



Engineering and Architectural Services Project Management Staffing Report

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EXECUTIVE SUMMARY

In the 2015-17 State Capital Budget ([House Bill 1115, Section 1096](#)), state lawmakers directed the Washington State Department of Enterprise Services (DES) to report to the state Office of Financial Management (OFM) and the legislative fiscal committees regarding performance improvements in the DES Engineering & Architectural Services (E&AS) program, resulting from an increase in appropriation. This report attempts to quantify results and highlight other accomplishments of the program.

The E&AS program provides project management for capital public works projects for state agencies, and technical and community colleges. Our project managers include professional engineers, registered architects and construction managers with many years of experience. The primary responsibilities of project managers include:

- Ensuring compliance with public works laws
- Establishing selection and bidding processes
- Updating contract provisions
- Providing professional advice to client agencies
- Project management
- Defending against contract claims and procedural protests

Effective project management is essential to successful completion of any capital improvement project. The two primary performance measures characteristic of a successful project are: a) meeting the project schedule, and b) meeting the project budget.

With the additional funding provided by the Legislature, DES was able to invest more resources into project management and improve performance on both measures. On time project delivery increased by 6 percent, while projects experiencing delays greater than 60 days decreased by 10 percent. Increased cost from change orders also decreased for the same period.

Schedule				
	On Time or Early	1 - 30 Days Late	31 - 60 Days Late	Greater than 60 Days Late
FY 2015	44%	20%	13%	23%
FY 2016	50%	22%	15%	13%

Budget			
	Total Value of Projects	Cost Increase*	% Increase**
FY 2015	\$ 748,623,127	\$28,630,000	3.8%
FY 2016	\$ 1,070,609,296	\$20,480,000	1.9%

*The aggregate increase in cost for all contracts closed in that fiscal year

**The percentage increase in cost for all contracts closed in that fiscal year

The E&AS program’s effectiveness is dependent upon available resources. When project managers have adequate capacity, they have sufficient time for a thorough review of plans and specifications prior to bid. During construction, they would have adequate time to monitor the project schedule and perform contract enforcement. The desired number of projects for each project manager is between 10 and 15 at any given time – even less if the projects are large and complex. With the increased funding, DES was able to hire five additional project managers, resulting in a decrease in the number of projects per project manager, albeit not to the targeted level.

Projects per Project Manager											
Mar 2015*	May 2016	June 2016	July 2016	Aug. 2016	Sept. 2016	Oct. 2016	Nov. 2016	Dec 2016	Jan 2017	Feb 2017	Mar 2017
20	18.2	19	18.8	18.2	17.8	18.5	17.3	17	17	17	16.8

* DES began tracking workload metrics for project managers in May 2016. The data for March 2015 was derived from supervisor records and does not include DOC/DSHS project managers.

Data appears to show a trend toward the targeted workload for project managers. However, the performance metric will need to be tracked for a longer period to determine if this reduction in project manager workload is indeed a trend, or is seasonal fluctuation resulting from biennial funding or with the construction season.

E&AS program staff members were involved in several other initiatives and process improvements including:

- Creating a business plan
- Increasing diverse business participation
- Implementing software for subcontractor tracking and project management
- Developing a project management manual
- Facilitating client workshops
- Performing small public works training
- Staff development training

DES has developed a culture of continuous improvement. While we are proud of the accomplishments achieved during the 2015-17 Biennium, we are looking forward to continued improvement in the next biennium.

The following are improvement goals for the 2017-19 Biennium.

Data Collection and Project Management Technology

The current data management system is the Project Tracking System (PTS). PTS was developed several decades ago and no longer meet our needs. We are in the process of implementing a new web-based project management system, TRIRIGA – Capital Planning and Project Management. When fully implemented, TRIRIGA will allow mobile access to our records, streamline workflow processes, and provide improved reporting and monitoring capabilities.

Improved Project Management and Consistency

The development of our project management manual has given us the opportunity to assess our processes and make improvements. We are actively training staff to ensure consistency for all projects. The manual outlines project manager expectations for items such as plan review, change order management, schedule monitoring, and contract claim documentation. Consistent application of these principles will result in projects staying on time and on budget.

