

TRAFFIC ENGINEERING DIVISION

OCTOBER 10, 2001

REPORT NO. 542

OFFICE OF THE COUNCIL AUDITOR
Suite 200, St. James Building



October 10, 2001

Report No. 542

Honorable Members of the City Council
City of Jacksonville

INTRODUCTION

Pursuant to Section 5.10 of the Charter of the City of Jacksonville and Chapter 102 of the Jacksonville Municipal Code, we examined the activities of the Traffic Engineering Division and present this report thereon.

The Traffic Engineering Division of Public Works was created by Chapter 32.401 of the City Ordinance Code, which states that the Division shall be responsible for traffic engineering services, traffic signals, and other traffic-control devices, including railroad crossing signals, and for operating the streets and highways of the Consolidated Government. The Division provides for orderly movement of all traffic, motorized and non-motorized, through the City transportation system and provides such guidance and warnings as are needed to insure the safe operation of the traffic system.

We began our Traffic Engineering audit work in November 1999. At that time, we identified problems with the interface between the computer program used by Traffic Engineering to manage its daily workload and the computer program developed by the City to report and track service requests. We decided to postpone our audit testing to allow enough time for the City Information Technologies Division to make the necessary corrections and for some history of transactions to accumulate. We did this so that we could test a system that was thought to be working properly, rather than one that we knew had problems. In a letter to the Director of the Public Works Department, we identified internal control strengths and weaknesses and improvement opportunities that we noted during our preliminary audit work. This letter, dated February 29, 2000, and a response from the City Traffic Engineer are attached as Attachments A and B respectively.

We returned to Traffic Engineering in June 2001 to follow up on our earlier recommendations and to perform audit testing of work requests.

STATEMENT OF OBJECTIVES

The objectives of the audit were as follows:

1. To determine if Traffic Engineering has implemented the recommendations made in the Council Auditor's February 29, 2000 letter.
2. To determine if Traffic Engineering is capturing 100% of work requests from all sources and completing them within the timeframes established in their business plan and the CARE system.

STATEMENT OF SCOPE

The audit period for testing work requests was October 1, 2000 through March 31, 2001. The scope includes all work requests entered into the CARE system, the TEAMS system, and recorded on work reports.

BACKGROUND

There are three systems used to record Traffic Engineering issues, which are essentially work requests. The three systems examined were the Citizens Active Response Effort (CARE) system, the Traffic Engineering Activity Management System (TEAMS), and work reports used by Traffic Engineering employees in the field. The CARE system is used to enter the original work request for traffic signs and traffic signals. The information entered into CARE is automatically forwarded to TEAMS through a computer interface. In TEAMS, the work order is assigned to and completed by a member of Traffic Engineering's staff. The field crews fill out work reports to record the work that they perform at each intersection. These work reports are then used to update TEAMS and close the work order. When the work order is closed in TEAMS, it is automatically closed in CARE. Traffic Engineering has developed a list that dictates the threshold number days in which an issue must be completed. Traffic Engineering has also developed a business plan with a goal that 50% of sign issues should be completed within 16 days during the first quarter of Fiscal Year 00/01 and 60% of sign issues should be completed within 16 days during the second quarter of Fiscal Year 00/01.

STATEMENT OF METHODOLOGY

We selected a statistical sample from CARE, TEAMS, and the work reports using the Stat. V.1.1 statistical sampling program. The sample size for the CARE system was determined using a 95% confidence level with a maximum acceptable error rate of + or - 5%. The sample size for TEAMS and the work reports were determined using a 94% confidence level with a maximum acceptable error rate of + or - 7%. We reviewed a sample of issues to determine whether Traffic Engineering had completed work on the issues within their threshold number of days and to determine whether Traffic Engineering met its business plan goals.

STATEMENT OF AUDITING STANDARDS

We conducted our audit in accordance with generally accepted government auditing standards issued by the Comptroller General of the United States. Those standards require that we plan and perform the audit to afford a reasonable basis for our judgements and conclusions regarding the organization, program, activity, or function under audit. This audit also included an assessment of applicable management controls and compliance with requirements of laws and regulations when necessary to satisfy audit objectives. We believe that our audit provides a reasonable basis for our conclusions.

