 10 supervisors, and move the span of control ratio closer to the peer average of 6.83 staff per supervisor. If salaries were reduced to the average of the highest annual staff wages, HCEO could save approximately $33,500, annually, including retirement costs. If HCEO decides to reduce the supervisory levels through attrition, cost savings would be recognized over a longer period and may not have a significant impact on the current financial climate.

Financial Implication Summary

The following table summarizes estimated annual cost savings from select recommendations in this section. Only recommendations with quantifiable financial impacts are listed.

Summary of Financial Implications

Recommendation	Annual Cost Savings
R4.1 Reduce sick leave payout at retirement	$97,750
R4.2 Reclassify 11 supervisor positions to staff positions	$33,500
Total Financial Implications	**$131,250**

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Administration

Background

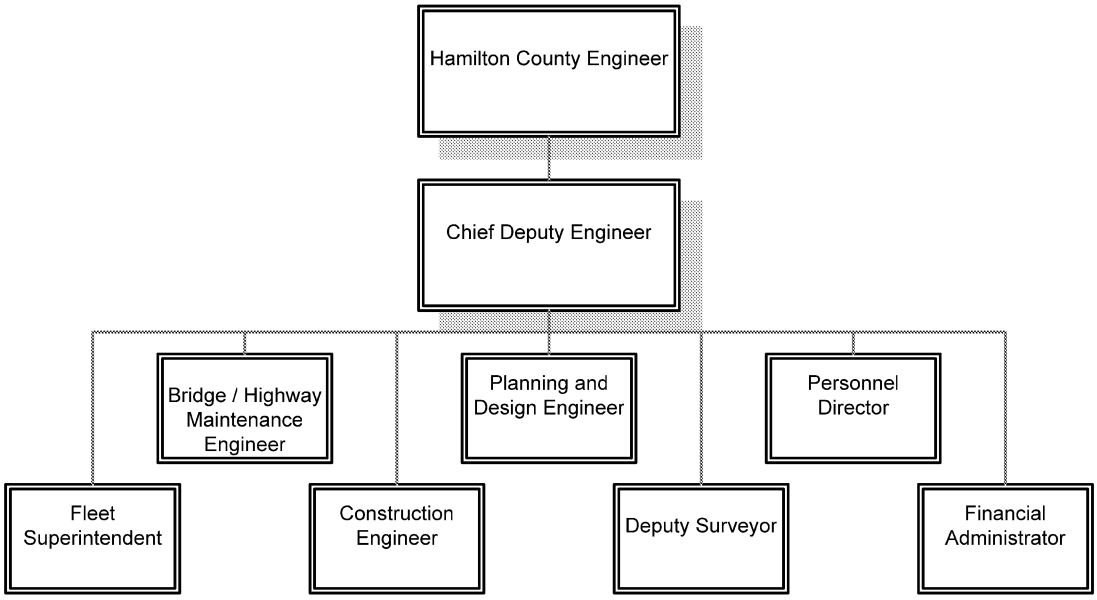
This section of the performance audit focuses on the Hamilton County Engineer's Office (HCEO) administrative operations. For audit purposes, administrative operations are defined as strategic planning, organizational design, fleet management activities, and the driveway permitting function. The objective of the performance audit is to analyze the strategic planning mechanism and to develop recommendations for potential improvements and cost savings. Performance comparisons are made between Franklin County Engineer's office (FCEO), Montgomery County Engineer's office (MCEO) and Summit County Engineer's office (SCEO). Comparisons were also made to best practices in the following organizations: The American Public Works Association (APWA), Ohio Department of Transportation (ODOT) and International County/City Management Association (ICMA).

Organizational Structure

Chart 5-1 illustrates HCEO's organizational structure, by operating unit[5-1], for upper management personnel.

[5-1] Institutionally, HCEO refers to its locations as departments. Within a single Department several functions may occur under several different supervisors. Operating unit refers to all functions grouped under a single supervisor.

Chart 5-1: HCEO Operating Structure



Source: Hamilton County Engineer's Office

As shown in **Chart 5-1**, HCEO is divided into seven operating units. Administrative activities are performed at all levels of the organization. The Hamilton County Engineer's primary responsibility is to determine the strategic priorities of the organization, securing funding for construction projects and representing Hamilton County in a number of different organizations and councils. The Chief Deputy Engineer supplements the activities of the engineer by assisting in management, plan development, problem resolution, and procurement of funding, as well as representation at local meetings and events. The Chief Deputy Engineer is also responsible for ensuring that strategic priorities are communicated to the department heads and completed to the satisfaction of the engineer. Each sub-division has a manager or superintendent who reports directly to the Chief Deputy Engineer. These department heads are responsible for the day–to-day activities of the organization, including goal setting and performance measurement. Administrative activities such as capital equipment management and driveway permitting are performed within these divisions. Specifically, these tasks fall under the supervision of the fleet superintendent and construction manager, respectively.

Assessments Not Yielding Recommendations

In addition to the analysis presented in this report, assessments were conducted on two areas which did not warrant changes and did not yield any recommendations. These areas include the following:

- **Solicitation of Stakeholder Input:** HECO attempts to solicit stakeholder input through a number of different ways. The chief deputy engineer indicated that HCEO sends representatives to public meetings of township officials whenever possible. In addition, HCEO performs a number of activities such as attendance at community events, a "contact us" link on the website, an internal log of complaints, and project-specific public meetings. The chief deputy engineer also noted that in special circumstances, HCEO will implement additional measures to gauge stakeholder satisfaction. For example, HCEO has hired a public relations consultant to assist with the Eastern Corridor project. The consultant has helped HCEO create a website, walk-in office, and on-line survey to help gauge public response to this project.

- **Permit Application Process:** HCEO's permit application process is more efficient than the peers. HCEO offers fewer types of permits than the peers and only requires one submission of a permit application. In comparison, FCEO offers seven types of permits and for each project. Also, an application to install must be submitted prior to the actual permit application. In addition, the HCEO permit application and guidelines are easily accessible to potential applicants via the HCEO website whereas the peers do not offer this level of accessibility.

Recommendations

Strategic Planning

R5.1 HCEO should develop clear and concise mission, vision and value statements. These statements should be developed by a representative group of HCEO staff and management and approved by the County Engineer to ensure adequate inclusion of stakeholder input.

HCEO does not currently have formalized mission, vision, and value statements. Working with the engineer and Office administrators and staff, the chief deputy engineer reported that in practice, the mission of the HCEO is to provide efficient, safe, and effective service with respect to the traveling public through cooperation and coordination with various jurisdictions and citizens. However, this mission is not formally communicated throughout the organization and was developed without input from sources other than high-level administrators.

The American Public Works Association (APWA) identifies the establishment of mission, vision, and value statements as best practices. Mission, vision, and value statements reflect the purpose, direction, and core values of an organization. In addition, these statements should seek to achieve the following:

- The mission statement should be a concise description of the fundamental purpose for which the agency exists. The mission statement should identify why the agency exists and who it is intended to serve.

- The vision statement should describe the vision of the organizations leadership. The vision statement should identify what the leadership of the organization wants to create and where the agency is going.

- The values statement establishes the core values which will assist in accomplishing the mission. The values statement should establish what culture the organization wants to create and how employees are to act.

HCEO does not have mission, vision, and value statements because management has not viewed these items as an essential strategic planning activity. HCEO has approached strategic planning from an abstract perspective, focusing on project-based goals rather than formal organizational goals. HCEO does not have a formal strategic plan (See **R5.2**) which would require management to define the mission, vision, and values of the organization.

The Society for Human Resource Management (SHRM) suggests that the effectiveness of a mission or vision statement is dependant on the degree to which people understand, accept and embrace the basic strategy of the organization. Including a broad range of employees in the development of the organizations mission and vision can help ensure that employees at every level of the organization are result-motivated and clear about the organizations intent.

R5.2 HCEO should adopt a formal strategic plan. The plan should include HCEO's mission, vision and value statements, concise and measurable objectives, strategies, action plans, responsible parties, timelines, as well as a process for implementing, monitoring and updating the plan.

HCEO has not prepared a formal strategic plan to serve as a guide for the long-term development of the organization. According to staff, HCEO's primary goals include the following:

- **Safety:** Issues which if not resolved promptly would pose an immediate threat to the safety of the traveling public. For example, snow and ice removal and bridge-outs.

- **Leveraging Funding:** HCEO participates in a number of agreements which share the costs of major projects with local governments. Long-term projects are prioritized and goals for these projects are determined based on a number of factors including project size, amount of funding required by HCEO, and public need.

- **Coordination of Entities:** HCEO sets a number of goals based on coordination of activities with participating governments. HCEO's cost-sharing agreements dictate the responsibilities required to be performed by participating entities. Therefore, project timelines and goals are often determined based on the estimated date other entities will complete their portion of the work at hand.

According to the Management Assistance Program for Non-profits (MAP) strategic planning can serve a number of purposes within an organization including the following:

- Clearly define the purpose of the organization (mission) and establish realistic goals and objectives consistent with that mission
- Communicate goals and objectives to constituents
- Ensure the effective use of resources by focusing resources on key priorities

- Provide a starting point from which progress can be measured
- Build consensus within the organization

The Ohio Department of Transportation (ODOT) issues two-year strategic plan[5-2] which incorporates these best practices. The plan (Ohio's Transportation Priorities Through 2015) is composed of five-key areas as shown in **Chart 5-2** below.

Chart 5-2: ODOT Strategic Plan Components

Source: ODOT

The pyramid structure implies that a foundation-based relationship exists between the components. Thereby linking the agency's mission and vision to its goals and strategic initiatives (mission and vision statements are also discussed in **R5.1**). The plan details new strategic initiatives and reviews the strategic initiatives which were introduced in the previous plan. Outcomes of past strategic objectives are detailed along with actions and resources which are still needed to fulfill the objectives.

HCEO conducts a number of activities in accordance with goals and objectives. However, in determining these goals and objectives the organization has merged the concepts of business planning and strategic planning. During the course of the performance audit, organizational leaders consistently referred to the capital improvement plan as the organizations strategic plan. By definition, the capital improvement plan fits a business planning model, as it is focused on particular products

[5-2] The ODOT 2004-2005 Business Plan is by definition a strategic plan. Therefore, it is referred to throughout the audit as a strategic plan.

or services. In contrast, strategic planning is typically goals-based and uses the organizations mission, vision, and values to communicate the organizations objective, how it intends to achieve those objectives, and measurable outcomes to determine if objectives were met.

By implementing a strategic plan, HCEO will clarify the organizations plans and ensure that key leaders are all working towards the same results. This will put HCEO in a better position to communicate key initiatives and future needs to county commissioners, employees, and the public which it serves.

R5.3 In conjunction with R5.1 and R5.2, HCEO should include measures of efficiency, quality, and effectiveness in the evaluation of agency activities. HCEO should develop outcome-based performance measures consistent with the agency mission, goals, and objectives. These performance measures should be used to provide the stakeholders with consistent and reliable reporting of performance.

HCEO does not systematically use performance measures to evaluate the efficiency, quality, and effectiveness of the services it provides. Interviews with department heads and supervisors indicated that throughout the organization efficiency is viewed solely on the basis of inputs or outputs such as the size of the budget or the volume of work accomplished. The organization does not have a mechanism in place to systematically measure efficiency as the ratio of output (or outcomes) for a given number of inputs.

Performance measurement is the regular collection of specific information regarding the results of services. Performance measurement seeks to paint a complete picture of an agencies efforts by including indicators of efficiency, quality, and effectiveness in addition to typical measures of output. Fairfax County, Virginia provides a model for incorporating performance measurement into county services. This model uses the mission, goals and objectives of the organization to measure efficiency and effectiveness using outcome based indicators. The Fairfax County model provides a four-step methodology to guide agencies through the development of performance measures.

- **Review and evaluate existing agency mission and cost center goals:** Using the mission, set goals that determine how the agency will achieve its mission. With each goal, an outcome indicator should be identified that enables measurement of the extent to which a goal has been achieved.

- **Identify service areas:** Agencies have limited resources with which to measure performance, therefore activities should be consolidated into service areas to be used as the basic level for developing objectives and indicators. Service areas should have a common purpose and lead to a common outcome for customers of the service.

- **Define service area objectives:** Service area objectives are outcome-based statements of specifically what will be accomplished within the budget year. Each service area should have at least one objective and one indicator of each type, i.e., output, efficiency, service quality, and outcome. Service area objectives should clearly demonstrate progress toward the cost center goal.

- **Identify indicators that measure progress on objectives:** Indicators are the first-level data for reporting performance. These indicators are the measurables needed to ensure that objectives are being met.

Some Fairfax county programs have adopted a logic model to further identify and develop performance measures. This logic model is a description of how the program works to achieve the desired benefit diagramed as a series of boxes representing inputs (resources), outputs (activities and strategies), and outcomes (desired benefits). An example of the logic model is presented below:

Table 5-1: Fairfax County Logic Model

INPUTS	OUTPUTS	OUTCOMES		
What we Invest	What we do (activities/ strategies)	Short-Term	Medium Term	Long-Term
Staff Dollars Volunteers Materials Equipment Technology	Workshops Outreach Inspections Assessments Monitoring	Awareness Knowledge Attitudes Skills	Behavior Decisions Policies	Conditions: Safety Economic Social Environment Civic

Source: Fairfax County Manual for Performance Measurement

During interviews several HCEO department heads expressed the opinion that HCEO could not use performance measurement due to the nature of the work that the agency performs. The Fairfax County program acknowledges this response as a common argument against performance measurement. The program notes that while performance measurement does have limitations, areas previously thought to be "immeasurable" such as education, welfare, and international relation have proven to be measurable under the proper conditions. As mentioned in **R2.1** and **R2.2**, HCEO does not have a formal mission statement, vision statement, or strategic plan. In order for performance measurement to succeed, these items must be clearly defined. Therefore, the organization has not yet developed the proper infrastructure to adequately incorporate performance measurement in its operations.

Limiting operational decisions to simple measures of input and output does not ensure that HCEO is achieving maximum levels of efficiency. Implementing a system of

performance measurement will help HCEO to be a more responsive and competitive organization. In addition, performance measurement will also serve to support the strategic planning and goal-setting initiative outlined in **R2.2** and provide increased accountability.

R5.4 HCEO should prepare an annual report of performance in a format which is comprehensible to stakeholders who do not have advanced knowledge of HCEO operations. The report should include performance measures, criteria for evaluation, and broad recommendations or insight into future plans. The report should detail each of the various aspects of HCEO operations and encourage feedback from stakeholders which can be used to facilitate the strategic planning process.

HCEO does not solicit stakeholder feedback in a manner which is conducive to improving the strategic planning efforts of the organization. HCEO provides several options for stakeholders to communicate directly with the organization. However, these options are targeted towards specific project planning and complaint management rather than the overall performance of the organization. HCEO attempts to communicate performance in an annual report of operations, but this report is prepared primarily for county and township officials and contains a great deal of information targeted at individuals with advanced knowledge of the operation. This format inadvertently limits the ability of the general public to receive information about HCEO and provide useful feedback to the organization.

The *2003 Report on Ohio's County Highways* issued by the County Engineers Association of Ohio (CEAO) communicates information in a manner which is conducive to obtaining useful feedback from all levels of stakeholders. This report communicates performance using the following tools:

- **Performance Measures:** The current condition of the report subject is communicated through easy-to-understand measurements such as contribution per Ohio Family (driving an average of 24,900 miles per year).

- **Recommendations:** This section uses the institutional knowledge of the organization to provide recommendations for improving the current condition. For each recommendation the specific steps to be taken and the estimated amount of resources needed are also detailed.

- **Assessment criteria:** This section provides the justification for the recommendations. The ideal operating standards are defined and sources of information are disclosed.

Historically, HCEO has sought and received activity-specific feedback from stakeholders. Since the organization does not have a formal strategic plan they have not actively pursued stakeholder feedback pertaining to the direction of the entire organization. For this type of feedback HCEO has relied on the other local government with which it does business. This is reflected in the format of the current annual report.

The organization can benefit from stakeholder feedback targeted at the overall performance of the organization. Under its current practices most of the stakeholder feedback HCEO receives is reactionary or focused on prior events or individual projects. By issuing an annual report employing the key features of the CEAO report, HCEO can encourage stakeholders to provide feedback pertaining to the overall performance of the organization. This type of feedback will be useful in defining the strategic direction of the organization and developing a formal strategic plan (**See R5.2**) which adequately addresses the needs of stakeholders.

R5.5 In accordance with R5.2, HCEO should create a formal succession plan to prepare for the potential departure of senior executives and other employees with critical skills. This succession plan should be linked to the strategic plan and focus on both current and future organizational needs.

