



Audit of Orange County Highway Construction Division

**Report by the
Office of County Comptroller**

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October 12, 2005

Richard T. Crotty, County Mayor
And
Board of County Commissioners

We have conducted an audit of the Highway Construction Division of the Orange County Public Works Department. The audit was limited to a review of road and sidewalk construction. The period audited was October 1, 2002 through June 30, 2004; however, given the length of time it takes to complete road construction projects, we reviewed certain activities and expenditures that occurred outside this period. Our audit was conducted in accordance with generally accepted government auditing standards, and included such tests as we considered necessary in the circumstances.

Responses to our Recommendations for Improvement were received from the Manager of the Highway Construction Division and are incorporated herein.

We appreciate the cooperation of the personnel of the Highway Construction Division, the Purchasing and Contracts Division, and the respective outside contractors during the course of the audit.

Martha O. Haynie, CPA
County Comptroller

c: Ajit Lalchandani, County Administrator
William P. Baxter, Director, Public Works Department
Julie Naditz, Manager, Highway Construction Division
Johnny M. Richardson, Manager, Purchasing and Contracts Division

EXECUTIVE SUMMARY

Executive Summary

We have conducted an audit of the Highway Construction Division (HCD) of the Orange County Public Works Department. The audit scope consisted of a review of completed and in-progress road and sidewalk construction projects. The audit period was October 1, 2002 to June 30, 2004; however, given the length of time it takes to complete road construction projects, we reviewed certain activities and expenditures that occurred outside this period. The objectives of our review were to determine whether:

- Expenditures made to contractors were reasonable, accurate, properly authorized, and were for actual services rendered and work performed;
- Contractors complied with contract provisions and specifications; and,
- HCD adequately monitored the road and sidewalk construction programs.

Based upon the work performed, we noted that expenditures made to contractors were reasonable and represented work performed and contractors materially complied with contract provisions and specifications, except for the asphalt base course. In our opinion, monitoring of the road and sidewalk construction programs was adequate; except for the assignment of projects under sidewalk term contracts and documentation of pay requests and change orders. Improvements are needed as outlined in this report.

As part of our audit, we engaged an independent geotechnical engineering and road materials testing consultant to obtain core samples from two road construction projects to verify deliverables. As a result of that testing, we found the asphalt pavement thickness at Apopka-Vineland Road did not meet the thickness specified in the contract. After presenting this data to the County Engineering Inspectors (CEI), the CEI reviewed the elevation of the Apopka-Vineland Road asphalt surface and found that it was significantly below specifications and slope requirements. Further, the testing found that the asphalt pavement thickness at Forsyth Road did not meet the thickness specified in the contract. In discussing the testing performed by the County's contract testing firms with the CEIs, we were informed that there is no schedule for them to do core sampling for depth of the various layers of the road, including asphalt pavement, until the road is nearly completed. A more effective means of testing deliverables with core sampling is to require the testing contractor to obtain test cores as the project progresses.

During our review of the Forsyth Road Construction, we noted that a HCD Staff person had revised the asphalt thickness requirements for the road. We did not observe any documentation in the project files showing that the County's design engineers had authorized the changes in specifications. Such approval should be obtained and documented.

Two of nine sidewalk construction projects reviewed appeared to have significant overpayments as a result of unsupported quantities. These quantity differences appeared to show the County overpaid the contractor in excess of \$100,000. However, after subsequent investigation by HCD management, we were informed that HCD's staff had included the cost of other materials and labor as additional linear feet of sidewalk. HCD stated their staff person had agreed with the Contractor to overstate the number of square yards of sidewalks, driveways, and sod to cover the cost of the piping materials, labor and other lump sum items. HCD Management reviewed the specific projects and provided support to indicate fair value was received on these projects.

HCD did not obtain approval from the Purchasing and Contracts Division to issue a delivery order for a sidewalk project requiring such approval. In addition, one of ten delivery orders for sidewalk construction did not include the location of the project and seven of the remaining nine projects did not include an adequate description as to where the project started and ended.

Based upon information obtained from contractors' invoices, CEI's construction diaries and other documentation in the project files, we noted that four of nine sidewalk construction projects were not finished by the completion date set in the delivery order.

A physical examination of a sample of ten sidewalk projects revealed that five projects had cracked concrete slabs of varying degrees with some cracks extending across the entire slabs. HCD does not have a policy to inspect and document the inspection prior to the one-year sidewalk warranty expiration date.

Our physical examination of the sidewalk projects also revealed graffiti and other markings in six of the ten projects sampled. After discussing this with CEIs, there appears to be no consistent standard for the inspection of completed sidewalks prior to final acceptance and payment.

During our review of change orders, we noted items that should have resulted in a change order were instead charged to other contract tasks that had yet to be completed.

Coordinating activities of utilities and communications companies at the Forsyth Road construction project was reportedly challenging and difficult for the road construction contractor due to the untimely completion of various tasks by these entities. Splitting the work into two phases could be one option to reduce the congestion and extent of coordination needed. Another option would be to build into the contract a 90 to 120 days break after the clearing and grubbing during which the contractor would do no work. During this period, the utilities and communications companies would be asked to complete their work.

The County did not use direct purchases to acquire any materials needed on the three active road construction projects examined. Further inquiries revealed that HCD has never employed the direct purchases method to acquire materials for use on any of its construction projects.

The contractors for two road construction projects reviewed did not adequately maintain owner/contractor meeting minutes. In addition, County Staff did not always adequately complete construction diaries.

Invoices supporting stored materials on monthly pay requests are not being reviewed for accuracy and adequacy; and the required forms documenting stored materials were not always completed. In addition, monitoring procedures to ensure contract compliance were not adequate.

The Highway Construction Department concurred with all of the Recommendations for Improvement. Corrective action is either underway, planned, or completed.

ACTION PLAN

**AUDIT OF ORANGE COUNTY HIGHWAY CONSTRUCTION DIVISION
ACTION PLAN**

| NO. | RECOMMENDATIONS | MANAGEMENT RESPONSE | | | IMPLEMENTATION STATUS | |
|-----|---|---------------------|------------------|---------------|-----------------------|---------|
| | | CONCUR | PARTIALLY CONCUR | DO NOT CONCUR | UNDERWAY | PLANNED |
| 1. | We recommend the following: | | | | | |
| A) | HCD ensures the contractors at both Apopka-Vineland and Forsyth Roads bring the asphalt pavement into compliance with contract specifications for depth and slopes prior to the application of the friction course; and, | ✓ | | | ✓ | |
| B) | HCD prepares guidelines laying out the frequency and milestones for using core sample and string-line testing to test the depth of subgrade, soil-cement and asphalt pavement. | ✓ | | | ✓ | |
| 2. | We recommend HCD ensures that material changes to contract specifications are authorized by the County's design engineers and project management and adequately documented in HCD's project files. | ✓ | | | ✓ | |
| 3. | We recommend HCD reviews the current sidewalk construction process and revises procedures to ensure the appropriate method of construction is utilized for each project and that invoices and records accurately reflect work performed. This review should also include designating appropriate levels of approval, specifying adequate documentation, and segregating the selection, review, and authorization functions. | ✓ | | | ✓ | |
| 4. | We recommend the following: | | | | | |
| A) | HCD ensures delivery orders that exceed \$150,000 are approved by PCD prior to giving the Contractor authority to perform the work in accordance with term contract requirements; and, | ✓ | | Completed | | |