AUDIT CONCLUSIONS

Based on our audit testing, we arrived at the following conclusions:

1. Traffic Engineering has implemented most, but not all, of the recommendations made in the Council Auditor's letter dated February 29, 2000.
2. Traffic Engineering appears to be capturing 100% of work requests from all sources, but it is not completing them within the timeframes established in their business plan and the CARE system.

AUDIT OBJECTIVE #1

In order to determine if Traffic Engineering has implemented the recommendations outlined in the Council Auditor's letter dated February 29, 2000, (see Attachment A), we performed audit testing as necessary to verify the action taken. Based on our testing, we determined that Traffic Engineering has implemented most, but not all of our recommendations. Below, we have restated those weaknesses and improvement opportunities and our associated recommendations that we feel have not been adequately addressed by Traffic Engineering.

Opportunity for Improvement #1

Traffic Engineering cannot produce a report that identifies those traffic signals which have required the most service calls during the year. Such a report would enable Traffic Engineering to change components or perform preventative maintenance that would reduce the number of service calls in the future, thus improving public safety.

Recommendation

Traffic Engineering should have the necessary computer programming performed so that they can call up a computer report at any time that will rank the City's traffic signals from those with the most service calls to those with the least service calls for any period of time. Traffic Engineering should then utilize the report to perform preventive maintenance.

Traffic Engineering Division Response

In working with TEAMS to extract this information, we have determined that this report is available. We have generated this report and will be using the information to identify problem locations. We are also working with ITD to make the report more user friendly.

Opportunity for Improvement #2

Traffic Engineering receives a report of traffic accidents in the City by intersection each quarter, but Traffic Engineering does not utilize the report.

Recommendation

Traffic Engineering should utilize the report to identify the intersections with the most accidents. Traffic Engineering should then analyze the cause of the accidents and make the necessary improvements to reduce the number of accidents. If the intersections fall under the jurisdiction of another governmental entity (such as the Florida Department of Transportation), Traffic Engineering should inform the other entity in writing of the situation and ask that they take action to improve the safety of the intersection. Traffic Engineering should then follow up to insure that action is taken.

Traffic Engineering Division Response

Due to staff vacancies, the Traffic Engineering Division was not using this report to identify high crash locations at the time of the audit. However, these vacancies have been filled and the Division has begun the process of reviewing the high crash location list. A list of improvement options will be developed annually for the high crash locations on all roads except the Interstate Highway system and other freeway type facilities that are the responsibility of the Florida Department of Transportation. The improvement options for each location will be used in forming the Intersection Improvement List for the following year.

AUDIT OBJECTIVE #2

To determine if Traffic Engineering is capturing 100% of work requests from all sources and completing them within the timeframes established in their business plan and the CARE system, we selected a random sample of 73 CARE issues, 38 TEAMS Service Order Requests (SOR's), and 31 work reports (total of 142). For all issues, we determined:

1. if the number of days it took to complete the issue was less than or equal to the threshold number of days, which Traffic Engineering allows itself to address the applicable type of complaint before that item is considered late or past due.
2. if Traffic Engineering is meeting its business plan goal to improve the traffic sign installation process so that 90% of all signs are installed in 16 calendar days. It should be noted that Traffic Engineering is moving toward the 90% goal. For the audit period however, the goal was 50% for the first quarter of the fiscal year and 60% for the second quarter of the fiscal year.
3. the amount of time it took to correct an issue if it was a dangerous condition. A dangerous condition is one in which public safety is threatened. For signs, examples include missing Stop, Yield, Do Not Enter, and One-Way signs. For signals, examples include accident/equipment damage, conflicting movements, flashing, head twisted or falling, hung up, and pre-empt R/R malfunctions.

For the 38 TEAMS SOR's and the 31 work reports, we also verified that the issue was entered into the CARE system. The findings, internal control weaknesses, and opportunities for improvement that we noted are as follows:

Finding #1

1. The issue was not completed within Traffic Engineering's threshold days in 17 (12%) of the 142 issues tested.
2. Based on our sample, Traffic Engineering met its first quarter goal of installing 50% of signs within 16 calendar days, but did not meet its second quarter goal of installing 60% of signs within 16 calendar days. Traffic Engineering installed seven of eleven signs (63%) within 16 calendar days during the first quarter. Traffic Engineering installed eight of seventeen signs (47%) within 16 calendar days during the second quarter. We noted two sign issues that had been open for five months when we brought them to Traffic Engineering's attention. One had been addressed and one had not, but neither had ever been closed out.
3. For the 27 issues in our sample that met the criteria of a dangerous condition, it took Traffic Engineering an average of 3.18 hours to remedy the problem. Although there are no national standards for purposes of comparison, the average number of hours appears reasonable.

