

ALASKA STATE LEGISLATURE

LEGISLATIVE BUDGET AND AUDIT COMMITTEE

Division of Legislative Audit



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SUMMARY OF: A Special Report on the Department of Transportation and Public Facilities, Benchmarking, July 28, 2006.

PURPOSE OF THE REPORT

In accordance with Title 24 of the Alaska Statutes and a special request by the Legislative Budget and Audit Committee, we have conducted a review of the Department of Transportation and Public Facilities' (DOTPF) performance on highway construction projects. The objectives were to:

- Identify existing relevant highway construction benchmarks and related data.
- After identifying relevant benchmarks, apply them to DOTPF's highway construction projects. As part of this performance evaluation, we reviewed documentation related to the design, bidding, and construction of selected projects.
- Develop a narrative describing how highway projects are identified, reviewed, approved, funded, and built.

REPORT CONCLUSIONS

We were directed to identify any widely recognized cost and operational "benchmark" standards related to highway construction. After identifying such standards we were to use them to evaluate state highway design and construction operations of DOTPF.

We determined that there were no such benchmark standards in wide use. Since most states maintain highway project cost and performance data in nonstandard formats, no existing data or studies were found which could efficiently and economically provide readily useful information for comparisons. As a result, highway construction efforts were evaluated using various applicable performance objectives from DOTPF's "missions and measures" information prepared for Office of Management and Budget.

For the projects reviewed, we determined DOTPF consistently did a good job of meeting benchmarks aimed at restraining what are typically thought of as overhead costs. However, the projects reviewed had less success when it came to measures reflecting how project costs

were managed during construction. There may be a relationship between the department's good performance at meeting overhead benchmarks and its lesser performance involving management of direct construction costs and bid design.

In addition we concluded that DOTPF's lack of certain design procedures limit opportunities for evaluation and improvement; specifically, decisions were not reviewed or documented. DOTPF also has no formal process in place to incorporate construction experience into the design phase of future projects.

FINDINGS AND RECOMMENDATIONS

1. DOTPF should continue restructuring how it reports performance measurement information.
2. DOTPF should provide more specific guidance regarding records and documentation related to design of highway projects.

There are gaps in the DOTPF design process for highway projects. As a result, projects may not be managed as effectively as could be during the design phase. Specifically, there is little standardization in the recordkeeping requirements for design. This results in key aspects of the design processes, either, not being completed or not adequately documented.

3. DOTPF should develop a formal process to ensure construction experience has more of an effective impact on the design and construction process for future projects.

For the projects reviewed, we saw no evidence where DOTPF was using actual construction experience to perhaps modify design procedures or processes for future projects.

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July 28, 2006

Members of the Legislative Budget
and Audit Committee:

In accordance with the provisions of Title 24 of the Alaska Statutes, the attached report is submitted for your review.

DEPARTMENT OF TRANSPORTATION AND PUBLIC FACILITIES BENCHMARKING

July 28, 2006

Audit Control Number

25-30027-06

The purpose of the audit was to review the State of Alaska, Department of Transportation and Public Facilities' (DOTPF) performance on highway construction projects. The main objectives were to identify and apply existing relevant highway construction benchmarks; and to develop a narrative describing how highway projects are developed.

The audit was conducted in accordance with generally accepted government audit standards. Fieldwork procedures utilized in the course of developing the findings and discussion presented in this report are discussed in the Objectives, Scope, and Methodology.

Pat Davidson, CPA
Legislative Auditor

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OBJECTIVES, SCOPE, AND METHODOLOGY

In accordance with Title 24 of the Alaska Statutes and a special request by the Legislative Budget and Audit Committee, we conducted a review of the State of Alaska, Department of Transportation and Public Facilities' (DOTPF) performance on highway construction projects. The objectives, scope, and methodology of our review were as follows:

Objectives

Specific objectives of this audit were to:

- Identify existing relevant highway construction benchmarks and related data.
- After identifying relevant benchmarks, apply them to selected DOTPF highway construction projects. As part of this performance evaluation, we reviewed documentation related to the design, bidding, and construction of selected projects.
- Develop a narrative describing how highway projects are identified, reviewed, approved, funded, and built.

Scope and Methodology

We tried to locate national benchmarks and related data to apply against DOTPF's highway projects. Extensive research of internet available resources was performed which included, but was not limited to, other state DOT's, Federal DOTPF, and the Federal Highway Administration (FHWA). Interviews were conducted with governmental researchers, and an industry consultant was engaged to assist in identifying and evaluating benchmarks and data for relevance and correlation with DOTPF projects. We determined that no such applicable benchmarks were in wide use.

While searching for national benchmarks, we selected eleven highway projects constructed within the last five years that were relatively simplistic in nature. Our initial intention was to compare DOTPF's benchmark results to constructed projects outside Alaska. However, since most states maintain highway project cost and performance data in non-standard formats, no existing data or studies were found which could efficiently and economically provide readily useful information. As a result, DOTPF's "missions and measures" prepared for the Office of Management and Budget published on June 5, 2005 served as the basis for our benchmarking criteria.

Additional field work included the following:

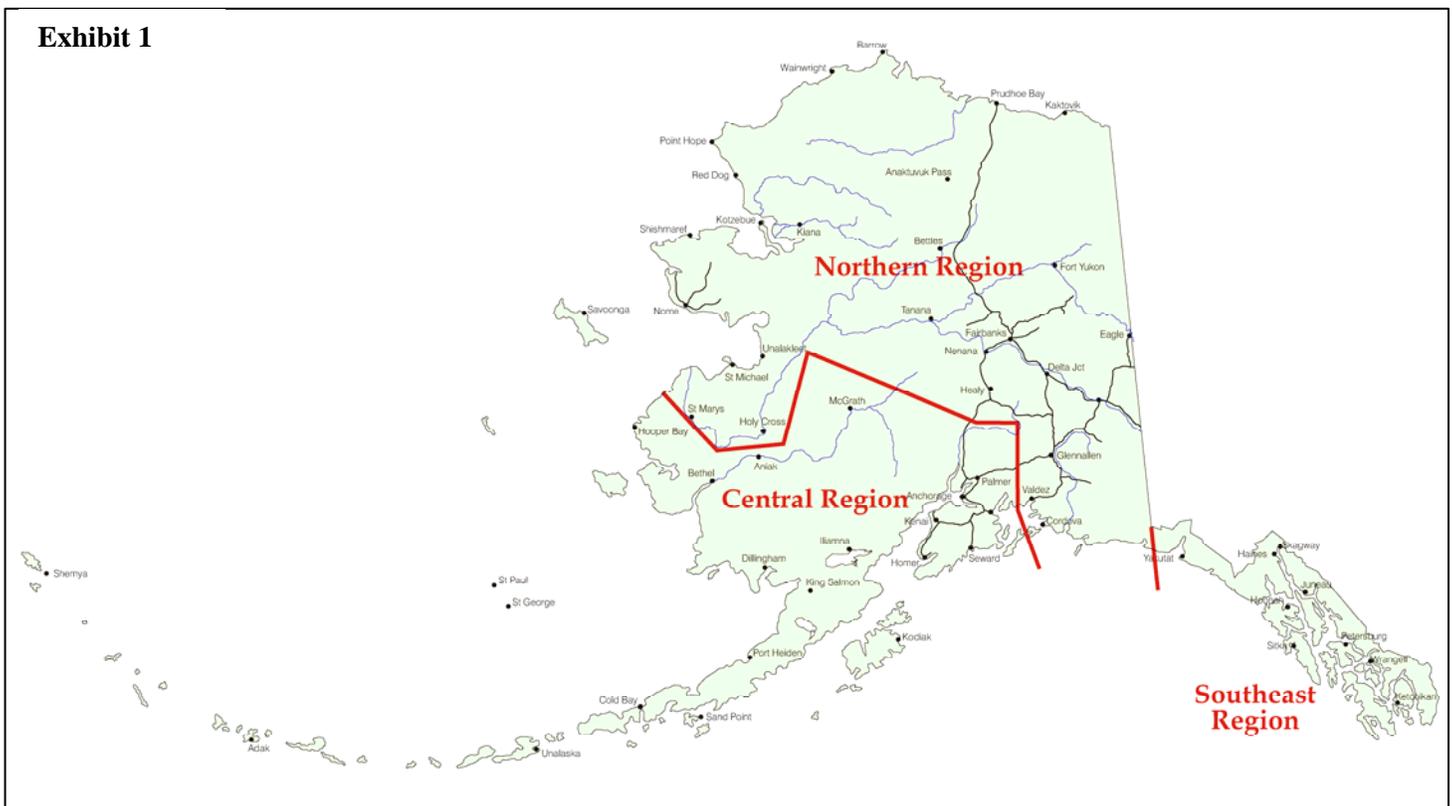
- Review of DOTPF's Preconstruction and Construction Manuals, and applicable policies and procedures
- Examination and analysis of the department's project records, specifically design and construction files
- Interviews with DOTPF and FHWA personnel, and members of the construction industry
- Review and selection of relevant DOTPF's missions and measures
- Calculation of benchmark results using State accounting and project records
- Attendance at FHWA training courses
- Data analysis of the project's estimate, bid, and construction totals

ORGANIZATION AND FUNCTION

The Department of Transportation and Public Facilities (DOTPF) mission is to “provide for the movement of people and goods and the delivery of state services.” Its core services include developing, maintaining, and operating:

- Highways
- Alaska Marine Highway System
- Airports
- Public Facilities
- Ports and Harbors
- State Equipment Fleet

The responsibility for planning, constructing, and maintaining the state highway system is divided into three regions – Northern, Central, and Southeast. See Exhibit 1 below for DOTPF’s regional boundary map. Headquarters provides technical and support services to the regions.



Each region manages highway projects in similarly ways. The regions have sections for planning, design, construction, and project control. The planning section is responsible for determining transportation needs for the geographic area and providing for effective public involvement in the planning process. The design section performs design studies, holds

location and design public hearings, develops cost estimates, negotiates and manages consultant contracts, and provides environmental, hydrological, and geological support. Construction administers construction contracts, provides technical assistance, inspects materials, monitors projects, and assures that contract requirements and federal specifications have been satisfied. Project control coordinates with all other sections to prepare financial documents and supporting data.