**AUDIT OF ORANGE COUNTY HIGHWAY CONSTRUCTION DIVISION
ACTION PLAN**

| NO. | RECOMMENDATIONS | MANAGEMENT RESPONSE | | | IMPLEMENTATION STATUS | |
|-------|---|---------------------|------------------|---------------|-----------------------|---------|
| | | CONCUR | PARTIALLY CONCUR | DO NOT CONCUR | UNDERWAY | PLANNED |
| 4. B) | HCD ensures precise location (Cross streets, addresses of residences/businesses, side of street) of sidewalk construction be included on the delivery orders and invoices from contractors. | ✓ | | | Completed | |
| 5. | We recommend the following: | | | | | |
| A) | HCD ensures that CEIs monitor construction completion dates as stipulated in the delivery orders; and, | ✓ | | | Completed | |
| B) | HCD prepares change orders to extend delivery dates where extensions are justified or, assesses and collects liquidated damages in instances where delivery dates are not met and extensions are not granted. | ✓ | | | | ✓ |
| 6. | We recommend HCD establishes a written policy requiring the inspection of all sidewalk projects prior to the expiration of the warranty period. This inspection should be documented in the project file. | ✓ | | | ✓ | |
| 7. | We recommend HCD develops and implements a written policy with standard criteria for the inspection of sidewalks for graffiti. | ✓ | | | | ✓ |
| 8. | We recommend HCD work with the PCD to develop a system to improve the change order approval and payment process. This process should ensure the following: | | | | | |
| A) | All change orders receive the appropriate level of approval prior to authorizing changed work to proceed; and, | ✓ | | | | ✓ |
| B) | Charges for work performed are applied to the proper related pay item. | ✓ | | | Completed | |

**AUDIT OF ORANGE COUNTY HIGHWAY CONSTRUCTION DIVISION
ACTION PLAN**

| NO. | RECOMMENDATIONS | MANAGEMENT RESPONSE | | | IMPLEMENTATION STATUS | |
|-----|---|---------------------|------------------|---------------|-----------------------|---------|
| | | CONCUR | PARTIALLY CONCUR | DO NOT CONCUR | UNDERWAY | PLANNED |
| 9. | We recommend the County considers setting up a committee, including individuals from PCD, Design and HCD, to look into the possibility of using a two-phased bidding/construction process or building a 90 to 120 day break period after clearing and grubbing into road construction contracts for certain projects depending on their complexity. | ✓ | | | | ✓ |
| 10. | We recommend the County implements direct purchases for the acquisition of applicable materials needed for road construction projects. | ✓ | | | | ✓ |
| 11. | We recommend HCD requires contractors to prepare written or recorded minutes of all owner/contractor meetings. Copies of minutes should be provided to and retained by HCD. | ✓ | | | ✓ | |
| 12. | We recommend the following: | | | | | |
| A) | HCD establishes written policy and procedures requiring all CEIs to complete construction daily diaries for road and sidewalk construction projects and delineating the type of events that should be recorded in the diaries; and, | ✓ | | | | ✓ |
| B) | HCD's management periodically reviews the daily diaries to ensure that they are being completed in accordance with office policy and procedures. | ✓ | | | ✓ | |
| 13. | We recommend the following: | | | | | |
| A) | HCD ensures that support documents for stored materials are reviewed by CEIs for completeness; and, | ✓ | | | ✓ | |

**AUDIT OF ORANGE COUNTY HIGHWAY CONSTRUCTION DIVISION
ACTION PLAN**

| NO. | RECOMMENDATIONS | MANAGEMENT RESPONSE | | | IMPLEMENTATION STATUS | |
|--------|---|---------------------|------------------|---------------|-----------------------|---------|
| | | CONCUR | PARTIALLY CONCUR | DO NOT CONCUR | UNDERWAY | PLANNED |
| 13. B) | HCD ensures the CEIs review invoices for stored materials for ship-to addresses. In cases where the project site is not the ship-to address, the CEI should verify that the materials were actually on site at the time of billing. | ✓ | | | ✓ | |
| 14. | We recommend HCD ensures the following: | | | | | |
| A) | Contractors keep separate sets of as-built plans currently annotated and available for review at their site offices at all times; | ✓ | | | ✓ | |
| B) | CEIs for the projects periodically review as-built plans to ensure they are being kept up to date; and, | ✓ | | | ✓ | |
| C) | Appropriate certified and sealed field notes are obtained from Professional Surveyor and Mappers prior to the start of fieldwork and at the time of substantial completion. | ✓ | | | ✓ | |
| | | | | | | |

INTRODUCTION

Background

The highway construction program, administered by the Highway Construction Division (HCD) of the Orange County Public Works Department (PWD), provides construction and inspection services for roadway, sidewalks, and drainage capital projects throughout unincorporated Orange County. Funding for these projects is derived from a variety of gas tax revenues, such as the six-cent Local Option Gas Tax, Constitutional Gas Tax, County Gas Tax, and Impact Fees collected from building permits issued on new construction.

Contracts administered during the audit period, October 1, 2002 to June 30, 2004, by HCD totaled approximately \$158 million. Actual payments made to contractors during this period totaled approximately \$82 million.

Unit price contracts are used for the construction of roads and drainage



projects and unit price term contracts are used for sidewalk projects. Contracts are let by the Purchasing and Contracts Division (PCD) in conjunction with the Engineering Division of PWD.

During the period under review, HCD had 24 authorized personnel positions with the same number authorized for fiscal year 2004-05.



County Engineering Inspectors (CEI) perform day-to-day administration of construction and inspection services under the supervision of Senior Engineering Inspectors who report to the Chief Engineer. The

Chief Engineer, who is assisted by an Assistant Project

Scope, Objectives, and Methodology

Manager, Contract Administrator and Administration Specialist, reports to the Division Manager.

The audit scope consisted of a review of completed and in-progress road and sidewalk construction projects. The audit period was October 1, 2002 to June 30, 2004; however, given the length of time it takes to complete road construction projects, we reviewed certain activities and expenditures that occurred outside this period.

The objectives of our review were to determine whether:

- A) Expenditures made to contractors were reasonable, accurate, properly authorized, and were for actual services rendered and work performed;
- B) Contractors complied with contract provisions and specifications; and,
- C) HCD adequately monitored the road and sidewalk construction programs.

Described below are the procedures used to achieve the audit objectives.

- A) To determine whether expenditures made to contractors were reasonable, accurate, properly authorized, and were for actual services rendered and work performed, we obtained a schedule of all road construction contracts issued as of June 30, 2004 for which payments were made during the audit period. We validated the population, stratified the contracts by amounts, and selected the five largest contracts and two other contracts randomly for review. We then classified the projects as active (still under construction) or completed.
 - 1) For each project in the sample, we performed the following:

- Prepared a control schedule of all payments made to the contractors, based upon their monthly pay requests and verified the net payments made with the amounts recorded in the County's financial system;
 - Obtained the most recently approved monthly pay requests and performed the following:
 - Examined them for proper authorization and accuracy;
 - Recomputed retainage and unit price extensions for selected pay items;
 - Traced unit prices to contracts and verified that documents supporting stored materials were adequate; and,
 - Reviewed for proper authorization and timeliness of processing.
 - Reviewed invoices supporting stored materials for duplication and delivery addresses; and,
 - Prepared a schedule of checks issued to the contractors for the last pay period and traced five checks to the control schedule for each project and also reviewed each for proper endorsement and possible overpayments.
- 2) For each active project in the sample, we performed the following:

