Cost Containment Analysis & Evaluation for Selected Denali Commission Projects

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Executive Summary

Using a combination of **benchmark costs** and measures to encourage partners to adopt project management best practices, including **best value**, **standard designs** and **bundling of procurement and construction contracts**, we estimate the Denali Commission could reduce the cost of the teacher housing, washeteria, and clinic programs by roughly 10-15% over the next five (5) years, compared to business as usual.

Benchmark Tool

One effective way to contain program costs is to set realistic benchmark costs and require partners to meet them. Along those lines, a **benchmark tool model** has been developed that allows program managers to use cost benchmarks ($ per square foot) that allow for variations in regional cost due to factors that are largely outside of management control – including climate, weather, transportation costs, soil conditions, and import requirements for specialized labor (travel, room, and board). The following table highlights regional target costs that can be considered for implementation.

Table 1: Regional Benchmark Target Costs ($ per square foot)

Region	Housing	Washeterias	Clinics
Aleutian/Pribilof Islands Association	$243	$693	$479
Arctic Slope Native Association	$304	$846	$578
Bristol Bay Area Health Corporation	$235	$675	$468
Maniilaq Association	$296	$828	$566
Metlakatla	$224	$668	$454
Norton Sound Health Corporation	$299	$811	$555
Southeast Regional Health Consortium	$218	$615	$429
Tanana Chiefs Conference	$278	$720	$497
Yukon-Kuskokwim Health Corporation	$275	$792	$543

Source: MAFA, Benchmark Cost Development

The regional benchmark target costs can allow the Denali Commission to make inter and intra-regional comparisons. Furthermore, the benchmarking tool will allow program managers to evaluate a specific project for cost effectiveness and reasonableness of bid.

In recognition that many material costs and construction inputs are at or near historic highs, it may be prudent to periodically update the benchmark costs to capture likely future cost reductions.

To increase the effectiveness of the cost benchmarking tool, the program manager can fine-tune the existing project management information system to **require clear consistent cost reporting from partners** to enable accurate comparisons with benchmarks and facilitate future benchmark cost updates.[1]

Program Management Best Practices

After benchmark costs are set, program managers can encourage partners to adopt a **best value approach** at the conceptual planning and engineering/design phases of project development. The best value approach considers practical alternative solutions using appropriate materials and methods to optimize the life cycle cost of projects while preserving basic value.

Specific Recommendations

- Utilize the above mentioned regional benchmark target costs to establish Commission benchmarks for targeted programs;

[1] Cost reporting between and among agencies and partners remain inconsistent and incomplete. As a result comparisons between benchmarks and cost estimates require detailed line-by-line review in order to verify whether the comparisons are valid. Even then, because a uniform system of accounts has not been established, one often has to go to the actual project invoices to verify what is included in which line in each accounting system. A uniform system of accounts in each program area would greatly improve cost and scope management throughout the project life cycle. In the absence of a uniform system of accounts, a sample of year-end audits to review scope, schedule and cost would make a significant contribution toward a better understanding of cost and scope.

- Utilize the benchmarking tool to evaluate specific projects for cost effectiveness;
- Build upon existing management information systems and standardize cost reporting to ensure accuracy in performance measures;
- Conduct detailed audits of selected projects to evaluate compliance to program design and construction standards and to verify accounting practices of projects;
- Institutionalize and build upon existing best practices in cost containment for targeted programs;
    - Review standard design principles for targeted programs;
    - Establish best value procurement and construction contracts and practices;
    - Improve coordination between different levels of program delivery.

Foreword

This report was prepared as part of an analysis and evaluation of opportunities to improve the cost effective delivery of constructed facilities in rural Alaska. The goal is to ensure the sustainability of investments funded by the Denali Commission and its partners.

Significant cost savings are possible through establishment of clear cost goals for project partners. The Denali Commission and its program managers can emphasize the importance of cost containment by monitoring progress toward the achievement of those cost goals by using a clear concise cost scorecard that measures partner cost performance.

To assist with meeting cost goals, Denali Commission program managers can encourage partners to adopt project and construction management best practices by continuing to strive for standard designs and leverage their value by encouraging the bundling of procurement and construction contracts. Finally, program managers and partners should explore best value design, procurement and construction practices that require competition on performance and price.

NANA Pacific greatly benefited from the substantial assistance and contributions of many organizations and individuals in the course of this study. Respondents helped to ensure that a wide variety of perspectives were considered, and reviewers of individual sections have also contributed to its accuracy and completeness. NANA Pacific would like to thank the primary contributors of this consultation, Mark Foster and Jim Fergusson, for their substantial expertise and effort with this work. In addition, we would also like thank those who served on the expert panel review, including:

- Jay Farmwald, DOWL Engineers;
- John Crittenden, Architects Alaska;
- Jay Lavoie, Estimations Inc.; and
- Dave Cramer, Summit Consulting Services.

These individuals provided their professional expertise from their respective fields, as well as resources and insight into cost containment in rural Alaska. Their opinions and experience with Denali Commission funded projects provides a "real world" construction experience in rural Alaska. Lastly, the value of this exercise is further increased by the willingness of all of the Commission and affiliated partners to participate. In particular, NANA Pacific would like to thank Alaska Housing and Finance Corporation, Village Safe Water, Yukon Kuskokwim Health Corporation, and the Alaska Native Tribal Health Consortium.

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Tables and Figures

1. Introduction

The Denali Commission (Commission) is engaged in the construction of health care infrastructure, teacher housing, and washeteria construction projects throughout Alaska[2]. The Commission has placed a strong emphasis on cost containment with the intent to maximize the results achieved from expenditure of public funds. The Commission's infrastructure sub-committee requested an evaluation, analysis, and review of the overall effectiveness of cost containment strategies[3].

The specific deliverables of the approved task order include the following:

- **Cost Driver Identification.** Identify the factors that drive construction costs in rural Alaska for selected types of projects. This step is an inventory and review of those factors that drive costs for construction projects in rural Alaska, as well as a descriptive inventory of the relevant cost drivers and how these drivers influence project costing.
- **Benchmarking Tool.** The most important cost drivers were selected to develop a benchmarking tool that can be used by the Commission to evaluate individual projects for cost effectiveness. This tool is a programmed Excel spreadsheet that allows Commission staff to estimate a "benchmark" cost for construction projects in rural Alaska.

  The tool uses a series of cost drivers that, when applied to a Southcentral Alaska-based cost estimate will adjust the Southcentral Alaska cost to a regionally identified rural cost. Benchmark tool users are required to input the Southcentral Alaska default cost based on the main design components. The spreadsheet also requires the entry of site-specific information (via checkboxes) that will allow the tool to select the appropriate cost driver to be applied to the appropriate Southcentral Alaska-based cost components. Therefore, the "benchmark" cost estimate is a cost driver

[2] Refer to Appendix B for detailed program descriptions.
[3] Refer to Appendix A for task order.

adjusted Southcentral Alaska cost estimate reflecting unique site conditions of a particular project. This tool produces a "benchmark cost", NOT an engineer cost estimate of the facility. The benchmark would be appropriate for use in evaluating the reasonableness of bids from contractors and in negotiations with contractors by providing an acceptable "range" of cost to the Commission.

- **Evaluation of cost containment strategies.** A panel of rural construction experts was assembled to review Commission and rural construction projects for cost containment strategies for conceptual soundness. A review of the benchmarking model, an evaluation of cost containment strategies from a conceptual perspective, and a prioritized list of the most effective cost containment strategies was undertaken.
- **Training of Commission Staff.** The final step is to train Commission on appropriate use of the benchmarking tool.

NANA Pacific assembled a team of experienced in-house personnel and subcontractors for this project. The project team included Mark A. Foster and Associates (MAFA) and Jim Fergusson and Associates (F&A) as primary subcontractors and were responsible for the majority of the work. The effort was supplemented by the collective expertise of Jay Farmwald with DOWL Engineers, Dave Cramer with Summit Consulting Services, John Crittenden with Architects Alaska, and Jay Lavoie with Estimations, Inc. The work was supplemented with contributions from HMS, Inc and program documents, proposals, and reports from Commission partners.

The team's assessment involved the following explicit methodologies to address the above-mentioned requirements:

- **Operations Research.** Interviews[4] were conducted with Commission program managers, partner program managers, and applicants/sub-recipients. The focus of

[4] Refer to Appendix C for those interviewed.

these interviews was to document cost containment practices, solicit potential cost containment measures and practices, and to collect program/cost information. Research included review of program documents, records, engineering reports, and other documents supplied by the Commission and their partners.

- **Expert Review.** A panel of construction professionals was assembled to review current Commission cost containment practices and evaluate these practices from a conceptual perspective. All of these experts have direct field experience with the implementation of Commission funded projects.
- **Cost Modeling.** The project team developed the benchmark cost model to be used by Commission staff. This model was developed independently from Commission funded projects. The benchmark models for targeted programs are included in the appendix of this document.