HCEO does not have a formal plan to address the potential succession of upper management employees or employees with critical skills. To date, HCEO's succession planning has been limited to informal discussion of the top executive position (engineer). According to the chief deputy engineer, succession of the engineer would follow the organizational hierarchy with the chief deputy engineer assuming the role of the engineer until the next election. In addition to the chief deputy engineer, the organization has one individual who has obtained the proper qualifications to step into the role of engineer if necessary.

According to a study by the United States General Accounting Office (GAO), leading organizations engage in broad, integrated succession planning and management efforts that focus on both current and future organizational capacity. This study identified the following best practices in regards to succession planning:

- **Receive active support of top leadership:** Top leadership should actively participate in the development of key succession planning and management initiatives.

- **Link to strategic planning:** In order to ensure an agency-wide perspective, succession planning should identify current and future needs of the organization.

- **Identify talent from multiple organizational levels, early in careers, or with critical skills:** Target high-potential individuals early in their career and provide them with training necessary to develop specific competencies.

- **Emphasize developmental assignments in addition to formal training:** Provide high potential individuals with developmental assignments in addition to formal training to strengthen skills and broaden experiences.
- **Address specific human capital challenges, such as diversity, leadership capacity, and retention:** Consider the current needs of the organization and develop a program which helps to strengthen that need.

- **Facilitate broader transformation efforts:** Prepare future leaders who will have the skills and experiences to help the organization successfully adapt to agency transformation.

HCEO management has not considered succession planning to have the wide-ranging scope recommended by the GAO. Succession planning has been viewed only within the narrow framework of the engineer position. Based on this view, HCEO management expressed the opinion that succession planning for positions other than the engineer would not be possible because the engineer is an elected official. Typically, an elected official appoints the high-level positions in the organization. Therefore, any succession planning could not extend beyond the current term of the engineer.

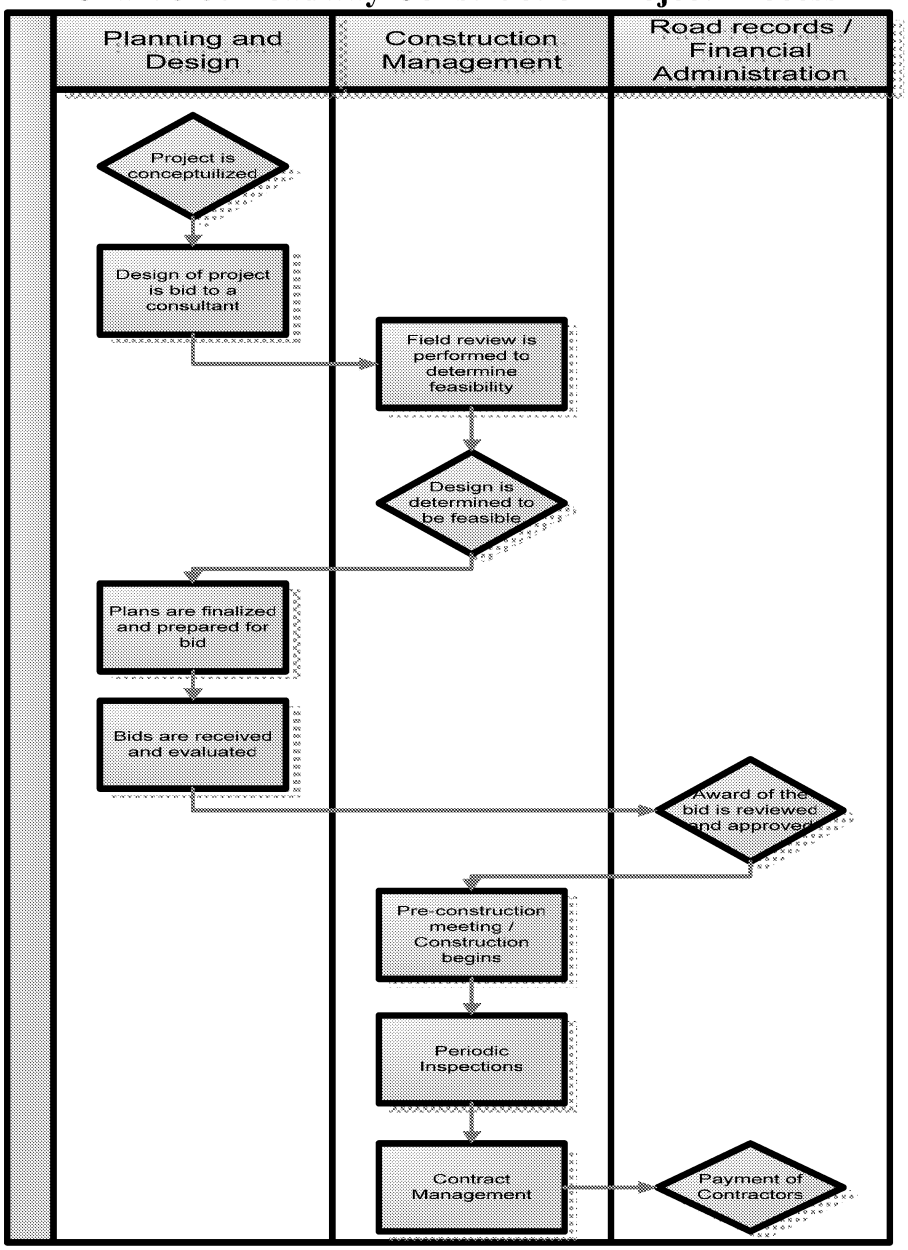
The framework provided by the GAO is a comprehensive approach which could be applied well beyond the current term of the engineer. While consideration must be given to the possibility of politically-inspired changes, the GAO framework addresses all levels of the organization. By developing a succession plan HCEO will strengthen both the current and future organizational capacity. The organization will be able to identify, develop, and select a capable workforce and ensure an ongoing supply of successors for key employees. Succession planning ensures that the organization has the right people, with the right skills, at the right time for leadership and other key tasks.

R5.6 In conjunction with R5.1 and R5.2 HCEO should implement a process-based organizational structure to support the implementation an execution of a formal strategic plan. HCEO should clarify its departmental designations and streamline the organization into the following four functional subdivisions: Operations, Engineering, Human Resources, and Administration.

As shown in **Chart 5-1**, HCEO is divided into seven operational units. Based on interviews with the directors and superintendents, several departments use similar types of information or perform tasks which are closely related to one another. For example,

the activities of the Planning and Design department and the Construction Management department are primarily focused on the roadway construction process. **Chart 5-3** outlines the roadway construction process and displays the transfer of information between departments.

Chart 5-3: Roadway Construction Project Process



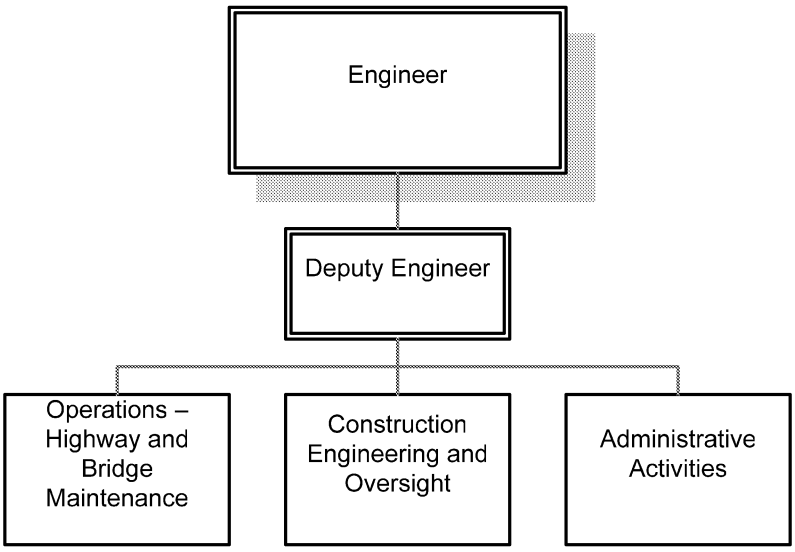
Source: Hamilton County Engineer Office

As shown in **Chart 5-3**, successful completion of the roadway construction process requires information to flow between the departments in multiple instances. While the design of the organization was not based on any specific theory of organizational design, the current structure appears to most closely resemble the theory of Self-Contained Unit Design. Under a self-contained unit design, all or most of the resources needed to complete a specific objective or task are set-up as a self-contained unit. Based on the type of work performed by HCEO, the organization may be better suited for a process-based organizational structure

According to *Organizational Development and Change* (Cummins and Worley, 2001), a process-based organizational structure places all functions necessary to produce a product or service in a common unit. For example, under a process-based design the roadway construction process shown in **Chart 5-3** would combine the activities of planning and design with construction under one department. Process-based structures can eliminate hierarchal and departmental boundaries that can impede task coordination and slow decision making and task performance.

The peers have implemented process-based organizational structures. The peers divide activities into three primary groups as shown in **Chart 5-4**:

Chart 5-4: Basic Framework of Peer Organizational Structures



Source: Peer Organizational Charts

This type of organizational design facilitates the movement of information down the organizational chart in a simplified manner. Operations are streamlined so that all activities pertaining to a given process are under the same department. **Table 5-2** below shows compares HCEO's organizational structure to the peers.

Table 5-2: Comparison of Organizational Structure

Peer Department	Comparable HCEO Department(s)
Operations – Highway and Bridge Maintenance	- Bridge and Highway Maintenance - Fleet Department
Construction Engineering and Oversight	- Construction - Planning and Design - Survey
Administrative Activities	- Personnel - Financial Administration

Source: HCEO and Peer Organizational Charts

None of HCEO's current department heads expressed any problems with the flow of information under the current organizational structure. However, the organization currently does not operate within the framework of a formal strategic plan with clear performance indicators. Should HCEO adopt a formal strategic plan as recommended in **R5.2**, simplifying the flow of information into a process-based format may be beneficial. Simplification will ensure that operating units who are engaged in the same process do not have conflicting goals. In addition, it will ensure that each process has its own benchmarks which reflect the performance of the entire process rather than isolated objectives or tasks.

R5.7 HCEO should adopt a formal plan for the replacement and retirement of vehicles and other capital equipment. This plan should be linked to the strategic budgeting process recommended in the financial operations section and should ensure that capital assets are replaced at the most economical point in their life cycle.

The fleet supervisor has identified goals for the replacement and repair of most capital assets. However, these goals are not formalized or adequately incorporated in the HCEO budget. The fleet supervisor is given a capital replacement and acquisition budget of $800,000 each year. The supervisor is expected to work within this number to complete all replacement and acquisition. However, this method does not adequately consider asset needs or long-term replacement costs. In general, replacement of vehicles is not linked to strategic planning or budgeting functions within HCEO.

Also, HCEO does not have individual vehicle or equipment replacement policies. HCEO prepares an annual equipment inspection report of vehicles and capital equipment but its contents are limited to an inventory report, replacement cost estimation, and a report on the current mileage on each vehicle. Each piece of equipment has the year, make, model,

vehicle number, and replacement cost listed. Planning is not conducted on an individual vehicle basis. HCEO does not have a long term plan which addresses the replacement of its ageing vehicles and equipment.

The Public Works Management Practices Manual (PWMP), published by the American Public Works Association (APWA), recommends a replacement policy that establishes equipment, parts, and supply replacement cycles that are clearly defined. The policy should be reviewed regularly to verify replacement analysis and economic modeling procedures.

An economical replacement policy considers the following criteria:

- Total cost of maintenance and depreciation,
- The environment in which the equipment operates,
- Fuel Cost,
- Condition,
- Suitability,
- Safety,
- Downtime, and
- New technology.

Without a formalized equipment and vehicle replacement plan, the procedure for determining the expected life and resources needed yearly for replacement is speculative. Vehicles and equipment should be replaced at the most economical point in its life cycle. This requires the development of a planned, well administered turnover that is consistent from one year to the next. Replacement cycles should be clearly established as policy so that related maintenance support can be planned.

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INFRASTRUTURE PLANNING & MANAGEMENT

Infrastructure Planning & Management

Background

This section of the performance audit focuses on the Hamilton County Engineer's infrastructure planning and management (IP&M) function. IP&M includes two functional responsibilities, planning development and construction management, that address county infrastructure improvements. The objective of this section is to analyze the construction planning and management processes and to develop recommendations for potential improvements and cost savings, if warranted. Performance comparisons use information from the Franklin County Engineer's office (FCEO), Montgomery County Engineer's office (MCEO), and Summit County Engineer's office (SCEO). The American Public Works Association (APWA), Ohio Department of Transportation (ODOT), and International County/City Management Association (ICMA) were used for additional best practice comparisons.

Planning Development

Similar to the peers, the planning and development phase starts with identifying needs for major infrastructure improvements through HCEO inspections or recommendations from county businesses or citizens. The process includes seeking federal transportation funding, preparing the project scope, preparing bid packets for the selection of a construction contractor, and evaluating contractor qualifications for the selection of material testing and engineer consultants. This phase is managed by the HCEO planning and design engineer.

Construction Management

HCEO's construction management process is similar to the peers, in that, once final plans and specifications are developed, and the projects are bid and awarded the construction management phase begins. A preconstruction meeting is scheduled with the contractor and all contract issues are discussed, including work to be performed, bonding, retainage, escrow, change order procedures, and pay schedules. The construction management or administration phase is managed by the HCEO construction engineer and consists of oversight of the construction by inspectors to ensure that contractors are conforming to specifications, and documenting work and validating material quantities used on the project. The construction engineer also ensures that proper coordination and communication with utility companies is established. Furthermore, the construction engineer facilitates conflict resolutions, is an intermediary between the public and other governmental agencies, develops monthly pay estimates, ensures prevailing wage compliance, and other administrative functions that help ensure proper completion of the project.

Table 6-1 shows total contracted and final costs for project completed in FY 2002, FY 2003, and FY 2004.

Table 6-1: Historic Completed Project Costs

	2002	2003	2004	Average
Number of Completed Projects	4	6	4 [1]	4.7
Total Contract Costs	$2,158,581	$5,858,172	$2,934,624	$10,951,377
Total Final Costs	$2,020,004	$5,690,636	$2,429,062	$10,139,702
Percent of Final Costs Over/(Under) Budget	**(6.4%)**	**(2.9%)**	**(17.2%)**	**(7.4%)**

Source: County Engineer Departments
[1] Twelve projects started.

HCEO shows a consistent ability to finish projects under budget with the average under budget percent for the three year period of 7.4 percent. **Table 6-2** shows a comparison of HCEO's infrastructure planning and management staffing levels with the peers. HCEO and the peers' construction and planning staff rely on support from other departments for information technology and budgeting to effectively plan and design infrastructure. As a result, it is difficult to determine the total number of staff, outside the construction and planning divisions within each county, that help in the construction and planning process. Therefore, the total number of staff represented within this assessment, are only those that are located within the construction and planning division of each county.

Table 6-2: Infrastructure Management & Planning Staffing Comparison

Classifications	HCEO	FCEO	MCEO	SCEO	Peer Average
Administration [1]					
Chief Deputy Engineer / Senior Engineer / Manager	2.4 [2]	7.0	6.0	9.0	7.3
Administrative Assistant /Clerical	1.0	1.0	4.0 [18]	1.0	2.0
Total Administration	**3.4**	**8.0**	**10.0**	**10.0**	**9.3**
Construction Roads/Highways/Drainage					
Assistants	0.0	5.0	0.0	4.0 [14]	4.5
Project Engineers	1.0 [3]	5.0 [8]	4.5 [11]	4.0	4.5
Project Inspectors	12.0	7.0	7.0	7.0	7.0
Hydraulics Technician	1.0	0.0	0.0	0.0	0.0
Utility Coordinator	0.0	4.0	0.0	2.0	3.0
Total Road/Highway/Drainage Construction Staff	**14.0**	**21.0**	**11.5**	**17.0**	**16.5**
Construction Bridge					
Assistants / Engineers	0.0	3.0	0.0	1.0 [15]	2.0
Total Bridge Construction Staff	**.0.0** [4]	**3.0**	**0.0**	**1.0**	**2.0**
Information Systems (IS)					
Technicians / Coordinators	2.0	2.0	4.0 [12]	3.0	3.0
Total IS Staff	**2.0**	**2.0**	**4.0**	**3.0**	**3.0**
Surveying					
Surveyors	0.0	10.0 [9]	5.0	5.0	6.7
Total Surveying Staff	**0.0** [5]	**10.0**	**5.0**	**5.0**	**6.7**
Other Construction Support					
Real Estate, Tax Map, Records, Planning & Programming, Project Funding	4.0	9.0	0.0	0.0	N/A
Co-ops	0.5 [6]	1.0	0.9 [17]	0.5 [6]	.8
Total Other Construction Support Staff	**4.5**	**10.0**	**0.9**	**0.5**	**3.8**
Total FTEs	**23.9**	**54.0**	**31.4**	**36.5**	**39.8**
Lane Miles	1,157	483	611	726	606
Lane Miles per FTE	**48.4**	**8.9**	**19.5**	**19.9**	**15.2**
Estimated Population of Unincorporated areas	514,018 [7]	366,846 [10]	392,883 [13]	325,825 [16]	361,851
FTE per 10,000 population	**1: 2.0**	**1: 0.7**	**1: 1.2**	**1: 0.9**	**1: 0.9**

Source: County Engineer departments

[1] Includes administrators responsible for construction operations

[2] The bridge supervisor is responsible for maintaining bridges 60 percent of the time and overseeing bridge construction and repairs 40 percent of the time.