- Verified work performed and quantities billed on the most recent pay request for selected pay items by physical measurement and observation of CEI's daily construction diaries, annotated plans, and supporting invoices;
 - Prepared a schedule of all invoices from the contracted geotechnical and materials testing services company and performed the following:
 - Verified recording of payments in the County's financial system;
 - Ensured proper authorization was received;
 - Checked the mathematical accuracy of invoices (including rate extensions based upon contracted rates); and,
 - Tested results supporting billings.
 - Evaluated the schedule of values for lump sum items [Mobilization, Management of Traffic (MOT), Clearing and Grubbing, etc.] for reasonableness and verified that payments were made in accordance with the pre-approved schedule of values.
- 3) With respect to change orders, we prepared a schedule of all change orders issued and reviewed for accuracy, reasonableness, timely processing, and proper approval. Also, we obtained and reviewed the contractors' schedule of change orders and evaluated the status of each item;

- 4) For the sidewalk construction program, we prepared a schedule of all sidewalks constructed or under construction during the audit period and selected a judgmental sample of projects based on dollar value of the contract and examined each sample as follows:
 - Verified that paid contractor invoices were supported by contractors' estimates, delivery orders, and quantity and completion reports;
 - Verified accuracy of unit prices with contract prices, unit price extensions and invoice totals;
 - Verified quantities billed by identifying projects and measuring sidewalks and driveways constructed;
 - Physically examined each sample project for graffiti and cracks; and,
 - Examined close-out documents to ascertain whether projects were completed within contracted delivery dates.
 - 5) For Community Development projects being supervised by CEIs, we verified timeliness and accuracy of reimbursement requests.
- B) To determine contractor compliance with contract provisions and specifications, we performed the following:
- 1) Obtained and reviewed the road and sidewalk contractors' bid packages (for the sample projects selected) and verified applicable licenses were on file;

- 2) Verified contractor contract compliance with the County's preconstruction conference requirements, equipment and working space for County CEI's use, and results of geotechnical and material testing;
 - 3) For the projects under construction, verified that annotated drawings were kept updated on site, right of way and construction easement staking were maintained throughout construction, vehicular access to residences and public roads was maintained at all times;
 - 4) Through the engagement of an independent Geotechnical and Materials Testing Services Consultant, verified compliance of sub-base, soil cement and asphalt applications with required depths and densities for certain on-going projects;
 - 5) For completed projects, verified that final inspection was performed by County personnel, punch list items were addressed, completion was achieved within the required number of days, Final Completion Certification was issued prior to approval of the final payment, appropriate waiver of claims and release of lien forms were submitted, certified copies of Professional Surveyors' field notes and final as-built plans were submitted; and,
 - 6) Verified that performance bonds and insurance requirements were in compliance with contract specifications.
- C) To determine whether HCD was adequately monitoring road and sidewalk construction programs, we performed periodic physical observations of construction in progress, observed CEIs at work, attended owner/contractor meetings, and reviewed project files, correspondence, meeting minutes, and construction daily diaries.

**Overall Evaluation**

Based upon the work performed, expenditures made to contractors were reasonable and represented work performed; and, contractors materially complied with contract provisions and specifications, except for the asphalt base course. In our opinion, monitoring of the road and sidewalk construction programs was adequate, except for the assignment of projects under sidewalk term contracts and documentation of pay requests and change orders. Recommended improvements are noted herein.

RECOMMENDATIONS FOR IMPROVEMENT

**RECOMMENDATIONS
FOR IMPROVEMENT**



1. Asphalt Pavement Thickness Should Be Brought Into Compliance With Contract Specifications and Testing Performed as Construction Progresses

With the assistance of an independent geotechnical engineering and road materials testing consultant, we obtained core samples of road materials from two road construction projects to verify deliverables. The tests performed on the cores obtained revealed the following:

- A) Asphalt pavement thickness at Apopka-Vineland Road did not meet the thickness specified in the contract. After allowing for a tolerance of ¼ inch, 80 percent (32 of 40) of the cores showed thickness less than those required by the contract. The shortage in this deliverable ranged from .28 to 1.47 inches. In addition, the thickness of one of four cores of Aggregate Base Course, required in limited specified areas, was below the required specifications by 3.0 inches. As a result, the County Engineering Inspectors (CEI) reviewed the elevation of the Apopka-Vineland Road asphalt surface and found that it was significantly below specifications. Examples are as follows:



| RESULTS OF ELEVATION MEASUREMENTS | |
|-----------------------------------|--|
| Location | Inches Road Surface Below Required Elevation |
| Station 33+88 (RT) | 1.42" |
| Station 35+10 (RT) | 1.73" |
| Station 36+32 (RT) | 1.72" |
| Station 36+62 (LT) | 1.35" |
| Station 44+60 (LT) | 1.30" |

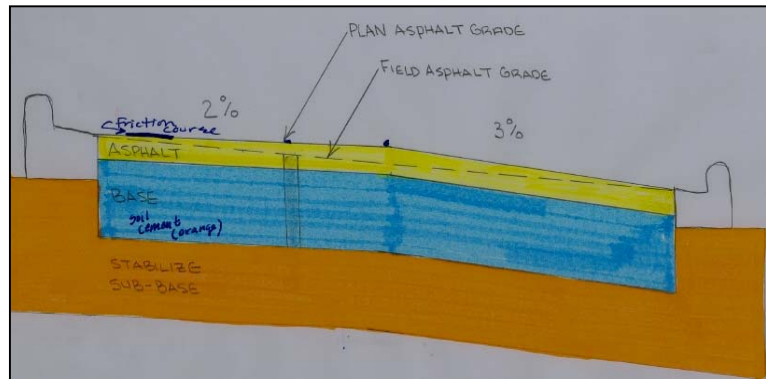
RT = Right Lane

LT = Left Lane

RECOMMENDATIONS FOR IMPROVEMENT



Also, the asphalt surface was basically flat. Contract specifications required a grade point and grades (slopes) of two percent and three percent on either side of the grade point as shown by a cross sectional view below.



(Drawing provided by Highway Construction Division)

Without the slopes, water could settle on the surface, which could result in the hydroplaning of vehicles. As of January 25, 2005 (Pay Request No. 25), the contractor had billed 94 percent of the total contract cost (\$15.8 of \$16.7 million). Considering the extent of the above deficiencies, the County's Senior Engineering Inspector noted that extensive corrective action will have to be done by the contractor.

- B) Asphalt pavement thickness at Forsyth Road did not meet the thickness specified in the contract. After allowing for a tolerance of $\frac{1}{4}$ inch, 41 percent (9 of 22) of the cores showed thickness less than those specified.



The County has under contract its own geotechnical engineering and materials testing services firms for each project. These firms are required to perform various tests, including core samples, to ensure compliance of the contractor with contract specifications. In discussing the testing performed by these testing firms with the CEIs, we were informed that there is no schedule for them to do core sampling for depth of the various layers of the road,

including asphalt pavement, until the road is completed. Core samples, according to the CEIs, are usually taken just prior to the application of the friction course (final layer near the end of the project). According to HCD, they would have discovered the asphalt deficiencies at this point.

A more effective means of testing deliverables with core sampling is to require the testing contractor to obtain test cores as the project progresses. Using this method, non-compliance can be detected and corrected early. If all the test cores are obtained just before the friction course is applied and test results show a shortage of deliverables, the shortages could be throughout the entire project, as our tests showed, thus requiring extensive corrective action, delays, or possible reduction (if sufficient funds remain unpaid) in payment to the Contractor.

If not detected and corrected, asphalt pavements that do not meet engineering specifications for depth could be more likely to suffer premature pavement failures and require repairs at earlier stages than pavements that are constructed to specification. Also, slope deficiencies could cause significant safety concerns.