New Services and New Customers

The E&AS program has long offered project management services as a reimbursable fee for services. Our customer base is expanding into schools, hospitals, transit and other municipal taxing districts, offering not only traditional design-bid-build services, but also job order contracting (JOC) and design-build alternatives.

Customer Service Feedback

The current system for receiving customer feedback is limited to a simple survey scoring system. DES plans to improve the existing customer satisfaction survey initiated at the end of each project, to include tracking themes for expectations of service. Based on survey results, our intent will be to devise methods on how best to meet those expectations.

Small and Diverse Business Inclusion

With the implementation of new software, B2Gnow, DES is now gathering subcontractor and supplier information on a real-time basis. Performance metrics for small and diverse firm utilization is now available and being used to monitor contracts. This information will also be used to make decisions for future improvements.

BACKGROUND

The E&AS program was created by state statute in 1959, well before DES was created in 2011. E&AS provides a wide range of public works and project management expertise, and serves as the primary public works authority for state facility construction.

E&AS performs capital project management, employing private sector professional service consultants and construction contractors, to deliver the following project management activities:

- **Planning and Feasibility Studies.** Preliminary planning and investigations are performed to determine the potential benefits of a specific project or activity. The main purpose of a feasibility study is to consider all factors associated with a project and to determine benefits, risks, challenges and impacts for the stakeholders involved.
- **Pre-design Reports.** During a pre-design, project alternatives are analyzed and a preferred option is identified. Studies are done to analyze space requirements, existing conditions, constraints and opportunities of the proposed site, and the expected project cost.
- **Design-Bid-Build Construction.** This is a project delivery method in which the agency or owner contracts with separate entities for the design and construction

of a project. This is the traditional method for project delivery and consists of three main phases: design phase, bidding phase, and construction phase.

- **Design-Build Construction.** Design-build is a project delivery system in which design and construction services are fulfilled by a single firm. Design-build is used to minimize risks for the project owner and reduce the delivery schedule by overlapping the design and construction phase of a project.
- **General Contractor Construction Manager Contracts.** This contract method employs the services of a contractor to assist in the design and construction management, to serve as the general contractor, and to guarantee the facility will be built within budget.
- **Job Order Contracting.** Commonly referred to as JOC, under this contract method, the contractor agrees to perform an indefinite quantity of public works jobs, defined by individual work orders, over a fixed period of time.
- **Energy Savings Performance Contracting (ESPC).** With oversight from the Energy program, Energy Savings Contractors (ESCO) are contracted to identify opportunities, design innovative solutions, and implement energy efficiency projects in public buildings.

The E&AS program is funded through an appropriation in the capital budget and through reimbursable interagency agreements for alternatively financed projects. In 2015, DES received an appropriation of \$14.8 million, a 15 percent increase over the previous biennium. The legislative intent was to reduce the number of projects assigned to each project manager, with the following expected results:

- Improved accountability
- Reduced project delays
- Reduction in number and cost of change orders

DES is required to report the performance improvement results from the increased funds appropriation/service charge to OFM and the legislative fiscal committees at the close of each fiscal year. Those performance improvements results are to include:

- The number of projects managed by each manager compared to the previous biennia;
- Projects that were not completed on schedule and the reasons for delays; and
- The number and cost of the change orders and the reason for each change order.