2. Review of Cost Containment in Targeted Programs

The following section is provided as a review of existing cost containment strategies in the Commission's teacher housing, washeteria, and health clinic programs as undertaken by the project team.

2.1 Teacher Housing: Applications of Cost Containment

The Teacher Housing Program is implemented by the Alaska Housing and Finance Corporation (AHFC) and uses their existing competitive granting mechanism for project development. The Teacher Housing Program is one of the newer initiatives of the Commission and generally lacks substantially completed projects and relevant cost data points at this time to evaluate the soundness of their cost containment approach.

According to AHFC program managers, the first strategy of cost containment is a competitive review and selection of proposals. The application process is open to a wide variety of applicant organizations (for-profit, school district, housing authority, traditional council, etc.). The existing Commission-funded projects reflect this diversity.

AHFC program managers assess feasibility of a project using life-cycle cash flow analysis and applicant's ability and willingness to carry debt. Using this owner's equity framework, AHFC analyzes the applicant's willingness to limit total development costs. AHFC does a strict review of matching funds and financing before resource commitment. This approach appears to be conceptually sound and is supported by AHFC's expertise and anecdotes.

AHFC limits construction costs on per unit cost[5], not on a cost per square foot. AHFC reviews cost proposals based upon an acceptable range of costs garnered through their experience in housing construction, continually comparing cost data from their project data base. They compare this cost data from their various programs to ascertain an acceptable range of project costs. AHFC does ask for third party review of construction cost estimates as part of the bid.

[5] HUD calculates TDC for Alaska on a statistical representation of projects in Alaska.

Although attempts have been made at procurement and transportation coordination, demonstrable examples of coordination with other entities have not materialized. As mentioned above, these cost containment measures are conceptually sound.

Although program managers were able to discuss applications of cost containment, a specific cost-containment policy framework was not readily available. AHFC did have some historical cost data (TDC, cost per square foot, etc.) dating back to 1998 for projects.

2.2 Health Clinic: Applications of Cost Containment

The Commission works primarily with Alaska Native Tribal Health Consortium (ANTHC) on health clinic construction implementation. Smaller contributions come from the Alaska Area Native Health Service (AANHS) and other direct partners.

The health clinic program has experience with a broad range of cost containment strategies in various regions and types of programs. By several accounts, the first generation of health clinic projects funded by the Commission had a fast-track approach in project implementation. Planning, design, and lead time for procurement were reportedly also fast-tracked. As a result of changes in both the funding and policy environments, and an increase in project costs, ANTHC has previously implemented a series of explicit cost-containment measures. These measures include:

- **Improved Technical Assistance.** Technical assistance for both planning and engineering was initiated to help focus communities on the types of services to be offered, as well as the appropriate design of these facilities for maximum delivery.
- **Regionalization of Projects.** ANTHC has planned construction projects in various regions and employed a "circuit rider" approach with conceptualization, design, and construction. Regionalization also allows for bundling of logistics, transportation, and procurement.
- **Force Account Labor Model.** The force account model has been proposed as a leading strategy for cost containment. Most of the sub-recipient organizations have implemented this approach and have maintained that force accounts increase

productivity and decrease costs. While anecdotes were wide spread about the effectiveness of the force account model, no quantifiable data materialized to support these anecdotes.

- **Improved Lead Times with Procurement.** A new practice in the most recent Memorandum of Understanding (MOU) allows for procurement scheduling up to 18 months in advance to allow for bulk purchases and adequate procurement of transportation. This could alleviate some of the problems with transportation coordination.
- **Value Engineering.** Specific efforts in value engineering have resulted in demonstrable cost savings potential in the clinic's prototype design. Through an engineer's review, clinic construction materials such as telecommunications equipment, reduction in door types used throughout the building, and simplification of alarm systems were identified as opportunities for cost containment and effectively re-engineered.
- **Prototype Design.** The health clinic program has three (3) types of drawings, each corresponding to community's size. While not an explicit requirement, the Commission strongly encourages applicants to use these designs. In terms of an absolute cost containment strategy, questions have come forth as to whether a prototype design has the cost savings potential that its advocates had originally envisioned. Furthermore, the prototype design has not been consistently applied and implemented.
- **Comparison of Costs.** ANTHC compares cost with rural schools and Indian Health Service (IHS) to ascertain whether construction cost estimates are realistic with their health care clinics.
- **Cost Multipliers.** Both ANTHC and AANHS use regional cost multipliers in the preparation of budgets for construction.

Demonstrable progress has occurred on implementation of cost containment strategies into program delivery. ANTHC efforts on the clinic program on cost containment strategies should be highlighted. As in other programs, quantifiable cost data was unavailable to support these

anecdotes. It is suggested to adopt an explicit cost containment policy and measure demonstrable progress through documentation of specific cost savings.

2.3 Washeteria: Applications of Cost Containment

The Commission relies on the Village Safe Water Program (VSW) and ANTHC for the actual implementation of Washeteria projects. Program partners had some initial difficulty citing demonstrable cost containment strategies that have been incorporated into program delivery, citing the reliance on existing institutional policy and procurement practices. Other program actors cited a "duplication of efforts" and limited "coordination" occurring in the field. In addition to the frequent turnover of Commission staff responsible for the washeteria program, an explicit cost containment effort has not been fully realized.

Regardless, cost containment strategies have been considered in program design. Shared mobilization, standard design, and construction readiness were mentioned by program managers as important cost containment strategies. Other cost containment strategies that have been considered in program design include sustainability of operations, efficiency of operations, best-value design, and a strong emphasis on conceptual planning. The washeteria design of Eek, Alaska has been suggested as a possible basis for prototype design.

2.4 Cost Monitoring of Targeted Programs

In terms of monitoring of costs in targeted programs, there appear to be few controls in place to compare costs across all of the targeted programs. Cross-program standards are non-existent, making it difficult to compare both within and across programs. Detailed cost information is not readily available at the partner level and the cost categories are not synchronized across programs and organizations. What is available is sometimes compared to projects in a non-uniform manner, creating distortion.

There is cost data available at the sub-recipient level (YKHC, Norton Sound, Manilaaq), but the format does not allow for effective cost comparisons. Therefore, it is a challenge to

transfer the experience in cost control and management garnered from one project experience to another.

The program manager at the Commission has the lead responsibility for monitoring costs and cost containment. From that point, cost monitoring and control responsibility is passed through the system, from Commission program manager to the partner, to the construction manager, and finally to the community or local partner. The sub-recipient responsible for maintaining records for audit purposes will generally have the most detailed and insightful cost data.

As previously documented, partner accounting systems have changed and are evolving. However, there appears to be limited efforts at standardized reporting procedures. Summit Consulting Services proposed a professional cost monitoring system that could be adapted for Commission use during the expert panel review and is attached in the resource section.

3. Errors in Rural Construction Program Delivery

As in the case of the cost drivers, management and implementation errors drive the costs in rural construction. These observations are made with Commission projects in mind by the assembled expert panel of building professionals.

Discouragement of Innovation in Design

Despite advances in building technology appropriate for rural Alaska, more efforts could be incorporated into innovation in design practices. Basic frame construction on post and pad foundations is encouraged, with no encouragement to look for new ideas of design to overcome rural construction difficulties.

Unclear Expectations of Quality

Existing partner submittal requirements and poor guidance working through existing prototype design have created difficulties and simultaneously driven costs.

Facility Sizing

The importance of properly evaluating community need to ensure properly sized facilities over the long term should be emphasized. Larger projects, while having a smaller $ per square foot, tend to tip the cost scale as opposed to smaller designs.

Funding Guidelines

Not all projects that overrun funding limits are the result of poor management oversight. These issues can be remedied by instituting administrative and managerial controls.

The funding process may start before any detailed information is known about the project by agencies that may not be totally conversant with construction activities in Alaska. Premature cost estimating and ineffective planning may result in cost estimates that are less than the

amount for which the project can reasonably be constructed. During the funding process, Alaska construction savvy personnel are not consulted to review the funding request[6].

Planning and Coordination

Planning and coordination errors have also driven higher costs. Errors of coordination at the various steps of project implementation include:

- Delays in materials arrival on site,
- Improperly mobilizing construction personnel in a timely manner,
- Underestimating the local work force's availability and commitment to the project,
- Problems with vendor representatives,
- Lack of available inspector,
- Failure to require Partner organizations to track in-house utilization rates, and
- Being too risk adverse with respect to decision making and contract clauses.

Mobilization/Demobilization and Logistics

Significant errors also occur in mobilization and demobilization, including underestimating of time and effort, underutilization of local resources, underestimating logistics of performing construction work, effects of weather, and beginning projects at the wrong time of year in Alaska has also been prevalent.

Cultural Sensitivity

When working in these remote communities, it is important to recognize its unique cultural context. Not being aware of and sensitive to the local culture and traditions and how to appropriately plan/coordinate with villagers can increase planning and implementation time horizons.

[6] Refer to Appendix K.

4. Cost Drivers Discussion

Managing rural construction activities requires an underlying understanding of the root causes that increase the costs of these projects. For Commission funded projects, it is important to search for the root causes of cost escalation to effectively measure the performance of partners.