We Recommend the following:

- A) HCD ensures the contractors at both Apopka-Vineland and Forsyth Roads bring the asphalt pavement into compliance with contract specifications for depth and slopes prior to the application of the friction course; and,
- B) HCD prepares guidelines laying out the frequency and milestones for using core sample and string-line testing to test the depth of subgrade, soil-cement and asphalt pavement.

Highway Construction Division's Response:

Management concurs. Underway.

- A) On the Apopka-Vineland Road project, the Contractor is currently verifying cross-slopes to determine what will be required to bring the asphalt to specified requirements. The contractor will present to Highway Construction a plan for remediation, at their expense. We will then core to verify that pavement has been brought into compliance with contract specifications prior to allowing application of friction course.

On the Forsyth Road project, most cores during the audit were taken prior to the installation of the final lift of structural asphalt. The second or final lift is now being installed. Cores will be taken by Highway Construction after installation of the final lift to ensure compliance with specifications prior to installation of the friction course. In addition, the Forsyth Road project has been divided into approximately 5 different sections. Each section will be cored immediately after application of the final lift of asphalt so that non-compliance can be detected and corrected earlier.

- B) Guidelines for core sampling and stringline testing will be prepared by Highway Construction with summary as follows: The inspector will review the contractor's schedule for application of asphalt and friction course for a project. The inspector will then break the project down into smaller sections to obtain test cores immediately after application of the asphalt. This should allow for non-compliance to be detected and corrected earlier. This same process will be applied to stringline testing prior to placement of the base and asphalt. This will assure that the proper slopes are in place.

2. Material Changes to Road Design Specifications Should Be Approved by the County Design Engineers

During our review of the Forsyth Road Construction, we noted that a HCD Staff person had revised the asphalt thickness requirements for the road. The Road's Original

RECOMMENDATIONS FOR IMPROVEMENT



Audit of Orange County Highway
Construction Division

plans and specifications required a thickness of 3.5 inches of type S-1 asphalt pavement, as well as the application of friction course (FC-2). The friction course is the final (surface) layer designed to promote traction between motor vehicle tires and the road surface. A policy change was made by PWD management to upgrade all FC-2 specifications to FC-3 on all projects where possible because of its durability. The HCD staff person overseeing this project instructed the Contractor to use FC-3 instead of FC-2. However, the staff person also instructed the contractor to reduce the thickness of the asphalt pavement from 3.5 to 3.0 inches. A change order was subsequently written and approved for approximately \$160,000 to accommodate the net increased costs caused by these changes. However, the description on the change order was only,

Change from FC-2 to FC-3 - Orange County has requested that FC-3 friction course be substituted for the FC-2 specified in the bid as FC-3 is better suited for high volume commercial road.

As such, no mention was made of the reduced thickness of the asphalt pavement in the change order. In addition, we did not observe any documentation in the project files showing that the County's design engineers had authorized the changes in specifications. Such approval should be obtained and documented.

Upon further discussion with HCD, we were informed that the staff person believed the increased depth of FC-3 would provide the same or better level of quality on the finished road. While this net change may not affect the final road quality, such changes should be approved by the design engineers as well as department management since the basis of the design (traffic load capacity, etc.) had not been changed and specification changes usually involve changes in project costs.

We Recommend HCD ensures that material changes to contract specifications are authorized by the County's design

engineers and project management and adequately documented in HCD's project files.

Highway Construction Division's Response:

Management concurs. Underway.

Any material change to the contract specifications will be reviewed and authorized by the County's design engineers and project management, including the County's design consultant where appropriate. Thorough documentation outlining why material changes are made will be maintained in the project files.

In the Forsyth Road example presented, the County Engineer, Engineering Manager and Highway Construction Manager authorized the material change, with the concurrence of the Roads and Drainage Manager. Note that it was the consensus of the group to make this change without going back to the original Design Engineer or Consultant on the projects because each time you ask the consultant to review a change to the plans they would charge Orange County a design fee. Since everyone was in agreement with the issue, the change was incorporated by Highway Construction. On the Forsyth Road project we did calculations to show that you get the same structural number on the road section by decreasing the thickness of the structural course when combining it with FC-3. However, details of the review and authorization by those noted above were not well documented in Highway Construction's files or on the change orders processed for the impacted project. In the future, thorough documentation outlining why changes are made will be maintained in the project files.

**RECOMMENDATIONS
FOR IMPROVEMENT**



3. Procedures Should Be Revised for the Review of Contractor Invoices, the Authorization of Payments and the Closing Out of Sidewalk Construction Projects

Two of nine sidewalk construction projects reviewed appeared to have significant overpayments as a result of unsupported quantities. These are as follows:

- A) The Amber and Oleander Sidewalk Project had significant variances in the square yards of sidewalk paid for and the actual square yards of sidewalks delivered. Audit tests found that the quantities measured during the audit significantly differed from amounts paid by the County, as shown in the table below.

| AMBER AND OLEANDER ROADS (Combined) | | | | |
|--|----------------------------|-----------------------------|--------------------|-------------------------------|
| Description Of Work | Square Yards Billed | Audited Square Yards | Over Stated | Apparent Over Payment* |
| Concrete sidewalks (4") | 4,000 | 1,658 | 2,342 | \$65,576 |
| Concrete driveways (6") | 2,500 | 1,536 | 964 | 23,618 |
| Sod | 10,020 | 4,025 | 5,995 | 13,189 |
| Total | | | | \$102,383 |

* - Contract rates multiplied by overstated quantities

These quantity differences appeared to show the County overpaid the contractor by over \$100,000. However, after subsequent investigation by HCD management, we were informed that HCD's staff had inappropriately included this project under the sidewalk term contract program instead of utilizing competitive bidding. According to HCD's management, the work involved deep piping and major trunk lines not usually included in a sidewalk construction project. As a result, in addition to the cost of materials and labor for the pipe culverts, major expenditures for lump sum items, normally accommodated under a competitively bid contract (mobilization, maintenance of traffic, etc.), were incurred by the contractor.

**RECOMMENDATIONS
FOR IMPROVEMENT**



Separate unit prices were not bid for these items in the contractor’s term contract. Therefore, the term contract could not accommodate the expenditures. In a term contract for sidewalk, no provisions are made for major piping work or related lump sum items. As a result, HCD stated their staff person had agreed with the Contractor to overstate the number of square yards of sidewalks, driveways, and sod to cover the cost of the piping materials, labor and the lump sum items.

Because the projects were not competitively bid and not appropriately paid for under the term contract, we cannot determine if fair value was received for the work performed. However, HCD management provided us with an analysis of four projects they believe are similar in scope to the Amber and Oleander project that showed the total amounts negotiated “off contract” were consistent with what would have been paid had the project been competitively bid. As such, it appears fair value was received.

- B) A Contractor billed the County and was paid \$23,342 for quantities of sidewalks and driveways constructed on the Eggleston Avenue sidewalk project. However, the quantities were not supported by physical measurements. As a result, there was an apparent overpayment of \$13,298 (132%). This is shown as follows:

| EGGLESTON AVENUE | | | | |
|----------------------------|----------------------------|-----------------------------|--------------------|-----------------------|
| Description Of Work | Square Yards Billed | Audited Square Yards | Over Stated | * Over Payment |
| Concrete sidewalks (4") | 812 | 281 | 531 | \$13,110 |
| Concrete driveways (6") | 34 | 28 | 6 | 188 |
| Total Overpayment | | | | \$13,298 |

* = Contract rates multiplied by overstated quantities

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In accounting for the significant difference between the billed quantities and the audited quantities during the audit, the CEI noted the following:

- A segment of the sidewalk (1700 Eggleston to the corner of Eggleston and Van Ness Road) poured during construction was removed and re-poured because the initial pour encroached on an apartment complex's private property;
- A drainage system was installed under ground, but not separately billed;
- Total cost of the re-pouring, re-sodding and the drainage system was \$8,310;
- The County owed the contractor balances totaling \$3,075 from work done on two other projects (Ambassador and Church Street); and,
- These additional costs noted above, according to the CEI, were converted into square yards of concrete sidewalk and included in the billed quantities. However, there was no notation of the activities or their costs in the project files.