BACKGROUND INFORMATION

We were directed to compare the performance of Alaska's Department of Transportation and Public Facilities' (DOTPF) construction of highway projects with other states. Generally, the audit request asked Division of Legislative Audit to determine if DOTPF is operating efficiently and giving Alaskans best value on state highway projects.

As discussed in the Conclusions section, we began this review by trying to locate standard benchmark costs. The intent was to use widely recognized benchmarks as a way to evaluate the cost-effectiveness of highway construction in Alaska. While trying to locate these benchmarks, we also started to select a group of completed highway projects against which we could apply these benchmarks.

Engineers we interviewed, within and outside of DOTPF, consistently tried to emphasize that all projects are unique and it was impossible to compare costs between projects. In particular, we were advised against selecting projects that involved extensive bridge construction or highway overpasses. We selected 11 projects, listed in Exhibit 2 on the following page, which we believed were representative of standard – to the extent the term is applicable – DOTPF highway construction projects. Even though we tried to use similar projects, the per-lane mile cost for the group ranged from just over \$111,000 to almost \$375,000, with an average of just over \$246,000.

The lack of relevant, nationally-recognized, construction benchmarks made it impractical to analyze these 11 projects on that basis. Alternatively, the projects were used as a basis for compiling statistics for the missions and measures performance objectives set out in the department's reporting to the Office of Management and Budget (OMB).

While gaining a general understanding of DOTPF's process and development of construction highway projects, we developed a narrative, presented in Appendix A, of the process most highways must go through in order to be built. The objective of this discussion, in the format set out, was to provide an overall perspective on how projects proceed from first being identified and evaluated to final construction. The discussion makes reference to major administrative, design, study, and construction procedures that the department follows for projects involving federal funding.

Performance measurement is receiving increasing emphasis

In recent years all levels of government have developed an increased interest in quantifying the operations and performance of public agencies. In Alaska, this interest has taken the form of what is termed "missions and measures." On the State's OMB website, missions and measures are explained as a way to assist in answering if the State has spent money on services that produced results or created expected value. The website likens missions and measures to a progress report of the "*return on investment for public dollars spent – the state's equivalent to a 'bottom line.'*"

Exhibit 2

PROJECT INFORMATION

<i>Project Number and Name General Description</i>	<i>Federally Funded with some State Funding</i>	<i>100% State Funded</i>	<i>Number of Construction Seasons to Physically Complete</i>	<i>Total Project Cost</i>	<i>Dollars per Lane Mile</i>
55019 - Talkeetna Spur Road Rehabilitation and resurfaced approximately 14 miles of road that connects to the Parks Hwy and to the town of Talkeetna.	✓		2	\$ 8,963,361	\$312,312
55140 - Mat-Su Roads Rehabilitation and paved approx 32 miles of 24 road sections, mostly gravel surfaces, throughout the Mat-Su Borough.	✓		2	\$ 7,058,968	\$111,200
55579 - Eklutna Lake Road Paved approximately 8 miles of gravel road including the roads and parking lots within the Eklutna Lake Recreation Area.	✓		1	\$ 4,203,556	\$272,604
56571 - Old Glenn Highway (MP 0-11.5) Rehabilitation and repaved approximately 11 miles of road.		✓	1	\$ 3,705,606	\$161,113
61064 - Elliott Highway (MP 28-72) Rehabilitation and paved approximately 42 miles including the intersection of the Elliott and Dalton Highways.	✓		2	\$17,158,068	\$205,191
65052 - Parks Highway (MP 262-288) Rehabilitation and resurfaced approximately 26 miles of the interstate highway.	✓		2	\$15,064,988	\$283,283
65353 - Steese Highway A (MP 35-44) Rehabilitation and resurfaced approximately 8 miles of road.	✓		3	\$ 6,041,007	\$362,171
67034 - Richardson Highway (MP 14-26) Rehabilitation and resurfaced approximately 12 miles of road.	✓		2	\$ 6,537,912	\$281,080
67071 - Steese Highway B (MP 22-35) Rehabilitation and resurfaced approximately 12 miles of road.	✓		3	\$ 4,581,617	\$194,797
68118 - Fish Creek Road Reconstruction and resurfaced approximately 5 miles of road.	✓		3	\$ 1,513,774	\$152,291
68542 - Back Loop Road Rehabilitation and resurfaced approximately 4 miles of road.	✓		1	\$ 2,951,729	\$374,585

Source: Information and costs obtained and calculated from state accounting and project document as of September 2, 2005.

The best performance measures are those that can serve as a useful management tool and also be understood by the general public. Developing such measures is often challenging. A performance measure must be a meaningful reflection of the agency's operations. The measure should also utilize data or information that can be objectively identified and accumulated in a cost-effective way. Measures using esoteric data involving subjective definition may be useful to informed and trained professionals, but would likely hold very little meaning for the general public.

Missions and Measures objectives lend themselves to project-by-project analyses

Efficiency in government is very often seen as a key operational concern. Government managers, like their private sector counterparts, should always strive to get the most they can out of two basic elements – time and money. DOTPF's missions and measures reflect this emphasis.

A central objective involved with developing and tracking operational measures is to provide perspective on how well things are getting done. Measures, based on various operating data, can inform both management and the public about how well a government agency is performing.

For example, one DOTPF measure involves getting out highway bids early in the construction season. DOTPF's objective of wanting to advertise for bids, for at least 75% of available annual highway construction funding by the end of March,¹ reflects concerns about making efficient use of the state's relatively short construction season. The measure reflects the importance of getting funds committed, bids awarded, and projects progressing early in the year. This serves both the general public and the State's highway construction contractor community. This benchmark is easy to measure and understand, and it provides a gauge as to the effectiveness of DOTPF's preconstruction efforts. Getting construction money out on the street early in the construction season helps contractors be more efficient in their planning and mobilization activities.

Other benchmarks reflect management objectives of trying to contain what are considered as "overhead" costs, in addition to measuring how the department is at estimating construction costs in its bidding and contract administration. These overhead cost measures involve:

1. Controlling design costs. DOTPF wants to spend, on average, 15% of a project's funding on design – although as some of our analyses suggests, perhaps spending too little on design may result in eventually higher costs during construction.
2. Limiting administrative and engineering costs. It is the department's objective to limit the costs involved in administrative and engineering expenses to less than 30% of a project's total costs. While this is an important function, it is seen as an overhead cost. There is an

¹In November 2005 the measure to advertise new construction projects by March 31 was changed to April 30th.

ongoing desire to maximize the amount of funding used for construction spending while controlling the related overhead.

3. Controlling construction engineering costs. Construction Engineering (CE) is a subset of the project engineering costs, discussed above in item 2, and is considered as overhead. CE usually reflects the costs involved to supervise the project during the actual construction phase. These supervisors may be either an in-house DOTPF project engineer or private-sector engineering firm employee working under contract. CE may also include costs generated by various groups in DOTPF that may be asked to assist during the construction of the project. These groups may include specialists from traffic engineering, design, materials, or environmental. The measure used by DOTPF for this more specified overhead cost category is 14.5%.

Exhibit 3, on page 10, summarizes how each reviewed project did on these objectives.

Measures aimed at evaluating how well projects are planned involve:

1. Controlling negotiated contractor payments. It is difficult to anticipate all costs and related factors that may be involved in a highway construction project. This objective is intended to track and measure the costs originating with negotiated payments to contractors, rather than costs stemming from competitive bid. Although the definitions and parameters of the payments and costs involved with this measure are not rigorously defined – DOTPF’s objective is to limit such negotiated payment costs to less than 5% of contractor payments.
2. Monitoring and limiting the variance between the contractor’s bid and final payments. If payments made to a contractor differ from the bid amount, it is most likely due to: (a) the quantities of a given item in the original bid being either under- or over-estimated; (b) an item not being included in the original bid, but was necessary to complete the project; (c) the bid item being deleted; (d) changes in scope being made after the contract award; or (e) changed conditions that may not have been reasonably foreseen during design. DOTPF strives to keep this variance to less than 8%. A higher or lower variance may be indicative of inaccurate design work and bid preparation.

Exhibit 4, on page 10, summarizes how each project did on these two objectives.

In addition to the bid timeliness measure discussed earlier, DOTPF uses two other administrative missions and measures objectives. One is to hold formal in-house scoping meetings for projects over \$1 million and the other is to closeout contracts within three months² of the end of the project. Exhibit 5, on page 11, summarizes how each project did on these three administrative objectives.

²The target was changed to closing contracts to within the next fiscal year following the construction completion date.

REPORT CONCLUSIONS

We were directed to identify any widely recognized cost and operational “benchmark” standards related to highway construction. After identifying such standards we were to use them to evaluate state highway design and construction operations of Department of Transportation and Public Facilities (DOTPF).

We determined that there were no such benchmark standards in wide use. Since most states maintain highway project cost and performance data in nonstandard formats, no existing data or studies were found which could efficiently and economically provide readily useful information for comparisons. As a result, highway construction efforts were evaluated using various applicable performance objectives from DOTPF’s “missions and measures” information prepared for Office of Management and Budget (OMB).

DOTPF had eight operational benchmark measures that could be applied to highway projects. In June 2005, most measures did not have any reportable data gathered on a departmental basis. Although the department had identified certain measures, they had not yet developed a reporting system sufficient to generate the information in a consistent, ongoing way.

Using 11 highway projects from across the State, we developed cost and operational data to provide some perspective on DOTPF’s highway design and construction operations. For the 11 projects reviewed, we determined DOTPF consistently did a good job of meeting benchmarks aimed at restraining what are typically thought of as overhead costs. However, the projects reviewed had less success when it came to measures reflecting how project costs were managed during construction. As discussed further in this section, there may be a relationship between the department’s good performance at meeting overhead benchmarks and its lesser performance involving management of direct construction costs and bid design.

DOTPF consistently met two out of three “overhead” cost benchmarks for selected projects

As summarized in Exhibit 3, three benchmarks are aimed at controlling what are generally thought of as indirect or overhead costs related to highway projects.