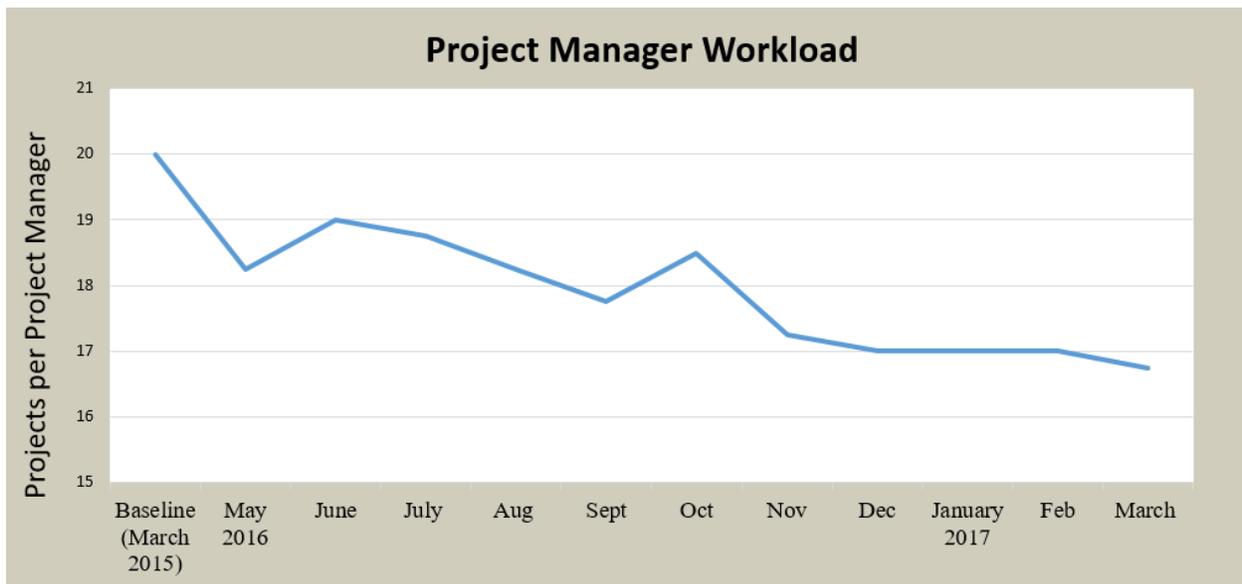
Project manager workload data for previous biennia was limited and available only through an arduous compilation of supervisory records and written information in project files. Therefore, the timeframe for comparison includes data from 2015 through March 2017.

PERFORMANCE METRICS

Number of Projects per Project Manager

With the 2015 appropriation, DES was able to increase the number of project managers for public works contracting from 21 to 26. The number, and value of active projects

also increased during that timeframe, resulting in a smaller than anticipated reduction in workload than targeted.

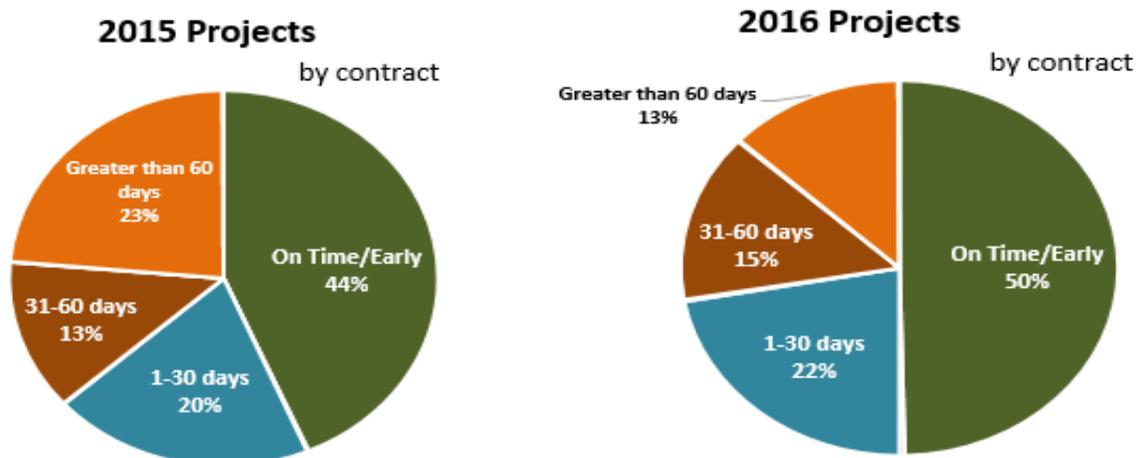


The graph above shows the average number of active projects managed by a project manager by month. DES began to capture this data beginning May 2016. The data from March 2015 compiled from supervisor records does not reflect DOC/ DSHS project managers. Each project managers' workload differs depending on experience, project complexity and assigned client agency needs for project management services.