Figure 2: Activity-Based Management Model for Commission Funded Projects

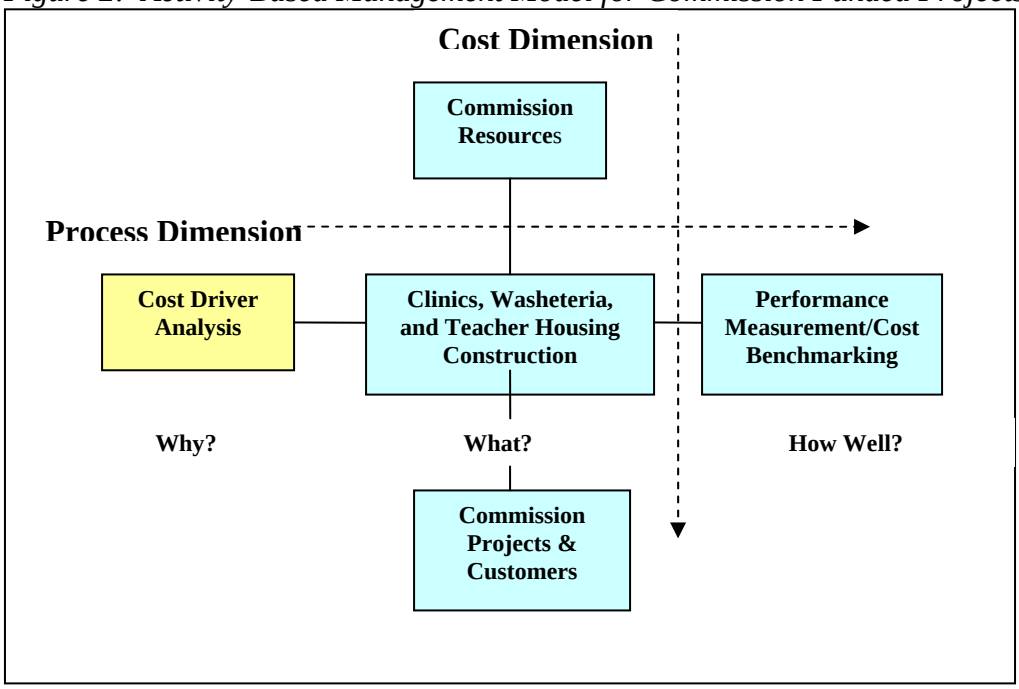

Figure 2 illustrates an activity based management model involving analysis of cost drives and the establishment of performance measures. It is also a precursor of the benchmarking model section of this document. This discussion is the collective result of interviews, observations and experience of the expert panel review, reflecting their direct experience managing Commission funded projects at the project level. The following cost driver analysis is the compilation of the work of all subcontractors and expert panel review and serves as the foundation of the cost models.

4.1 Cost Drivers

Diverging Visions

One of the challenges for building professionals is navigating the many management and administrative layers for each individual project, thus experiencing a divergence of vision. Included in this vision is the need for the facility to meet and have in sight the end user's desires, needs and limitations. A general lack of vision on projects can and has prolonged project planning, design and construction schedules.

Conceptualization, Planning, and Design

The conceptualization and design stage likely exerts the most control over the ultimate cost of a project. Materials used, assembly methods, prefabricated components, standardized component detailing, etc., all figure into ultimate in-place cost. Obtaining fair costs for design services might require a longstanding relationship between contractor and architect/engineer.

Most projects funded by the Commission are relatively small in physical size. (1,000-3,000 SQUARE FOOT in floor area) These projects may contain all the elements of larger projects, making it necessary to absorb the cost of numerous mobilization and demobilization cycles by the various trades involved in the construction.

For example, it may be considerably less expensive to prefabricate the entire structure in components and ship the assembled structure. Alternatively, it may be more time efficient to have the enclosure prefabricated in panels for field assembly. Structural foam panels, for instance, are factory engineered and can be assembled on prepared foundations very quickly.

Choice of Labor in Construction

The methods selected for construction, including locally contracted, force account managed projects, competitive bid, etc., have a direct impact on design decisions. The commitment to utilize local labor resources to the fullest extent possible can mean that certain aspects of the project may require reworking due to the work not being performed by journeymen

craftsmen[7]. The choice of labor in construction in rural Alaska is also a function of labor productivity, prevailing and selection of wage rates (Davis Bacon, Little Davis Bacon, union, institutional salary policy, etc), the use of shift labor, billeting, and skill level. Labor and their respective skill level and training is one of the key cost drivers where program managers can exert control[8].

Market Conditions and Contract Methods

The high volume of construction work throughout the state has lead to the overall reduction in competition, especially with respect to mechanical and electrical subcontractors. Lack of new entrants into the construction field has also lead to an increase in costs by limiting the number of available and competent building industry professionals. Market conditions, such as a competitively bid project in a high demand market and limited supply, low demand for construction services and oversupply, and time and material where the owner takes on risk, are all significant factors that drive costs for Commission funded projects. Time and material[9] may have lower, upfront costs associated with a project, but the owner assumes all risk

Weather Conditions

The choice of when to build and the climatic impact on costs can be significant. Weather impacts labor, equipment, technology, and subcontractors.

Geotechnical Conditions

The type of soil and the appropriate choice of foundation will have a significant impact on project costing. In particular, the use of gravel pad foundation, pile foundation, or triodetic foundation all have different costs can drive costs in projects.

[7] Refer to Appendix K for responses of building industry experts.
[8] Significant variances in the labor costs for the construction of the Mekoryuk clinic in comparison to that of three YKHC clinics was noted. This variance was attributed to the skill level of the supervisor and crews by YKHC program managers in Mekoryuk.
[9] Force account projects may have similar contractual arrangements to time and material projects.

Material Freight Factor

Delivered freight factors and whether the community is accessible via road, ocean barge, or river barge are significant factors in cost differentiation for Commission funded projects. The material freight factor is an explicit component of the cost model.

4.2 Benchmarking Tool Cost Drivers

The project team identified key factors that influence the cost of constructed facilities in rural Alaska. The team developed an independent estimate of the range of cost impact those factors might have on labor, material, equipment, and subcontractors based on regional location assumptions and construction contracting methods[10].

The project team's estimates were supplemented by HMS, Estimations Inc., materials suppliers, program partner agency personnel, rural utility managers and other purchasers of rural service delivery. In the case of freight, regional freight cost multiplier estimates were revised to take into account a sample of direct measures of the total cost to deliver materials and equipment to site based on material and equipment weight, freight rates, and the cost to move the materials and equipment from the barge or plane to the local construction site.
In order to keep the benchmark cost estimates up to date, it is recommended that freight rates be updated annually and that river water depth is verified as this may influence the amount of freight that is sent by barge vs. air.

Based on time and budget constraints, we have excluded several local cost variation considerations from the benchmark costs we developed in the executive summary and leave those specific items to be developed as part of a more comprehensive study or left to individual project negotiations. For example, almost all construction projects require the use of some gravel material. The cost of gravel delivered to the construction site varies considerably from location to location and since a comprehensive survey of gravel costs was beyond the scope of the contract, the model assumes $5/cy gravel.

[10] See Appendix L: Fergusson & Associates Cost Drivers

The following table summarizes the cost drivers and if they were included in the benchmarking tool.

Table 3: Cost Driver Inclusion Summary

#	Cost Driver	Summary	Included in Cost Model
1	Foundation Type	Variances in gravel, pile, triodetic and price of gravel can distort costing.	yes
2	Size of facility	Benchmark quantities and costs based on standard design and size.	yes
3	Number of Units	Unit development scale impacts costing.	no
4	Labor Rate	Differing wage rates cause variances. Model assumes Title 36 wages.	yes
5	Labor Productivity	Shift labor, skill level, travel, and billeting all impact labor productivity.	no
6	Equipment Mobilization	Equipment mobilization for foundation and the need to winterize equipment.	yes
7	Material Freight Factor	Road access, southeast ocean barge, southwest ocean barge, western Alaska ocean barge, western Alaska Ocean Barge, North Slope Ocean barge, YK River Barge, and air freight are all considerations.	yes
8	Climate /Weather	Weather in various regions of Alaska were assessed can influence project costing to a certain degree.	yes
9	Contracting Method/Market Condition	Competitive bid in a high demand market place vs. competitive bid in a low market place, time and material.	no

5. Benchmark Costs

The goal of establishing these benchmark costs is to provide program level managers with a reasonably achievable cost goal to pass down to partners to assist with cost containment and improve the cost effective delivery of service.

A benchmark cost has been developed for teacher housing, washeterias and clinics in each region listed by averaging across high and low cost communities in each region. The benchmark cost model has been constructed to enable a benchmark cost to be developed for individual communities.

5.1 Implementation Considerations

Denali Commission

At the Commissioner level, Commissioners could establish a benchmark cost for each region and review the difference between the regional average and the regional benchmark to monitor cost levels. This would provide Commissioners and partners with a clear concise scorecard that would enable an assessment of performance.