The first of these benchmarks is aimed at limiting design engineering costs to 15% of total project costs. All selected projects met this benchmark target. This suggests that DOTPF is doing a good job in keeping design phase costs within target.

Costs associated with design changes, made during construction, are not reflected in this benchmark. Work occurring during construction, which was not included in original bid provisions, may be evidenced by high bid to payment ratios. This work may have been more appropriately planned for and addressed in the design phase. Addressing all possible work which may be anticipated in the design phase helps develop better bid estimates and overall project economies.

The second benchmark is to hold administrative and engineering costs to 30% of total project costs. All selected projects met this benchmark target. DOTPF was consistently successful in getting more dollars directly into actual road construction for the projects reviewed.

The third benchmark is to hold construction engineering costs to 14.5% of total contractor payments.

Construction engineering costs are the direct expenditures for administering and overseeing construction. Only five projects met this benchmark. According to DOTPF staff, the reasons for high construction engineering costs were often related to: (1) design work that occurred during the construction phase; (2) the large number of change orders or types of changes that occurred during construction; (3) construction or contract issues requiring more oversight or attention than expected; and (4) consultants being utilized on the projects.³

For most of the projects, DOTPF did not meet benchmarks for direct construction costs

As summarized in Exhibit 4, two benchmarks help evaluate how well highway projects are planned. DOTPF's performance against these benchmarks further reflects the difficulties the department has in dealing with many project changes during the construction phase.

The first benchmark seeks to restrict contract changes, especially those requiring price negotiation, to 5% of the total contract. Only one project reviewed was able to hold

Exhibit 3			
<i>Project Name</i>	<i>Design as % of Project Cost</i>	<i>Administrative and Engineering as % of Project Cost</i>	<i>Construction Engineering % to Contractor Payments</i>
Benchmark Target:	Less than 15%	Less than 30%	Less than 14.5%
Talkeetna Spur Road	8	25	17
Mat-Su Roads	1	23	22
Eklutna Lake Road	3	24	23
Old Glenn Highway	10	27	19
Elliott Highway	1	13	9
Parks Highway	4	15	8
Steese Highway A	8	24	20
Richardson Highway	7	19	11
Steese Highway B	8	24	19
Fish Creek Road	3	15	9
Back Loop Road	2	14	8
# of Projects that made Target:	11	11	5

Source: Results calculated from state accounting and project documents.

Exhibit 4		
<i>Project Name</i>	<i>% of Contractor Payments Determined by Negotiation</i>	<i>Bid and Final Contractor Payments % Difference</i>
Benchmark Target:	Less than 5%	Less than 8%
Talkeetna Spur Road	13	21
Mat-Su Roads	13	14
Eklutna Lake Road	6	(4)
Old Glenn Highway	3	(7)
Elliott Highway	31	18
Parks Highway	7	10
Steese Highway A	10	25
Richardson Highway	32	13
Steese Highway B	31	(2)
Fish Creek Road	47	53
Back Loop Road	20	(0.1)
# of Projects that made Target:	1	4

Source: Results calculated from state accounting and project documents.

³Four of the six projects that missed this benchmark were administered by consultants.

negotiated contractor payments to less than the 5% target. Again, these results reflect a situation where there are inordinate number of changes and additions being made to the project during construction.

The second benchmark is to keep the difference between the contractor’s bid and final payments to 8%. DOTPF met this benchmark for only four of the 11 reviewed projects. Similar to the results of the first benchmark, this suggests significant changes occurred during construction.

DOTPF had mixed success with measures of administrative efficiency

As summarized in Exhibit 5, three benchmark measures evaluate how well projects are being administered.

The first benchmark is aimed at ensuring that projects are well-planned by holding a formal preauthorization scope meeting. The benchmark is designed to improve overall project development efficiency by reaching a consensus on the project scope for projects that exceed \$1 million.

None of the projects selected for review had a formal scoping meeting, because the benchmark was not an operational measure at the time of design.

The second benchmark, as discussed in the background section, is aimed at getting projects advertised to make best use of Alaska’s relatively short construction season and limited number of contractors. DOTPF met this target⁴ for six of the selected projects.

Exhibit 5			
<i>Project Name</i>	<i>Formal Scoping Meeting Held</i>	<i>Project Advertised by March 31st</i>	<i>No. of Months To Contract Closeout</i>
Talkeetna Spur Road	No	No	21
Mat-Su Roads	No	Yes	30+
Eklutna Lake Road	No	Yes	28
Old Glenn Highway	No	Yes	19+
Elliott Highway	No	No	18
Parks Highway	No	No	20+
Steese Highway A	No	Yes	16
Richardson Highway	No	Yes	36
Steese Highway B	No	No	15
Fish Creek Road	No	No	13
Back Loop Road	No	Yes	18
# of Projects that made Target:	0	6	0
<i>Source: Results calculated from state accounting and project documents. + indicates that the contract was not closed as of April 1, 2006.</i>			

The emphasis of the final benchmark objective is to encourage DOTPF to closeout construction contracts in a timely manner. Exhibit 5 also summarizes the number of months it took to close each of the selected project contracts. None of the selected project contracts were closed within 120 days, following completion of construction work. DOTPF has encountered difficulties in closing out construction contracts and the related projects in a

⁴In November 2005 the measure to advertise new construction projects by March 31 was changed to April 30th. This change in target did not change the results when applied to the selected projects.

timely manner. The primary reported causes are staffing issues and contractor delays in submitting required documents.

DOTPF staff explained that the measure had an unrealistic target; thus, the target was changed in November 2005. The target was changed to closing contracts within the next fiscal year following the construction completion date. Five projects met this target when considering the change.

Highway project missions and measures reporting is of limited use

Although DOTPF has recently improved the way it reports performance information, the results for the department's highway projects remain highly aggregated, relatively untimely, and includes unrelated information. These deficiencies limit the usefulness of the performance base information presented on OMB's website and in other documentation.

Financial information, used in reporting operational measures, is collected and summarized at too high of a level to be meaningful. No project-by-project financial data is readily available for public review. Reporting on how specific projects are doing, compared to missions and measures objectives, would be more informative about highway project efforts. Such reporting would allow separation of dissimilar projects, such as airport and runway construction, providing clearer perspective of how highway projects are progressing. Further discussion of our concerns is set out in Recommendation No. 1.

Lack of certain design procedures limit opportunities for evaluation and improvement

From the review of 11 highway projects, recurring operational shortcomings were identified in the design phase of the selected projects. Specifically, we identified the following design phase procedures were not consistently carried out throughout the regions:

1. Decisions not documented. Design engineers do not have a process in place to make sure certain records are retained to the extent required by DOTPF policies. Documents relating to detailed design budgets, timelines, and expenditure reports were not available or routinely retained. In addition, the plans, specifications, and estimate (PS&E) review memorandums were not on file for some projects.
2. Plans-in-Hand (PIH) reviews were not held or documented. DOTPF's highway preconstruction manual requires all projects have a PIH review.⁵ The department's preconstruction manual states that some smaller projects may have the PIH review combined with the PS&E review, if approved by the regional preconstruction engineer.

⁵The Alaska Highway Preconstruction Manual, page 450-14 defines a Plans-in Hand Review as follows:

Plans-in-Hand Review consists of an office review of the 75-percent-completed plans, specifications, and estimate of cost, and a field review of the proposed project site. Its purpose is to ensure conformity with project scope and design standards, verify environmental commitments, review design details and coordinate technical recommendations, assess the cost-effectiveness of project construction, and evaluate the quality of product.

However, the manual does not provide any guidance as to what constitutes a small project.

Of the 11 projects reviewed, three had a PIH review. While it appeared another six projects had a combined PIH and PS&E review, there was no documentation supporting why a combined review was appropriate or that the combined review had been approved by the regional preconstruction engineer. The two remaining projects had no evidence that a PIH review was performed nor combined with a PS&E review.

3. Shelved projects may not be receiving updated reviews prior to bid. A shelved project is one where the design work has been completed, but more than three years have passed without it having gone to bid for construction. This happens sometimes due to a shift in priorities or funding. For three shelved projects included in the review, no evidence was found that the project bid, specifications, and plans had been reviewed or updated prior to going to bid. Failure to update shelved projects prior to bid can lead to: (1) significantly increased costs because of changes in road conditions; (2) availability and costs of materials; and (3) other changes affecting construction.
4. Project planned estimates not consistently reviewed or maintained. DOTPF's highway preconstruction manual requires that engineer's estimates be checked by the design manager. For many of the projects reviewed, there was no evidence where estimates were checked and reviewed. Additionally, there is no guidance in the manual regarding what documents should be maintained to support the engineer's estimate. As a result, the engineer's estimate-calculation documents were not available for some projects, and if available, some documents had no evidence of having been reviewed.

For one project, there was a design computation error for aggregate material. Another project had an incorrect culvert diameter-size in the bid. A third project had an incorrect application rate for hydro-matting in the bid specifications. The supervisory review of estimates is an important control procedure that should be followed and documented to help minimize avoidable errors.

5. Process for determining the most economical method for obtaining construction vehicles is not consistently documented. DOTPF personnel and project consultants use vehicles for various purposes during construction. Vehicles are used for inspecting, administrative, and oversight work. DOTPF often requires contractors bidding on construction projects to obtain and provide these vehicles. The bid specifications typically call for recent model, low-mileage vehicles that prospective contractors must include in their bid. Other times, provisions for vehicles were addressed as "add-on" items during the construction phase of the project.

DOTPF staff asserts this approach is more cost-effective than obtaining vehicles through the State Equipment Fleet. There were often no calculations or other documentation in the bid preparation files where any comparative cost analysis was done. Given the costs involved with the contractor being required to provide vehicles – some documented –

comparative analysis should be done, at least on a periodic basis, before placing such requirements in a project's invitation-to-bid.

See Recommendation No. 2 for further discussion of these design phase issues.