[3] Responsible for utility coordination

[4] Bridge supervisor is accounted for under administrative staffing

[5] Surveying is included within the Design Contract and is outsourced. According to HCEO administration, the survey department provides some internal services estimated at approximately 0.5 FTE.

[6] One intern works an average of two quarters (6months) a year eight hours per day

[7] Based on the U.S. 2000 census population for Hamilton County (845,303) minus the incorporated population of Cincinnati (331,285) to get unincorporated population

[8] Three engineers focus on utility coordination

[9] Surveyors are also Geographical Information System (GIS) operators

[10] Based on the U.S. 2000 census population for Franklin County (1,068,978) minus the incorporated population of Columbus (702,132)

[11] Includes three design and planning engineers for all construction including bridges
[12] Includes CADD, Traffic, Plat Technicians
[13] Based on the U.S. 2000 census population for Montgomery County (559,062) minus the incorporated population of Dayton (166,179)
[14] Two assistants focus on utility coordination
[15] Summit County currently has two bridge engineer positions with one position open.
[16] Based on the U.S. 2000 census population for Summit County (542,899) minus the incorporated population of Akron (217,074)
[17] Three co-ops work one semester (4 months) per year full-time to equal a total of .90 FTEs
[18] Included Beverly Blair who became responsible for clerical support for Arnold Stemen, surveyors and bridge staffing in 2005.

As shown in **Table 6-2**, HCEO's infrastructure planning and management staffing number is approximately 40 percent below the peer average, even though its level of responsibility (population and lane miles) is almost double that of the peers and HCEO's construction staff is responsible for more infrastructure than its peers. Although HCEO's overall staffing numbers are lower than the peer average, its total number of inspectors is 42 percent higher than the peers. While HCEO places emphasis on its inspection staff, the peers place their greatest emphases on surveying staff. This is because HCEO contracts all of its construction design (along with surveying) to engineering consultants, whereas the peers perform some aspect of design and surveying in-house. SCEO is similar to HCEO in that it outsources 85 to 90 percent of design work and 100 percent of material testing. Even then, HCEO's total staffing is 28.4 percent lower than SCEO.

According to ODOT, construction inspection is considered to be the key to effective construction management and oversight. Inspectors are responsible for all construction monitoring and quality control functions, and permit inspections for driveways and other right-of-way projects to ensure all work is performed in compliance with federal, state and local laws. Also, unlike the peers, some of HCEO's inspectors are also available for snow and ice control operations. A higher number of HCEO construction/permit inspectors shown in **Table 6-2**, is due to HCEO's focus on quality control and construction oversight. This is evident by the number of construction contracts in 2002, 2003, and 2004 that HCEO has managed that have been within budget and within reasonable timelines, while maintaining a high quality of work. HCEO's construction planning and management section staffing levels are adequate when compared to staffing information provided by the peers.

Assessments Not Yielding Recommendations

Assessments were conducted on areas of contract management and planning operations that did not warrant changes and did not yield any recommendations:

- **Staffing:** HCEO maintains a greater level of workload per staff for construction and planning projects when compared to the peers, without jeopardizing construction quality, as evidenced by construction projects that meet budget objectives.

- **Design Costs:** HCEO's consultant design costs average 6.4 percent of the overall construction costs, which is consistent with Clark County, NV (an APWA accredited engineering department), the Ohio Public Works Commission, and the State of California, Legislative Office.

- **Consultant Selection:** HCEO follows ORC § 153.65 and 153.69 and has processes in place to effectively select consultants. HCEO maintains a permanent record of the selection of each consultant within the construction project file to ensure accountability. Furthermore, HCEO employs the American Public Works Departments (APWA) recommended processes for effective consultant selection.

- **Construction Contract Management:** HCEO meets ORC, ODOT guidelines, and APWA's best practices for contract planning and management, particularly in the following areas.

    - Specifications;
    - Request for Proposals and Request for Qualifications;
    - Bidding requirements and Conditions;
    - Award and Execution of Contract;
    - Scope of Work ;
    - Control of Work;
    - Control of Material; and
    - Acceptance, Measurement, and Payment.

Conclusion

Overall, HCEO's construction planning and management section performs in a manner which facilitates and controls the execution of construction contracts so that the intended work is completed within a reasonable time and within the planned expenditure amounts. HCEO also ensures that its agency employees do the work in compliance with the construction plans and specifications.

HCEO has effective construction planning controls and processes. As the planning function is one of the most important activities of construction management and requires professional judgment in developing physical improvements in their proper sequence, HCEO's in-house processes ensure prudent use of taxpayer resources and effective completion of construction contracts.

HCEO is effective in its construction management processes through ensuring that design plans and specifications are translated and implemented into a quality construction project.

Furthermore, HCEO provides a level of quality assurance by maintaining necessary oversight inspections during construction to ensure the county is receiving a completed quality product.

INFRASTRUCTURE MAINTENENCE

Infrastructure Maintenance

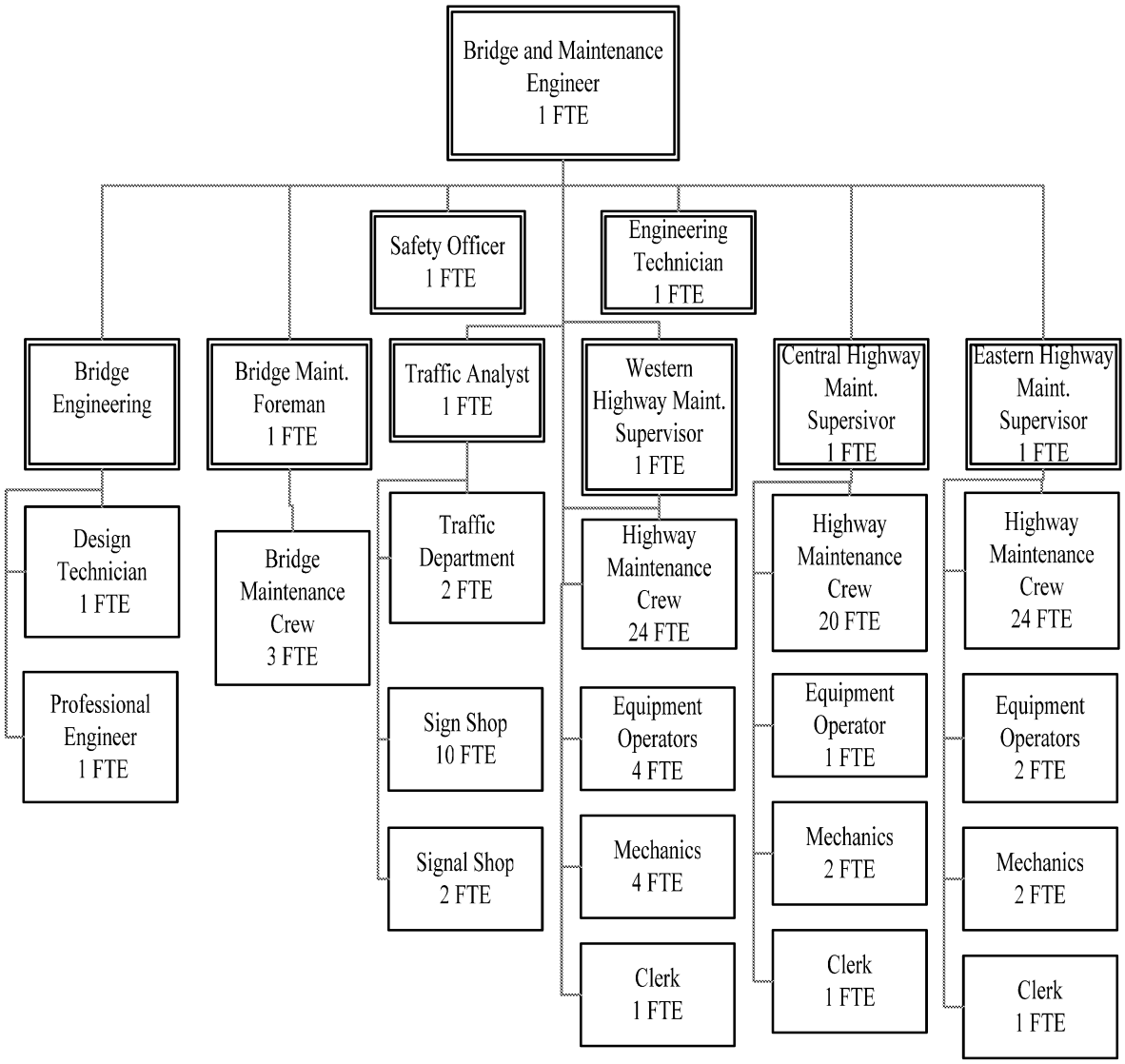
Background

This section of the report includes a review of the efficiency and effectiveness of various infrastructure maintenance functions of the Hamilton County Engineer's Office (HCEO) Bridge and Highway Maintenance Department (BHMD). These involve maintenance functions surrounding pavement, snow and ice control, roadside foliage, storm water devices, bridges, signs, traffic signals and pavement markings. In addition, a focused review was conducted on certain elements related to the HCEO's daily management of the Hamilton County Storm Water District (HCSWD). Consequently, the operations are evaluated against best practices and operational standards from the Franklin County Engineer's Office (FCEO), Montgomery County Engineer's Office (MCEO), Summit County Engineer's Office (SCEO), the Ohio Department of Transportation (ODOT), the American Public Works Association (APWA), the Salt Institute, the industry-recognized book *Municipal Benchmarks,* the Federal Highway Administration, and other sources.

Organizational Chart and Function

Chart 7-1 provides an overview of the BHMD structure and staffing levels, as of Jan. 2004.

Chart 7-1: HCEO Bridge and Highway Maintenance Department [1]



Source: HCEO
[1] The chart does not include supervisors within the regional highway garages.

The primary responsibility of the BHMD is to maintain the county's infrastructure in a manner that ensures quality service to its citizens and mitigates loss of useful value. This is achieved through the following departments or persons:

- *Bridge Engineering.* Responsible for annual inspections of all bridges on the county highway system and on township roads, as well as planning major bridge and landslide projects. Most of the work is contracted out.

- *Bridge Maintenance.* Responsible for all routine maintenance on county bridges. This staff also spends approximately 10 percent of its time on snow and ice patrol in the winter.

- *Traffic Department.* Responsible for all analysis, planning and maintenance related to traffic control devices. This includes inspection and maintenance on all electronic traffic signals, road signs and lane markings.

- *Regional Garages.* Responsible for pavement maintenance including pothole patching, asphalt patching, crack sealing, guardrail repair, and shoulder work. Also responsible for routine maintenance on drainage infrastructure, certain foliage control functions and snow/ice control during the winter.

- *Engineering Technician:* Responsible for overseeing and updating the agency's pavement management system. Also responsible for administering foliage control and sweeping contracts.

Key Statistics

Table 7-1 lists select infrastructure pieces maintained by the HCEO and peer agencies.

Table 7-1: Select Infrastructure Inventory

	HCEO	FCEO	MCEO	SCEO	Peer Average
Lane miles of county roads	1,157	611	726	483	607
Bridges	458	372	362	316	350
Culverts [1]	4,351	206	2,000	1,204	1,137
Catch basins	6,912	N/A	2,000	N/A	N/A
Traffic signs	12,000	3,800	7,081	4,500	5,127
Traffic signals	154	61	47	29	46

Source: HCEO and peer engineer offices

[1] FCEO only maintains records on culverts of certain lengths.

According to **Table 7-1**, HCEO maintains significantly more infrastructure than the peer agencies. This includes 91 percent more county roads, 31 percent more bridges, 283 percent more culverts, 134 percent more traffic signs and 237 percent more traffic signals.

Assessments Not Yielding Recommendations

- *Pavement Management Efficiency.* The Auditor of State (AOS) assessed the efficiency of various pavement maintenance functions including emergency pothole repair, partial and full-depth asphalt patching, and crack sealing. Various cost ratios for these functions (total cost per hour, total cost per ton, labor hours per ton, etc.) indicated unit costs and/or labor hours per unit fell largely within peer averages or were sufficiently explained.

- *Snow and Ice Control Efficiency*. The AOS assessed various efficiency factors including cost per ton of salt, average route lane miles, tons of salt used per lane mile, salt storage capacity and existence of a winter night shift. It determined these factors either fell within peer/industry standards, or were sufficiently explained. For example, HCEO management explained that having snow routes shorter than the peer average allowed it to expedite re-salting and avoid the costly process of pre-treating roads with salt brine.

- *Foliage Control Effectiveness*. The HCEO requires a turf height for roadside mowing that falls within peer and industry standards. Also, disposing of certain brush waste on site by spreading it as mulch is a cost-effective and environmentally friendly solution.

- *Hamilton County Storm Water District Select Issues.* The HCSWD is addressing concerns by the Ohio Environmental Protection Agency regarding deficiencies in its initial storm water plan. The HCEO, which administers the HCSWD on a daily basis, has implemented controls to ensure its employees are billing back time they spend on HCSWD activities to a restricted HCSWD fund.

- *Bridge Maintenance Efficiency and Effectiveness.* The structural condition of nearly 96 percent of county bridges are considered acceptable or better on the industry standard General Appraisal scale. This is comparable to the peer average score of 97 percent, although HCEO maintains nearly 20 percent more bridges. Further, there are no functioning load-limited bridges on the county system. While the HCEO does maintain a higher cleaning cost per bridge than ODOT, there appear to be several reasonable explanations. For example, it takes a more timely, yet meticulous, approach to bridge cleaning to help reduce the amount of reactive maintenance.

- *Sign, Signal and Pavement Marking Efficiency and Effectiveness.* HCEO meets industry standards for various preventive maintenance techniques to ensure motorist safety, such as ensuring that damaged stop signs are replaced within 90 minutes. Further, it meets or exceeds efficiency ratios for road striping and electrician staffing per signal. Finally, it is implementing a database to track condition and maintenance of its 12,000 road signs.

Noteworthy Accomplishments

- The HCEO has applied multiple strategies to reduce "deadhead" miles on snow routes so that drivers are not wasting time driving to locations to refill with salt. It has nine separate storage domes with more than 225% of the storage capacity of peer agencies, so that drivers can efficiently refill their trucks without having to drive back to a central location. Also, the HCEO has reciprocal agreements with area townships allowing trucks to restock at any county or township salt dome, further reducing deadhead miles. Finally, HCEO's reliance on covered facilities also eliminates salt loss and even potential environmental problems from rain.

- The HCEO will increase the efficiency of filling its salt domes through purchase of an automated conveyor in 2005. It is even using the motor from one of its existing tractors to power the conveyor, instead of purchasing a separate power source. Further, it intends to help finance the cost of this equipment by renting out the conveyor to area townships for their domes.

- The HCEO has developed a best practice to simplify an ODOT recommendation on inspecting culverts. Instead of sending a survey crew to assess every foot of a 1,200 foot corrugated metal culvert, it developed a methodology using technology and a 3-man crew to test the inside of the culvert every 25 feet. ODOT has accepted this methodology as reasonable.

- The HCEO is currently retrofitting its traffic signals with high efficiency light-emitting diode (LED) lights. These lower wattage light burn brighter than standard incandescent lamps, yet use 80 percent less electricity. The HCEO anticipates completely recouping installation costs within two to three years. It eventually plans to use to use this technology to reduce the energy cost of walk/don't walk signals.

Issues for Further Study

- The Board of Commissioners has not yet determined the rate of compensation that should be paid to the engineer for duties related to the storm water district. Two peer counties have interpreted additional compensation to the elected engineer as permissible under Section 315.14 of the Ohio Revised Code. The Hamilton County Engineer and Board of County Commissioners should consult with the Hamilton County Prosecutor for additional interpretation of this statute. If these parties agree to provide additional compensation to the county engineer, The Board of Commissioners may wish to refer to other similar size SWD's to establish a benchmark for compensation, such as Summit County or Franklin County.