Recommendation

We recommend that Traffic Engineering attempt to identify the reason(s) that they did not meet the timeframes established in their business plan and the CARE system and implement any changes necessary to meet their goals in the future.

Traffic Engineering Division Response

The 60% target mentioned above is an internally set, end of second quarter target established to provide a way of tracking the Division's progress in meeting the Business Plan goal. As a part of measuring this Business Plan the completion time for all sign work orders was measured and reported in Flexmeasures. The targets for each month were met and the actual completion rate by the end of FY 00/01 was 94.5% of the work orders completed within 16 calendar days.

Internal Control Weakness #1

The CARE system does not contain a completion date field. Instead it contains a field for the date that the last open work order was closed out. The completion date frequently differs from the date that the last work order was closed out.

Recommendation

We recommend that a completion date field be added to Traffic Engineering's CARE screen and be linked to the TEAMS completion date field.

Traffic Engineering Division Response

ITD was requested to link the close out date in CARE with the completion date in TEAMS. This change has now been implemented so that the completion date is the date the work was completed.

Internal Control Weakness #2

For signal issues, the dispatcher at Traffic Engineering closes out CARE issues that require follow-up work and creates new issues for the follow-up portion of the issue. This practice has the following consequences:

- It creates additional work because the dispatcher must enter these CARE issues into the computer twice.
- It creates the risk that the new issue might not be entered into CARE and the follow up work never performed.
- It artificially increases the number of issues.
- It gives the appearance that issues were closed out in a shorter amount of time than it actually took.
- The citizen who reported the original issue would not have the new CARE issue number to reference their reported problem.

Recommendation

We recommend that Traffic Engineering stop their current practice of closing out CARE issues that require follow-up work and keep issues open until all of the work has been completed.

Traffic Engineering Division Response

This recommendation was implemented on September 1, 2001.

Opportunity for Improvement #3

Sometimes, the person entering a problem into the CARE system enters the address of the caller in the computer screen field where they should have entered the address of the problem.

Recommendation

The “Address” field in the CARE system should be changed to “Problem Location” to differentiate between the address of the caller and the address of the problem. In addition, Traffic Engineering needs the ability to overwrite a bad address in the CARE system.

Traffic Engineering Division Response

It is our understanding that ITD is currently reviewing the CARE input screen. We have suggested that this change be considered as a part of their review.

Respectfully submitted,

Robert O. Johnson, CPA
Council Auditor

Audit Performed by:

Kyle Billy, CPA

Jennifer Spinelli

OFFICE OF THE COUNCIL AUDITOR
Suite 200, St. James Building



February 29, 2000

Mr. Sam Mousa, Director
Public Works Department
City of Jacksonville

Dear Mr. Mousa,

We have completed our preliminary survey of the Traffic Engineering Division. The purpose of the preliminary survey is to provide the auditor with a clear picture of the organization's mission and operations and its controls and risks. With knowledge gained from the preliminary survey, the auditor develops the audit's objectives and the audit steps necessary to achieve those objectives. As a result, a more intelligent, effective, and efficient audit will be performed. Based on our preliminary survey, we have identified the internal control strengths and weaknesses and the improvement opportunities listed below. Due to the weaknesses identified in the CARE and TEAMS interfaces, we have decided to postpone our audit testing of the Traffic Engineering Division. It is our intention to allow enough time to pass for the City Information Technologies Division to make the necessary corrections and for some history of transactions to accumulate, before performing audit testing. This will allow us to test a system that is at least thought to be working properly, rather than one that we know has problems.

Regarding the weaknesses and improvement opportunities listed below, we are not asking for a formal response at this time. Instead, we recommend that Traffic Engineering investigate these items to determine what improvements, if any, should be made. We will follow up on these items when we return to perform audit testing.