No formal process is in place to incorporate construction experience into the design phase of future projects

The review of the 11 projects, and the analyses of benchmarks, points to recurring changes being made during the construction phase. The frequency and extent of these changes, which resulted in higher costs, stemmed from circumstances that may have been better addressed during the project's design phase.

Although the changes were justified and necessary, the State may not be getting best value. Making changes during construction often involves paying for work on a negotiated basis. Had work items been addressed in the design and bid development phase, costs could possibly have been lower. An important element of the bid process is to provide the competitive price mechanism for construction work.

DOTPF's staff believes that construction experiences are taken into consideration when evaluating possible changes to the way highway projects are developed and built; however, there is no formal process to ensure this routinely occurs.

Exhibit 6						
Project Estimate, Bid, and Actual Cost - Construction Only Including Percent Changes						
<i>Project Name</i>	<i>DOTPF Estimate</i>	<i>Contractor's Bid Amount</i>	<i>Contractor's Actual Cost</i>	<i>Estimate Variance (B-A)/A</i>	<i>Bid to Actual Variance (C-B)/B</i>	<i>Estimate to Actual Cost Variance (C-A)/A</i>
Talkeetna Spur Road	\$4,993,366	\$5,554,525	\$6,713,647	11%	21%	34%
Mat-Su Roads	4,639,741	4,748,746	5,426,157	2%	14%	17%
Eklutna Lake Road	2,568,125	3,214,111	3,091,741	25%	(4%)	20%
Old Glenn Highway	3,542,842	2,853,820	2,656,245	(19%)	(7%)	(25%)
Elliott Highway	13,609,711	12,672,037	14,990,274	(7%)	18%	10%
Parks Highway	14,981,240	11,668,075	12,786,865	(22%)	10%	(15%)
Steese Highway A	3,750,181	3,556,657	4,449,100	(5%)	25%	19%
Richardson Highway	5,518,135	4,686,776	5,299,581	(15%)	13%	(4%)
Steese Highway B	3,768,537	3,538,480	3,456,944	(6%)	(2%)	(8%)
Fish Creek Road	1,112,710	842,823	1,287,082	(24%)	53%	16%
Back Loop Road	2,529,575	2,543,900	2,541,942	1%	(.1%)	.5%

Source: Obtained or calculated from State accounting and project documents.

Appendix B provides a list of change orders issued during construction for each project we reviewed. Also listed is the reason for the change and the associated costs. The change order list suggests recurring themes. More specifically, for the projects reviewed, we often saw:

1. Final quantities and costs not evaluated for improvement. There is little evidence that final project construction quantities and payments are evaluated and compared to planned estimates after a project is complete. Exhibit 6, on the previous page, provides information regarding selected projects' construction estimate, the contractor's bid amount, and the actual construction costs.

Column D in Exhibit 6 is the percent change between DOTPF's construction estimate and the contractor's bid. The variance indicates the extent to which DOTPF's estimates for bid items may not reflect current costs in the market or reflects the extent contractors are bidding items below market.

Column E represents the percent change between the contractor's bid and the actual costs. This variance reflects changes in bid quantities and additions or deletions of work items made during construction.

Column F is the percent change between DOTPF's planned estimates and the contractor's actual costs. This variance reflects the extent that quantity and prices differed from the original estimate, along with additions or deletions of work made during construction.

Exhibit 7 lists examples where there were significant increases in the quantity and the associated total costs of certain bid items. There was little evidence that DOTPF engineers analyzed the reasons for these variance for possible improvement in future design procedures.

Exhibit 7			
Examples of Selected Bid Items Increase in Quantity from Planned			
<i>Project Name</i>	<i>Contract Bid Item</i>	<i>Quantity Increase</i>	<i>Contract Increase</i>
Talkeetna Spur Road	borrow (Mg)	202%	\$371,619
Eklutna Lake Road	standard signs (ft2)	168%	\$29,268
Mat-Su Roads	standard signs (m2)	3,458%	\$103,728
Parks Highway	borrow (ton)	57%	\$628,288
Elliott Highway	guardrail work (meter)	731%	\$346,277
Steese Highway A	borrow (ton)	72%	\$339,673
Back Loop Road	valve box work (ea)	500%	\$6,250
<i>Source: Project documents.</i>			

2. Traffic control cost estimates were often unrealistic.

Flagging, traffic control, and traffic maintenance were contract items that, repeatedly, were substantially higher than DOTPF's estimates. For one project flagging was 347% higher than estimated, while traffic control was six times higher. For another project traffic maintenance was 639% higher than planned. A third project had flagging 125% higher, and traffic maintenance for a fourth project was four times higher than estimated. DOTPF's management reported they experience significant difficulties in estimating optimal and accurate safety requirement costs for the individual projects.

3. Construction experiences are not consistently evaluated for potential improvement in future projects. DOTPF's Construction Manual states "*[t]he project engineer should report on any Design recommendations that have been encountered during the construction of the project.*" Five out of 11 projects reviewed did not have a design recommendation memorandum completed. No projects reviewed held a postmortem meeting⁶ to discuss the issues encountered during construction.

See Recommendation No. 3, for further discussion, regarding the feedback loop between construction and design.

⁶DOTPF refers to postmortem meetings as a coming together of selected stakeholders, including DOTPF project design and construction employees and the contractor, to discuss the issues and problems experienced during construction.

FINDINGS AND RECOMMENDATIONS

Recommendation No. 1

Department of Transportation and Public Facilities (DOTPF) should continue restructuring how it reports performance measurement information.

Currently, using the budgetary missions and measures format, DOTPF publishes departmental performance information through an Office of Management and Budget link on its website. The information, presented, has improved in recent months because the department has broken out some of the measures by region. This segregation of the performance measures, related to highway construction, has improved the usefulness of the agency's reporting. This change addressed, to some extent, a major weakness to DOTPF's missions and measures reporting – aggregation of data across regions of the state.

There are four other weaknesses involved with the department's performance reporting. These weaknesses limit the usefulness and perspective intended to be provided by such reporting. The weaknesses and suggested remedies involve:

1. Timeliness. Construction contracts have not been consistently closed out in a timely manner. This is reflected by the department's lack of success on the benchmark measure which is aimed at closing contracts in a timely manner. Some projects seem to hang "open" almost indefinitely. As a result, various ratios and other collective data might be skewed by performances that do not reflect current operational practices. Although DOTPF has taken considerable steps in the last year to address the timeliness of closing out projects, it should continue to make it a priority and address its close-out procedures ensuring timeliness of benchmark results reflect active operational performance.
2. Combination of dissimilar construction work. Mission and measure statistics combine financial information and data related to two differing types of construction – aviation and highway projects. In addition to increased regional reporting, DOTPF should segregate information by types of construction when reporting performance measures.
3. No project-by-project reporting. DOTPF could significantly improve its communication about its performance to legislators and other members of the public by publishing information on a project-by-project basis.
4. No allocation of design costs for spin-off construction projects. DOTPF does not allocate design costs to spin-off projects. Spin-off projects are those that are usually designed under one "parent" project number then constructed under multiple phases. Each of these phases is given a separate project numbers. However, no design costs are allocated to the spin-off construction projects. If DOTPF continues to move more towards the spin-off project approach, DOTPF should consider developing a separate measure to help evaluate its performance on these projects.

Such changes could serve legislators and other members of the public interested in timely, useful, and informative performance data.

Recommendation No. 2

DOTPF should provide more specific guidance regarding records and documentation related to design of highway projects.

There are gaps in the DOTPF design process for highway projects. As a result, projects may not be managed as effectively as could be during the design phase. Specifically, there is little standardization in the recordkeeping requirements for design. This results in key aspects of the design processes, either, not being completed or not adequately documented.

From our review of 11 highway projects we often could not locate detail design budgets; documentation supporting some estimates; and the supervisory review of estimates. Lack of standardized recordkeeping did not allow us to confirm that DOTPF design engineers were in compliance with departmental policies and procedures or other practices aimed to enhancing the effectiveness of the design process.

DOTPF does not have standard procedures in place to document:

1. That “shelved” project plans, specifications, and estimates have been reviewed and updated prior to proceeding to bid.
2. Review of certain engineering cost estimates to confirm they are reasonable and supported.
3. Consideration of, and action on, comments generated by the PS&E review process.
4. The costs involved in providing vehicles for construction management of the project.

Although retention rules require design records to be kept for a specified time frame, DOTPF has no detailed procedures in place to systematically identify records subject to these requirements. DOTPF also does not have a process in place to ensure required design records are centrally located, in each of the regions, that document compliance with record retention requirements.

DOTPF’s preconstruction manual should be updated to provide specific guidance to help staff come into compliance. Standardizing of recordkeeping and other important procedures will not only help promote compliance with state and federal rules, but will help enhance the efficiency of the design phase. Standardization of recordkeeping also provides invaluable guidance and information to newer employees.

DOTPF should periodically make it a priority to review project design records not only to ensure compliance with state and federal rules, but to foster continuous improvement in its processes.

Recommendation No. 3

DOTPF should develop a formal process to ensure construction experience has more of an effective impact on the design and construction process for future projects.

As reflected in the Conclusions section, past construction experience is not being consistently analyzed for ways to improve the department's design and construction process. The feedback loop, between what happens in the field and how the process could be improved, is not working effectively.

For the projects reviewed, analyses of change orders; comparisons of actual construction totals to design estimates; and, other post-mortem evaluations were either not being done or were not being effectively communicated back to and being integrated into the design process. Additional work and costs were repeatedly being incurred during construction.

DOTPF's Construction Manual states the project engineer should report any design recommendation resulting from construction experience. Our review of projects indicated little emphasis and priority was placed on this activity. In addition, little post mortem activity is conducted on projects to determine if operational improvements could be made.

Evaluating the design engineering planned estimates against contractor actuals along with consideration of change orders may lead to improvements and greater efficiencies by serving as a feedback loop between construction and design activities.

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APPENDICES

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APPENDIX A

The Life Cycle of a Highway Project

Where does the money come from to build highway projects?

Most of the money used to build roads in Alaska comes from the federal government. As a result, much of the process for identifying and selecting which road projects are built is established in federal law and regulation. The procedural steps that must be followed are administered by the Department of Transportation and Public Facilities (DOTPF). Responsibility for administering these procedures has been delegated by the Federal Highway Administration (FHWA) under a formal written responsibility agreement.