- The Hamilton County Engineer should consult with the Hamilton County Prosecutor to determine the potential need for and structure of bonding for HCEO employees related to the HCSWD. They should determine the appropriateness and need for the prosecutor to seek to add bond coverage for services/duties relating to the storm water district. Whatever conclusion is reached, the parties should also consult with the HCEO's insurer and the Auditor of State to ensure all parties are in agreement with the final structure of the bonding.

Recommendations

All Functional Areas

R7.1 The HCEO should obtain training to fully use the functionality of its automated work order system for performance measurement of its maintenance functions. The agency is not currently producing summary reports of specific maintenance functions capturing average unit costs and labor hours. This hinders the ability of HCEO managers to investigate potential inefficiencies and make corresponding decisions in planning, budgeting and performance standards. The HCEO should designate and train an employee to routinely produce these reports for management analysis, budgeting and continuous improvement.

During the course of the audit, the HCEO was asked to produce data summarizing annual average unit costs and labor hours detailing various maintenance functions. For example, these could include the average cost to patch a pothole, cost per lane mile of crack sealing, cost to clean each drainage structure, etc. However, HCEO was not able to efficiently generate these summary reports through its automated work order system for the entire agency. In order to conserve time, the HCEO complied with these requests by limiting data mining of its work order system to one geographic region. While these efforts produced limited summary data, the HCEO was still forced to perform several manual calculations just to determine average unit costs and labor hours.

The HCEO is not maximizing the full potential of its work order system to allow for resources at detailed enough levels for managers to make informed decisions. Consequently, it may not have sufficient data to fully determine if it is managing assets well enough to gain the maximum return on investment, and to be able to link these findings to its budget. HCEO's personnel director stated the staffer proficient in generating such detail reports had retired, and no replacement had been trained.

Conversely, the FCEO and the Ohio Department of Transportation generate complete summary data through their system. Both agencies track maintenance efficiency by generating "exception reports" which compare outputs of selected maintenance activities over a given time period against function averages or range of averages. The reports lists those work orders that fall outside the defined standards for management followup. The vendor which installed HCEO's current work order system still has the capability to generate detail summary reports, and that a new staffer could be sufficiently trained on the software within two days.

Financial Implication: The vendor for HCEO's work order system estimates one-time training costs at $3,000 to $3,500.

R7.2 The HCEO should consider adopting a uniform performance index to track the effectiveness of a wide variety of maintenance functions within a central database. This system would compare maintenance efforts to criteria for excellence, and allow HCEO management to monitor progress toward achieving these goals and making necessary adjustments. Adopting this system would entail adapting and expanding its current infrastructure inspection efforts to develop a uniform deficiency rating system. Further, adoption of touch-screen, GPS-based technology would help the HCEO more efficiently capture and process data on its massive inventories such as 12,000 road signs.

HCEO places a premium on high quality service, but given the magnitude of its infrastructure inventory it has challenges in assessing the effectiveness of its maintenance. While it inspects and tracks the condition of certain infrastructure, results are largely maintained on separate databases with criteria that are not uniform across the various maintenance functions.

Without quantitative, consistent measures for maintenance effectiveness, the HCEO is hindered in its efforts to ensure whether its limited resources are being directed to where they are most needed. Further, the HCEO is concerned that attempts to embrace performance management could overwhelm its limited staff resources in administrative tasks. For example, it cited concerns on how it could efficiently manage the data-entry involved with creating a computerized inventory for its 12,000 road signs.

ODOT maintains an organizational performance index (OPI) as the basis for its efforts to achieve its goals and mission. All employees are expected to do what is necessary to achieve the goals set forth in the OPI, as measured by a 0-6 score. Scores are calculated through quarterly maintenance quality surveys (25% of roadway at a time) that a team of ODOT inspectors conduct on state and interstate highways on key infrastructure indicators. Inspectors use touch-screen GPS technology to track deficiencies related to pavement, vegetation obstruction, signs, drainage and other areas. These scored conditions are then entered into a computer spreadsheet provided to state and local ODOT management, from which an ongoing prioritized work plan for each county is derived and summarized on one page.

The plans serve as an indicator of the efficiency of resources expended toward meeting an established set of minimum system condition goals and preventive maintenance measures. The county work plan lists each county's prioritized maintenance activities, the work effort, resources, and funding expended on each activity. The plan tracks the number of deficiencies in each maintenance category, the increase or decrease in deficiencies, the total dollars spent on each maintenance area and the cost per category of maintaining the highway system. Using this information, counties and districts are able to adjust their maintenance activities to meet their most pressing needs. Through this

accountability system, ODOT's Assistant Maintenance Administrator for Highway Operations said the ODOT reached its statewide goal within 3 years of achieving a 4 rating out of a possible 6.

Financial Implication: Based on ODOT estimates, a two-person survey team could cover all county roadways within 10 working days. Consequently, it appears the HCEO could reassign internal resources to complete this task. According to an ODOT consultant, the county could equip one of its vans with the needed technology to capture survey data for approximately $5,000.

R7.3 The HCEO should begin adoption of policies for key infrastructure maintenance standards, as well as develop manuals for how to most efficiently and effectively complete specific tasks. HCEO staff has demonstrated exceptional institutional knowledge of industry standards and best practices during the course of the audit. However, it has documented very little in terms of policies and general guidance. Formally documenting standards and practices will help ensure this institutional knowledge is not lost to absences or turnover so that infrastructure life and safety are maximized.

The HCEO has not developed written procedures to guide its employees for many maintenance functions, with the exception of manuals for snow and ice control (see **R7.6**) However, the department has standard maintenance practices that employees follow, often under the direction of experienced supervisors. Many specific maintenance practices which HCEO officials testified appear to represent industry standards.

The American Public Works Association has developed hundreds of recommended practices to enhance the effectiveness of agencies and their competencies in the public works field. Benefits cited by agencies that have conducted self assessments using these recommended practices include: development of proactive management systems; systematic evaluation of processes; increased employee satisfaction; a high level of professionalism; standardized operation and management functions; reduced potential liability; and increased public awareness of the critical role of public works. For example, ODOT has detailed policies and manuals on all its infrastructure maintenance functions.

The HCEO is largely relying on the institutional knowledge of its staff to direct maintenance. However, there is a short-term risk that during absences of key personnel some of this critical knowledge may not be conveyed. Moreover, as key management turns over there is a longer-term risk for loss of this institutional knowledge if it is not documented. Further, formally documenting in policy maintenance standards would ensure that activities are performed to maximize infrastructure life while ensuring the safety of staff, contractors and the traveling public.

Pavement Management

R7.4 Given its lack of funding to resurface roads on an optimum schedule, the HCEO should continue maximizing its efforts to extend the county road pavement life-cycle. While the agency does have a logical approach, in general, to maintenance and rehabilitation, additional management information could even improve its efforts to target limited funds. For example, certain recommendations in this audit section should contribute to this goal, such as performance measures to track overall maintenance effectiveness (R7.2).

The standard means to measure pavement maintenance needs involves assigning a "pavement condition rating" (PCR). The rating method provides a uniform method for visually identifying and describing pavement distress, which are eventually converted into a 0-100 score (100 being new). **Table 7-2** lists average PCR ratings by surface area as reported by HCEO and two peer agencies according to a rating scale ODOT developed. For lower-speed, lower-volume two-lane roads, ODOT considers a 55 PCR rating the lowest threshold for an acceptable ride. The HCEO agreed that its ideal repaving threshold is for scores in the 55-60 range.

Table 7-2: Average Pavement Condition Ratings by Surface Area [1]

	HCEO	FCEO	MCEO [2]	SCEO	Peer Average
Very Good (90-100)	32.1%	52.7%	57.7%	14%	41.5%
Good (75-89)	40.2%	33.5%	33.9%	26%	31.1%
Fair (65-74)	12.4%	9.2%	7.6%	36%	17.6%
Fair to Poor (55-64)	6.6%	3.5%	0.8%	9%	4.4%
Poor (40-54)	7.7%	0.5%	0%	11%	3.8%

Source: HCEO and peer agencies

[1] The HCEO aggregated ratings in terms of square footage, while the peers reported these according to lane miles.

[2] Data was not available on 22 lane miles due to municipal boundary adjustments.

Nearly 9 percent of HCEO roads fell below ODOT's lowest acceptable threshold for PCR quality (roads in poor-very poor range). This compared to a peer average in this range of only 5.3 percent, and 4 percent for all roads statewide under ODOT jurisdiction. Further, HCEO has a much larger share in the mediocre ranges (fair-to-poor, fair) than FCEO and MCEO. This is also a troubling indicator as these roads could deteriorate into the deficient ranges in a few years. ODOT generally assumes an annual standard deterioration of 3 PCR points.

Poor pavement conditions affect the speed of free-flow traffic, as pavement may have large potholes and deep cracks. Pavements in the worst condition are passable only at reduced speeds, and with considerable ride discomfort. However, the HCEO Bridge and Maintenance Engineer stated that he knows of only one rarely used county road on which

drivers must slow down. By delaying maintenance or rehabilitation due to lack of funding, the HCEO may incur greater long-run costs to restore the pavement condition to a predetermined level. In general, an early and systematic maintenance and rehabilitation plan is the most cost effective and results in the greatest extension of useful pavement life. The Washington State Department of Transportation reports that in order to restore pavement to a predetermined level, it will cost two-to-three times as much if the pavement is allowed to deteriorate 2-3 years beyond the optimum rehabilitation point.

The HCEO states that it cannot keep pace with repaving needs due to lack of funding for its 1,157 lane miles of county roads. The Highway Maintenance Engineer stated if the agency could resurface 8 percent of its roads annually, it could achieve a replacement cycle of 12-13 years, but the cycle is closer to 15 years. Given this quandary, the HCEO should fully use all management data possible to ensure maximum efficiency and effectiveness in its maintenance functions (See **R7.1** and **R7.2**). It should schedule all levels of maintenance activity through its pavement management system.

R7.5 The HCEO should assess data from its work order and pavement management systems to determine optimum criteria and time of year for crack sealing. In addition, it should develop a policy that specifies the type of maintenance to be performed on cracked pavement and when to perform it. Based on these results, the HCEO may find it beneficial to reseal certain roads multiple times between resurfacing.

Crack-sealing is the most common form of pavement preventive maintenance to retard deterioration. Sealing cracks with rubberized asphalt material minimizes the intrusion of water into the pavement, and will extend pavement life by 3 to 8 years, according to industry statistics. Crack-sealing provides the most cost-effective use of dollars over time compared to other pavement maintenance techniques.

The HCEO generally assumes a pavement life extension of 8 years. It seals road cracks 2-3 years after repaving during the spring or fall, but normally will not reseal a road if it is scheduled to be repaved within 2 years to avoid potentially wasting resources. On the other hand, ODOT states that it may sometimes reseal a road multiple times between resurfacing based on its PCR rating, with every 3-5 years as optimal. ODOT also attempts to target this function in the late fall when cracks are widest, because the pavement shrinks and cracks are open.

According to the Nebraska Department of Roads (DOR) Pavement Maintenance Manual, the fall of the year usually provides the best conditions for crack-sealing because of moderate temperatures, minimal rainfall, and the cracks reaching their midpoint in width. Although spring temperatures are also moderate, crack-sealing crews may often have to

contend with moisture in the pavement which must be minimized prior to sealing resulting in extra work.

While cracks can appear in pavement up to 7 years after construction, the Nebraska DOR states priority must be given to newer pavements. For older pavements, the NDOR recommends that agencies prioritize resealing efforts based on weather, age of pavement, general pavement condition and type/condition of crack. The potential for moisture-related pavement damage must be evaluated in order to establish both the need and urgency for resealing. For example, cracking on older pavements may be so severe that resealing may not be appropriate and other repair methods must be considered. However, if HCEO developed a set of criteria for resealing older pavements prioritizing these factors, it might be able to cost-effectively further retard pavement deterioration prior to repaving a road.

Snow and Ice Control

R7.6 The HCEO should develop a salt application chart and/or decision matrix providing general guidance on achieving effective and efficient application rates for various weather conditions. It appears the HCEO is applying salt above recommended industry guidelines. While snow and ice control is not an exact science, developing a written policy on standard approaches to different types of storms would assist the HCEO in anticipating potential road conditions and generally accepted responses. This will better allow the HCEO to maximizing efficiency and environmental friendliness, while upholding its high standards for safe driving conditions.

Table 7-3 shows certain indicators for salt usage among HCEO and the peer agencies for the 2003-04 season.

Table 7-3: Salt Usage, 2003-04 Season

	HCEO	FCEO	MCEO	SCEO	Peer Average	Peer Average w/o SCEO
Tons of salt used	15,894	10,500	6,500	20,297	12,432.3	8,500
Total tons of salt per lane mile	10.5	13.0	9.0	34.4	18.8	11.0
Snowfall for season (inches)	22	24.1	17.5	47.5	29.7	20.8
Tons of salt per lane mile per inch of snow [1]	0.48	0.54	0.51	0.72	0.60	.53

Source: HCEO and peer agencies

[1] Snowfall is only one indicator toward salt usage. Other variables include pavement temperature, pavement surface (dry, wet, slush, etc), freezing rain, wind, etc.

When excluding SCEO, which sustains a much higher level of snowfall compared to the peers, HCEO applies salt at rates similar to the peer average. However, the HCEO does not maintain guidelines that establish the application of materials to control snow and ice. It allows drivers to judge application based on radio counsel from the shift foremen.

The Bridge and Maintenance Engineer stated that generally trucks salt at 600 pounds per lane mile for maximum applications, although if the driver is only applying salt and not plowing, then both lanes are treated at the same time. During lighter snows, foremen instruct drivers to reduce application to 300 pounds per lane mile or 600 pounds for two lanes. The Engineer noted that due to the urban setting of the service area, the HCEO may apply salt at greater rates than other agencies due to the strong citizen expectation for black pavement.

The Salt Institute, an industry think-tank for snow and ice control, reports that application rates generally range from 300 to 800 pounds per two-lane mile. Based on statements from the Bridge and Maintenance Engineer, HCEO does appear to apply salt above this level although tons of salt used per lane mile fall within the peer agency average. Regardless, HCEO risks over application of salt because it does not have written application guidelines in place taking various factors into account.

Table 7-4 presents the Salt Institute's general application guidelines for combating various storms, although it notes local conditions and policies will be the final determining factor. The Operations Engineer for the MCEO stated the agency follows these general guidelines for salt application.