County procedures require that payments be made only for work that is actually performed. Quantities should never be inflated to include unspecified costs. Where additional work needs to be done, the changed work should be handled by change order/or a revised delivery order for term contracts.

One of the causes that allowed these instances to occur was the inadequate segregation of duties in the handling of the sidewalk construction program. Procedures allowed one HCD staff person to exert total control of the assignment and authorization of tasks as well as the authorization of payments. This person decided which projects were to be done, which contractor (under term contract) would do the work, negotiated the quantities with the contractor, reviewed and approved the contractor's invoices and authorized payment by memo to PWD Fiscal. Good internal controls

require the separation of the selection, review, and authorization processes.

We Recommend HCD reviews the current sidewalk construction process and revises procedures to ensure the appropriate method of construction is utilized for each project and that invoices and records accurately reflect work performed. This review should also include designating appropriate levels of approval, specifying adequate documentation, and segregating the selection, review, and authorization functions.

Highway Construction Division's Response:

Management concurs. Underway.

Highway Construction created a committee consisting of Julie Naditz, Manager, Highway Construction, Roger Cain, Manager, Development Engineering, Ghulam Qadir, Senior Engineer, Public Works Engineering and John Workman, Inspector III, Highway Construction. The committee was tasked with developing an internal process to determine whether a sidewalk project should be built utilizing one of the Term Contracts for Concrete Sidewalk Construction or utilizing the County's competitive bidding process. If it is determined that some items outside the scope of the term contract may be required to construct the project, a price will be obtained and approval will be requested from Purchasing and Contracts to proceed with a Sole Source PO for those items. If it appears that a significant amount of the work is outside the scope of the term contract, the project will be sent back to Engineering to be bid.

Segregation of the various steps in handling a sidewalk project has also been accomplished through this same worksheet. Engineering first determines which projects will be reviewed for constructability under the sidewalk term contract. Upon approval, one Highway Construction staff member will handle assignment of projects to the contractors, based upon availability, proximity and equality of workloads. Inspection staff will review the work and verify billed quantities, which are then approved by two staff

members, including the Highway Construction Chief Engineer or Manager. This process already has been implemented for the past 6 months and appears to be working smoothly.

In addition, Highway Construction conducted an internal audit of the sidewalk program. A list was made of sidewalk projects completed in 2002/2003/2004. This totaled 98 projects. Projects where additional work was paid for under the sidewalk line item (7 projects) were removed from this list and 91 projects remained.

Highway Construction pulled a 20% sampling of the 91 projects and a total of 18 projects were verified in the field by Design Engineers from Public Works Engineering Division. The analysis showed that similar quantity of sidewalk was measured in the field as was detailed on the contractor's invoices.

4. Delivery Orders for Sidewalk Term Contracts Should Be Properly Approved and Include Adequate Descriptions of Projects

We noted the following during our review of delivery orders for sidewalk construction:

- A) HCD did not obtain approval from the Purchasing and Contracts Division to issue a delivery order (Authority to proceed noting quantities, costs and completion date) to a contractor for a sidewalk project in excess of \$150,000. Section IV of the term contract between the County and the contractor requires that all delivery orders in excess of \$150,000 must have "the express written authority of the Purchasing and Contracts Department."
- B) One of ten delivery orders for sidewalk construction did not include the location of the project. In addition, in seven of the remaining nine projects, the descriptions as to where to start and end the construction were not stated on the delivery orders.

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In these seven instances, work was identified only by the name of the project, for example, Powers Drive 2. We also noted that the location of work performed was not precisely described on the invoices from the contractors and, in two instances, the invoices did not include the names of the projects. Good controls require that the location of sidewalk construction be adequately described in the delivery orders and invoices. This means that starting and ending points, such as cross streets or addresses of residences and which side of the street should be used to identify the precise location of the construction. Because of inadequate and omitted description of project locations, to adequately identify past projects during our review, CEIs had to provide verbal information and, in some instances, physically walk the projects to identify where construction took place. Also, without an adequate description of project location HCD may not be able to properly control the scope of work being performed or the accuracy of contractors' invoices.

We Recommend the following:

- A) HCD ensures delivery orders that exceed \$150,000 are approved by PCD prior to giving the Contractor authority to perform the work in accordance with term contract requirements; and,
- B) HCD ensures precise location (Cross streets, addresses of residences/businesses, side of street) of sidewalk construction be included on the delivery orders and invoices from contractors.

Highway Construction Division's Response:

Management concurs. Completed.

- A) Highway Construction will observe the threshold amount requiring Purchasing approval for delivery orders and ensure that any exceeding this amount are reviewed and approved by Purchasing. Please note



that the threshold amount differs for several contracts that are currently in use. The Y1-144 contract required a threshold of \$150,000 but the Y2-1066, Y3-163 and Y4-1022 contracts now require \$400,000.

- B) A precise description of the location, including cross streets, addresses, anticipated length and side of the street is now being required on all quotes and invoices for the term sidewalk contract.

5. Sidewalk Construction Should Be Completed by the Delivery Date

Based upon information obtained from contractors' invoices, CEI's construction diaries and other documentation in the project files, we noted that four of nine (44 percent) sidewalk construction projects were not finished by the completion date set in the delivery order. The projects are shown as follows:

| SIDEWALK PROJECTS COMPLETED AFTER DELIVERY DATE | | | | |
|---|------------------------|--------------------|--------------------------------|---------------------|
| Name | Required Delivery Date | Final Invoice Date | Completion Date in CEI's Diary | Number of Days Late |
| Amber Rd. & Oleander | 09/30/02 | 02/04/03 | 02/10/03 | 133 |
| Buck road | 09/30/02 | 11/13/02 | 11/11/02 | 42 |
| Eggleston Avenue | 05/31/04 | 08/15/04 | Not provided | 76 |
| Powers Dr. 2 | 11/27/03 | 05/06/04 | Not provided | 161 |

Article 13 of the construction contract stipulates that,

The Contract Performance period or Completion of any delivery order may only be changed by a written change order. Any claim for an extension in the Completion Time to be eligible for consideration shall be in writing and delivered to the Project Manager within five (5) days of the occurrence of the event giving rise to the claim...all time limits stated in the delivery order are of the essence to the Agreement.

In addition, the article provides for liquidated damages of \$100 per day should the contractor fail to complete all work on or before the delivery date stipulated in the delivery order. As a result, the County may have been due \$41,200 in liquidated damages on the above projects.

We Recommend the following:

- A) HCD ensures that CEIs monitor construction completion dates as stipulated in the delivery orders; and,
- B) HCD prepares change orders to extend delivery dates where extensions are justified or, assesses and collects liquidated damages in instances where delivery dates are not met and extensions are not granted.

Highway Construction Division's Response:

Management concurs. A) Completed. B) Planned.