Money used for highway projects is appropriated from a federal fund made up primarily of taxes on gasoline. Historically, these federal tax funds have accounted for about 90% of the money spent on state road projects. State and local funds, appropriated by the legislature or local governments, make up the rest of the money. In recent years, with increased revenues to the State's general fund, the number of highway projects funded entirely with state funds has also increased. These projects generally involve a less extensive administrative process, since FHWA procedures do not need to be followed.

How does a new road or highway project get started?

Projects must first be nominated by submitting a form available on the DOTPF website. Nominations come from a variety of sources, such as:

- Individual citizens
- Citizen groups
- Local Governments
- Tribal Governments
- Federal Agencies (such as the Corps of Engineers)
- DOTPF planners

Nominated projects may be added to the State's transportation needs list. The needs list is an extensive listing of all reviewed and approved nominated projects compiled over the years. Before being added to the needs list, all projects are reviewed to make sure they meet certain requirements. Key considerations include constructability- can the project be bid, built, and administered. Another important requirement for some projects is that a local government must be willing to maintain the finished road. If a nominated project passes review, it is placed on the State's needs list.

How do projects move from the needs list to the Statewide Transportation Improvement Plan?

After being placed on the needs list, the next step is inclusion on the Statewide Transportation Improvement Plan (STIP). Projects on the needs list are segregated into various categories. Depending on how a project is categorized, it is subject to a different evaluation process.

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The Life Cycle of a Highway Project

Some proposed projects are classified as being safety improvements. Such projects are made part of the Highway Safety Improvement Program for the state. These projects are not identified individually in the STIP. Projects in this category are evaluated and selected, based on identified safety hazards and cost benefit analysis.

Projects that are categorized as part of the National Highway System or the Alaska Highway System are evaluated internally by DOTPF planners and engineers. Two other categories of projects involving DOTPF planners and management in their scoring and evaluation, also involve members of the general public. Public involvement is part of evaluating transportation projects which are not part of the state or national road systems or for projects related to trail construction or access to trails.

After evaluation, a project may be moved from the needs list onto the STIP. Ranking scores, available funding, and various other factors have an impact on when a project is scheduled in the STIP. Most projects take at least two years, but some may only take six months to move from the needs list to the STIP. Funding listed on the STIP for a project is specific to the various development phases such as predesign, environmental, design, right-of-way, utilities, and construction. Depending on complexity, available funding, and many other factors, projects can stay on the STIP for up to seven years before moving towards preconstruction.

The FHWA requires that the STIP be what is termed financially constrained. This means the estimated costs of all the projects cannot exceed the amount of projected available funds from the FHWA, state, and local sources. Since the amount of projected available funds continually fluctuate, DOTPF planners must continuously balance spending and funding estimates. To achieve balance, sometimes projects are delayed, downsized in scope, or removed from the STIP.

Once a project is on the STIP, what is required to move it into design?

The STIP serves as a basis for DOTPF's legislative funding requests. If projects are not authorized through the appropriation process, they are often rescheduled into future years or dropped from the STIP. Once the necessary funding is authorized by the legislature and approved by FHWA, DOTPF's managers have the authority to begin moving projects into the preconstruction phase.

The preconstruction phase involves public meetings, environmental studies, and the development of plans, specifications, and estimates in order to ready the project for construction. This phase can take as little as six months for less complex projects. More complex projects, requiring an EIS (Environment Impact Statement), may take up to five years or more for preconstruction. In recent years, FHWA has placed increasing emphasis on what is termed "context sensitive design and solutions." The objective of context sensitive design and solutions is to identify and address the full range of impacts a given project may have in the community including assessment of cultural, historic, and other community values.

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The Life Cycle of a Highway Project

DOTPF must first define the scope of the project. Scoping includes defining the problem or improvements of what needs to be done and where. Scoping also addresses issues such as: does the project involve building a new road or the upgrading of an existing road. To help make these decisions, DOTPF often holds public meetings in conjunction with internal departmental scoping meetings. After a project is scoped the department must conduct the appropriate environmental study. The nature and extent of the environmental study varies depending on the location, size, complexity, and projected environmental sensitivity of the affected area.

What does an environmental study involve?

The purpose of the environmental study process is to solicit public comment and to assess the potential impact the highway project will have on a wide-range of social, economic, and natural environment resources. Resources include such things as wildlife, parklands, refuges and wetlands, along with considerations such as historical, archeological, and anthropological concerns. DOTPF has identified 20 potential resource areas that should be considered when studying the impacts of highway projects. The environmental process considers the context of the project and considers alternatives to address the purpose and need of the project within that context.

The nature and scope of the environmental study process is set by requirements of federal law and regulation. The nature and extent of the environmental study process has grown steadily since it was first established by the 1969 National Environmental Policy Act (NEPA). More than 50 pieces of federal legislation, passed over the last 40 years, has steadily expanded the number of resource impacts which must be considered prior to starting any federally-funded highway construction.

Depending on the nature and scope of the project, the environmental study process can take as little as a few weeks to more than five years to complete. Some of the work involved with the study can only be done at certain times of the year. The short Alaska summer generally limits the window for field studies to June through September.

Federal funding requirements limit the type of work that can be done, prior to the completion of the environmental study document. Right-of-way, appraisal, and acquisition work along with the preparation of the final plans, specifications, and estimates cannot start until the FHWA approves the final environmental study document (ED). After approval of the ED, DOTPF receives the authority to proceed with the project.

Besides the environmental study document, what other activities are involved in bringing a highway closer to construction?

After completing the ED, DOTPF also finalizes what is termed a Design Study Report (DSR). An instrumental part of the ED is the consideration of various design alternatives for the project, and the basis that DOTPF used to select the preferred alternative. The DSR fine tunes the

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The Life Cycle of a Highway Project

selected alternative identified in the ED. The DSR also summarizes and documents substantial technical data related to the proposed project.

As part of the development of a project's plans, specifications, and estimates, DOTPF personnel are typically involved in a wide variety of activities such as:

1. Utility Relocation. Staff must negotiate written agreements with utilities such as water and electric companies, and cable television operators, outlining responsibility for relocating utility connections and how the work is to be done.
2. Permitting. Environmental staff must coordinate with various oversight agencies to obtain the necessary permits, specifying "where" and "how" construction work should be carried out. Often these agencies require design changes before granting a permit. Design changes always add money and time to a project.
3. Traffic and Safety. DOTPF staff must coordinate with the project designers to develop traffic signals, signing, striping, highway illumination, guardrail, traffic control plans, and other roadway safety features. Traffic and safety also consults on capacity considerations. A traffic control plan generally outlines how vehicles are to be re-routed and the devices and procedures to be used to guide traffic safely through work zones. More specific, traffic control measures are developed in conjunction with the primary contractor, prior to the beginning of actual construction.
4. Right-of-way. After completion of the ED for a new project, DOTPF must negotiate for and obtain property and property rights necessary for construction. This is less of a factor for projects involving repaving or rehabilitation of existing roads.

As the above activities are being carried out, DOTPF design engineers are developing plans for construction of the approved project. Often this involves collecting data in the field regarding soils, water, terrain, and other topographical factors. When design is about three-fourths complete, the department conducts a plans-in-hand (PIH) review. A similar, more comprehensive review process – termed as a plans, specifications, and estimates review (PS&E) – is also held when the design is more fully developed. For a variety of reasons, including meeting construction schedules, DOTPF often combines the PIH and PS&E reviews.

These review processes draw on a variety of expertise to review and comment on all aspects of the proposed design, including such things as:

1. The construction cost estimate.
2. The impact on capacity and safety.
3. Factors involved with keeping the road functional after it is built.

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The Life Cycle of a Highway Project

4. Comments from local groups or organizations such as municipalities, cities, boroughs, and tribal governments the project may impact.
5. Comments from utility companies who may have their infrastructure affected by the project.
6. Permits needed from local, tribal, state, and federal agencies related to project construction.
7. Comments from any consultants hired by DOTPF for analysis of preconstruction design, constructability review, or prospective project management services.

Project reviewers receive: construction design drawings; cost and quantity estimates; and, plan specifications. Besides DOTPF personnel, project reviewers may include staff from local governments, affected utilities, and other federal/state agencies. All reviewers are requested to submit comments regarding the design prior to attending a review meeting. The engineer responsible for this review considers and responds to all comments. On occasion, a field review is conducted where certain groups of reviewers inspect the project site. The review process typically takes several weeks. Upon completion of this process the design is finalized which, depending on the complexity of the project, could possibly take as much as six months.

Given the number of projects in this preconstruction and design phase at any one time, DOTPF often uses consultants to carry out much of the design work. In DOTPF's Central region, up to two-thirds of the highway projects are handled by contracted design engineers; in the Northern region, about one-third of the projects have their design work contracted out; and, in the Southeast region, a substantial number of the highway projects are designed by consultants.

The critical work product of the preconstruction phase is the bid package, or final invitation to bid (ITB). State law requires that the ITB be advertised for at least 21 days. After bidders submit the required documentation, and the bidding period ends, DOTPF begins the bid tabulation process. This process compares and ranks the bids by lowest, overall dollar amount. The department then issues a notice to the winning bidder – and unsuccessful bidders can file a formal protest for a given period. Upon resolution of any protests or expiration of the protest period, the contract award is made.

What happens during construction?

The selected contractor must complete numerous engineering and administrative tasks, prior to beginning construction work. A critical Environmental Protection Agency requirement is development of the storm water pollution prevention plan. This plan, which must be approved by DOTPF, is important in providing assurance that environmental issues resulting from erosion and sedimentation have been considered and addressed.