Table 7-4: Salt Application Guidelines

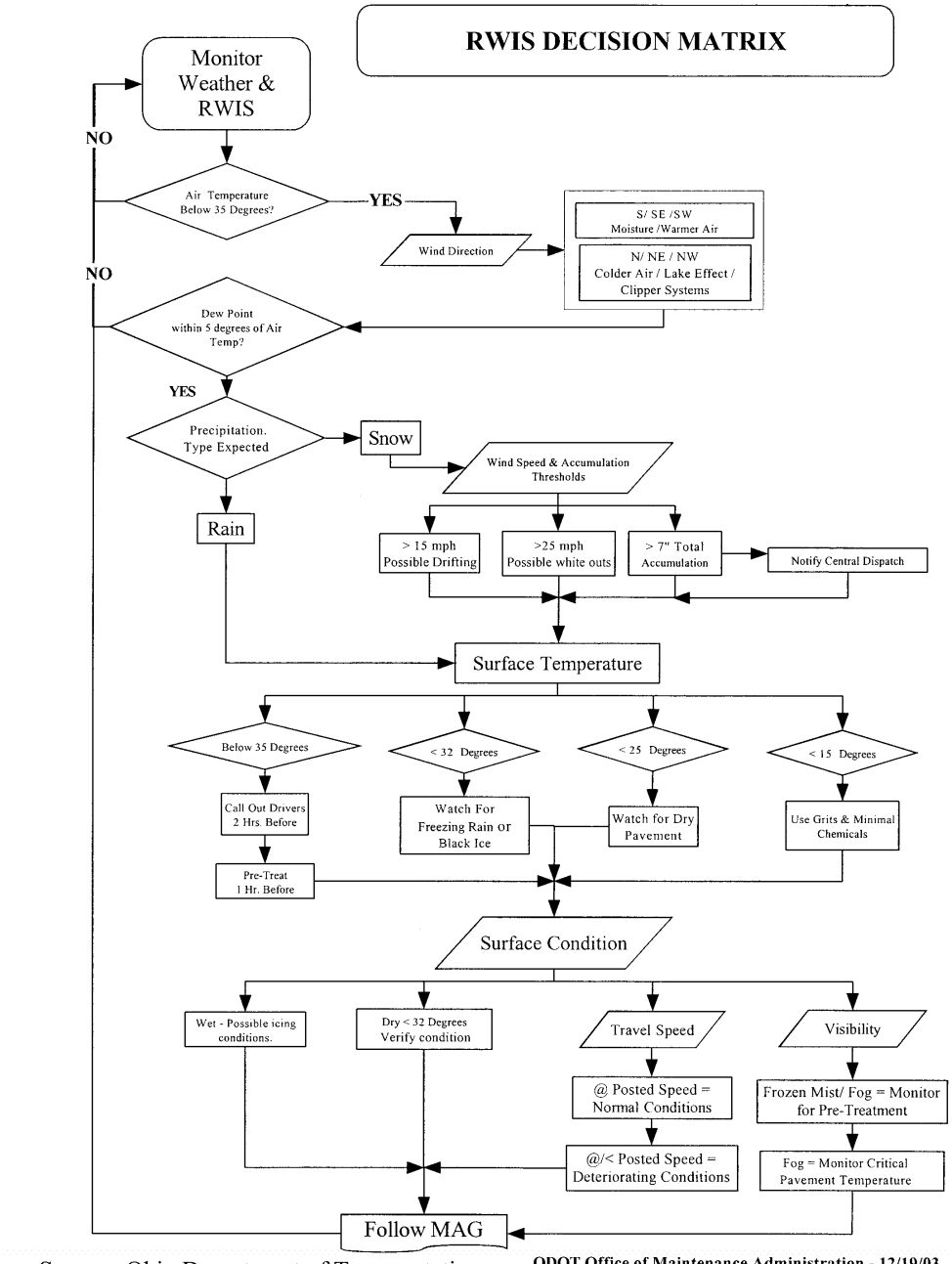
Condition 1 **Temperature**: Near 30º **Precipitation**: Snow, sleet or freezing rain **Road Surface**: Wet	If snow or sleet, apply salt at 500 lbs. per two-lane mile. If snow or sleet continues and accumulates, plow and salt simultaneously. If freezing rain, apply salt at 200 lbs. per two-lane mile. If rain continues to freeze, re-apply salt at 200 lbs. per two-lane mile. [1]
Condition 2 **Temperature**: Below 30º or falling **Precipitation**: Snow, sleet or freezing rain **Road Surface**: Wet or sticky	Apply salt at 300-800 lbs. per two-lane mile, depending on accumulation rate. As snowfall continues and accumulates, plow and repeat salt application. If freezing rain, apply salt at 200-400 lbs. per two-lane mile. [1]
Condition 3 **Temperature**: Below 20º and falling **Precipitation**: Dry snow **Road Surface**: Dry	Plow as soon as possible. Do not apply salt. Continue to plow and patrol to check for wet, packed or icy spots; treat them with heavy salt applications.
Condition 4 **Temperature**: Below 20º Precipitation: Snow, sleet or freezing rain **Road Surface**: Wet	Apply salt at 600-800 lbs. per two-lane mile, as required. If snow or sleet continues and accumulates, plow and salt simultaneously. If temperature starts to rise, apply salt at 250-300 lbs. per lane mile, wait for salt to react before plowing. Continue until safe pavement is obtained.
Condition 5 **Temperature**: Below 10º **Precipitation**: Snow or freezing rain **Road Surface**: Accumulation of packed snow or ice	Apply salt at rate of 800 lbs. per two-lane mile or salt-treated abrasives at rate of 1,500 to 2,000 lbs. per two-lane mile. When snow or ice becomes mealy or slushy, plow. Repeat application and plowing as necessary.

Source: The Salt Institute

[1] The 200 lbs. per two-lane mile application in conditions 1-2 must be repeated often during the condition.

Table 7-4 clearly shows the five different types of storms each require somewhat different approaches. ODOT has taken this a step further by developing a detailed decision matrix that provides several additional factors for management to consider when facing a potential snow or ice event, as evidenced by **Chart 7-2.** The matrix assists managers in gauging air and surface temperature, precipitation, wind data and visibility from automated sensors in developing effective responses to controlling snow and ice.

Chart 7-2: ODOT Road and Weather Information System Matrix



Source: Ohio Department of Transportation

The decision tree such as ODOT's can help HCEO management predict potential weather conditions and their impact on snow and ice treatment. Further, HCEO has online access

to three geographic ODOT sensors in Hamilton County that gather data for its road and weather information system.

Management must continue to depend upon well-trained maintenance crews to use initiative and imagination in coping with unforeseen problem. Nevertheless, general written guidelines on material application rates and decision trees provide baseline guidance on the balancing of effectiveness and efficiency in snow/ice control. This is especially crucial when key supervisory staff are absent.

R7.7 The HCEO should standardize its snow and ice control guide books for drivers across its three divisions. Valuable data on safety precautions, winter forecast terminology, emergency contact numbers and other information do not consistently appear in all three booklets. Standardizing these booklets would ensure that all drivers, and their substitutes, receive steady written guidance from HCEO management on the numerous facets of snow and ice control.

Each of the three HCEO Divisions has a route guide and checklist book. Much of the information is consistent, including detailed route directions with driver names, identification of bridges and overpasses that may require additional salting; and basic equipment operation guidelines. However there is valuable data that is not consistently found in all three division guides. Some of this information, including booklets where they are currently found, includes:

- Safety precautions (Western and Central)
- Listing of roads with hills (Eastern) [1]
- Guidelines on clearing bridges/overpasses (Western)
- Procedures for reporting work-related accidents (Central)[2]
- Hamilton EMA definitions of winter forecast terms (Central and Eastern)
- Local city/county/state emergency numbers (Western)

According to the APWA, governments should develop snow and ice control plans which establish control methods to meet specified levels of service for various types of roads. The plans should detail procedures for the amount of time required to complete the removal effort, and specify personnel, equipment and materials to meet prescribed service levels. By not having key procedure, safety, emergency contact and other data consistent in all regional snow manuals, HCEO increases the risk of effectiveness or even safety issues.

[1] The HCEO noted there are no hills on county roads in the western portion of Hamilton County.
[2] The HCEO noted that documentation for reporting accidents is readily available at all division offices.

R7.8 The HCEO should develop an ongoing performance measurement program specifically for its snow and ice control operations given the program's substantial cost and direct impact on customer safety. It should work with stakeholders to define in policy level of service goals that are meaningful, measurable and achievable. In developing effectiveness measures, it should develop an ongoing survey program asking customers to rate the performance of snow and ice control. The Ohio Department of Transportation operates a "Snow and Ice Spotter" survey program, and uses gleaned data for continuous improvement efforts, performance evaluation and to address specific on-site problems.

The HCEO does track snow/ice incident costs on a spreadsheet according to labor, equipment, salt and chemicals. However, it does not have a formal process in place to use this and other data to measure the efficiency or effectiveness of its snow and ice control program. According to the Salt Institute, this is a continuous effort that begins with setting level of service goals that are meaningful, measurable and achievable. These goals involve both outputs (timing, frequency, type and location of treatment) and outcomes (road conditions during/after event, traffic movement descriptors). Without a performance measurement system, HCEO will have difficulty achieving a high level of efficiency (lower unit costs) while also sustaining its desired level of service within its snow and ice control program. The 2004-05 snow and ice control program consumed more than $1.5 million through mid-March.

The HCEO can use data from its spreadsheets to measure efficiency, such as cost per lane mile for various snow and ice control tasks by storm, storm hour, inch of snow, day, week, season, etc. For example, FCEO tracks the hourly cost of specific anti-icing activities, and the cost per mile of plowing and salting activities. It also has the ability to sort this data by whatever time period is desired (monthly, annual, storm event, etc), so it can quickly obtain whatever management data it desires (e.g., salt usage per storm event, cost per storm event, etc.). The HCEO should also attempt to derive performance measures that capture effectiveness in snow and ice control. These could include output measures such as the number of hours in a plowing/spreading cycle or plowing/treating within "X" hours after an event begins or ends.

Outcome measures are even more valuable because they assess how well an agency preserves or restores a safe level of service on the roadway, but they depend on collecting external data. Nonetheless, agencies such as ODOT District 12 collect outcome data from a volunteer "spotter" customer database of drivers. Each county developed a list of approximately 10 snow spotters per county from a list of professional drivers. On a weekly basis or after a significant snow and ice event, phone calls are made to each designated snow spotter and a short list of questions are asked on our performance on a scale of one to 10 with 10 being outstanding. Comments and ratings from the spotters are

logged into the computer. Overall performance ratings are tabulated and averaged for each week with previous scores resulting in a cumulative average rating.

Foliage Control

R7.9 The HCEO should consider reducing its mowing frequency to a level commiserate with the peers and industry practices, resulting in at least one less mowing per season. While the HCEO places a very high value on aesthetics in maintaining roadsides, this practice comes with a substantial cost to taxpayers. The HCEO should track the level of citizen complaints in response to reduced mowing, and if it determines necessary, restore its mowing schedule the following year. As an alternative, it could also consider reduced mowing frequencies in less populated areas of its jurisdiction to both minimize complaints and reap some savings.

The HCEO contracts out the majority of foliage control functions, including roadside mowing. **Table 7-5** lists the frequency of mowing cycles in comparison with the peer agencies and ODOT

Table 7-5: Roadside Mowing Cycle Frequencies

HCEO	ODOT	FCEO	MCEO	SCEO
5 with option for 6	3 with option for 4	3 with option of 4 in certain areas if conditions warrant	5 with option for 6	3 times per season

Source: HCEO and peer agencies

Table 7-5 demonstrates that only one peer agency mows as frequently as HCEO, with most ranging from 3 to 4 times per season. In fact, the FCEO Highway Engineer stated that the county recently reduced its roadside mowing costs by 33% by cutting back on the frequency of mowing in certain areas. He stated the department was constantly mowing during the wet spring weather, and decided instead to reduce frequency and concentrate additional mowings if necessary on the most highly traveled and populated areas.

Based on current contract costs, each additional mowing cycle costs HCEO an additional $30,000. The HCEO replied that because the agency serves a largely urban area, residents expect a high level of customer service in terms of aesthetics and have complained in the past when grass grows too high. Nonetheless, these higher service levels have resulted in higher costs. Reduced foliage control costs could be redirected toward other areas in critical need of funding such as pavement management (see **R7.4**). The HCEO should weigh the costs and benefits of continuing this policy, and at least consider reducing the scope of mowing in less populated areas.

Financial Implication: Based on current contract costs, reducing one mowing cycle would save $30,000 a year.

R7.10 HCEO should consider consolidating all of its mowing services into a single contract. It should consolidate its three separate roadside mowing contracts into a single contract. Since breaking the countywide contract into three sections several years ago, a lack of interested bidders has resulted in a single company consistently receiving all three contracts. The HCEO should also increase requirements on how bidding vendors define proposed unit costs to better ensure it receives a fair market value. There was no clear methodology for defining unit cost in the roadside mowing contract.

At the request of county commissioners, the HCEO has broken up its roadside mowing contract into three regional contracts to appeal to more small business and minority owners. However, due to the capital-intensive nature of the job, only one larger company successfully bid and received all three contracts the past several years.

The justification as to how the vendor tabulated unit cost is unclear in certain contracts, such as roadside mowing. For example, the payment methodologies for the three roadside mowing contracts, awarded to the same vendor, are listed in **Table 7-6:**

Table 7-6: HCEO Contract Roadside Mowing Costs [1]

Contract Region	Western		Central		Eastern	
Mowings	Cost per mowing	Cost per lane mile	Cost per mowing	Cost per lane mile	Cost per mowing	Cost per lane mile
First	$15,000.00	$69.12	$9,500.00	$75.10	$9,000.00	$90.00
Second	$15,000.00	$69.12	$9,000.00	$71.15	$8,000.00	$80.00
Third	$15,000.00	$69.12	$8,000.00	$63.24	$7,100.00	$71.00
Fourth	$15,000.00	$69.12	$8,000.00	$63.24	$6,000.00	$60.00
Fifth	$12,000.00	$55.30	$7,500.00	$59.29	$5,500.00	$55.00
Sixth (optional)	$10,000.00	$46.08	$4,900.00	$38.74	$4,000.00	$40.00
Total cost [2]	**$72,000.00**	**$331.80**	**$42,000.00**	**$332.02**	**$35,600.00**	**$356.00**

Source: HCEO roadside mowing contracts
[1] Costs per lane mile was not in the original proposal document, added by AOS
[2] Total does not include optional mowing

Costs per lane mile vary by as much as $25 between the three contracts. Also, the percentage variances charged for each mowing vary widely for each contract. None of these items were explained in the cost sheets submitted with each proposal. It was later noted in an interview that the same vendor was charging different rates for different areas

of the county as a differential for the traveling out to those areas of the county, though this rationale was never specified or justified in the bid documents.

According to the *Contract Management Manual* produced by Ohio University's Voinovich Center for Leadership and Public Affairs, project deliverables in the request for proposal (RFP) must clearly describe the performance expectations of the vendor that must be included in the proposal submissions. This should include quantity and quality of the service delivery, as well as the quantity and quality of output effectiveness. Further, the government should clearly identify in the RFP any requirements for the format and content for a budget to support the service proposal if this is an important element of the proposal evaluation process.

The HCEO is following proper bidding procedures for its foliage control contracts. However, splitting the roadside mowing into three contracts has not brought the desired results in affording opportunities to multiple small business owners. This increased administrative burden, combined with unclear criteria to how the vendor calculated unit cost, resulted in the county paying the same vendor wide variances in cost per mile per mowing within each region without a methodology explained in the bid documents. Though it was verbally stated some of the additional cost was to compensate the vendor for having to travel farther, the cost methodology was not specified in the contract.

Consequently, the HCEO should base payments on uniform project deliverables, such as cost per center lane mile, and allow for documented adjustments for issues such as travel expense. It could also require that potential vendors submit budgets in their RFPs supporting their service proposals.

R7.11 The HCEO should also increase communication with the Hamilton County Purchasing Department to ensure that accurate project scope data is included whenever it issues a request for proposal to avoid vendor confusion, help widen the bidder pool, and potentially improve contract costs.

All contracts are administered through competitive bidding by the county's purchasing department. They include detailed scope documents. However, the scope portions of the roadside mowing contracts appear to duplicate work in the separate contract for mowing behind the guardrail. For example, both contracts specify for mowing in front of the guardrail. Also, question and answer documents attached to the roadside mowing contracts include references to mowing behind the guardrail.

According to the Ohio University's *Contract Management Manual,* taxpayers expect public agencies to set criteria for: what is to be purchased; by whom; for what purpose; with what results; and at what price. A public agency has the responsibility to administer its purchase of service program in a manner that is consistent, fair and objective. A

professionally developed process and consistently employed contract administration procedures will provide these assurances to the community regarding objectivity in purchasing services.

The HCEO staffer in charge of foliage contracts stated the errors in the RFP scope and addendum documents were the responsibility of the county purchasing department. Regardless, the HCEO should review all RFP documents prior to release and communicate concerns back to the purchasing department to guard against mistakes. The scope mistake in the RFP, though it did not result in duplication of work, could have dissuaded potential bidders who did not have the resources to complete the entire project as incorrectly advertised. The county may have paid a higher bid price than necessary.

R7.12 The HCEO should formalize in writing a vision clearance policy regarding landscaping and foliage abutting the public right of way. Although the HCEO reserves the right to remove or trim any hazardous tree encroaching the right of way, trimming attempts often draw complaints. A formal policy would educate both HCEO staff and landowners as to the acceptable standards for vision clearance. It could potentially both reduce complaints and the need to revert as often to costly bucket-trimming.

The HCEO does not have a formal vision clearance policy to prevent landscaping and foliage from restricting motorists' vision. In fact, HCEO management stated that several years ago the county was party to a lawsuit when a limb encroaching from a tree growing on private property fell onto a driver on a county road. State law provides wide discretion for a county engineer to trim or remove vegetation encroaching county roads, and HCEO management noted they have since aggressively exercised this right as a matter of practice. They state they notify the landowner of encroaching brush, and if not addressed in a timely manner, HCEO crews are sent out.

The most efficient means to control roadside brush is a side-arm "boom" mower, in which a giant trimming device attached to the side of tractor slices through brush and trees. However, HCEO noted this approach often draws landowner complaints who claim the devices trim off too much of their brush and shrubbery. Consequently, the HCEO occasionally has to revert to sending out trucks with "buckets" that lift staff up to manually trim down foliage. While more effective in preserving aesthetics, this means is much less efficient as these trucks require a crew of 4-5 staff including flaggers.

According to the APWA *Management Practices Manual,* agencies should adopt programs, ordinances or zoning codes to define the limits of vision clearance and the responsibility of the agency and property owner to maintain proper heights of landscaping or foliage in the area. For example, one county vision clearance policy states the county may trim trees to a minimum height of 20 feet above the road.