Regional Implementation

At the Commission, a program manager could limit the average cost in a region to the regional average cost benchmark, allowing regional partners to bundle unique local cost circumstances with other projects to meet or beat the benchmark cost. The advantage to this approach is that it is simple and straightforward and places the burden of solving cost containment problems closer to the project implementation level.

Project Level Implementation

Alternatively, the program manager could require that individual projects meet or beat the benchmark cost and take on the potential individual project requests for exceptions to the benchmark cost.

This approach may place additional cost pressure on individual projects and reduce the ability of regions to bundle up their high cost projects with their low cost projects. It requires additional work on the part of the Commission program managers.

Assumption Updates

Given the historically high cost of many parameters (materials, especially structural wood panels, plywood, oriented strand board, structural steel, and the high cost of freight due to high fuel costs) that are incorporated into our baseline material costs this year (2004), we encourage users to consider annual updates and the use of site specific information whenever possible to the model to improve its efficacy.

5.2 Benchmark Methodology

The benchmark costs were developed using the following methodology:

1. Solicit client for identification of benchmark cost effective projects.
    a. Client determined that few, if any, of its in-house projects were suitable candidates due to limited efforts at cost containment and limited exposure of project procurement to competitive forces.
2. Review of contractor database for private sector projects that might be considered suitable candidates for benchmark. A search of over 5,000 projects in the Associated General Contractors database yielded fewer than 12 private sector projects. Limited data was available on private sector projects.
3. In the absence of specific benchmark projects to review for cost performance, select a standard design for facility (teacher housing, washeteria, clinic) and foundations types (gravel pad, pile, triodesic).
    a. Specify exclusions
4. Develop an independent construction cost estimate with a breakdown by labor, material, equipment, and subcontractors for each building and foundation type assuming:
    a. Competitive bid fixed price contract
    b. Anchorage facilities location

5. Supplement independent construction cost estimate to fill in excluded items where additional information was available.
6. Adjust the Anchorage baseline construction cost estimate to take into account variation in the size of the facility (square footage) based on industry standards (RS Means 2004).
7. [HOUSING ONLY] Adjust the square footage adjusted Anchorage baseline construction cost estimate to take into account the number of identical units being built in the same location in the same season (learning curve effect of multiple units) based on actual data from Alaska locations (Alaska Housing Finance Corporation, Total Project Cost, Housing Developments, 1999-2003).
8. Develop cost multipliers/adders to account for reasonable variations in local conditions between Anchorage and rural Alaska locations, including:
    a. Type of foundation appropriate for local soil conditions (gravel pad, pile, triodesic).
    b. Price of gravel delivered to the local community ($/cy).
    c. Average loaded labor rate (wages, fringes, insurance, taxes).
    d. Shift Labor (6 days a week, 10 hours per day) with associated adjustments to take into account:
        i. Reduction in labor productivity for longer shifts
        ii. Overtime pay multiplier
    e. Labor skill level with associated adjustments to productivity (labor crew output per hour) [11]:
        i. Skilled Labor
        ii. Less Skilled Labor
    f. Travel allowance to take into account the number of round trips required for imported supervision and imported labor.
    g. Billeting allowance to take into account the room and board requirements for imported supervision and imported labor.

[11] Please note that the cost adder approach to the clinics and washeterias assumes comparable skill levels and comparable wages to baseline.

h. Pile Equipment Mobilization/Demobilization allowance to take into account mob/demob requirements depending upon whether pile equipment (crane, pile hammer, etc.) is:
    i. Locally available or available by year-round well-maintained road
    ii. Available by ocean barge or nearby (<50 mile) river barge
    iii. Available by distant river barge
    iv. Available by air
i. Material Freight Factor allowance to take into account cost to deliver materials to the local community based upon the following categories[12]:
    i. Year-round well-maintained road
    ii. Southeast Ocean Barge
    iii. Southwest Ocean Barge
    iv. Western Alaska Ocean Barge
    v. North Slope Ocean Barge
    vi. Ocean Barge + River Barge
    vii. Air Freight
j. Weather allowance to take into account the reduction in the productivity of labor and equipment based upon region:
    i. Southeast
    ii. Interior
    iii. Aleutians
    iv. Southwest
    v. Northwest
    vi. North Slope
k. Contracting Risk to take into account variations in profit/risk allowance due to remoteness, logistical challenges, etc.[13].

[12] Please note that the clinics and washeteria cost adder models allow the user to directly enter the freight rates for barge and air freight.
[13] At the request of the client, the profit and contingency allowances were eliminated to reflect current procurement practice where the vast majority of facilities are being constructed by non-profit agencies and

l. Contracting Market Conditions allowance to take into account potential variations in profit/risk allowance due to supply and demand for key construction inputs (supervision, labor, equipment)[14].
   i. High Demand, Limited Supply
   ii. Low Demand, Oversupply

M. Contracting Methods allowance to take into account potential variations in profit/risk allowance due to risk sharing between owner and construction manager[15]:
   iii. Competitive Bid, Fixed Price (risks on construction contractor)
   iv. Time and Material (risks assumed by agency, owners)

9. Assign cost multipliers to individual communities where local information was available or could be reasonably estimated, provide for user adjustment to default values where user needed to investigate local conditions[16].
10. Adjust Anchorage baseline cost (previously adjusted for square footage and number of units in development) to take into account local cost driver assumptions and user provided assumptions (including contract method and contract market conditions).
11. Validate resulting benchmark costs by comparing benchmark cost model results against actual project cost data where actual data is available in sufficient detail to enable comparisons (e.g., taking into account foundations)[17].
12. Adjust Anchorage baseline cost to fill in some previously excluded items.
13. Adjust cost multipliers based on updated information.

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regional health corporations acting as the general contractor using a combination of local force account labor and subcontractors.

[14] At the request of the client, these considerations have not been incorporated into the clinic and washeteria cost models.

[15] At the request of the client, these considerations have not been incorporated into the clinic and washeteria cost models.

[16] Please note that the original scope of work calls for the model user to research local conditions and provide site-specific assumptions. We have conducted limited research on local conditions in order to validate the model. The development of regional benchmark costs should consider a larger sample of sites from within a region in order to provide a statistically robust result.

[17] Please note that limited data and inconsistent and incomplete cost reporting limited validation to a small sample.

14. Review benchmark cost model assumptions, calculations and results with panel of experts.
15. Compare benchmark cost model against detailed independent third party estimates to assist in identifying which cost multipliers may need adjustment to ensure reasonable results.
16. Adjust baseline costs and cost multipliers as appropriate to take into account expert panel comments and additional information to achieve reasonable results

5.3 Basic Facility Estimate

Fergusson and Associates (F&A) started with a standard design for each facility (teacher housing, washeteria, clinic) and foundations types (gravel pad, pile, triodesic) and developed an independent construction cost estimate with a breakdown by labor, material, equipment, and subcontractors for each building and foundation type assuming competitive bid fixed price contract and Anchorage facilities location[18].

The F&A estimates were reviewed and supplemented by MAFA in consultation with F&A in order to fill in costs for some of the excluded items.

F&A updated estimates in response to review comments from expert panel. MAFA made additional adjustments to take into account review comments from expert panel, new information as it became available, and comparisons to current market information.

5.4 Cost Benchmarking Tool Examples

The following sections on teacher housing, washeterias, and clinics provide an overview of an example conceptual cost estimate using the benchmark cost tool for a specific community.

[18] See Appendix K: Fergusson & Associates Final Report: Baseline Assumptions, Exclusions

Teacher Housing[19] - Example

Refer to appendix D for cost model.

Assume a 4-unit teacher housing project to be built in 2004. Each unit will consist of essentially identical 1032 square feet houses with two bedrooms and one full bath and full kitchen, with metal roofing. The units will be built in Bethel, assuming pile foundations. Accepting the default assumptions of:

1. Anchorage baseline construction cost = $201.00[20].
2. Basic wage rate = $46.23 (Title 36 labor rates).
3. Labor productivity will be diminished relative to the baseline due to shift work of 6 days a week, 10 hours a day. This will also incur overtime costs.
4. A locally skilled labor crew is available.
5. A supervisor will be flown in to the job site from Anchorage and will be housed and fed locally during the duration of the project with allowances for return flights.
6. The cost of gravel is $12.63/cy, or 3 times as much as the baseline of $4.21/cy.
7. The pile foundation will require roughly $40,000 of pile equipment (crane and pile hammer and support equipment) mobilization and demobilization.
8. Freight from Anchorage to the job site, including local handling, will cost on the order of 50% of the total cost of materials and will incur equipment mobilization/demobilization costs.
9. Weather delays throughout the project will add up to 30% to the cost of labor and hold time on equipment.
10. The construction market is steady, the overhead and profit allowance for a competitively bid project is on the order of 16% in Bethel.
11. The total construction contract cost plus 10% contingencies is $276.

[19] The housing benchmark cost analysis has been simplified and the housing benchmark costs have been updated to reflect a consistent presentation and methodology with the clinics and washeterias.