Other administrative tasks that must be addressed by the contractor include:

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The Life Cycle of a Highway Project

1. Materials certification list (MCL). A MCL is a listing of all the material certifications required by the contract. Prior to physical construction, the contractor provides the project engineer with a list of all their material suppliers for approval. Additionally, the contractor is required to submit material certifications for approval on the materials used in the project. The approval of material certifications attests that the materials meet contract specifications.
2. Traffic control plan. Although this is typically a cost item in the bid, the contractor must provide traffic control plans specifying how they will carry out their work while safely managing construction and public traffic through the project work site. This is a more detailed plan that builds on the traffic and safety planning efforts outlined during development of the project's plans, specifications, and estimates.
3. Listing of subcontractors and disadvantaged business enterprises (DBE). The prime contractor also must provide a listing of any subcontractors they plan to use on the project. Of particular importance, especially for federally-funded projects, is the use of certified DBEs. A DBE is a for-profit business entity that is at least 51% owned by one or more individuals who fall into federal classifications of being both "socially and economically" disadvantaged.

The central point of control and responsibility for a highway project rests with DOTPF's designated project engineer. The project engineer must make sure the construction activity complies with the plans and specifications, the plethora of federal regulations, good construction practices, and the myriad of permit conditions that may be involved with a given project.

During construction, the contractor's work is monitored. Every pay item set out in the contract involves observation, measurement, test, or verification. DOTPF personnel or supervising engineers conduct quality acceptance tests of base materials and pavement materials used in the construction process. They also inspect installation of items such as guardrails, light poles, and culverts. Quality assurance testing is also conducted to verify the project acceptance testing.

Like every phase of the highway planning, preconstruction, and construction process, the FHWA requirements drive much of the activity. However, the day-to-day construction oversight is the responsibility of DOTPF under the agreement with FHWA. The agreement officially delegates to DOTPF the burden and responsibility of interpreting and applying federal requirements.

The project engineer must deal with complaints and concerns from business owners and residents whose business and property may be disrupted by the construction activity. DOTPF tries to be as responsive as possible to many of these concerns. While dealing formally with the public is not specifically required (as it is during the project identification, selection, and planning phases), DOTPF may hold public meetings during project construction to address unanticipated concerns which may arise.

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The Life Cycle of a Highway Project

Changes to projects during construction are inevitable. Modifications may occur to address field condition changes, operational issues, or public complaints and concerns. Although DOTPF follows the required public notification processes during planning and preconstruction, people often do not respond specifically until they see the project taking shape.

Projects are sometimes delayed due to weather conditions or suspension of work in order to comply with conditions involved with a permit – such as shutting down during weeks of critical salmon spawning. Rain is often an impediment to some construction work – paving contractors cannot effectively apply asphalt during periods of rain. In the more northern climes, freeze-thaw cycles in the spring and fall can be very damaging to roads that are in a “partially constructed” condition. In such situations, work may be suspended on a project until the weather improves.

When most of the work on a project has been completed, the project engineer begins to prepare for the final inspection. DOTPF assesses the status of all significant work items and prepares a “punch list” for the primary contractor.

Often, from the perspective of the public, the project may be considered finished despite an incomplete “punch list.” The road may be drivable, but still require items like signage, seeding, landscaping, and road striping to meet requirements set out in the contract. Germination, establishment of the seeding, and landscaping may require an additional construction season.

Most construction projects span at least two construction seasons. Typically, construction of such projects will begin one spring or summer; continue until first snowfall; resume the next spring; and, effectively finish before the end of the subsequent season. Oftentimes, from the public’s perspective, road construction is complete but the project remains administratively open. Accordingly, some of the expenditures may still be charged to the project related to final inspection costs, costs involved from completing “punch list” items, and final quality assurance reviews.

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APPENDIX B

**PROJECT CHANGE ORDERS AND BID ADJUSTMENTS
REASONS AND ASSOCIATED COSTS**

<u>Project Number and Name, Change Order No. and Description, or Bid Change</u>	<u>Design Change</u>	<u>Work/Item not in Bid</u>	<u>Request for Work</u>	<u>Quality, Quantity, or Type Issue</u>	<u>\$ Amount of Contract Change</u>
55019 - Talkeetna Spur Road					
1: additional clearing work to improve site distance		✓			32,729
2: change boardwalk design to asphalt pathway	✓				(321,179)
3: material adjustment - source change				✓	(19,910)
4: relocate light standard due to pathway design change	✓				9,450
5: modify specs for driveway materials and culverts				✓	-0-
6: pavement change (overlay to a rotor-mill)	✓				308,557
7: add railings due to pathway design change	✓				22,285
8: additional pathway and parking improvements			✓		310,000
9: railroad crossing detour		✓			21,824
10: regrade new pathway to address maint and ops concerns				✓	6,766
11: compensate contractor for prep work on items not used	✓				1,078
12: ditch grading clarification issue (qty and locations)				✓	(21,300)
13: d1 material quantity computation error				✓	78,234
14: added sign work		✓			11,059
15: contract completion date change					-0-
16: out-of-compliance credit for pavement smoothness				✓	(1,000)
17: d1 material spec change regarding measurement				✓	-0-
18: add back item that was deleted in change order #6				✓	1,288
19: modify specs for driveway materials and culverts				✓	-0-
Increase in bid quantity for borrow C material				✓	366,584
Increase in bid total for traffic control items				✓	347,882
Other increases and decreases in bid item estimates				✓	4,774
Total Contract Increase:					\$1,159,121
55140 - Mat-Su Roads					
1: delete work for road that is privately owned				✓	(15,836)
1: culvert size change				✓	66,244
1: pavement repair				✓	6,816
1: additional approach work		✓			53,550
2: change order rescinded					-0-
3: slope stabilization work requested by maint and ops			✓		18,032
4: native sodding work requested by Division of Parks			✓		20,845
5: guardrail changes and additions per traffic and safety staff recommendations			✓		238,327
6: added guardrail per traffic and safety recommendations			✓		90,347
7: added parking markings requested by Division of Parks			✓		2,600
8: address guardrail safety concerns				✓	6,700
Increase in bid quantity for borrow A material				✓	167,497
Increase in bid quantity for standard signs				✓	103,728
Increase in traffic control items				✓	92,723
Decrease in bid quantity for asphalt concrete type II class B				✓	(166,799)
Decrease in bid amount for asphalt price adjustment				✓	(133,230)
Other increases and decreases in bid item estimates				✓	(74,995)
Supplemental Agreement: extend road being paved			✓		200,862
Total Contract Increase:					\$677,411

Source: DOTPF change orders, supplemental agreement, and project documents

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(continued)
PROJECT CHANGE ORDERS AND BID ADJUSTMENTS
REASONS AND ASSOCIATED COSTS

<u>Project Number and Name, Change Order No. and Description, or Bid Change</u>	<u>Design Change</u>	<u>Work/Item not in Bid</u>	<u>Request for Work</u>	<u>Quality, Quantity, or Type Issue</u>	<u>\$ Amount of Contract Change</u>
55579 - Eklutna Lake Road					
1: change in hydro-matting work				✓	(4,288)
2: pavement repair				✓	26,500
2: rigid delineators (snow markers)		✓			13,650
3: address ditch foreslopes due to community concerns				✓	35,863
3: reestablish a turnout due to community concerns				✓	3,186
3: add'l culvert erosion work per request of hydrologist			✓		5,650
Increase in bid total for traffic control items				✓	79,208
Increase in bid quantity for standard signs				✓	29,268
Decrease in bid quantity for borrow A material				✓	(111,270)
Decrease in bid quantity for unclassified excavation				✓	(83,765)
Decrease in bid amount for asphalt price adjustment				✓	(30,974)
Decrease in bid quantity for survey hours				✓	(31,980)
Other increases and decreases in bid item estimates				✓	(53,418)
Total Contract Decrease:					(\$122,370)
56571 - Old Glenn Highway (MP 0-11.5)					
1: steel bridge railing repair work		✓			4,550
2: change the number and scope of driveway work		✓			35,480
3: contractor to supply field lab		✓			2,313
4: decrease materials/work due to a request by design to change the beginning/ending of project stations to accommodate a new intersection for the next project	✓				(49,340)
5: surface tolerance and pavement smoothness specification change per request of the materials engineer				✓	-0-
6: compensate contractor for additional reconditioning of existing pavement that was thicker than planned		✓			35,000
Decrease in bid quantity for unclassified excavation				✓	(155,150)
Decrease in bid quantity for borrow A material				✓	(37,549)
Increase in bid quantity for asphalt concrete type II class B				✓	36,394
Other increases and decreases in bid item estimates				✓	(69,273)
Total Contract Decrease:					(\$197,575)
61064 - Elliott Highway (MP 28-72)					
1: additional vehicles		✓			44,476
2: remote network internet and phones services and equip		✓			11,947
3: pavement design change	✓				202,969
4: added dozer work to address erosion areas		✓			18,845
5: change pipe thickness per hydraulics engineer request				✓	13,800
5: extra surveying work		✓			3,470
6: correct guardrail deficiencies at washout areas		✓			429,145
7: culvert extensions and anchors per hydraulics engineer				✓	25,151
7: change percent passing sieve for ATB				✓	(10,000)
7: replace a vandalized sign not in plans		✓			3,023
8: install weigh scale pad			✓		26,160
8: change type of tack coat material				✓	(3,359)
9: fuel for state vehicles		✓			3,302