Clearly defining the vision clearance area to the property owner would inform that property owner what the standards are for foliage encroaching onto the right of way. The HCEO Bridge and Maintenance Engineer stated that newer boom mowers the agency is purchasing provide a "cleaner" cut that have reduced resident complaints of "over-trimming." Nonetheless, a policy might further reduce the level of complaints, and consequently, reduce the need for the HCEO to revert to more expensive bucket-trimming rather than boom mowing. It would also provide clear guidance to employees as to what degree brush needs to be trimmed back. Finally, it would memorialize the HCEO's efforts to ensure driver safety and further assist in the HCEO's risk mitigation efforts.

R7.13 The HCEO should strive to eliminate its contract for mowing/trimming vegetation behind its 106 miles of guardrail. The current contract costs three times as much in maintenance as standard roadside mowing, largely due to the labor and equipment intensive duty of cutting back brush and trees behind the guardrails. When presented with this information by auditors, HCEO management proactively presented a potential solution to use its new fleet of "boom arm" mowers to perform this work in-house. Significant maintenance issues with its older fleet of boom arm mowers had necessitated the need to contract this service. Even with the up-front capital investment of having to purchase three mowers at $70,000 - $75,000 each, it appears the HCEO can recoup these costs from contract savings within two years.

The HCEO currently maintains a contract to maintain foliage around 106 miles of guardrail on county roads twice a season. The contract costs $95,600 per mowing ($896) per center-lane mile, nearly three times the per lane mile contract cost of standard roadside mowing. The increased costs are largely attributed to the "boom" mowing of brush the contractor performs behind these guardrails. The county stated that historically it had no choice but to contract this service due to maintenance problems with its own older boom mowers. The HCEO fleet supervisor stated that he couldn't recall a time when all three county boom mowers could operate consecutively. These maintenance problems have not only delayed productivity; they have also increased unit costs for boom mowing as evidenced by **Table 7-7**:

Table 7-7: Brush control labor vs. equipment cost per hour [1]

	HCEO	ODOT (Hamilton County)	ODOT (Statewide)	FCEO
Labor	$15.63	$14.52	$14.97	$22.03
Equipment	$21.03	$5.60	$6.06	$10.21

Source: HCEO and peer agencies

[1] Represents only one geographic division of HCEO

Though labor costs are 9 percent less for brush control, equipment costs were 188 percent greater than the peer average. However, the county has recently started purchasing

replacement boom mowers that do not have the same clutch problems and require much less maintenance. If fact, the fleet supervisor stated the new model purchased in 2004 has been operable every day that it hasn't snowed, and can operate in virtually any time of year because of a climate-controlled cabin. These new mowers costs $74,000, and the county intends to purchase two more to supply each of its three geographic regions in 2005 and 2006.

During discussions with the AOS over its costly guardrail contract, HCEO management noted the potential for eliminating this contract by utilizing the new boom mowers instead. The Bridge and Maintenance Engineer maintenance estimates this would add approximately 720 hours internally each year, and that trimming around the guardrails could be done simultaneously by the flagman on this operation. Even with the additional internal hours and assuming maintenance costs of the next highest peer (FCEO), it appears taking back this function could save $130,000 annually over current contract costs. Consequently, the county could reasonably recoup the purchase costs for the three boom mowers ($225,000) within two years.

Financial Implication: It is estimated that eliminating the guardrail vegetation contract could conservatively save $130,000 annually.

Storm Water Device Maintenance

R7.14 The HCEO should prioritize completion of a central database of its 4,350 culverts, including maintenance and operation needs. It should hire and train an intern/co-op to assist the planning and design engineer in this process. The complete database would help the agency more effectively flag service needs to maximize the life expectancy of these structures and the surrounding roads, as well as enhance work scheduling and budgeting. Once completed, it should link this database to its central infrastructure database so HCEO can more easily access data on culvert condition.

A culvert is any drainage structure not classified as a bridge that provides an opening under the roadway. The HCEO's Planning and Design Engineer has been compiling and refining a central culvert database the past 2 years based on 4-5 different paper sources, including historical culvert records and results from culvert inspections of the last two decades. He reports this is an extremely time-intensive process due to the need to modify data for accuracy and sort out duplicative data. However, this individual has been unable to work in this database recently due to other office responsibilities, and estimates at least 2-3 months of uninterrupted work for its completion. HCEO was the only peer that was unable to provide complete data on culvert condition.

The APWA *Management Practices Manual* recommends that agencies maintain and regularly update a detailed record of drainage infrastructure condition. The MCEO

maintains a comprehensive database for its 2,000 culverts listing standard general condition ratings (0-9) by township and culvert size. MCEO personnel actively utilize this database when for consideration of maintenance and operation needs. By delaying completion of the culvert database, HCEO impairs its ability to efficiently flag service needs to maximize the life expectancy of its culverts. The Planning and Design Engineer stated that if the agency could hire a detail-oriented cooperative student, he could train and monitor that student to hasten completion of the database. Once this database is completed, he believed a column could be added to HCEO's central infrastructure database (which already lists culverts) describing the physical condition of that culvert.

Financial Implication: The cost to hire a co-op student for a 3 month period is $5,200.

R7.15 The HCEO should consider increasing the frequency of routine inspections so that each culvert is formally inspected at least every eight years. Some culverts have not been inspected for up to 12 years.

The HCEO inspects culverts through two means. First, it inspects culverts and all drainage infrastructure whenever it rehabilitates a road to ensure these devices are in good condition before resurfacing. There is also a multi-year routine inspection cycle for culverts. Given the immense number of culverts, it doesn't have the manpower to inspect each one annually. The first ran from 1993 to 2000. The HCEO started by inspecting the largest culverts (36 inches up in diameter) and worked its way through the inventory to the smallest pipes. The HCEO restarted the inspection process during late 2004. **Table 7-8** lists the results of culvert condition at HCEO in comparison to peer agencies.

Table 7-8: Culverts by Physical Condition [1]

Culvert Condition	HCEO [2]	FCEO	MCEO [3]	SCEO	Average
Good to excellent	49%	65%	26%	68%	53%
Satisfactory to fair	42%	26%	60%	28%	38%
Poor to failed	9%	9%	14%	4%	9%

Source: HCEO and peer agencies

[1] All peer ratings based on the standard General Appraisal rating system, which were conformed for this analysis to match. HCEO's "poor-fair-good" rating system.

[2] HCEO was only able to provide partial data from its western division. Represents 847 culverts.

[3] MCEO did not have rating data for one township, as well as 200 other culverts.

While the condition of HCEO culverts are comparable to the peer average, some of HCEO data employed is up to 12 years old. According to the University of New Hampshire Technology Transfer Center, thorough inspection of culverts is essential to effective maintenance. Knowledge of culvert material can predict the types of problems a culvert may have, as each material has specific weaknesses.

While there are no laws governing frequency of culvert inspections, ODOT maintains a policy to inspect culverts greater than 12 inches in diameter at least once every five years.

The MCEO routinely inspects culverts every 6-8 years. The 4-year hiatus between completion of HCEO's culvert inspection cycles risks that culvert deterioration might not be detected in a timely manner. Water is the most destructive force associated with road maintenance, and poor drainage causes potholes, cracks and other imperfections in the road surface as well as pavement failure below the surface. If the HCEO ran a continuous culvert inspection program, it could re-inspect culverts every 7-8 years – a frequency similar to MCEO.

R7.16 As HCEO develops written guidelines for all its maintenance activities (R7.3), it must take into consideration environmental concerns related to debris and sediment gather from these storm water devices. It must ensure that maintenance crews realize the need to collect and properly dispose of these materials to the maximum extent practicable. It should incorporate this debris removal guideline as a "Best Management Practice" for helping to meet the minimum control measures required by Ohio EPA Permit.

The HCEO has no written policies at this time to address proper disposal of debris cleaned out of storm water devices. When the HCEO cleans debris out of storm water devices, the general procedure for disposing of debris is that any trash is placed in a dumpster which is hauled to a contractor's sanitary landfill. Tree debris, if large, dirt and sediment is hauled to a contained disposal site owned by the county. HCEO tests potential spills of foreign substances before acceptance into the vendor's landfill. Highly unusual matters are referred to the fire department or state EPA.

The Federal Clean Water Act requires that local governments develop a storm water management plan that addresses six minimum control measures to minimize polluted runoff. One strategy adopted by ODOT as a "Best Management Practice" includes guidance on debris removal from storm water devices. Sediment removed from a storm water device could contain high levels of pollutants and consequently need disposal in a licensed hazardous waste landfill. When working within areas under an Ohio EPA storm water permit, ODOT requires that debris and sediment from cleaning operations be collected and properly disposed of to the maximum extent practicable. Documented guidance is crucial given the environmental regulations that HCEO must adhere to under its storm water permit.

Hamilton County Storm Water District

R7.17 The Hamilton County Storm Water District Oversight Board should coordinate with the Hamilton County Commissioner's Office to establish an ongoing item on the Commissioner's meeting agenda. This agenda item would allow the advisory board representing more than 40 entities a regular opportunity to brief the full commission and potentially expedite resolutions related to the district. The

commissioners would still retain a seat on the Oversight board to gather information at the advisory board's monthly meetings. However, a permanent time slot at commissioner meetings would provide an additional resource should commission representatives be unable to attend the Oversight board meetings, as was often the case the past two years.

Hamilton County has established the Hamilton County Storm Water District under ORC § 6117 to control the quality of storm water discharge and ensure compliance with the federal Clean Water Act. The county engineer is responsible for directing the day-to-day operations of the Hamilton County SWD, which involves more than 40 jurisdictions within Hamilton County. The Hamilton County Engineer is the secretary treasurer for the seven-member "oversight" board representing district membership to help guide policy decisions. However, this board acts only in an advisory capacity to the Hamilton County Board of Commissioners, which itself must authorize all formal actions for the District.

The HCEO has concerns that the organization structure creates inefficiencies because all actions have to go through the county commissioners. Due to what it perceives as inconsistent attendance by Commissioners or their representatives at monthly HCSWD oversight board meetings, it states it must often re-educate staff and/or commissioners on District issues, as well as get issues on the commissioners agenda which itself takes two weeks. The HCEO said this can result in a very time-consuming process to get actions officially taken.

The HCSWD oversight board contains one county commissioner as an appointed member, and one alternate from the Hamilton County Commissioner's office. A survey of the first 11 Oversight Board meetings from 2003 and 2004 showed the commissioner missed six meetings, and the alternate missed five. However, there was only one meeting where both the commissioner and alternate missed.

Given the breadth of membership and complexity of issues, it is crucial that Hamilton County Commissioners received regular, ongoing education and input on HCSWD matters. The current process requires a commissioner and/or alternate to gather information at oversight board meetings and take it back to the full commission for deliberations and final action. This process may become complicated and perhaps inefficient when busy schedules preclude attendance at these meetings.

Signs, Signals and Pavement Markings

R7.18 The HCEO should specify whether accidents recorded in its annual crash analysis report took place on roads under state, township or county jurisdiction. This would help traffic engineers from the HCEO, townships and other interested parties more easily analyze crash data and its potential correlation to traffic control devices. The

HCEO implemented this recommendation in its 2004 crash analysis report released in 2005.

Annually, the HCEO produces a crash analysis report detailing crash statistics for non-municipal areas within Hamilton County. However, the data does not specify which roads are under township or county jurisdiction.

The Manual on Uniform Traffic Control Devices for Streets and Highways (US DOT) provides guidance in identifying circumstances that warrant various traffic control devices. The installation of a traffic signal, for instance, may be warranted by accident experience when five or more accidents of a type that could be avoided with a traffic signal occur within a 12-month period, in conjunction with other factors. Without specifically identifying which government has jurisdiction over high-crash volume intersections, the HCEO has greater difficulty analyzing the need to potentially revise traffic control devices. The HCEO agreed with this analysis and modified its 2004 report.

Financial Implication Summary

The following table summarizes estimated annual costs and savings from select recommendations in this section. Only recommendations with quantifiable financial impacts are listed.

Summary of Financial Implications

Recommendation	Annual Cost Savings	One-time Implementation Cost
R7.1 Obtain training on HCEO work order system		$3,000 - $3,500
R7.2 Equip van with touch-screen, GPS technology		$5,000
R7.9 Reduce mowing frequency by one cycle	$30,000	
R7.13 Eliminate guardrail vegetation contract	$130,000	
R7.14 Hire co-op student to complete culvert database		$5,200
Total	**$160,000**	**$13,700**

INFORMATION TECHNOLGY
&
RECORD MANAGEMENT

Information Technology & Records Management

Background

This section of the performance audit focuses on the information technology and records management functions of the Hamilton County Engineer's Office (HCEO). HCEO does not have a centralized organization to oversee records management. Departments that provide records management functions include the following:

- Geographic Information System (GIS),
- Information Technology (IT),
- Surveys,
- Tax Map, and
- Road Records.

Technology plays a significant role in HCEO's operations by supporting the administrative and clerical functions of the Office, helping to comply with Ohio Revised Code (ORC) requirements for records retention, and providing mapping and map transcription services to other County departments, offices, and the public.

Organizational Staffing

Table 8-1 shows staffing levels and responsibilities for the HCEO Road Records (records management staff only), Survey, Tax Map, GIS, and IT departments. HCEO records management staff consists of an office manager (0.2 FTEs), records specialist (1.0 FTE), and clerical specialists (4.0 FTEs). The Tax Map staff consists of 4.0 FTEs; GIS staff of 4.0 FTEs; Survey of 2.0 FTEs (surveyors); and a director (1.0 FTE) split between the three. HCEO's Information Technology (IT) Department is comprised of a network administrator (1.0 FTE) and computer programmer/analyst (1.0 FTE).

Table 8-1: HCEO Records Management, Survey/Tax Map and Information Technology Staffing and Responsibilities

Department	HCEO Staffing [1]	Responsibilities
Road Records (Records Management)	5.2	Road records (records management) staff are responsible for conducting records retention and disposal, researching historical files, accepting records fees, entering information into the Cincinnati Area Geographic Information System (CAGIS) permit system, answering questions from the public, and coordinating printing activity (generate maps and microfiche prints).
Tax Map	4.3	Tax map technicians are responsible for updating county and township maps, verifying deed descriptions, and assisting the general public.
GIS	4.3	GIS specialists are responsible for creating and maintaining graphic and attribute layers in Cincinnati Area Geographic Information System (CAGIS) database for the County tax map.
Survey	2.3	Field surveyors are responsible for conducting field surveys for County projects.
IT	2.0	The network administrator is responsible for installing and maintaining access to the local area network and hardware, troubleshooting network usage and computer peripherals, and performing system backups and data recovery. The computer programmer/analyst is responsible for developing analytical computer programs and evaluative reports, designing and implementing computer applications and programs, and serving as the liaison in departmental computer matters.

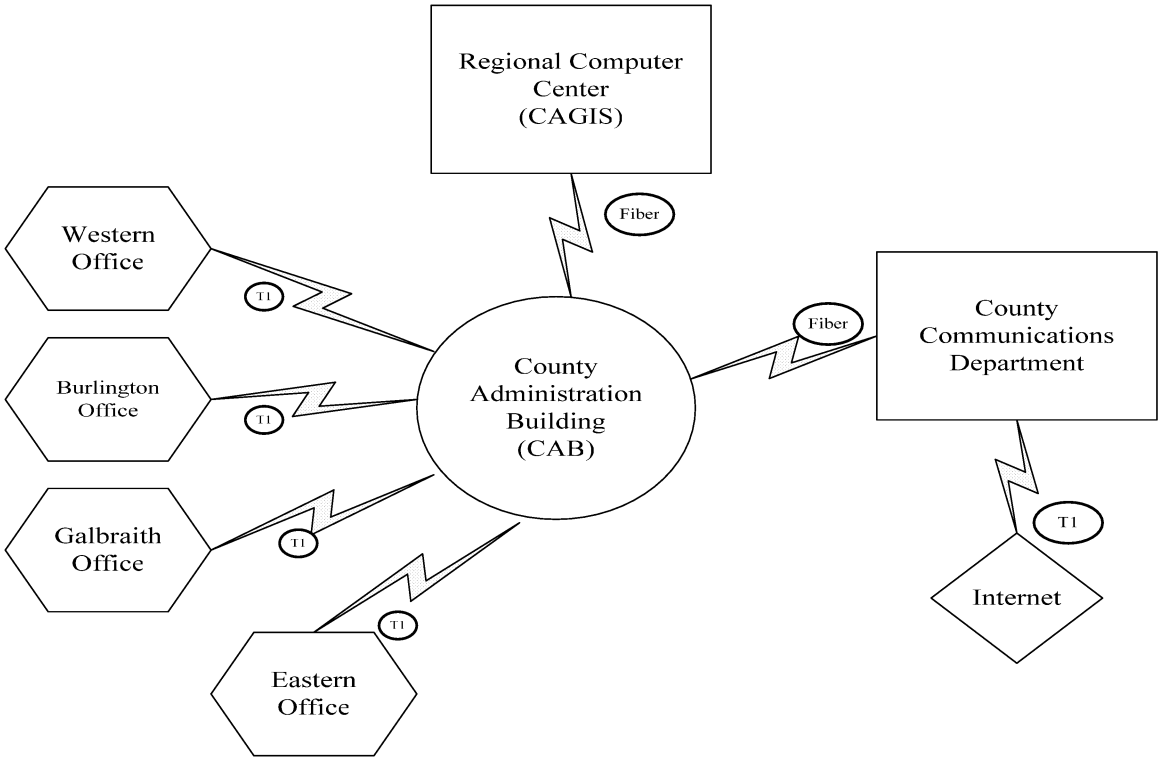
Source: HCEO

[1] A percentage of a director's time was distributed equally (.33 FTEs) for Tax Map, GIS and Survey.