Internal Control Strengths and Weaknesses

I. Traffic Signal Timing

Strengths

1. Timing changes require the approval of the City Traffic Engineer or the Traffic Signal Engineer.

Weaknesses

1. Traffic signal work is performed prior to the creation of the work order.

117 West Duval Street Jacksonville, Florida 32202-3701 Telephone (904) 630-1625 Fax (904) 630-2908

II. Traffic Signal Maintenance

Strengths

1. Traffic Engineering maintains a database of all traffic signal locations for which they are responsible and the traffic signal equipment which is at that location.
2. Traffic Engineering has written standard operating procedures for traffic signal field repair.

Weaknesses

1. Traffic signal work is performed prior to the creation of the work order.
2. No log is maintained of equipment in the repair area that needs repairing.

III. Traffic Sign Fabrication, Installation, and Maintenance

Strengths

1. Work is performed based on a numbered work order.

IV. Streetlights

Strengths

1. JEA has a Management Directive, MD #909, which governs streetlight installation, maintenance, and electric charges.

V. CARE and TEAMS Systems and Miscellaneous

Strengths

1. CARE utilizes a sequential numbering system for complaints beginning the first day of each fiscal year.
2. TEAMS utilizes a sequential numbering system for service order requests beginning the first day of each fiscal year.
3. TEAMS numbers work orders sequentially.
4. Traffic Engineering reviewed and upgraded to achieve 100% Y2K readiness.
5. Traffic Engineering has a written Disaster Contingency Plan dated April 27, 1998. Per Fred Kyle, this plan has been updated as of October 1, 1999.

Weaknesses

1. There are deficiencies in the CARE to TEAMS and TEAMS to CARE computer program interfaces that do not always allow the transfer of information between the two programs in a timely manner. We made the following observations:
 - A. Traffic Engineering employees are frustrated by the delay in the transfer of information between the two programs. In some instances, for example, an employee

enters an issue into the CARE system, but cannot start working on solving that issue until the TEAMS program creates the work order, a day or two later.

- B. The TEAMS program temporary table does not have an automatic scheduler, so the transfer must be made manually.
2. Traffic Engineering's threshold days programmed into the CARE system are not logical and do not reflect Traffic Engineering's actual practices. We made the following observations:
- A. All issue descriptions are either a medium or high priority. There are no low priority issues.
 - B. Medium priority issues have three different numbers of threshold days; 7, 14, and 30. A different number of threshold days should be indicative of different priority levels.
 - C. Some high priority issues have the same number of threshold days as medium priority issues.
 - D. Seven days are allowed to repair a school pedestrian flasher malfunction and thirty days are allowed to repair a signal light that is out. These dangerous situations should be corrected much quicker than the threshold days allow.
3. Traffic Engineering paid the electric bills for streetlights and traffic signals each month, without questioning or understanding the "transferred amount" line-item on the bills. We made the following observations:

Due to the significant amount of Traffic Engineering's budget spent on electricity for streetlights and traffic signals, Auditor reviewed billings for each. When Traffic Engineering could not explain the transferred amount line-item on the electric bills, Auditor investigation discovered that the transferred amounts represent additional addresses for which Traffic Engineering was being charged electricity. When Traffic Engineering did not know what was located at the addresses or why they were grouped separately on the electric bills, Auditor requested that they travel to the addresses and find out. Further investigation revealed that although the additional addresses were all legitimate, two of the addresses should have been billed to Public Buildings, instead of Traffic Engineering.

Improvement Opportunities

- 1. Traffic Engineering cannot produce a report that identifies those traffic signals which have required the most service calls during the year. (For example, out of the 1100 signals, what 10 have required the most service calls during the past year?) Such a report would enable Traffic Engineering to change components or perform preventive maintenance that would reduce the number of service calls in the future, thus improving public safety and traffic flow.

2. Traffic Engineering does not regularly receive a list of auto accidents in the City by intersection. Such a report would enable Traffic Engineering to identify problem intersections and make improvements to reduce accidents. Per Traffic Engineer Fred Kyle, this report was received from City ITD in the past, but it has not been received since 1993.
3. The City is not maximizing Loss Recovery revenue for damage to City Traffic Engineering property. The loss recovery process is divided between Traffic Engineering and Scibal (a third-party administrator) with neither party possessing the full picture of damages and loss recovery efforts. We noted the following incident while performing field work at Traffic Engineering headquarters.
 - On November 12, 1999, a car struck the signal control box at the intersection of Main and Monroe Streets.