Source: DOTPF change orders and project documents

APPENDIX B
(continued)
PROJECT CHANGE ORDERS AND BID ADJUSTMENTS
REASONS AND ASSOCIATED COSTS

<i>Project Number and Name, Change Order No. and Description, or Bid Change</i>	<i>Design Change</i>	<i>Work/Item not in Bid</i>	<i>Request For Work</i>	<i>Quality, Quantity, or Type Issue</i>	<i>\$ Amount of Contract Change</i>
61064 – continued					
9: increase seeding areas					35,033
9: pavement design change	✓				(25,199)
10: down drains and batter board per hydraulics engineer		✓			39,696
11: mechanical clearing work per maint and ops request			✓		412,384
12: update guardrail end treatments		✓			152,178
13: install waterproof membrane per bridge design request			✓		18,650
13: miscellaneous excavation per maint and ops request			✓		18,185
14: install culvert extensions and anchors, assoc w/ CO #7				✓	41,300
15: provide and install control release guardrail terminals		✓			20,916
15: provide and install flexible guardrail markers		✓			3,676
15: ATB bridge transition per bridge design request			✓		3,028
16: extra guardrail end treatment work		✓			45,160
17: change stockpile material type per maint and ops request			✓		-
18: construct asphalt test strip		✓			-0-
18: prepare and pave extra turnouts		✓			22,625
19: change riprap unit to lump sum from contingent sum				✓	(29,131)
19: clean and repair culverts not in plans		✓			6,932
20: construct asphalt curbs on persistent washout areas				✓	4,551
20: repair damaged guardrail terminal		✓			11,304
20: replace damaged guardrail posts		✓			2,529
20: relocate existing bridge rail posts for new railing		✓			5,660
20: replace and repair signs and posts not in plans		✓			13,254
Increase in bid quantity for raising guardrail				✓	346,276
Increase in bid quantity for borrow material				✓	144,281
Increase in bid quantity for watering				✓	113,430
Other increases and decreases in bid item estimates				✓	142,590
Total Contract Increase:					\$2,318,237
65052 –Parks Highway (MP 262-288)					
1: pavement design change proposed by contractor	✓				-0-
2: additional vehicles		✓			70,200
3: reduce excavation work based on maint and ops info			✓		(368,120)
3: added geosynthetic material per geotechnical engineer			✓		36,159
3: increase ABC material to reconstruct shoulder grade		✓			540,819
4: required permanent construction signs		✓			2,500
4: vehicle damage repair				✓	2,254
5: bridge joint and abutment work		✓			9,833
5: barricades with high intensity flashers		✓			4,550
6: modify ditch excavation typical section specification				✓	-0-
6: added dozer work for additional earthwork		✓			15,110
7: upgrade standard signs to current design specifications				✓	47,861
7: delete mc-30 liquid asphalt material not required				✓	(48,300)
8: d1 stockpile material for maintenance and operations			✓		-
9: extra haul costs associated with borrow overrun				✓	66,650
10: fuel for state vehicles		✓			2,418

Source: DOTPF change orders and project documents

APPENDIX B
(continued)
PROJECT CHANGE ORDERS AND BID ADJUSTMENTS
REASONS AND ASSOCIATED COSTS

<i>Project Number and Name, Change Order No. and Description, or Bid Change</i>	<i>Design Change</i>	<i>Work/Item not in Bid</i>	<i>Request for Work</i>	<i>Quality, Quantity, or Type Issue</i>	<i>\$ Amount of Contract Change</i>
65052 - continued					
10: culvert marker posts brass plate engraving work		✓			5,000
10: rumble strips specification adjustment				✓	(1,500)
Increase in bid quantity for borrow				✓	628,288
Increase in bid quantity for w-beam guardrail				✓	72,896
Other increases and decreases in bid item estimates				✓	32,172
Total Contract Increase:					\$1,118,790
65353 – Steese Highway (MP 35-44)					
1: increase plate thickness on the structural steel work				✓	50,000
2: borrow material unit change for specific work				✓	77,370
2: install drive gate restricting public access		✓			3,525
3: design discrepancy caused an overrun on riprap class I material, remaining quantity units changed to a lump sum that includes extra hauling costs				✓	46,450
4: material source change				✓	-0-
5: asphalt surface treatment material change				✓	5,400
6: grade raise work for icing control			✓		99,595
7: establish tourist turnout		✓			18,656
7: additional clearing and grubbing work due to CO #6			✓		3,000
7: borrow material for guardrail widening work		✓			28,050
8: asphalt surface treatment material change, associated with CO #5				✓	(8,751)
9: negotiated price reduction for out of spec d1 material				✓	(4,287)
10: construct asphalt test strip		✓			-0-
10: pavement markings removal work		✓			6,200
11: asphalt price adjustment				✓	(45,000)
12: excavation areas not in plans		✓			25,336
12: asphalt core work		✓			4,125
13: change filter blanket unit cost to lump sum				✓	80
13: change riprap class II material unit cost to lump sum					1,910
14: reestablish water access for resident		✓			5,249
14: install gate restricting public access to material site		✓			5,120
15: miscellaneous removal work		✓			1,329
15: compensate contractor for extra freight for materials		✓			1,677
16: material source reclamation work		✓			11,211
Increase in bid quantity for borrow material				✓	267,433
Increase in bid total for traffic control items				✓	271,301
Other increases and decreases in bid item estimates				✓	17,464
Total Contract Increase:					\$892,443
67034 - Richardson Highway (MP 14-26)					
1: modify field office specification; revise existing monument summary, sub-excavation summary, and the turnout summary				✓	-0-
1: add commercial driveway		✓			707
1: revise guardrail terminal				✓	467

Source: DOTF change orders and project documents

APPENDIX B
(continued)
PROJECT CHANGE ORDERS AND BID ADJUSTMENTS
REASONS AND ASSOCIATED COSTS

<i>Project Number and Name, Change Order No. and Description, or Bid Change</i>	<i>Design Change</i>	<i>Work/Item not in Bid</i>	<i>Request for Work</i>	<i>Quality, Quantity, or Type Issue</i>	<i>\$ Amount of Contract Change</i>
67034 - continued					
2: change prime coat material				✓	(37,310)
2: add standard sign framing for five signs		✓			355
2: replace culvert not in plans		✓			4,984
3: subgrade modification for turnouts and approaches				✓	-
3: guardrail changes				✓	2,577
4: replace planned snow pole delineators to conform with current snow pole design criteria	✓				224,932
5: change sub-excavation work unit cost to lump sum				✓	-0-
6: change in monumentation work per ROW request			✓		27,000
7: additional bridge work		✓			27,817
7: asphalt price adjustment				✓	(36,026)
7: change prime coat material cost to lump sum, associated with CO #2				✓	(4,473)
7: correct planned standard sign				✓	358
7: additional new design snow pole delineators				✓	11,575
8: add magnetic preformed marking tape work for the alternative snow guidance system	✓				417,691
9: eliminate magnets for the snow guidance system and to compensate contractor for magnet work performed	✓				(133,008)
10: upgrade snow pole pads		✓			16,590
11: change traffic control contingent sum cost to lump sum				✓	314,258
Decrease in bid quantity for asphalt cement				✓	(144,161)
Other increases and decreases in bid item estimates				✓	(81,528)
Total Contract Increase:					\$612,805
67071 - Steese Highway (MP 22-35)					
1: change in excavation and placement work				✓	6,241
2: extend planned turnout work	✓				11,746
3: change field office specifications				✓	(938)
4: increase plate thickness on the structural steel work				✓	8,235
5: change dl material unit cost to lump sum				✓	-0-
5: temporarily correct drainage issue work		✓			2,800
6: additional excavation work		✓			47,000
7: construct asphalt test strip		✓			-0-
8: change riprap class II material unit cost to lump sum				✓	6,302
9: added peripheral asphalt work		✓			31,198
9: asphalt core work		✓			1,710
10: asphalt surface treatment material change				✓	37,492
10: bring sign post-bases into compliance		✓			8,354
11: construct ice control berm and trail access		✓			14,570
11: additional unclassified excavation work		✓			10,802

Source: DOTF change orders and project documents

APPENDIX B
(continued)
PROJECT CHANGE ORDERS AND BID ADJUSTMENTS
REASONS AND ASSOCIATED COSTS

<i>Project Number and Name, Change Order No. and Description, or Bid Change</i>	<i>Design Change</i>	<i>Work/Item not in Bid</i>	<i>Request for Work</i>	<i>Quality, Quantity, or Type Issue</i>	<i>\$ Amount of Contract Change</i>
67071- continued					
12: specification change to the asphalt surface treatment, traffic markings, pavement markings, and mob/demob				✓	-0-
13: mainline asphalt paving work unit cost to lump sum				✓	-0-
14: add factory bent guardrail work		✓			3,719
14: extend field office use		✓			2,789
15: change painted markings unit cost to lump sum				✓	1,497
Decrease in bid total for traffic control devices				✓	(187,600)
Other increases and decreases in bid item estimates				✓	(87,453)
Total Contract Decrease:					(\$81,536)
68118 - Fish Creek Road					
1: related to another project in bid					-
2: add'l paving due to the safety improvement project				✓	102,173
3: related to another project					-
4: added asphalt treated base work due to timing issues	✓				432,146
5: additional grade preparation		✓			24,946
6: added sand seal to bridge deck		✓			3,500
6: added shoulder grading work		✓			9,959
6: delete crushed asphalt base course work				✓	(58,000)
Other increases and decreases in bid item estimates				✓	(70,465)
Total Contract Increase:					\$444,259
68542 - Back Loop Road					
1: negotiated asphalt treated base course specification change due to missing aggregate specification				✓	53,988
1: paving under guardrail specification change				✓	17,170
2: related to another project					-
3: bridge concrete curb ramps		✓			1,594
4: css-1asphalt specification change				✓	-0-
5: additional asphalt concrete and cement due to quantity calculation issues for driveways and approaches				✓	61,594
5: asphalt cement credit				✓	(10,349)
Decrease in bid total for traffic control items				✓	(80,999)
Other increases and decreases in bid item estimates				✓	(44,956)
Total Contract Decrease:					(\$1,958)

Source: DOTPF change orders and project documents

STATE OF ALASKA

Office of the Governor

Office of Management and Budget

FRANK H. MURKOWSKI, GOVERNOR

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Pat Davidson, Legislative Auditor
Legislative Budget and Audit Committee
Division of Legislative Audit
P.O. Box 113300
Juneau, AK 99811-3300

Dear Ms. Davidson:

I appreciate this opportunity to comment on the Legislative Audit recommendation addressing Alaska's Missions & Measures (M&M). This program provides Alaska residents with information on the state's goals for the future and reports how well it is doing.

Performance information should provide perspective. Information can be collected and displayed at many levels depending on the purpose and the structure of a performance framework. In addition, when comparing results it is important to know exactly what the benchmarks or targets are designed to test.