Information Technology

HCEO provides connectivity to approximately 70 users located in 5 different buildings throughout the County. The users' computing needs vary with their assigned functions, such as administrative, operational, and clerical staff. HCEO connects to the Internet through the County Communications Department (CCD). The CCD provides T-1 lines to connect the County Administration Building (CAB) to satellite offices, and fiber cables to connect CAB to the Regional Computer Center and CCD. CCD also provides firewall protection for HCEO's technology operations**. Chart 8-1** shows HCEO's network diagram.

Chart 8-1: HCEO Network Diagram



Source: HCEO Network Administrator

The Regional Computer Center is responsible for managing computing resources for the Cincinnati Area Geographic Information System (CAGIS). Along with e-mail and Internet, HCEO staff can communicate internally through the Intranet. **Table 8-2** shows HCEO users, computers, and printers by location.

Table 8-2: HCEO Users and Hardware by Location

Location	Users	Computers	Printers
CAB	20	27	16
Western Office	5	5	3
Burlington Office	16	16	6
Galbraith Office	26	26	7
Eastern Office	3	3	1
Totals	**70**	**77**	**33**

Source: HCEO Network Administrator

HCEO supports approximately 77 computers and 33 printers for 70 users. Other supported hardware includes 2 printer/scanners, 2 plotters and servers. Seven computers are not included in this table. The computers are not in service and are ready to be auctioned by the County.

HCEO uses various types of computer software to assist with tracking and processing information. **Table 8-3** describes major HCEO software applications, functionality, and the users of the software.

Table 8-3: HCEO Software Applications [1]

Software Applications	Functionality	Users
Internet DOCS (IDOCS)	Document management software used to store tax maps and historical maps.	All Departments
AutoCAD	Engineering software used for planning projects. Allows the Survey Department to resolve boundaries, right-of-way and plats.	Survey/Tax Map; Planning/Design
ESRI Arc Edit	GIS editing software used for correcting errors on digitalized maps, modifying land features and creating new map layers.	Survey/Tax Map
Microsoft Office	Business software used to develop Access databases and perform other word-processing functions.	All Departments
AS 400	Fleet maintenance software used to track work orders and other maintenance information .	Maintenance Department
Traffic Simulation	Specialized software used to perform crash analysis.	Traffic Department
MicroPaver	Specialized software used for pavement testing and calculating the pavement condition index (PCI) rating.	Bridge/Highway Maintenance
CAGIS (GEN7)	Software used by road records and other departments to access CAGIS information (i.e., property lines, topography, etc..)	All departments

Source: HCEO IT Department

[1] Software not included in the table include Auditor fiscal software and County purchasing software

Table 8-4 shows 2004 technology expenditures for HCEO and peers.

Table 8-4: 2004 HCEO and Peer Technology Expenditures

	HCEO	FCEO	MCEO	SCEO	Peer Average
Hardware	$21,287	$133,232	$26,117	$24,200	$61,183
Software	$18,036	$126,617	$21,626	$159,500	$102,581
Other [1]	$0	$100,604	$0	$25,138	$41,914
Total	**$39,323**	**$360,453**	**$47,743**	**$208,838**	**$205,678**
Users	70	150	80	100	110
Costs per User	$562	$2,403	$597	$2,088	$1,870
Average Age	4	3	3	3	3

Source: HCEO and peers

[1] FCEO's other expenditures include repair agreements and training; SCEO other expenditures include a lease agreement.

In 2004, HCEO spent significantly less than the peers on technology and spent 70 percent less than the peer average for cost per user. HCEO's average age for computers is greater than the peer average.

Record Keeping/Document Management

The Ohio Revised Code (ORC) sets minimum standards for records that county engineers are required to maintain. Specific records listed in ORC § 315.14 include bids received, contracts, and surveys. ORC § 315.27 indicates that the county engineer should also maintain complete indexes to all the records in the office. In addition, ORC § 315.26 states that the responsibility to transcribe dilapidated maps, and records of plats and surveys from other offices, such as the county auditor, rests with the county engineer.

HCEO has developed a record retention and disposition schedule, in accordance with county records management policies. HCEO's office manager in Road Records indicated that their goal is to keep active records on-hand for five years, and store records older than five years in off-site storage. HCEO stores information electronically and in hardcopy format. Road records and survey/tax map records have been primarily centralized and are located in the CAB facility downtown. Other departments, such as Bridge and Highway Maintenance, maintain separate records required for their respective functions. **Table 8-5** shows HCEO records maintained in electronic format, hardcopy format and microfilm/microfishe/35 mm.

Table 8-5: HCEO Records Management

Electronic	Hardcopy	Microfilm/Microfishe/35 mm
Aerial photos Boundary changes Inventory Tax map Fiscal information (budgeting, invoices, revenue funds, voucher, warrants) CAGIS data	Topography maps Highway maps Project files Maintenance records Atlases Purchasing (i.e. salt, fuel) Contracts Advertising literature Surveys Studies/Consultant reports Inspection Reports Permit Applications Personnel Records Disaster reporting Maps (historical maps, subdivision maps, tax maps) Road inventory (mileage certification	Historical maps Subdivision maps Tax map Surveys

Source: Road Records - Office Manager – HCEO

Assessments Not Yielding Recommendations

Staffing Levels: HCEO staffing levels compared to peers' similar functions were lower than the peers and the peer average. The overall staffing level for Records Management, GIS, Survey, and IT (13.8 FTEs) was approximately 6.8 percent lower than the peer average (14.8 FTEs). Tax Map staffing was not included because two of the peers did not have responsibility for that function. However, HCEO's Tax Map staff of 4.3 FTEs was less than FCEO's staff of 6.3 FTEs.

Matters for Further Study

Staffing Efficiencies and Job Functions: As HCEO transcribes more documents into electronic formats, it should review staffing levels and records management functions to determine if reallocation of staff levels is needed. Eliminating the manual updating of the tax map could allow HCEO to reallocate Tax Map staff to other job functions or reduce positions. The process of reviewing staffing levels and responsibilities should ensure that key job functions for each department are performed efficiently and effectively.

Recommendations

Information Technology and System Security

R8.1 HCEO should complete and regularly update written standards for hardware and software. Standards should be developed to ensure that computer purchases are made in compliance with one brand or architecture over an extended period. In addition, a written software standard and list of current programs and licenses should be developed. Purchases from a standardized software list help ensure consistent support from technology staff. A current software inventory assists administration in software purchasing decisions by providing information on the software currently in use and whether additional licenses are available.

HCEO has started to standardize computer hardware by purchasing a single architecture (see **R8.2**) and, during the course of the performance audit, provided a list of licensed software. HCEO could improve this practice by maintaining and regularly updating written software and hardware equipment standards.

The systems administrator indicated that HCEO wants to standardize computers by purchasing a single brand of computers in the future. HCEO has multiple versions of Microsoft Office software installed on different computers, including, Office 2000 Professional, Office 2000 Standard, Office 97, Office XP Professional, and Office Premium. Supporting multiple brands of computers and software versions can make support efforts more difficult. Technical staff has to be knowledgeable of several systems and software applications.

R8.2 HCEO should adopt a systematic four-year replacement cycle to upgrade its computing equipment that is tied to its budgeting process.

HCEO does not have a replacement plan for IT equipment and does not budget for replacement. HCEO first determines hardware needs and then confers with the Fiscal Department to determine the availability of funds. HCEO operates approximately 77 computers and currently uses the state term contract to purchase new equipment. Computer ages range from two to over eight.

According to the systems administrator, HCEO wants to phase out the computers which are over eight years old, and move towards a uniform platform. The reason HCEO still operates older computers is they are able to use them to operate some programs that do not require large amounts of computing power or memory. HCEO IT staff also has the knowledge to swap hard drives and upgrade memory to increase the life of older systems.

The State of Michigan developed a document in response to Michigan law (Public Act 327 of 2004 Section 579) that recommends a life cycle of four years for PCs in all State departments. In addition, the Interim Information Technology Committee for the State of North Dakota recommends a four year computer replacement cycle for all state government. FCEO replaces PCs every 6 years, and laptops and servers every 4-5 years.

In addition to the fact that a replacement cycle minimizes maintenance and repair costs and standardizes system architecture (see **R8.1**), updated equipment helps to address technology security issues. According to the State of Michigan, six major security issues support shorter life cycle replacement times for desktop personal computers:

- Outdated hardware systems are vulnerable to attacks at sign-on.
- Older systems do not have adequate locking and password functions.
- Security fixes and vulnerability patches are often no longer available for older systems.
- Older operating systems often do not contain the necessary tools to identify and remedy system compromises.
- The risk of system compromise via Instant Messaging attacks is greater with outdated equipment.
- The overall security risk for older systems is increased due to a lack of available technical support and defensive measures.

Table 8-5 shows the costs associated with a four-year replacement cycle for computers for HCEO. This cycle will result in a single manufacturer by the end of year two.

Table 8-5: HCEO Four-Year Computer Replacement Cycle

Year	Number of Computers to Replace	Estimated Cost per Computer [1]	Total Annual Cost
2005	16	$1,272	$20,352
2006	25	$1,310	$32,750
2007	18	$1,350	$24,300
2008	18	$1,390	$25,020
Total	**77**		**$102,422**

Source: HCEO computer lists

[1] The per-computer cost is based on the latest costs incurred by HCEO. Costs are increased by an inflation factor of 3 percent per year.

Financial Implication: The average annual cost of replacing computers is approximately $25,600.

R8.3 HCEO should consider using new technologies such as personal digital assistants (PDAs), Global Positioning System (GPS) units and electronic subdivision/survey reviews to make work processes more efficient and generate more accurate data.

HCEO does not use personal digital assistants (PDA) or global positioning systems (GPS) for field operations. Peers use new technology, such as PDAs, GPS systems, and electronic subdivision and survey reviews. Using PDAs in the field would allow inspectors to make notes and fill out forms directly in the PDA, and then go back to office and download files to their PC, eliminating the manual process of transcribing hand-written notes taken in the field. Using GPS systems allow for more accurate referencing of physical features such as culverts, bridges and ditches. HCEO has discussed the use of PDAs and has met with consultants to discuss the possibility of purchasing GPS. According to the HCEO director for the Survey and Tax Map departments, the cost-effectiveness of purchasing GPS systems would have to be determined, because the units cost between $30,000 and $40,000. Additionally, HCEO does not currently require electronic submission of subdivision and survey documents. Requiring electronic subdivision and survey submission speeds up the process of receiving and sending subdivision and survey information, and ensures information is in the necessary format required by the Engineer.

SCEO requires surveys to be submitted electronically and in the Engineer's necessary format. The SCEO GIS director indicated that although some clients still submit hard copy surveys, submitting electronic data speeds up the process. For MCEO, consultants submit subdivision plats electronically for review by the Engineer's Office. According to MCEO, submitting subdivision plats electronically speeds up the process and allows consultants to avoid travel to submit paperwork.

SCEO uses GPS systems for surveys and ties data back to AutoCad software. FCEO also indicated they use GPS units to geo-reference physical features such as bridges, ditches, and culverts. In addition, FCEO's department head for the survey, records and tax map departments indicated that PDAs are used by inspectors in the field to enter field notes.

Financial Implication: Assuming HCEO pilots a program using ten PDAs at a cost of $500 each and $35,000 for a fully function GPS system, the Office would incur an implementation cost of approximately $40,000.

R8.4 HCEO should document and track quality assurance performance measures for technical support. Documenting and tracking quality assurance performance measures provides a method to measure the customer satisfaction with technical support services.

According to IT, HCEO does not formally document and track quality assurance performance measures for technical support. The HCEO systems administrator indicated that tracking performance measures formally is not necessary because it would take away time that could be spent on tasks that are a higher priority. Without documentation and tracking of quality assurance measures for technical support, HCEO does not have a

method to measure customer satisfaction or staff productivity. According to a technology support index developed by the International Society for Technology in Education (ISTE), quality assurance performance measures that could be tracked include the following:

- Tracking the number of in-house user inquiries and calls;
- Tracking the percent of computers that need repair; and
- Tracking time and cost of support activities.

SCEO does track inquiries, calls, or the time and cost of support activities. To document and track quality assurance performance measures for technical support, HCEO should use available tools that include user surveys and software (spreadsheets and data bases) to track customer inquiries, problems, and costs. Staff time would be required to develop the software tools with minimal financial cost to HCEO.

R8.5 HCEO should develop a disaster recovery plan. Developing a disaster recovery plan prepares an organization for recovery from a breach in security, a natural disaster (fire, flood, etc.), or other catastrophic event as quickly and efficiently as possible.

HCEO does not have a written disaster recovery plan for protecting records and information. However, HCEO has developed a computer use policy and during the course of the audit, developed written procedures for backing up data. The systems administrator indicated that back-up procedures involve changing out four sets of tapes every Monday. Three sets of tapes are kept at the CAB downtown and one set of tapes is sent to an off-site location. Data back-ups include data located in public/group folders, project data directories, word documents/spreadsheets, pictures, surveys, drawings, and other relevant data. Critical records such as historical maps, subdivision maps and tax maps are also placed on microfiche cards. However, a comprehensive disaster recovery plan for records and information has not been developed. **Table 8-6** outlines provisions that should be included in a disaster recovery plan.

Table 8-6: Key Elements of a Disaster Recovery Plan

Build Disaster Recovery Team	Identify a disaster recovery team and justify selections on the basis of expertise and background of identified personnel and organizational factors.
Document Key Information	Describe the purpose and organization of the plan. Document procedures for updating and distributing the plan. Document the operational, legal, and financial impact from a disruption or disaster affecting any computer or telecommunications service area of the agency. Document the threats that could debilitate computer or telecommunications service areas and cause business interruption. Document the general recovery strategy the agency will use in the event of a disaster (i.e. alternate data processing)
Emergency Response	Disaster recovery plans should document the emergency response actions the agency must take in the event of a disaster (i.e. fire, flood, bomb). This may involve gaining immediate help from fire and police, reducing outage duration or loss of IT services or assets, and establishing contact with the Office of Emergency Management.
Problem Escalation	Disaster recovery plans must state the steps to follow for escalating unresolved problems to disaster status. These procedures require a "contact tree," a list of individuals to be notified of the situation at specified time durations following the onset.
Disaster confirmation procedures	Document procedures to manage the initial assessment of a disaster or potential disaster situation. Document procedures and specify the personnel necessary to assess the damage and determine the level the severity of the incident. Document procedures for reporting findings to management. Document procedures for making initial emergency contacts. Document procedures for possible command center activation. Document recovery team notification procedures. Document procedures for declaring a disaster. Document procedures for informing employees, the public, customers and suppliers.
Primary site restoration	Document the procedures to use after the interim processing situation has stabilized. The intent is to provide a framework for restoring full processing capability at a permanent location.
Test the plan	Specify necessary tests and assign responsibility for overseeing testing.
Plan maintenance	Assign plan maintenance responsibility. Provide a schedule for the regular, systematic review of the content of the disaster recovery/business resumption plan.

Source: AOS –Information System Audit (ISA) division

HCEO should use the elements in **Table 8-6** to guide development of a disaster recovery plan. The first step in creating a plan is putting together a team of key personnel and stakeholders, including CAGIS, who are given specific roles and responsibilities for developing the plan. HCEO should share the plan with staff and then test it on a regular basis. A disaster recovery plan will assist in retaining critical data in the event of a disaster. HCEO should be able to develop a formal disaster recovery plan, distribute the information, and train for its use within existing resources.