[20] Teacher housing contingency remains to take into account variations in design that may arise between regions and between communities.

Clinic - Example

Please see "Clinic_Benchmark_Tool_04a." in appendix F.

Assume a clinic project to be built in 2004. It will consist of a 2500 square feet prototype clinic, and include the basic fixtures, furnishings and equipment in the prototype clinic model plus the community mental health (CMH) module. The facility is built for reliability and durability. The following assumptions are included within the baseline:

1. Anchorage baseline construction cost = $386.
2. Basic wage rate = $46.23 (Title 36 labor rates).
3. Labor productivity will be diminished due to shift work of 6 days a week, 10 hours a day. Overtime will also result in higher per hour costs.
4. A locally skilled labor crew is available for general labor and basic carpentry.
5. Subcontractors will use imported labor to do electrical and mechanical work.
6. Subcontractors will use imported labor to install medical equipment.
7. The cost of gravel is $5cy.

The user must specify the following items to identify items that will change the costs for the specific site relative to the baseline:

1. Climate region:
    a. Climate region will drive floor, foundation, wall and ceiling insulation requirements
    b. Climate will drive heating and ventilation requirements, including sizing of heating units
    c. The user must select from one of five (5) Building Energy Efficiency Standard climate designations[21]
2. Foundation type, select one of the following:
    a. Gravel

[21] See Alaska Housing Finance Corporation for a list of communities and their climate zone.

   b. Pile
3. Fire Sprinkler System, select one of the following:
   a. No
   b. Yes
4. Freight Rates, research and enter site specific information:
   a. Barge Freight (including any transfers from one barge to another, e.g., ocean barge unloading and loading onto river barge).
   b. Air Freight to take into account that due to circumstances beyond the control of managers, including weather, river water depth, etc., some freight may need to be delivered by air.
5. Local rate for room & board, research and enter site specific information.
6. Current rate for round trip airfare between Anchorage and specific rural site.
7. Identify the region within which the site is located:
   a. An estimate for mobilization/demobilization (including equipment) is provided based upon the region.
   b. An estimate of the cost of weather related delays is provided based upon the region.

From these assumptions and user specified assumptions, the spreadsheet sums up the rural cost factors and provides a total cost and total cost per square foot.

Washeteria - Example

Please see "Washeteria_Benchmark_Tool_04a" in appendix E.

Assume a washeteria project to be built in 2004. It will consist of a 1650 square feet building, and include energy efficient, commercial quality equipment, including 10 washers and 10 dryers. The facility is built for reliability and durability and is designed as a stand-alone facility with its own water, septic, and heating fuel storage and dual boilers. The following assumptions are included within the baseline:

1. Anchorage baseline construction cost = $548.
2. Basic wage rate = $46.23 (Title 36 labor rates).

3. Labor productivity will be diminished due to shift work of 6 days a week, 10 hours a day. Overtime will also result in higher per hour costs.
4. A locally skilled labor crew is available for general labor and basic carpentry.
5. Subcontractors will use imported labor to do electrical and mechanical work.
6. Subcontractors will use imported labor to install medical equipment.
7. The cost of gravel is $5cy.

The user must specify the following items to identify items that will change the costs for the specific site relative to the baseline:

1. Climate region:
    a. Climate region will drive floor, foundation, wall and ceiling insulation requirements
    b. Climate will drive heating and ventilation requirements, including sizing of heating units
    c. An allowance for heat tapes are included to provide for freeze protection
    d. The user must select from one of five (5) Building Energy Efficiency Standard climate designations[22]
2. Foundation type, select one of the following:
    a. Gravel
    b. Pile
3. Fire Sprinkler System, select one of the following:
    a. No
    b. Yes
4. Identify whether the water storage tanks and treatment system will be part of the budget that is paid by the Commission or whether it will be paid from other sources. Select the check box if the water storage tanks and treatment system will be included.
5. Freight Rates, the user is required to enter site specific freight rates:

[22] See Alaska Housing Finance Corporation for a list of communities and their climate zone.

   a. Barge Freight (including any transfers from one barge to another, e.g., ocean barge unloading and loading onto river barge).
   b. Air Freight to take into account that due to circumstances beyond the control of managers, including weather, river water depth, etc., some freight may need to be delivered by air.
6. Local rate for room & board, the user is required to enter a site specific rate.
7. Current rate for round trip airfare between Anchorage and specific rural site.
8. Identify the region within which the site is located:
   a. An estimate for mobilization/demobilization (including equipment) is provided based upon the region.
   b. An estimate of the cost of weather related delays is provided based upon the region.

From these assumptions and user specified assumptions, the spreadsheet sums up the rural cost factors and provides a total cost and total cost per square foot.

5.5 Comparison of Benchmark Cost to Actual Costs

Based upon the research into potential benchmark projects, it appears that the Commission and its direct staff do not retain detailed costs. Additional research at the key partner program manager level generated additional detail, but it did not lend itself to comparisons due to inconsistent accounting and insufficient information concerning key cost drivers such as foundation considerations. As a result, very little data has been located that would enable an "apples to apples" comparison between the benchmark cost model and actual project costs.

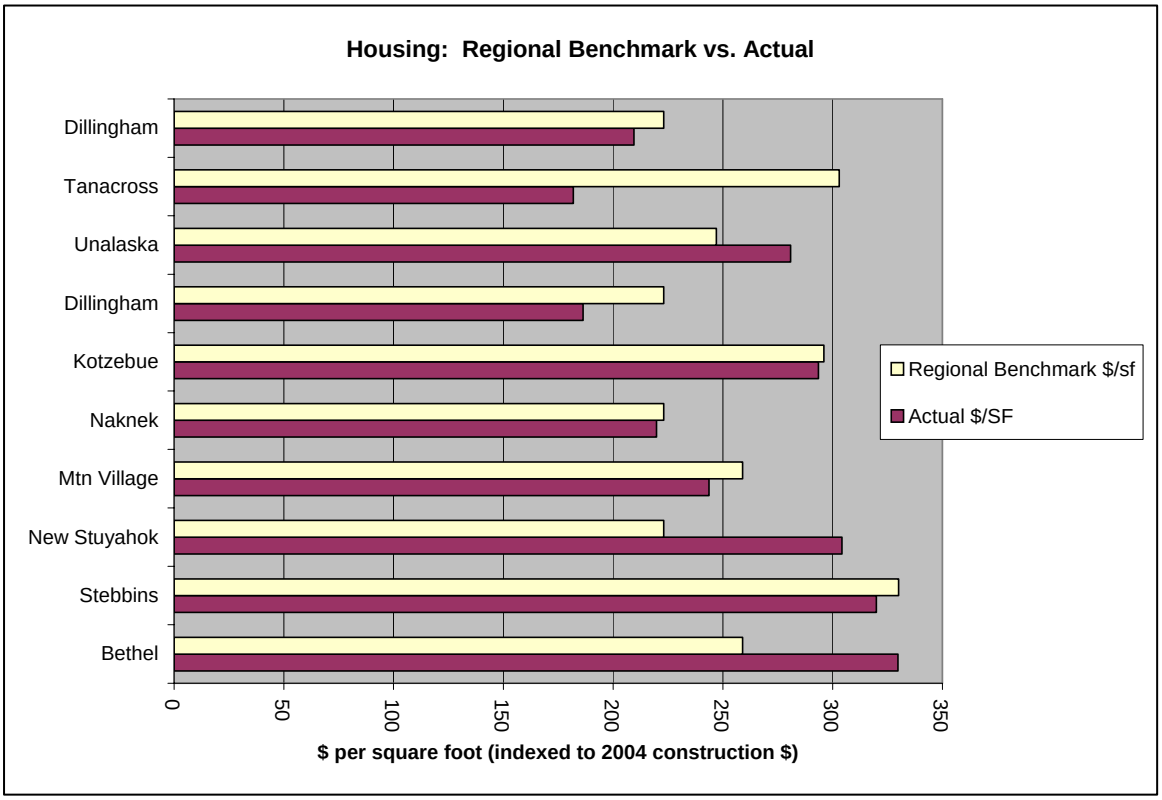
Where limited data has been tracked down and disaggregated, we provide the following preliminary assessment of how the benchmarks compare to actual costs or to other benchmarks.

Teacher Housing

Alaska Housing Finance Corporation does maintain records of project costs that are sufficiently detailed to do an initial reconnaissance level comparison of the benchmark cost model results to actual costs.

The Alaska Housing Finance Corporation costs were adjusted to take into account the difference between material costs during their construction year and current material costs. The net result is presented below. As you can see, some costs exceeded the benchmark cost, while a few projects came in under the benchmark.