When we contacted Scibal on January 14, 2000, they had set up a file on the incident, but were waiting for Traffic Engineering to send them an invoice of the damage. Traffic Engineering repaired the damage and had no plans to send an invoice to Scibal.

Respectfully submitted,



Robert O. Johnson, CPA
Council Auditor

cc. Fred Kyle

Equal Opportunity Employer

DEPARTMENT OF PUBLIC WORKS
Traffic Engineering Division


May 4, 2000


RECEIVED
MAY 09 2000



MEMORANDUM

Office of Council Auditor ^{Re}

TO:  Sam E. Mousa, P.E.
Deputy Chief Administrative Officer/
Director of Public Works

FROM: Fred Kyle, P.E. 
Chief, Traffic Engineering Division

SUBJECT: Council Audit Report Response - Update

(Updated information underlined.)

Internal Control Strengths and Weaknesses

I. Traffic Signal Timing

1. Traffic signal work is performed prior to the creation of the work order.

Effective March 1, 2000, work orders will be issued prior to installing new traffic signal timing in the field. Since the development of new timing plans is a design function, I do not think it is appropriate or necessary to use work orders for this purpose.

II. Traffic Signal Maintenance

1. Traffic signal work is performed prior to the creation of the work order.

The audit was done in November, before the creation of the Call Center. Currently, all telephone calls are routed to the Call Center where CARE issues are created before the item is dispatched to the repairman. As a result, most of the work is now being done after the work order has been created. The exception would be items that the repairmen see while they are out in the field and repair on their own or calls they receive at night or on weekends. For these calls, work orders are prepared the next workday from the work reports that are filled out by each repairman.

2. No log is maintained of equipment in the repair area that needs repairing.

Effective March 1, 2000, a log will be kept of equipment that is brought into the shop for repair.



Attachment B

AREA CODE 904 / 387-8861 / 1007 SUPERIOR STREET / JACKSONVILLE, FLORIDA 32254

V. CARE and TEAMS Systems and Miscellaneous

1. There are deficiencies in the CARE to TEAMS and TEAMS to CARE computer program interfaces that do not always allow the transfer of information between the two programs in a timely manner. We made the following observations:

- A. Traffic Engineering employees are frustrated by the delay in the transfer of information between the two programs. In some instances, for example, an employee enters an issue into the CARE system, but cannot start working on solving that issue until the TEAMS program creates the work order, a day or two later.

We met with ITD to discuss this problem. As a result, ITD made software changes that now creates TEAMS work orders from a CARE entry with no delay. Occasionally, if the system is busy there is a delay of 10 - 15 minutes before CARE creates the TEAMS issue. This is a rare occurrence that does not impact our process.

- B. The TEAMS program temporary table does not have an automatic scheduler, so the transfer must be made manually.

This problem was also discussed with ITD. They modified the TEAMS scheduler so that it is now updated automatically.

2. Traffic Engineering's threshold days programmed into the CARE system are not logical and do not reflect Traffic Engineering's actual practices. We made the following observations:

- A. All issue descriptions are either a medium or high priority. There are no low priority issues.

When the CARE system was brought on line, we were asked to look at each of the Traffic Engineering Division issues and determine the priority for each issue. No guidelines or quantifiable values were provided to assist in assigning the priorities. Therefore the Traffic Engineering Division issues were given priority levels based on engineering judgement using the

impacts on safety or customer service as a guideline. I have reviewed the issue description list, and would recommend that the priorities not be changed.

- B. Medium priority issues have three different numbers of threshold days: 7, 14, and 30. A different number of threshold days should be indicative of different priority levels.

When the CARE system was created, we were advised that completion time thresholds should be established that indicate the maximum amount of time needed to complete a task and not the priority of an issue. Therefore, we have issues that are listed as "High" priority that have longer completion times than "Medium" priority issues simply because they take longer to complete. There is no correlation between the priority an issue has and the threshold completion days.

- C. Some high priority issues have the same number of threshold days as medium priority issues.

See the response on the previous item.

- D. Seven days are allowed to repair a school pedestrian flasher malfunction and thirty days are allowed to repair a signal light that is out. These dangerous situations should be corrected much quicker than the threshold days allow.