- A) A completion time will be proposed by the contractor and approved by Highway Construction prior to issuance of a delivery order. Previously, if no completion date was specified by the user department, "Advantage" would automatically assign a 30 day delivery period, which was often not a reasonable completion requirement. Inspection staff will monitor for compliance with completion dates.
- B) If inspection staff determines that a project appears to be behind schedule, a letter will be sent to the contractor by the Highway Construction Manager informing them of their requirement for timely completion and will state that liquidated damages will be assessed unless acceptable justification for delays or time extension can be provided.

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6. A Written Policy Requiring the Inspection of Sidewalks Prior to the Expiration of the Contractor’s One-Year Warranty Should Be Developed

A physical examination of a sample of ten sidewalk projects revealed that five projects had cracked concrete slabs to varying degrees as noted below:

| SIDEWALKS WITH CRACKED SLABS | | |
|------------------------------|--------------------|-------------------------|
| NAME OF PROJECT | FINAL INVOICE DATE | NUMBER OF SLABS CRACKED |
| Powers Dr. 2 | 05/06/04 | 1 |
| Buck Rd. | 11/13/02 | 3 |
| Santa Anita Dr. | 05/13/03 | 8 |
| Arundel Dr. | 08/04/03 | 7 |
| Sarazen Dr. | 10/15/03 | 1 |

Cracks extended across the entire slabs on the Arundel Drive project (as shown). HCD does not have a policy to inspect and document the inspection prior to the one-year expiration date.



Further, there appears to be an ambiguity as to the performance of an inspection prior to the expiration of the one-year warranty period. According to one CEI, they depend on citizens to report any problems with the sidewalks. Since at the time of the auditor’s inspection the warranty period had expired on most of the projects, it could not be determined if some of the cracks had occurred prior to or after the warranty expiration dates. However, cracks could have occurred during the warranty period and were not detected and rectified at the contractors’ expense because inspections were not performed.

We Recommend HCD establishes a written policy requiring the inspection of all sidewalk projects prior to the expiration

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of the warranty period. This inspection should be documented in the project file.

Highway Construction Division's Response:

Management concurs. Underway.

The same process and worksheet described in Item 3 will trigger a request to the project inspector for a re-inspection of a sidewalk project just prior to the end of the one-year warranty period and a written policy will be distributed to all Highway Construction staff. Sidewalks will be evaluated for damage resulting from defects in materials and workmanship and these repairs shall be done by the original contractor at no cost to the County. Damage done by others, not obviously related to defects in materials and workmanship, are outside the scope of the contractor's maintenance warranty and these locations will be forwarded to Roads and Drainage Division for routine maintenance. This process is in place to cover projects that have been completed since June 2004.

7. A Written Policy with Standard Criteria Should Be Developed and Implemented for the Inspection of Sidewalks for Graffiti

Our physical examination of the sidewalk projects also revealed graffiti and other markings in six of the ten projects sampled. These are as follows:

| SIDEWALKS WITH GRAFFITI | | |
|--------------------------------|---------------------------|--------------------------------------|
| NAME OF PROJECT | FINAL INVOICE DATE | NUMBER OF SLABS WITH GRAFFITI |
| Powers Dr. 2 | 05/06/04 | 23 |
| Santa Anita Dr. | 05/13/03 | 36 |
| T.C.I. | 01/26/04 | 7 |
| Arundel Dr. | 08/04/03 | 5 |
| Sarazen Dr. | 10/15/03 | 7 |
| Eggleston | 08/15/04 | 1 |

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There appears to be no consistent standard for the inspection of completed sidewalks prior to final acceptance and payment. Discussions with CEIs revealed that, in some instances, sidewalks with graffiti, except profanity and trip hazards, would be accepted. In other instances, sidewalks with any graffiti and markings, except dog prints, would be rejected. However, in some instances, even sidewalks with dog prints would be rejected. Standard operating practices are to inform contractors that inspectors would not accept work that has bicycle tire tracks, kid's initials, footprints, or other graffiti etched into it during pre-construction meetings. Graffiti not only make the sidewalks unsightly, but also in some instances could be potential trip hazards.



We Recommend HCD develops and implements a written policy with standard criteria for the inspection of sidewalks for graffiti.

Highway Construction Division's Response:

Management concurs. Planned.

Highway Construction will review the graffiti policies of other agencies and form a review committee of inspectors to develop a written policy with standard criteria to be used by all inspectors on all projects. This committee will produce a report of their recommendations.

8. Change Orders Should Be Processed in Compliance with County Policy and Procedures

During our review of change orders, we noted items that should have resulted in a change order were instead

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charged to tasks that had yet to be completed to avoid preparing a change order. For example,

- A) \$91,294 of changed work for the Apopka-Vineland Road was approved by HCD staff and paid for from an unused line item until the change order was submitted and approved by the Board (from seven to fourteen months later.)
- B) On May 14, 2004, a change was approved by HCD staff on the Curry Ford Road project to use reinforced concrete pipes, but instead of processing a change order for the increased cost, HCD instructed the Contractor to include the amount under Pay Item No. 337-7-3 "Asphaltic Concrete (FC-3)." As a result, the Contractor converted the costs and billed for 6,602 Square Yards of FC-3 at \$3.74 per square yard to cover the amount of \$24,692. The pay request was processed and paid by the County. Subsequent to the audit period, a change order was processed and approved for this item on March 24, 2005.
- C) Changed work to build a gravity sewer system for the Orange County Maintenance Facility was approved by HCD on the Forsyth Road project, was completed, billed, and paid in pay request No. 16 dated June 2, 2004, without any change order documentation or approval from PCD. To get payment, the Contractor, with the concurrence of HCD, included the cost of the changed work under Pay Item No. 337-5-2 "Asphaltic Concrete Friction Course (FC-2)." This was represented as 20,962 Square Yards of FC-2 at \$1.50 per square yard for a total amount of \$31,443. The change did not affect the critical path of the project. A change order was subsequently processed and approved on August 2, 2004.

Several other instances similar to the above were also noted during our testing. County policies and procedures assign authority for approving change orders to the Manager of the PCD. Section X, of the Purchasing and Contracts manual states that the Manager of the PCD may authorize change

orders or amendments for construction up to a cumulative amount of five percent (5%) or fifty thousand dollars whichever is higher. Divisions are allowed to proceed with work within these limits without PCD's approval if the work is within the critical path of construction and, if not performed, would delay the overall project. In these situations, the change order paper work must be submitted to PCD for approval within 30 days. Change orders exceeding the fifty thousand or five percent limits must be approved by the Board.

Paying for changed work under unrelated pay items resulted in the overrun of these pay item budgets. Also, additional bookkeeping responsibilities are created for the Contractor and closer monitoring efforts are needed from County personnel. Furthermore, artificially inflating elements of the schedule of values in payment requests may have possibly created a breach of the contract terms.

In discussing this issue with HCD, we were informed that sometimes changed work is authorized to allow the project to continue and avoid delays. However, the work is completed and payment becomes due to the contractor before the change order documents progress through the system. As a result, there is no budgeted amount from which the Contractor can be paid.

An alternative method that could help alleviate any potential delays in payment would be to establish a budget line item for each project with a sum of money for anticipated change orders. This amount could be set by analyzing past projects and considering the complexity of the current project. All cumulative change orders up to the amount of the budgeted amount could be approved by the Division/Department Manager. Documentation of such approvals would still need to be obtained within a reasonable amount of time. Monitoring of this budgeted amount could allow staff to seek additional amounts to replenish the fund as needed.

We Recommend HCD work with the PCD to develop a system to improve the change order approval and payment process. This process should ensure the following:

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- A) All change orders receive the appropriate level of approval prior to authorizing changed work to proceed; and,
- B) Charges for work performed are applied to the proper related pay item.