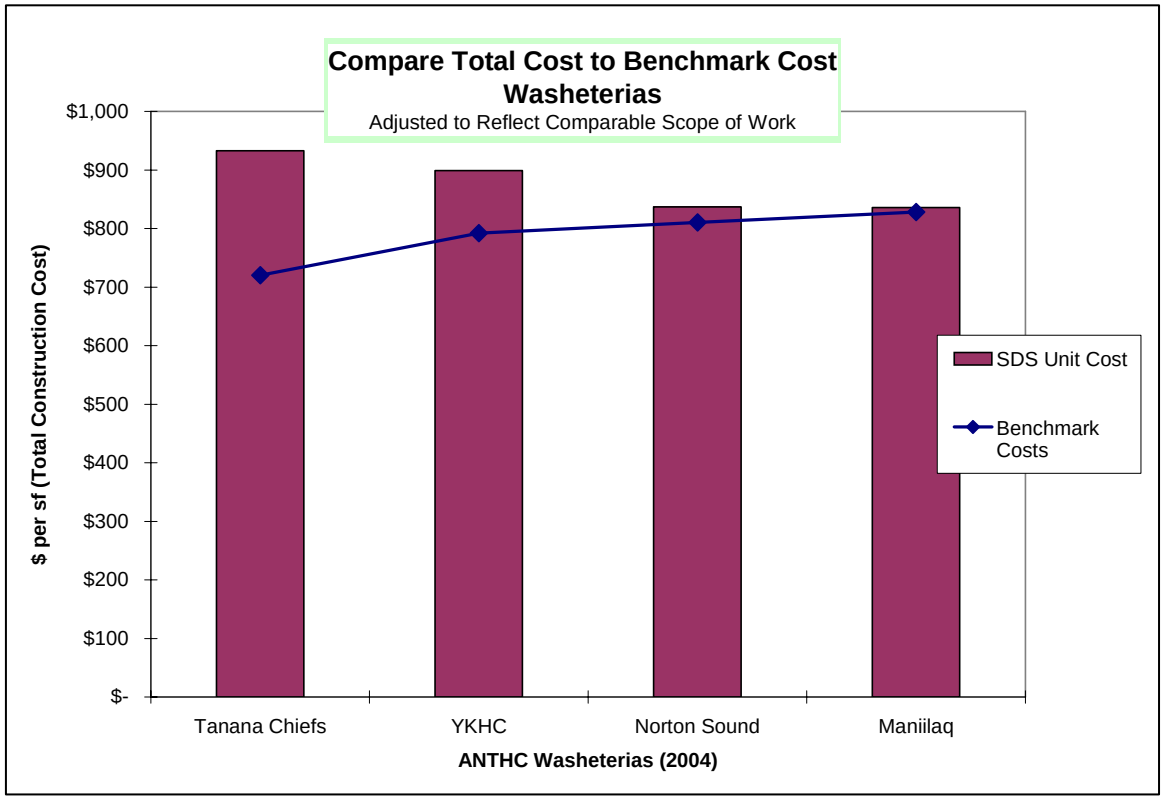
Figure 4: Housing Target Benchmarks



Washeteria

The following chart compares possible benchmark model outputs to the sanitation deficiency unit costs to serve as a foundation for comparison.

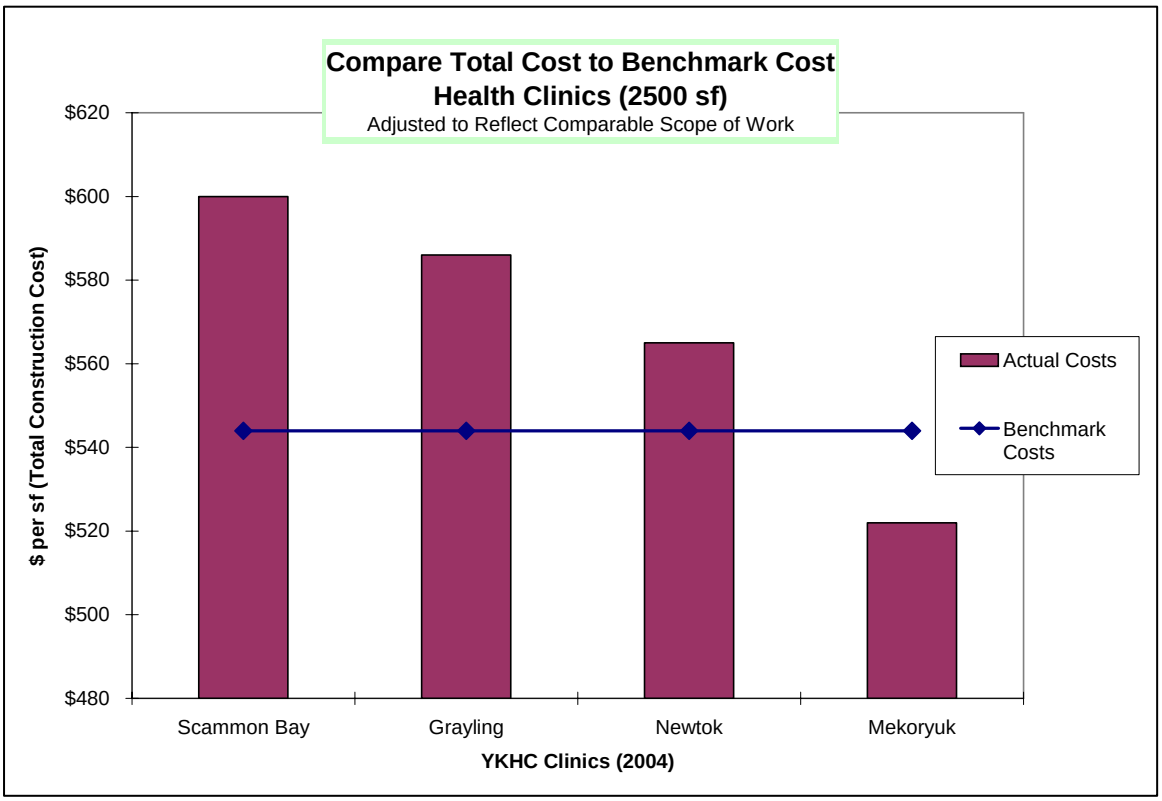
Figure 5: Washeteria Total Cost to Benchmark Target Cost Comparison



Clinic Comparisons

The following comparison illustrates a comparison of clinic cost model outputs and that of YKHC clinics.

Figure 6: Health Clinic Total Cost to Benchmark Cost Comparison



6. Integration of Benchmark Cost with Integrated Cost Containment Strategy

For the savings in a benchmark cost to be fully realized and leveraged, the tools and the policy framework must align in support of the partners. Commission program managers need to encourage their partners to take advantage of program management and project management best practices by focusing their individual project level cost containment efforts by:

- Focusing on the key cost decision points in the Project Life Cycle.
- Implementing a cost focused Project Management Information System.

The following table serves as a summary on an aggregate level measures to improve cost effectiveness of constructed facilities using the project lifecycle framework:

Table 7: Measures to Improve Cost Effectiveness of Constructed Facilities

Project Life Cycle Stages	Cost Drivers	Measures to Improve Cost Effectiveness
Planning	Programming Site Selection Size of facility	Realistic expectations[23] Implementation of a detailed, well-organized project cost control system[24] Benchmark Cost Caps ($ per sq ft)
Conceptual Design	Foundation, site orientation, utilities	Best Value Conceptual Design[25]
Engineering/Design	Choice of materials, methods, crafts	Best Value Engineering/Design[26]
Procurement	Bundling Clarity of requirements	Best Value Procurement[27] Bundle Clear concise requirements
Construction	Location[28] Contract Method Construction Market Conditions	Best Value Contracting[29]
Start-up/Warranty	Quality	Continued focus on best value
Operations and Maintenance	Quality	Continued focus on best value

Source: MAFA

[23] For an example of a program cost approach that sets realistic expectations from the earliest stages of project development, please see State of Alaska, Department of Education, Program Demand Cost Model for Alaskan Schools, 9th Edition. Available at http://www.eed.state.ak.us/Facilities/FacilitiesCIP.html

[24] See for example, State of Alaska, Department of Education, Standard Construction Cost Estimate Format, 2004 Edition for the cost accounting system that provides the foundation for a project cost control system.

[25] Best Value Approach During Conceptual Design: If historical cost data are properly tabulated and the project engineer has acquainted herself with local conditions, alternative comparable cost estimates can be prepared quickly allowing for the early identification of economical alternatives while preserving basic value.

[26] Best Value Approach During Engineering/Design: A well-organized construction manager, who has acquainted themselves with local conditions, with an up-to-date cost tracking system, listing alternative materials and methods, together with cost information and comparisons from previous jobs can quickly identify opportunities to reduce cost and maintain or add value during the engineering and design stage.

[27] Best Value Procurement: Procurement of resources based on *quality and price* to optimize life cycle cost of materials, equipment and associated systems.

[28] See Appendix L (4.3) Cost Drivers.

[29] For a description of best value construction contracting, please see http://construction.asu.edu/busdev/cmcp/cmcp_advconstrmgmt.htm.

6.1 Project Life Cycle Costs

One of the major contributions that a professional project management system can make in controlling cost is to influence the critical early stages of project development by taking full advantage of proven cost effective local planning, local methods, and local expert knowledge of construction.