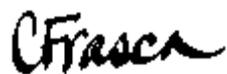
The State M&M web page is designed to provide a high level overview of evidence that will assist the public, stakeholders and management to have enhanced discussions about performance, and provide a sound contribution towards decision-making. In this context, the focus is on presenting key indicators to convey a summary of results in a format that is easy for the lay person to read and comprehend. The project by project detailed reporting recommended by Legislative Audit defeats both of these purposes, particularly when assessing statewide performance. The state framework allows for Web links to detailed data where an agency determines more compelling evidence is needed to draw informed conclusions.

Performance benchmarking is the collection of (generally numerical) performance information and making comparisons with other compatible organizations. As noted in the Legislative Audit report, performance benchmarks from comparable organizations were not available. In lieu of available benchmarks, the State M&M's identify a desired target. In a context of continuous improvement, it is desirable that targets be of a "stretch" nature (i.e. demanding improvement) where possible. Success is indicated by the incremental progress toward achieving the stretch target. Under this perspective, falling short of the target is not necessarily a "failure".

Legislative Auditor
October 23, 2006
Page 2

We appreciate the efforts of Legislative Audit to become familiar with the State's performance framework and hope that the clarifications on perspective and intent provide a lens for future reviews that address performance.

Sincerely,

A handwritten signature in black ink that reads "CFrasca". The letters are cursive and connected, with a prominent "C" at the beginning.

Cheryl Frasca

Director

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OFFICE OF THE COMMISSIONER

October 16, 2006

Pat Davidson, Legislative Auditor
Legislative Budget and Audit Committee
Division of Legislative Audit
P.O. Box 113300
Juneau, AK 99811-3300

Dear Ms. Davidson:

Thank you for allowing me to respond to the findings and recommendations contained in the preliminary audit report, Department of Transportation and Public Facilities, Benchmarking, July 28, 2006. The following are our comments:

Recommendation 1

Department of Transportation and Public Facilities (DOTPF) should continue restructuring how it reports performance measurement information.

1. Timeliness. We agree that the timeliness of closing out projects should continue to be a priority. While close-out activities on some contracts are unduly prolonged, we believe that most are now done within a year of field work completion. Because close-out is primarily an office activity, it is generally reserved to the winter months, so staff can be used on active projects during the construction season. The inconveniences caused by this approach have so far seemed relatively minor in comparison to the efficiencies achieved by not having to hire additional staff. Also, the Statewide Division of Design and Engineering Services in coordination with the three regions is revising the Concurrent Review Policy and Procedure (P&P 05.01.050) which prescribes review procedures and has significant impact on project closeouts. Changes to the P&P are expected to improve the timeliness of project closeouts and should be in effect by calendar year end. Regular meetings are being held in the regions to emphasize closeout of priority projects. In addition, winter training is planned for construction staff that will provide instruction on appropriate record keeping necessary to expedite project closeouts. Also, Central Region is working to establish a full time Engineering Assistant II position to serve as a Public Facilities Office Engineer. This position will focus on eliminating the backlog of projects in the closeout phase and will assist project engineers with required documentation during the course of construction. Central Region is also considering the use of consultants to help get projects ready for final closeout review.

2. Combined Work. We agree that the information would be more useful if facilities, highway and airport projects were reported separately. While some work items are similar, the federal program requirements, work constraints and reporting are different for each program. This likely influences the report data. Future reporting on performance measures will address the programs separately where appropriate.

3. Project by Project Reporting. While much information is available on a project by project basis, our experience to date has been that requests from legislators and the public are for specific purposes and that, usually, the information required is different in each case. Therefore, our responses are custom tailored to the request and the instance.

4. Cost Allocation for Spin-Off Projects. The inability to make detailed allocation of development costs for spin-off projects has at times been inconvenient for Department staff, as well. We expect these kinds of projects will continue to occur, usually in response to an ongoing program such as bridge scour, to construction staging requirements, or to budget and contracting concerns. Taken in aggregate, the data is available, but it may vary by individual project. We are open to, but have yet to identify, a method of separating the costs, in part because issues driving spin-off decisions often occur after the process has already begun.

Recommendation No. 2

DOTPF should provide more specific guidance regarding records and documentation related to design of highway projects.

1. Shelved Projects. The Department plans to revise the Alaska Highway Preconstruction Manual. It will direct project development staff to examine a shelved PS&E assembly prior to final advertisement, to assure the PS&E are still applicable to current conditions (changes on the ground, Right of Way, utilities, and economics of construction).

2. Cost Estimate Reviews. Cost estimates are generated and checked at several stages during development of a project. Some have the checker's signature directly and some indirectly, such as by approval of a larger assembly. Nevertheless, errors occur. We see room for improvement and will revise the Alaska Highway Preconstruction Manual. The current guidance will be strengthened to require signatures by the person preparing the estimate and the manager checking the estimate as a condition of the Authority to Award (ATA) request. Additionally, the guidance will require the signed final estimate be retained as part of the project records.

3. Review Comments. At present, resolution of all plan review comments is required and a resolution memo is part of the package submitted to Contracts for Final PS&E. Copies of all comments and their resolutions are also sent to Construction Section. The Alaska Preconstruction Manual will be revised to require the review resolution memo to be retained as part of the project records.

4. Vehicle Cost. The decision to use contractor provided vs. department provided vehicles is based on job location, transportation costs, availability of department vehicles, and other factors. The Construction Sections make the recommendation to Design, whether or not to include contractor furnished vehicles in the bid. The final bid estimate and conformed contract bid amount document estimated and actual costs for contractor provided vehicles. Department provided vehicles are billed at standard State Equipment Fleet rates. We agree that a comparative cost analysis should be performed, at least occasionally to assure the most cost-effective result. This will be an action item for Construction.

Currently, guidance on records retention is provided in the Records Retention Schedule and in Preconstruction Manual Section 420.4. Details of how the retained records are to be filed are left for the respective regional offices to determine. The Alaska Preconstruction Manual will be revised to identify what records are necessary to complete a design project file.

Recommendation No. 3

DOTPF should develop a formal process to ensure construction experience has more of an effective impact on the design and construction process for future projects.

We are inclined to a different conclusion with respect to the comment that “The feedback loop...is not working effectively,” at least as applied to current operations. While acknowledging there may have been inconsistencies back at the time of the projects selected for review, this is one of the areas where continuing efforts to improve our processes have paid off. Proposed change order work is being discussed with design staff in its formative stages, and copies of executed change orders are provided to design management and staff. Where repetitive changes are occurring, such as providing for nuclear testing equipment storage, standard modifications are developed to update statewide specifications. Similarly, Final Construction Reports include a section on recommendations for designers and are forwarded electronically to design management and staff as they are completed. Also, the original “As-built” plans are kept in Archives where they are readily available to designers and others. Finally, Central Region has developed a formal Post Mortem Review process that has been highly effective in providing feedback to design staff, as well as providing a way to share experiences with construction staff. Through time, the Post Mortem review has become less formal, but is still occurring. On the preparatory side, Construction Section receives all draft Design Study Reports and subsequent plan sets for review, and is provided with copies of the resolution of all reviewers comments. In addition, construction staff is task-assigned to assist with design during the winter season, based on the nature of the work and space available.

We appreciate the efforts of Legislative Audit staff to become familiar with DOT&PF procedures and their independent review and recommendations for improvements to our processes. Framing the report in the context of performance measures is both instructive and useful. If you have any questions, please contact Nancy Slagle at 465-8974.

Sincerely,

Mike Barton
Commissioner

cc: Gary Hogins, Chief Engineer, Division of Design & Engineering Services
Bob Janes, CPA, Internal Review Chief
Gordon Keith, Central Regional Director
John MacKinnon, Deputy Commissioner of Highways and Public Facilities
Malcolm Menzies, Southeast Regional Director
Andrew Niemiec, Northern Regional Director
Nancy Slagle, Director, Division of Administrative Services

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ALASKA STATE LEGISLATURE

LEGISLATIVE BUDGET AND AUDIT COMMITTEE

Division of Legislative Audit



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October 26, 2006

Members of the Legislative Budget
and Audit Committee:

We have reviewed the responses to our preliminary audit from the Department of Transportation and Public Facilities (DOTPF), and the Office of Management and Budget (OMB). Although the responses do not provide us with additional information to reconsider our conclusions or recommendations, the responses warrant further comment.

Recommendation No. 1

In its response, OMB suggests that restructuring missions and measures on project-by-project basis is inconsistent with the overall purpose of such reporting. OMB states that the purpose of missions and measures is to provide a high-level overview about state government performance. We acknowledge the practicality and purpose of presenting performance results at a highly summarized level. However, the public is often interested in individual projects that affect themselves and their communities.

Our nationwide research on benchmarks and performance measures for construction-related activities showed a focus on measuring how those activities directly affected individual citizens. Thus, reporting performance measures at the detail project level may be more useful to individual citizens.

Some of the department's performance measures are developed from project information. To that extent, our recommendation is for the department to structure its reporting of these measures to provide perspective on both the project and the department level. In restructuring

missions and measures reporting so that more project specific information is made available,¹ DOTPF can enhance disclosure and transparency of the highway construction process. The use of measures that report department-level performance is not necessarily incompatible with evaluating performance at the project level.

Recommendation No. 3

In the response from DOTPF, they indicated the feedback loop between design and construction is an area in which they have improved their process. The changes cited in the response reflect a combination of informal practices and select procedures currently set out in the department's construction manual. However, as demonstrated by the results of the projects we reviewed, the informal process of providing feedback between the construction and design groups clearly was not working during the timeframe under review. Informal procedures inherently are more susceptible to inconsistent application than formalized ones.

Recognizing that not all processes have to be formally incorporated into the construction manual to be effective, we suggest that DOTPF monitor the regions' adherence to this new process. The effectiveness of the new process should be seen in various areas including; a reduction in the number and size of change orders and bid estimates being closer to both actual bid prices and quantities used. However, if the effectiveness of the new process is not evident, then DOTPF should consider formalizing the procedures necessary to ensure effective communications between the design and constructions groups.

In summary, we reaffirm the findings and recommendations presented in this report.

Pat Davidson, CPA
Legislative Auditor

¹ To avoid overloading OMB's website with project detail, there could be a link to a DOTPF website or it can provide a link where project information can be obtained.