Highway Construction Division's Response:

Management concurs. A) Planned. B) Completed.

- A) Highway Construction Division will set up a meeting with the Purchasing and Contracts Division to develop a system to improve the change order approval and payment process. We strongly agree with the Auditors' recommendation to establish a contingency line item to provide for anticipated change orders. Note that all examples of change orders outlined in the Auditor's report have been processed at the appropriate levels.
- B) All staff has been informed that charges for work performed must be applied to the proper related pay item.

9. A Two-Phased Bidding/Construction Process or Break Period Should Be Considered for Complex Construction Projects

Coordinating activities of utilities and communications companies at the Forsyth Road construction project was reportedly challenging and difficult for the Contractor due to the untimely completion of various tasks by these entities. From time to time, the Contractor had to seek assistance from HCD with threats that continued delays by these entities could result in the delay of project completion. While assisting to the extent they could, HCD reminded the contractor that coordination of the activities was the Contractor's responsibility.

Article 10 of the Contract's Special Provisions specifies, "During the period of this contract CONTRACTOR shall coordinate all utility relocations and adjustments necessary for project." Also, Article 10 of the Contract's General Conditions specifies,

It is understood and agreed that the Contractor has considered in his bid all of the permanent and temporary utility appurtenances in their present or relocated positions as shown on the plans and that no additional compensation will be allowed for any delays, inconvenience or damage sustained by him to any interference for the said utility appurtenances or the operation of moving them.

Numerous memos, letters, e-mails and minutes of meetings from the Contractor to the County, the Contractor to the utilities, the County to the Contractor, the County to the utilities and within County divisions showed how difficult it was to get these utilities and communications companies to keep up with the construction schedule. As a result, it appeared the Contractor could not begin work of varying scope on schedule. Potentially, this could delay completion of the project. Also, extra effort was needed from the Contractor to keep construction moving. In addition, HCD had to intervene, from time to time, to spur on other entities with their work.

The Forsyth Road project was very complex with multiple plan sets and multiple sets of technical provisions that required extensive relocation of power and communications lines due to the widening of the road from two up to five lanes in some places along a total distance of approximately 2.75 miles. Significant coordination effort was needed as well as cooperation from all ten entities involved in the project. It appeared that some of these companies did not perform their work on schedule. In addition, at times, there appeared to be too many entities working on site causing conflicts with each other.

Splitting the work into two phases could be one option to reduce the congestion and extent of coordination needed.

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This would involve bidding and constructing certain phases of work separately. These could be as follows:

- A) Phase One
 - Clearing and grubbing of the right of way
 - De-mucking
 - Backfill
 - Utilities (Power, telephone, cable) relocations
 - Clearing of right of way by adjacent property owners

- B) Phase Two
 - Water mains
 - Sewer and storm drainage
 - Road and side walk construction
 - Sodding

The design engineers, depending on the complexity of the project, would determine specific activities in each phase. The contractor for each phase may be different or they could be the same. The objective would be to separate critical activities so that all the participating entities are not working on site at the same time.

Another option would be to build into the contract a 90 to 120 days break after the clearing and grubbing during which the contractor would do no work. During this period, the utilities and communications companies would be asked to complete their work. The contractor would then resume his work after the break period without any interference from the utilities and communications company.

Potential benefits of a two phased bidding process or the break period after clearing and grubbing are as follows:

- Reduced problems in coordinating the activities of the contractor, utilities and communications companies;
- Reduced potential delay claims against the County or utilities;

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- Reduced number of activities that need to be monitored by the CEI;
- Less involvement of HCD in the coordination of activities of the various entities; and,
- Less potential idle time for the contractors' employees and equipment.

We Recommend the County considers setting up a committee, including individuals from PCD, Design and HCD, to look into the possibility of using a two-phased bidding/construction process or building a 90 to 120 day break period after clearing and grubbing into road construction contracts for certain projects depending on their complexity.

Highway Construction Division's Response:

Management concurs. Planned.

Highway Construction will organize a review committee within 60 days comprised of representatives from Highway Construction, Public Works Engineering, Purchasing and Contracts Division, a private utility commonly encountered on our projects, a contractor and a design consultant with experience on County projects. The purpose of this committee will be to evaluate the feasibility of the two-phase bidding recommendation or building a 90 to 120 day break period after clearing and grubbing into road construction contracts. This committee will produce a report of their recommendations.

10. Direct Purchases Should Be Implemented for Applicable Acquisitions

The County did not use direct purchases to acquire any materials needed on the three active road construction projects examined. Further inquiries revealed that HCD has never employed the direct purchases method to acquire materials for use on any of its construction projects.

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As an example of the potential savings missed, based upon the prices of one category of materials (Concrete Pipe Culverts

(SS)(CLASS III sizes 15 to 60 inches used on all three projects), the County could have achieved sales tax savings of approximately \$100,000 had they used direct purchases. This is shown in the table below:



| POTENTIAL SALES TAX SAVINGS | | | | |
|-----------------------------|---------------------|--------------------------------------|------------------|------------------------|
| Name | Description | Total paid for Item for Each Project | Tax Savings rate | Sales Tax Savings Lost |
| Curry Ford Road | CPC (SS)(CLASS III) | \$938,108 | | |
| Forsyth Road | CPC (SS)(CLASS III) | 733,751 | | |
| Apopka-Vineland Rd. | CPC (SS)(CLASS III) | 138,274 | | |
| Total | | \$1,810,133 | 6.0%* | \$108,608 |

* - The state of Florida returns a half-cent of the 6.5 cents of sales tax collected within Orange County to Orange County.

Materials for Curry Ford and Forsyth roads were acquired from the same supplier. Other high priced items, such as curb inlets and manholes, which were acquired from the same supplier, could also have been considered for direct purchases. County purchasing policies require the use of direct purchases to acquire high value purchases for large-scale construction contracts.

We Recommend the County implements direct purchases for the acquisition of applicable materials needed for road construction projects.

Highway Construction Division's Response:

Management concurs. Planned.

Highway Construction will organize a review committee within 60 days comprised of representatives from Highway Construction, Public Works Engineering, Purchasing and Contracts Division and Business Development Division to review the feasibility of the direct purchase recommendation. This committee will evaluate the following: impact of price fluctuations, damaged materials, over or underestimates of quantities, changes to specified materials, additional staff required to monitor direct purchases and the impact to the minority participation guidelines. This committee will produce a report of their recommendations.

11. Minutes Should Be Prepared for Owner/Contractor Meetings

The contractors for the Curry Ford Road and Forsyth Road projects are not adequately maintaining owner/contractor meeting minutes. As a matter of good business practices, minutes of meetings should be kept in print form or on a cassette recording. Without written or recorded minutes, there is no reference for decisions reached and instructions given in case of disagreement.

We Recommend HCD requires contractors to prepare written or recorded minutes of all owner/contractor meetings. Copies of minutes should be provided to and retained by HCD.

Highway Construction Division's Response:

Management concurs. Underway.

Contractors are now required to produce minutes for owner/contractor meetings and to provide written copies to the County for our files. This requirement has been added to the Preconstruction Meeting Agenda and minutes and we will ask Purchasing and Contracts to announce this at Prebid Meetings.