I think the auditors are saying that that there should be a correlation between threshold days and priority. However, as mentioned above, the thresholds represent time to complete the task and not the priority assigned to the task as it relates to safety or customer service. For example, we will repair a signal light that is out and return it to safe operation much quicker than thirty days. However, there may be follow-up work that is required that does not affect intersection safety but is required before the task is completed.

- 3. Traffic Engineering paid the electric bills for streetlights and traffic signals each month, without questioning or understanding the "transferred amount" line-item on the bills. We made the following observations:

Due to the significant amount of Traffic Engineering's budget spent on electricity for streetlights and traffic signals, Auditor reviewed billings for each. When Traffic Engineering could not explain the transferred amount line-item on the electric bills, Auditor investigation discovered that the transferred amounts represent additional addresses for which Traffic Engineering was being charged electricity. When Traffic Engineering did not know what was located at the addresses or why they were grouped separately on the electric bills, Auditor requested that they travel to the addresses and find out. Further investigation revealed that although the additional addresses were all

legitimate, two of the addresses should have been billed to Public Buildings, instead of Traffic Engineering.

The two addresses that should have been billed to the Public Buildings Division are for the Traffic Engineering Division office and our warehouse. As soon as we became aware that this matter, Public Buildings was contacted and they in turn requested JEA to modify the billings so that the building power usage is billed to Public Buildings. As of the March 2000, electric power bill, the power for both the office and the warehouse had been transferred to the Public Buildings Division.

Improvement Opportunities

1. Traffic Engineering cannot produce a report that identifies those traffic signals which have required the most service calls during the year. (For example, out of the 1100 signals, what 10 have required the most service calls during the past year?) Such a report would enable Traffic Engineering to change components or perform preventive maintenance that would reduce the number of service calls in the future, thus improving public safety and traffic flow.

Through discussions with ITD they advise that it will take about 20 man-hours of programming time to modify the TEAMS program to provide this report. We will submit a CR to request this work. A beta version of the report was submitted to us the last week of March. We identified several changes that needed to be made and have requested ITD to make the changes. They advised that it will be the first of June before the report is ready.

2. Traffic Engineering does not regularly receive a list of auto accidents in the City by intersection. Such a report would enable Traffic Engineering to identify problem intersections and make improvements to reduce accidents. Per Traffic Engineer Fred Kyle, this report was received from City ITD in the past, but it has not been received since 1993.

After working with the JSO for several months, I received a listing of the high crash intersections about a month ago. They will continue to furnish this information to me on a quarterly basis. When the Division engineering staff is complete I will assign to one of the engineers the responsibility of annually reviewing the list and developing recommendations for improving the safety of at least the top ten intersections.

Page five

3. The City is not maximizing Loss Recovery revenue for damage to City Traffic Engineering property. The loss recovery process is divided between Traffic Engineering and Scibal (a third-party administrator) with neither party possessing the full picture of damages and loss recovery efforts. We noted the following incident while performing fieldwork at Traffic Engineering headquarters.

On November 12, 1999, a car struck the signal control box at the intersection of Main and Monroe Streets.

When we contacted Scibal on January 14, 2000, they had set up a file on the incident, but were waiting for Traffic Engineering to send them an invoice of the damage. Traffic Engineering repaired the damage and had no plans to send an invoice to Scibal.

On January 26, 2000, an invoice for \$13.95 was sent to Scibal to cover our cost in this incident. This is one hour's charge for labor only to reset the cabinet on the foundation. We do have a written procedure. Scibal sends us a letter for each incident requesting an estimate of cost for the repair. This is given to the section responsible for the repairs to prepare the estimate, which is then forwarded to Scibal. Hourly repair costs for labor and equipment have been developed and will be used for insurance billing effective May 1, 2000. The hourly charges for traffic signal repairs would be:

\$29 / hr for 1 man & 1 truck

\$47 / hr for 2 men & 1 truck

\$57 / hr for 2 men & 2 trucks

Overtime costs would be:

\$38 / hr for 1 man & 1 truck

\$65 / hr for 2 men & 1 truck

\$75 / hr for 2 men & 2 trucks

I believe this addresses the concerns raised in the auditor's report. Please let me know if you need any additional information.

FK:nk

cc: Marlene Wright
Administrative Assistant, Senior