Records Keeping/Document Management

R8.6 HCEO should compile records management policies and procedures in a formalized records manual. At a minimum, the records management manual should contain guidelines for retention and disposal of records, a filing plan to provide an indexing scheme for quick and efficient retrieval of paper and electronic records, and information on disaster recovery.

HCEO has not compiled records management policies and procedures in a formalized records manual, but follows the County program for retention and disposal of records. The records retention officer has developed supplemental procedures for performing right-of-way research, processing subdivision records and dedication plats. HCEO has also developed various indexes, including a bridge index, survey index, electronic tax map index, road index and culvert index.

A records management manual provides a clear explanation of records management issues unique to the organization and should address all aspects of the identification, security, safe custody, and disposal and retrieval of records. According to the records management policy manual of the U.S. Environmental Protection Agency, key components of a records management policy should:

- Cover the purpose, goals, regulations and policies related to records management;
- Identify staff responsibilities;
- Address records creation (when to create and what you need to do with them);
- Identify the records management responsibilities;
- Address records disposition issues (retention schedules);
- Cover special media issues;
- Contain a filing plan to ensure paper and electronic records are filed correctly and are up-to-date; and
- Address disaster recovery plans.

Peers have developed formalized records manuals that contain some of the elements of records management policies listed. FCEO's manual has procedures for records request; records storage; records inventory; microfilming plans and drawings, including codes used for Microfilm; retention periods; and records disposal. FCEO's Director of Records, Survey and Tax Map Department indicated that developing a disaster recovery plan for records is important because it outlines what records are stored offsite, fireproofing procedures, and the format in which records are to be stored (i.e. microfilm). The Summit County Engineer's Office (SCEO) filing protocol for records is listed in the records policy manual. The filing protocol gives a coding scheme for each record to facilitate retrieval. The Montgomery County Engineer's Office (MCEO) records

management manual contains guidelines regarding the county schedule of record retention and destruction.

A records management policy manual provides a basis for accountability and ensures information contained in records is managed effectively throughout the office. A well-organized filing plan also enables an organization to find information easily. Records that are correctly filed and stored are easily accessible, and this facilitates transparency and accountability.

R8.7 HCEO should develop records management procedures to ensure all project file original documents are maintained at the CAB location. Although individual departments could continue to maintain project records necessary to complete planning and other job functions, centralizing the storage of original documents at CAB would facilitate the retrieval of records and create a clearer paper trail to monitor the progress of a project. In addition, scanning documents into an electronic format could reduce costs for copying and the necessity to have paper copies of the same document in several department files.

HCEO departments (i.e., Bridge/Maintenance, Planning/Design, Right-of-Way, etc.) maintain a working project file containing original documents. A project file may contain bid documents, planning documents, contracts/agreements and consultant information. At the start of the project, departments send copies of the original contract/agreement to CAB. At the conclusion of a project, the original working department project files are reviewed by CAB records-keeping staff, and merged into one project file. Merging documents into one project file involves pulling out duplicate documents and determining which files are originals and which are copies. The process of reviewing and merging files at the end of the project results in delays because CAB staff have to pull duplicates, track down missing documents, and determine if a file is complete.

Scanning more documents in electronic format would reduce paper-costs and the necessity for each Department to physically make copies of project files (see **R8.9**). Although departments may need to keep separate files for unique aspects of the work they do, it is critical that maintenance and infrastructure information be centrally maintained and shared with different departments so it can be used to better plan projects and inform the public.

R8.8 HCEO should develop performance measures and evaluation criteria to monitor records management practices. Furthermore, HCEO should then document performance levels against the planned performance goals so management can be assured of the on-going effectiveness of the program and track performance measures so workloads can be monitored.

HCEO does not use evaluation criteria or performance measures to monitor its records management practices. HCEO's Road Records Department produces a report at the end of each month that contains fiscal information on items sold, such as maps sold to the public. In 2004, the road records office manager conducted a records inventory by reviewing boxes in off-site storage, cataloguing records and disposing of old records. However, HCEO has not developed evaluation criteria to monitor the quality of records created, response time in retrieving records and information, and the quantity of disposed records.

The Association for Information Management (ARMA) recommends that an agency should ensure compliance with records management policies and procedures throughout the organization by using the following strategies:

- Each program should document performance levels against a planned strategy so that management can be assured of the on-going effectiveness of the program.
- Records offices should keep some measures of activities – either weekly, monthly, or even semi-annually so that program effectiveness can be communicated, and changes in workload can be monitored;
- Once the system is in place, regular assessments should be completed. Feedback from users is crucial to ensure that problems are addressed and the system can continue to be effective.
- It is critical that all employees understand their responsibilities regarding the management of records and information management. Multiple methods may be used, such as in-house seminars, workshops, on-line web based education or even simple review of professional development needs.

Within the peers, SCEO tracks the number of maps produced and where they were sent. Through their cost-accounting system, FCEO can track the time staff spends on records management activities, such as scanning documents and records retention.

Performance measures could include the quantity of records created, response times for record retrieval, and the quantity of disposed records. Performing regular assessments and conducting on-going training of staff should enhance HCEO's records management program by increasing cost savings through efficient practices. Developing evaluation criteria for records managements should also improve HCEO's ability to monitor the effectiveness of records management, and provide timely response and feedback to customers.

R8.9 HCEO should accelerate work on converting paper records to electronic format. Converting records to electronic format will allow HCEO staff to search for information quickly and efficiently while providing long-term operational cost savings.

HCEO has begun an on-going project to convert current paper files to electronic format. The eventual goal of the project is to have all HCEO records available in an electronic format that can be searched and queried. Information currently available electronically includes tax map information, aerial photographs, fiscal information (i.e., budgeting and inventory), and CAGIS data (i.e. property boundary changes). Topographic maps, surveys, sections of the tax map, historic road records, and subdivision records are currently being converted to electronic format. HCEO estimates that it could take 10 to 15 years to convert all paper records, depending on the technology investment, so they can be searched electronically. Issues that may affect the project include high staff turnover, the ability to allot staff time to the project, and developing an index for scanned documents. To scan large maps, HCEO has two large-format printer/scanners, one in the administration building and one in planning and design. Converting records into electronic format allows staff to search for information quickly and efficiently. Converting records to electronic format also creates a second copy of the record, in case the hardcopy record is damaged.

Using a contracted vendor, FCEO has converted 75 percent of its records (this includes construction drawings and surveys) to electronic format over the past two years. The remaining 25 percent of records not scanned includes all other records (i.e., drainage/ditch records, contracts and administrative records). According to FCEO, records that should be converted first include those that are permanent in nature as well as survey records. MCEO indicated that aerial photos are currently available electronically and that the priority information they want to make available electronically includes bid projects, surveys, monuments, sketches, aerial photographs, Operation Department repair manuals, and historical road records. SCEO indicated that its goal is to eventually have all information accessible electronically. Examples of files they want to scan include road records, maps, and project file information (i.e., plans and contracts).

Converting to electronic documentation can provide HCEO with economies and efficiencies as more and more paper documents are converted. According to iSeries Network, a website sponsored by Penton Technology Media, publishers of professional technology magazines, electronic documentation can save money by reducing:

- Consumable expenditures;
- Peripheral expenditures;
- Mail and courier costs;
- Effort in report distribution and support; and
- Hard copy storage space and costs.

In addition, documents could be made available to the public by linking to files from HCEO's website.

Financial Implication: If HCEO were to contract for the conversion of 610 topographic maps and 15,000 surveys to electronic format, the cost would be approximately $19,500. The cost is calculated based on costs of $1.25 per document incurred by FCEO; however, it could be higher depending on the technology investment required to implement FCEO's methodology. HCEO could potentially hire an intern at a lower cost to convert documents. In the future, cost savings from the electronic conversion should offset any continuing conversion costs.

Survey/Tax Map

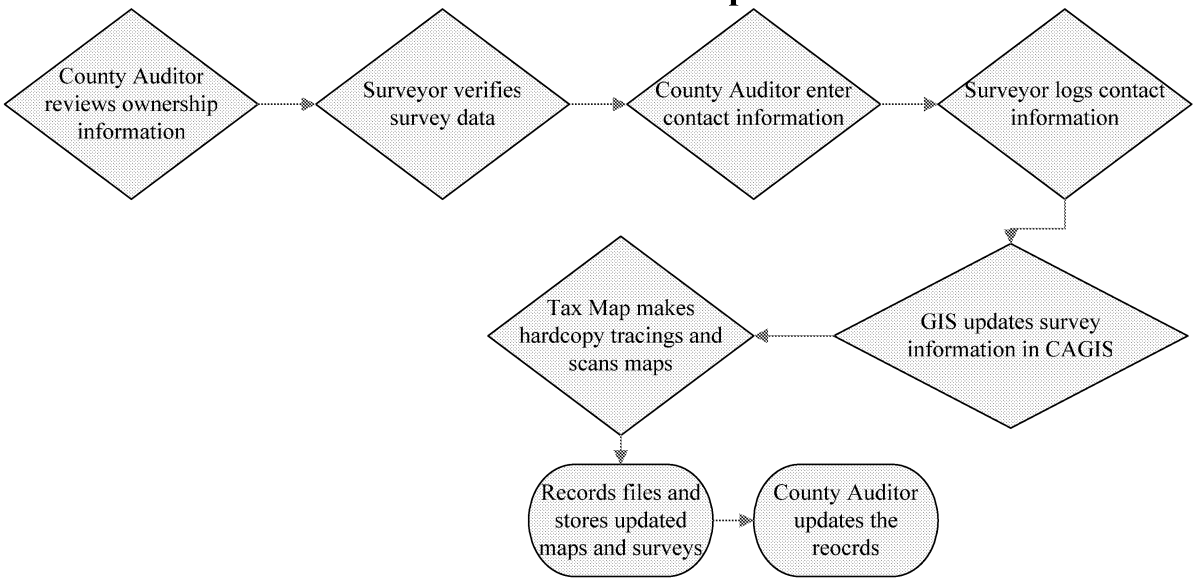
R8.10 HCEO should consider discontinuing its practice of manually updating the tax map. Updating tax maps both manually and electronically adds an extra step to the process and increases the time and effort required to update the maps.

A survey consists of a written legal description and a paper map of the survey points. This paper map is called a survey and is the basis for changes made to the tax map. The Tax Map Department updates tax maps both manually and electronically. The Department receives approximately four new surveys per day that require updating. The Tax Map Department updates tax maps manually by drawing changes in the original tax map books and then scanning the maps through the IDOCS system so the general public can view and print maps. In addition, the department reviews approximately 100 straight deed transfers daily. The Tax Map Department is responsible for maintaining 2,200 county tax maps.

The county tax maps are the legal representation of county deeds, and even though they are maintained by HCEO, the hard copies of the tax maps are the property of the County Auditor and are organized by township, city, and municipality.

Chart 8-2 depicts HCEO's process for updating County tax maps.

Chart 8-2: HCEO Tax Map Process



Source: HCEO

Runners from local law firms deliver information packets to the County Auditor containing the deed, survey, legal document describing the survey, and other paper-work needed by the Auditor. The Auditor checks the parcel number and deed to verify the owner of the property, and signs off on the documentation. The Tax Map Department staff compares the survey with the legal description, and checks for errors and adherence to standards. The Auditor receives the packet again, collects fees and logs contacts and other required information. The Tax Map staff then picks up packet again, and logs grantor/grantee information. HCEO GIS staff then receives the packet and uses ESRI GIS editing software to update survey information to CAGIS. Tax map staff then draws changes into the original tax map book, makes a tracing, and scans new tracings into IDOCS system. Weekly, tracings are put on microfiche and new surveys are put on microfilm. The County Auditor then updates records with the new information (i.e., acreage, new parcel, new owner, etc.).

HCEO was given the responsibility to update the maps because they had the technical skills to check deeds and surveys. Updating tax maps both manually and electronically adds an extra step to the process, increasing the time and effort it takes for the update process. For SCEO and MCEO, updating the tax map is the responsibility of either the County Fiscal Office or County Auditor, not the Engineer. FCEO updates tax maps electronically; hard copies are not manually updated with hand drawings.

Eliminating the process of updating both paper and electronic documents should improve operational efficiency and may result in cost savings. This issue should be considered when HCEO reviews staffing efficiencies suggested in ***Matters for Further Study***.

R8.11 HCEO should continue to work with CAGIS to integrate databases such as those for the sign inventory, signal inventory, and culverts with the CAGIS system. Integrating databases with CAGIS would give HCEO the ability to print and view geographic attributes such as culverts on CAGIS maps, track work-order information, and allow for more data to be shared.

HCEO databases, including those for the sign inventory, signal inventory, culverts, and drainage are not integrated with the CAGIS system. The traffic signal and sign shop director indicated there have been discussions on linking the sign inventory and signal inventory databases to CAGIS. The CAGIS data used by HCEO includes graphical data required for updating tax maps, including survey, parcel, and road inventory data. The benefit of integrating CAGIS with these databases is to have the capability to print out and view locations of attributes such as culverts on CAGIS maps. The traffic signal and sign shop director also indicated that another benefit for linking the sign and signal inventory databases is tracking work order information.

Individual departments, with support from the IT Department, have written specialized databases to track information. Databases have been generally written in Microsoft Access. The following is a list of major databases and their description..

- *Traffic* – includes sign and signal inventory databases and traffic accident database;
- *Fleet maintenance* – includes equipment maintenance;
- *Pavement management* – tracks all infrastructure inventory, including the condition of pavement, storm water devices, curbs and retaining walls;
- *Bridge inventory* – assigns bridge sufficiency rating based on various factors; and
- *Storm water* – includes drainage complaints and culverts.

The CAGIS information technology assistant manager indicated there is definite benefit to integrating as much data into CAGIS as possible because information can then be shared. CAGIS is based on Oracle relational databases, and can be integrated with HCEO Access databases. The CAGIS information technology assistant manager also indicated CAGIS has plans to digitize right-of-way and easements into digital maps, with data integrated into CAGIS.

FCEO has a program that links its GIS to their Work Manager (Cost Accounting System) and other databases. For example, all bridge data can be linked and mapped using the program. However, FCEO's head of survey, records, and tax map indicated that the

Office does not have a fully developed GIS system that would geo-reference all landmarks, allowing the user to click on, for example, a road or culvert, and view all the attribute data such as design plans, surveys, costs, maintenance/repairs, and right-of-way history. FCEO technology staff indicated that the primary benefit of integrating GIS with other databases is to be able to view and understand the history of work performed on a project (i.e., maintenance, costs, etc.).

The integration of HCEO databases with CAGIS should provide productive efficiencies that may result in cost savings and should be considered when HCEO reviews staffing efficiencies as suggested in ***Matters for Further Study***.

Financial Implication Summary

The following table summarizes estimated annual costs and one-time implementation costs based on recommendations in this section. Only recommendations with quantifiable financial impacts are listed.

Summary of Financial Implications

Recommendation	Annual Costs	One-time Implementation Cost
R8.2 Implement computer replacement cycle	$25,600	
R8.3 Implement new technology		$40,000
R8.10 Accelerate document conversion to electronic format		$19,500
Total	**$25,600**	**$59,500**

AGENCY RESPONSE

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September 29, 2005

The Honorable Betty Montgomery
Auditor of State
State of Ohio
88 E. Broad Street
Columbus, Ohio 43215-1140

Dear Auditor Montgomery:

Principal staff members of the Hamilton County Engineer's Office and I participated in a post audit meeting with your Auditor of State representatives on September 16, 2005. During this meeting a preliminary draft of the recently completed performance audit report of the Hamilton County Engineer's Office operations was distributed and reviewed.

There was a concern during the initial phases of the performance audit that your audit team would have a difficult time finding similar County Engineer operations to use as comparables. Hamilton County historically faced and continues to face unique challenges as an urban county with large townships surrounding a large municipality. The comparable counties identified in the performance audit report substantiated this point.

The performance audit report identified the Hamilton County Engineer lane mile responsibility to be 90% greater than the peer average for the comparable counties. No other county engineer has comparable numbers of population, lane miles, and responsibility and yet accomplishes as much with it's staffing.

The recommendations and findings support the long held belief that the Hamilton County Engineer's Office is a well run branch of county government. Furthermore, the office seeks to implement cost effective best practices for the betterment of the public in order to achieve the best value from available funding.

The efforts of your audit team in bringing suggestions of specific technological advances to our attention are greatly appreciated. We will study and make decisions regarding implementation as funding allows. Many of the recommendations are already being undertaken.

The professionalism of your staff is deeply appreciated. They were diligent, yet respectful of our duty to serve the public. We believe your audit process is an excellent value for the taxpayer.

Respectfully submitted,

William W. Brayshaw

WILLIAM W. BRAYSHAW, P.E.-P.S.
HAMILTON COUNTY ENGINEER

WWB/cgl