12. Construction Diaries Should Be Properly Completed for All Road and Sidewalk Construction Projects

We noted the following from our review of construction daily diaries:

- A) One of three CEIs supervising sidewalk construction projects did not maintain a construction diary for any of his sidewalk projects. This CEI was responsible for sidewalk projects with expenditures totaling approximately \$433,000 during the audit period.
- B) We were unable to verify certain quantities of materials billed by the contractors of Apopka-Vineland and Curry Ford road projects because adequate notations were not made in those construction diaries.
- C) The diary for the completed Hiawassee Road project showed long gaps without entries. For example, no entries were recorded for quantities used during the entire month of May 2001.
- D) The diaries did not provide evidence that certain critical monitoring activities were being performed. For example, there was no notation found in any diary that CEIs were taking the temperature of asphaltic mix during application. When questioned, we were informed that no notation of this monitoring activity is made because it is considered routine. Also, we were informed that on occasions, truckloads of asphalt had to be sent back as the temperature did not meet specifications. However, even in these reported

instances of non-compliance, there was no notation in the diaries.

Standard operating practices require CEIs to note in their construction diaries quantities of materials installed and use this notation as the basis of their review of the Contractor's monthly pay requests. In addition, construction diaries should be used to record construction activities, important decisions affecting a project, instructions given to the contractor, requests to correct deficiencies, disputes and resolutions, start and completion dates, and substantial and final inspections. Also, construction diaries could help demonstrate the level of supervision that the CEI provides to a project.

Without properly completed construction diaries, specific details concerning a project may not be noted, quantities billed by contractors cannot be easily verified; and there may not be any written record that important monitoring activities are being performed by the CEIs. In addition, well-maintained diaries can be very useful in analyzing delay and other claims that may be filed by a contractor.

We Recommend the following:

- A) HCD establishes written policy and procedures requiring all CEIs to complete construction daily diaries for road and sidewalk construction projects and delineating the type of events that should be recorded in the diaries; and,
- B) HCD's management periodically reviews the daily diaries to ensure that they are being completed in accordance with office policy and procedures.

Highway Construction Division's Response:

Management concurs. Planned and underway.

- A) Inspection staff has been instructed that diaries must be maintained on all projects, including sidewalk projects. Within 60 days, a committee will be formed

comprised of the Senior Inspectors and the Highway Construction Manager to formulate a written policy with standard criteria for construction diary content.

- B) Senior Inspectors will review the construction diaries of their staff at regular intervals. Additionally, the Highway Construction Manager will spot check project diaries randomly to ensure compliance.

13. Support Documents for Stored Materials Should Be Reviewed for Adequacy and Accuracy

- A) We noted the following from our review of support documents for stored materials:

- Invoices supporting stored materials on monthly pay requests are not being reviewed for accuracy and adequacy;
- In 3 of 39 (8%) instances there were no detailed inventory listing to support the amounts billed for stored materials; and,
- In no instance was the “Responsibility And Liability For Materials And Equipment Not Included In The Work” form submitted.

Article 19 of the Contract’s General Conditions requires that stored materials on pay requests be supported by (1) a detailed, itemized inventory listing the material stored at site for which payment is requested, (2) documentation to indicate and substantiate the cost or value attributed to the items included in the stored material inventory list, and (3) the County’s “Responsibility And Liability For Materials And Equipment Not Included In The Work” form executed by the contractor. The article further states “Failure to provide proper supporting documentation may subject the Progress Payment application to rejection.”

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- B) A review of invoices supporting stored materials in forty-nine pay requests revealed that twelve invoices totaling \$261,213 had ship-to addresses other than the job site or were items that were picked up directly from the manufacturer/dealer. As a matter of good business practices, all invoices for stored materials for which the County pays should show evidence that the materials were actually delivered to the project site. Invoices with the project site as the ship to address provide some assurance that the materials were on site at the time of billing.

We Recommend the following:

- A) HCD ensures that support documents for stored materials are reviewed by CEIs for completeness; and,
- B) HCD ensures the CEIs review invoices for stored materials for ship-to addresses. In cases where the project site is not the ship-to address, the CEI should verify that the materials were actually on site at the time of billing.

Highway Construction Division's Response:

Management concurs. Underway.

Inspection staff will sign off on the itemized inventory listing attached to the invoice after review and approval of stored material quantities.

If the ship-to address of stored materials is different from the project site, Highway Construction will verify that the materials are on site or secured at an approved site as provided for in Article 19 of the Contract.

14. Appropriate Procedures Should Be Established to Ensure Contract Compliance with Certain Provisions

During our review of certain contract compliance issues, we noted the following:

- A) The Contractors for the Apopka-Vineland and Forsyth Road construction projects do not keep separate annotated as-built plans showing the current progress of work and changes to date at the site offices. Changes are noted by the Professional Surveyor and Mapper (PS&M) on a smaller set of working plans for the Apopka-Vineland project. However, we were informed the Contractor had misplaced the updated pages and they had not been passed on to the Surveyor. At Forsyth Road, the plans maintained were being used routinely in the field and the contractors' offices. The Contract's General conditions, Article 9, specifies

The Contractor will keep one record copy of all specifications, Drawings, Addenda, Change Orders and Shop Drawings at the site in good order, and annotated and/or marked on a current basis to indicate the progress of the work done and to show all changes made during the construction process or conditions varying from the bid documents.

In addition, Part G of the Special Provisions (page G-4) of the contract specifies that "As-built plans shall be used for no other purpose than recording changes, shall be updated at least once weekly, and stored separate and apart from plans used on a routine basis." Without separate sets of as-built plans, the CEIs may not be able to ensure that all changes are being duly noted. In addition, incomplete plans could lead to problems with underground utilities or other conflicts when repairs or new development occurs.

RECOMMENDATIONS FOR IMPROVEMENT



- B) Based upon our investigations, we were not able to determine whether a set of field notes verifying the existing benchmark elevations relative to the two reference benchmarks shown on the construction plans prior to the start of fieldwork were submitted for Orange Avenue. Also, although the contractors for the Apopka-Vineland, Curry Ford and Hiawassee road projects submitted these field notes, they were not signed and sealed by the PS&M. In addition, certified copies of the field notes may not have been submitted, prior to substantial completion by the PS&Ms for Hiawassee Road and Orange Avenue, as these could not be located. Special Provisions, Part G, Article 4 of the contract specifies:

Prior to the beginning of any construction the Contractor shall submit to the County a set of field notes verifying the existing benchmark elevations relative to the two reference benchmarks shown on the construction plans. All submittals shall be signed and sealed by a PS&M registered in the State of Florida.

In addition, Article 4 also requires that, "Prior to substantial completion, Contractor shall submit a copy of the field notes certified by the PS&M to the Project Manager." The lack of field notes on file after the end of construction may delay or impair the County's ability to respond quickly and appropriately to problems that can occur.

We Recommend HCD ensures the following:

- A) Contractors keep separate sets of as-built plans currently annotated and available for review at their site offices at all times;
- B) CEIs for the projects periodically review as-built plans to ensure they are being kept up to date; and,
- C) Appropriate certified and sealed field notes are obtained from Professional Surveyor and Mappers

prior to the start of fieldwork and at the time of substantial completion.

Highway Construction Division's Response:

Management concurs. Underway.

Contractors are required to keep as-built plans updated on a current basis and available for review at their site offices at all times.

Inspection staff periodically reviews the as-built plans to ensure that they are being kept up to date.

Appropriate certified and sealed field notes are obtained from a Professional Surveyor and Mapper prior to beginning construction and at substantial completion.

These procedures have been standard practice for Highway Construction Division. However, in several instances the requested items were unable to be located for the older, completed projects. Additionally, contractors for current projects would often take the as-built plan set out of the office and into the field. We will stress to the contractors that the as-built plan set must remain in the site office. We will also ensure that the original signed and sealed field notes are maintained in Highway Construction's main office, with copies being kept in the field to avoid misplacement of the originals.