By focusing on cost effectiveness at the earliest stages of project planning, program managers can help set realistic expectations and impose an early cost discipline that can help contain escalating costs.

Planning and Design

Starting from the top to the bottom, nothing assures the successful completion of a project like good detailed planning. Integral to the process is good evaluations of program need to minimize oversized facilities and the matching of facility size to staffing potential. It is also important to encourage multi-use facilities and shared benefits from operation of activities within the buildings. Finally, it is important for early preparation of comprehensive project cost estimates and detailed construction estimating throughout the design phase.

In the early planning and design phases of a project, the relative expenditures are small compared to the life cycle cost of the project. Planning, engineering and design fees often amount to less than 15% of total construction costs. Similarly, capital costs are often a fraction of the total operations and maintenance costs over the life of a well-maintained facility. Although expenditures during the early phases of the project are small, decisions and commitments made during the early phases have a significant influence on future project expenditures. Decisions during the planning stages concerning:

- what program elements to include,
- where the facility should be located, and
- how large it should be,

can have a tremendous impact on the total project cost.

Panelized, modular construction with snap fittings, and roof panels may want to be considered in program delivery for program areas. This would require multi-project acquisition to allow modular designs to be cost effective. Furthermore, a possible consideration development of a "clinic package" that is fully engineered, with modularized components, with prefabricated elements, with size options, that has all components fully fabricated and ready for delivery. By allowing a single design team to design multiple similar projects, additional cost savings could occur.

Equipment suppliers and contractors have worked with designers in trying to evaluate best value in the design and equipment selection of rural washeterias. Points to be considered in this best-value framework include commercial vs. industrial selection, card operated, coin operated, token operated; and how to incorporate training and technical assistance in program design to decrease lifecycle costs.

An established peer review process and improved inter-agency coordination for the facility engineering is essential. At approximately 65% completion, competent construction personnel should review the design and continues through the project's lifecycle. The development of a checklist for design compliance for all projects which would include completion of a third-party review could improve quality and decrease costs. Finally, it is important to encourage positive regional over-site of construction/operation of washeterias, clinics, and other rural facilities.

Procurement and Construction

By the time construction begins, the remaining influence on project costs may be around 25% of total development costs. This represents the control that construction managers may have on productive use of labor, innovative methods and procurement policies. But the engineer and designer have had a greater influence on construction costs as they have already made decisions about the use of standard methods and materials[30], appropriate sizes, clearances that

[30] For a current example of non-standard designs, methods and materials that are leading to cost escalation and delays, see University of Alaska Fairbanks Museum Expansion Project.

may or may not allow ample room for construction, and the need for imported specialty craft labor.

There are many opportunities to save costs through effective procurement practices. A sampling of these procurement practices include:

- Establish a well-developed and structured procurement system that tracks material purchase activities from the requisition to the receiving report.
- Encourage competitive procurement of construction services as appropriate.
- Complete, thorough material takeoffs that are reviewed by both project managers and field personnel.
- Procurement of design and other professional support services via qualifications based selection process.
- Explore the feasibility of a Partner Consortium for procurement. This would develop relationships and special rates with a preferred list of vendors by exploiting the advantages associated with group purchasing and relationship based procurement practices.

Construction

Similarly, decisions made during construction can greatly impact the operation, maintenance and management costs of a facility[31].

At each stage of project development, there are opportunities to institute cost controls with the goal of maintaining value while seeking cost effective means of achieving the goals of the funding agency.

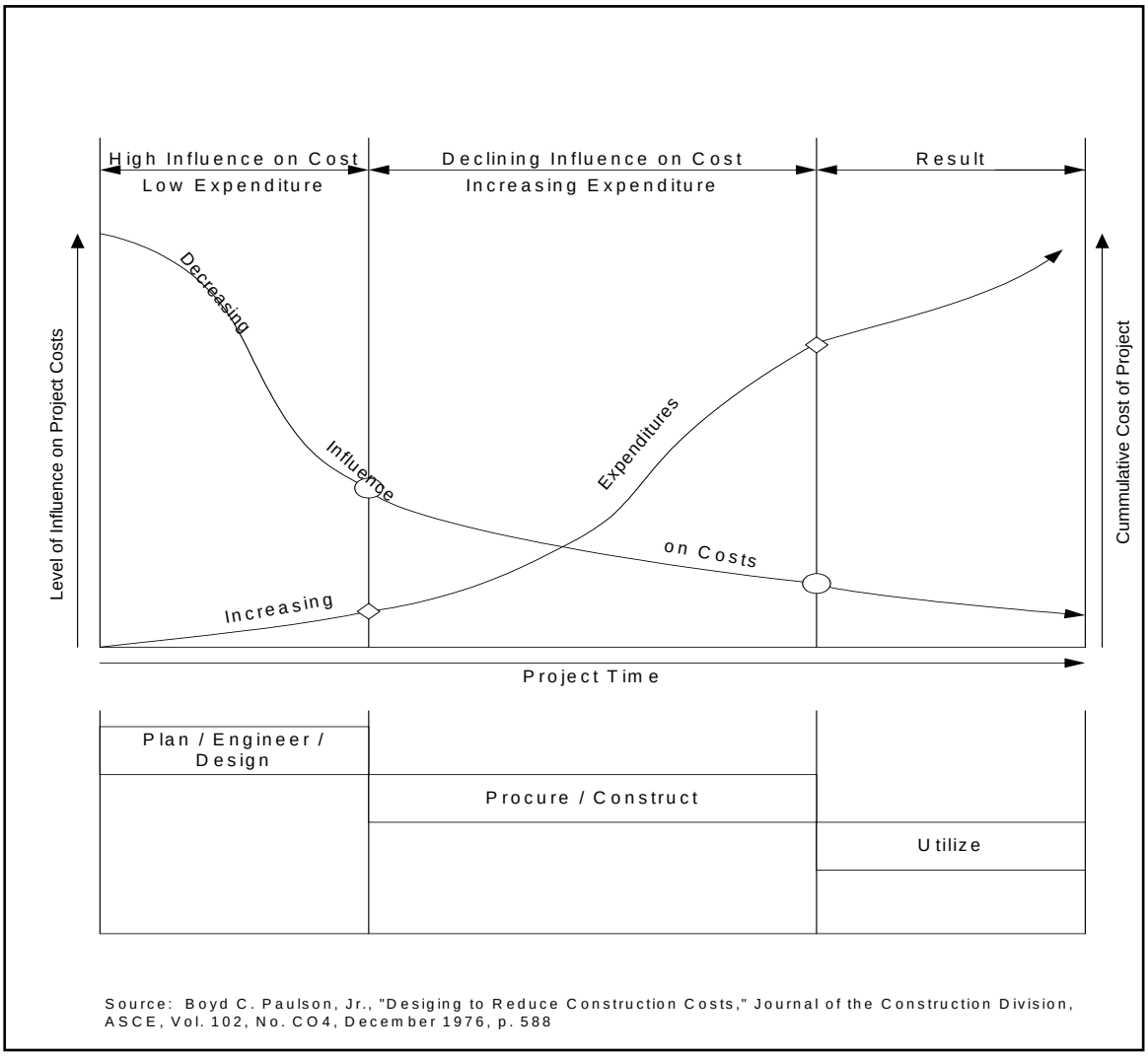
6.2 Best Opportunities for Cost Containment

The best opportunities for achieving significant advances in the cost effective delivery of rural infrastructure are in the initial planning stages. See Figure 5 below. Once the project has

[31] For example, Tanana Power representatives report that the size of the piping between a barge unloading fuel system and a new bulk fuel tank farm was decreased during construction resulting in longer barge lightering time that resulted in higher costs for fuel delivery.

reached the construction phase of the project lifecycle, a significant amount of cost savings potential has been lost.

Figure 8: Level of Influence on Project Costs



7. Management Information Systems

The most effective project managers adopt a comprehensive project cost control system in the early project development with the goal of establishing realistic expectations and project specific cost goals and actively controlling cost throughout the project life cycle.

Similarly, the most effective program managers require project managers to actively manage their costs throughout the project life cycle by:

- Establishing accurate, reliable benchmark cost caps at the early planning stages.
- Requiring a detailed, well-organized cost report starting with the early planning stages that is consistently carried through to each project stage and reviewed at each funding milestone.
- Requiring a project close-out report that includes an overview of the benchmark cost, the initial project budgets, subsequent budget variances, and total project cost at closeout.

An essential part of an effective project cost control system is a clear consistent comprehensive cost accounting system that enables cost comparisons from year to year and between projects. The project cost reporting should include, at a minimum, some basic management information including[32]:

- **Project Control and Budget.** Establish a consistent project controls system that monitors and documents project progress. Effectively track labor costs onsite and monitor productivity via man-hour variance reporting that shows week to date and overall labor productivity per cost code.
- **Differentiate between Actual and Obligated Costs.** Make a distinction between obligated and projected costs and begin tracking these costs per CSI cost code via detailed job cost status reporting.
- **Forecast-at-Completion Costs.**

[32] See for example, Project Cost Estimate; Job Cost Status, Summary; Job Cost Status, Individual Divisions 01 – 16; provided by Summit Consulting Services, Inc., October 18, 2004.

- **Monitor Cost Variances (Amount, %).** Establish a cost variance reporting process to include cost variance explanation and designation of a person responsible for cost variance explanation.

This system will feed a database that, after some time, can be used to estimate similar projects and final project cost reports. Finally, establish a regular audit schedule and process.

7.1 Background on MIS in Targeted Programs

For the most part, a basic project cost control process appears to be in place in the design phases of the project life cycle by partners. What appears to be missing from the current project development process is an effective cost discipline by partner program managers and project managers at the very earliest project planning stages.

- **Example #1:** In our research we found that a program manager within a regional agency reported that the engineers were deliberately excluded from early program planning in an effort to reduce agency overhead[33].
- **Example #2:** In our research we found an instance where a regional agency office approach to annual capital budgeting was to take the prior year's highest cost project, add a contingency, and carry that forward into the next funding cycle as the benchmark budget number. On its face, this is a generous form of inflation indexing and is likely to result in an upward spiral of costs – if fewer headaches for the front line program manager who has reduced the likelihood of having to say no to escalating costs due to funding constraints[34].

A comprehensive project cost control system that is used at the individual project level to manage project cost that rolls up into regional and statewide cost tracking reports.

[33] Cite Steve Weaver, ANTHC, September 2004 interview. This would reverse a prior policy direction that calls for the engineers (who have cost information) to stay out of these key early program development phases in order to reduce agency overhead.
[34] Cite March 3, 2004 YKHC letter to the Denali Commission on Review of business plans.

In summary, a comprehensive project cost management system is needed from the earliest stages and the management of the cost and quality of the project should be carried through to all project development stages.

8. Cost Benchmarking and Strategic Program Planning

The challenge to the Commission is the translation of cost benchmarking into tangible cost containment initiatives across projects and throughout program delivery. The balanced scorecard framework can facilitate this reflection by translating the Commissions strategy and mission into cost containment operational objectives and performance measures. This framework utilizes four different perspectives to facilitate this translation, including:

- **Financial Perspective.** Fundamental to the financial perspective for the Commission is a fair, yet challenging cost benchmark for each program area that describes the financial and economic consequences of actions taken in the other three perspectives.
- **Customer Perspective.** Specifically defines the customer and the value the end-user seeks with the constructed facilities and business processes.
- **Internal Process Perspective.** Assessing and describing the internal processes that add value to the customer and construction of a quality facility.
- **Learning and Growth Perspective.** Describes the capabilities needed to create long term growth and improvement for targeted programs. This perspective would have a particular focus on enabling factors, such as partner capabilities, management information system capabilities, and partner attitudes towards cost containment.

To achieve a fair and equitable cost benchmark for each program, these four perspectives need to be considered simultaneously and balanced against one another.

Throughout our research, we encountered capable and motivated partners and agency personnel willing to improve cost containment performance. It is important to develop a cost containment policy that translates Commission strategy into specific objectives, performance measures, targets, and initiatives that involves the partners and sub-recipient's detailed knowledge of operations. Implementation of an effective cost containment policy requires participation and strategic planning on the part of the Commission and respective partners.

9. Conclusions/Recommendation

The cost benchmarking tool is an opportunity to involve program partners in the development of specific cost containment policy. The Commission can work with partners in the development of specific cost benchmarks that are challenging, yet achievable. The subsequent development and implementation of cost containment measures and initiatives has the real potential to for significant savings in targeted programs. The following table is a compilation by the expert panel of possible cost containment initiatives at each level of program delivery.

These cost containment measures and initiatives can serve as discussion points for the development of comprehensive cost containment policy for each specific program.

Table 9: Cost Containment Measures and Initiatives

Program Level	Cost Containment Measures and Initiatives
Denali Commission	Streamline project application and approval process.
	Advocate for improve design/engineering quality of standardized projects.
	Standardize performance measure ($/sq ft) calculation.
	Monitor and standardize project accounting for cost control.
	Increase control over project outcomes.
	Implement project cost benchmarks.
	Encourage clearer design elements.
	Fully fund the planning/project development phase.
	Develop a realistic time frame for the construction phase.
	Consistency at all levels in program policy/outcomes expectations of stakeholders.
Partner Level	Regionalize project management services.
	Develop accurate sets of program/budget parameters.
	Increase some control in project management.
	Emphasize project scheduling.
	Encourage value engineering as appropriate.
	Grouping/regionalization of projects.
	Establish project cost caps.
	Encourage management system planning.
	Standardize reporting of costs.
	Allow the consultant to develop and plan the project on a realistic time frame.
	Increased accountability for outcomes.

	Recognition of DC as the "warehouse "and partner as the "subject matter expert".
Applicant/ Sub-Recipient	Consider implementing bonuses for coming in under cap.
	Assume risk when there is scope creep.
	Less choice in options.
	Educate for reasonable expectations.
	Realistic understanding about what they can operate and afford vs what they might like.
	Planning and ownership in the process, realistic expectations, recognition of funding constraints (sustainability requirements)
Designer	Regular construction cost estimating.
	Coordination between teams to improve product.
	Value engineering.
	Multi-Site Packages in specific communities.
	Increased standardization.
	Develop the project design on a site specific basis.
Builder	Select through competitive process or GMP contract model based on documented competitive unit costs.
	Retain builders based upon experience and qualifications.
	Project cost caps.
	Management submittal.
	Building methods coincide with community and workers abilities.
	Allow the builder or manager to participate in the planning/costing process.
Developer (if applicable)	Submit formal pro-forma with project application.
	Retain developer based upon experience and qualifications.
Owner	Constraints on scope creep and owner requested changes during construction.
	Consider long-term feasibility and sustainability for projects.
	Limit scope creep.
	Adhere to partner approach criteria.
	Understanding of the Commission's role and responsibilities.
	Consistent approach to project development.
	Simplify administrative procedures.
Operator	Designate a single point of contact for program issues during planning, design and construction phases.
	Fully fund a maintenance program.
Community	Early involvement and buy-in by the community.
	Designate a single point of contact for program issues during planning, design and construction phases.

	Approve a user fee approach that covers both O&M and contributes to a renewal fund.
	Educate for reasonable expectations.
	Internalize the virtues of the project. The project is not a set amount of dollars.

Source: Expert Panel and Commission Workshop on Cost Containment

9.1 Prioritized Recommendations

The following are prioritized recommendations that have been developed by the project team for consideration.

1. Establish a Comprehensive Management Information System to include detailed cost monitoring.
    a. Establish standardized cost controls and monitoring systems;
    b. Effectively track labor and other project costs at all levels of program delivery;
    c. Require consistency in project cost reporting; and
    d. Establish a clear parameters on the calculation of performance measures, to include $/sq foot.
2. Implement cost benchmark for targeted program areas that reflects market conditions.
    a. Calculate program benchmarks using the cost modeling tool;
    b. Establish project caps for each program area;
    c. Establish a medium term program wide goals of 10-15% cost savings as compared to business as usual;
    d. Effectively document annual savings with the previously established MIS system;
    e. Consider incentives for those project that are under the project benchmark;
    f. Attack cost containment at the planning stage of the project lifecycle;
    g. Update cost model inputs and cost model on a semi-annual basis; and
    h. Establish a clear policy framework for cost benchmark implementation and decision making.

3. Undertake audits of specific projects.
    a. Verify accounting and book-keeping standards for selected performance measures ($/square foot) for targeted programs.
    b. Verify adherence to program design standards.
4. Build upon and improve standardized design principles.
    a. Consider modular design units assembled by locally hired crews;
    b. Assign a single design team to design multiple similar projects;
    c. Emphasize value engineering at the partner, design, builder level;
    d. Ensure that design coincides with workers abilities;
    e. Develop a design compliance checklist for all projects, including completion of a third-party review; and
    f. Create a clearinghouse of designs available for use for partners;
5. Establish best value procurement and construction contracts.
    a. Encourage procurement of design and other professional support services via a qualifications-based selection process;
    b. Encourage extended lead time for procurement of material, logistics, and construction services;
    c. Encourage economies of scale via group purchasing;
    d. Sharing of lessons learned in remote-site construction; and
    e. Encourage single construction company implementing multiple projects in the same community.
6. Improve Inter-Agency Coordination
    a. Encourage regionalization/batching of projects, management, purchases, and design;
    b. Continue off-site training to crews prior to construction;
    c. Evaluate risk tolerance at all levels;
    d. Develop a consistent program cost containment policy framework at all levels;
    e. Require sound evaluations of community/program need to ensure facility sizing aligns with community's needs;

f. Encourage early involvement and realistic expectations on the part of the community;
g. Encourage sharing of lessons learned on cost containment;
h. Highlight and reward those program actors who are effectively containing costs;
i. Designate a single point of contact throughout the project lifecycle; and
j. Minimize project scope creep.