Projects Completed on Original Schedule

Due to the unique schedule and nature of each project, the number of closed-out projects per biennium does not always match the number of projects active or contracted for that period. Some projects may take more than a year to complete, while others are completed within a couple of weeks.

The charts below are based on original substantial completion dates as compared to actual substantial completion dates and do not account for valid adjustments to the original schedules in accordance to change orders.



In fiscal year (FY) 2015 (July 1, 2014 through June 30, 2015), a total of 369 contracts were completed. Of these, 161 contracts, or 44 percent, were completed on time or early. For FY 2016, 65 out of 132 contracts were completed on time, increasing the completion rate to 50 percent. Projects greater than 60 days late decreased from 23 percent in 2015 to 13 percent in 2016.

Often, delays in project completion are justified due to inclement weather, unforeseen latent conditions, or code changes that become apparent during the course of construction. Reasons for project delays can include:

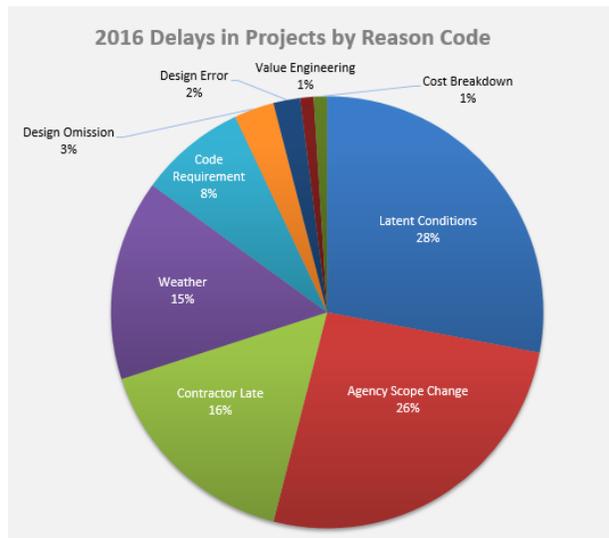
- **Agency.** Agency is a broad term representing that the owner, or client agency, ask for a change. Sub-categories include; scope change, enhancement and improvements, risk management, or delay impacts in which a project schedule delay may require compensation be authorized to the contractor, as recognition of the owner's responsibility for the impacts.
- **Code Requirements.** Code requirements can change during a project; either through interpretations by the Attorney General's Office or if codes were updated after the design phase was completed, or construction had begun.
- **Latent Conditions.** Latent conditions represent a category of unforeseen issues, which are not known at the time of initial design. Common examples are subsurface discoveries of differing site conditions, as well as discoveries of unknown existing building components and dimensions exposed during demolition or construction remodeling.
- **Design Errors.** Design errors may result in destruction of previously installed work. Impacts to the project could be schedule delay or loss of labor productivity for which the owner becomes liable. Design errors occur infrequently. When they do, design firms are required to perform additional services without compensation to correct or re-design as necessary, per project needs.
- **Design Omissions.** A certain, nominal level of design omissions are anticipated and are covered in the contingency planning. Omissions often represent poor or hasty planning by the project team, and may result in additional work and increased cost to the owner.
- **Value Engineering.** Value engineering should be applied to changes, which result in either lower cost to the owner through alternative design options, or increased cost resulting from the owner's decision to change the original design to improve serviceability, longevity, appearance and value.

In addition to these industry standard reason codes, DES has found it beneficial to designate two additional designations to help track reasons for delays more efficiently:

- **Contractor.** Contractor being late with scheduled work because of equipment, labor and/or material/product issues.
- **Weather Delays.** Pertains to unusual seasonal challenges.

Once these additional designations are taken into account, the reasons for project delay are more easily discerned.

The number one reason for delay in public works projects is latent conditions. This often includes unknown soil conditions, asbestos, dry rot, or unforeseen utility lines or pipes on older sites. On occasion, challenging conditions are identified in the design that are found to be much worse than originally anticipated once subsurface work has begun, or after walls, floors and roofs are opened or removed.

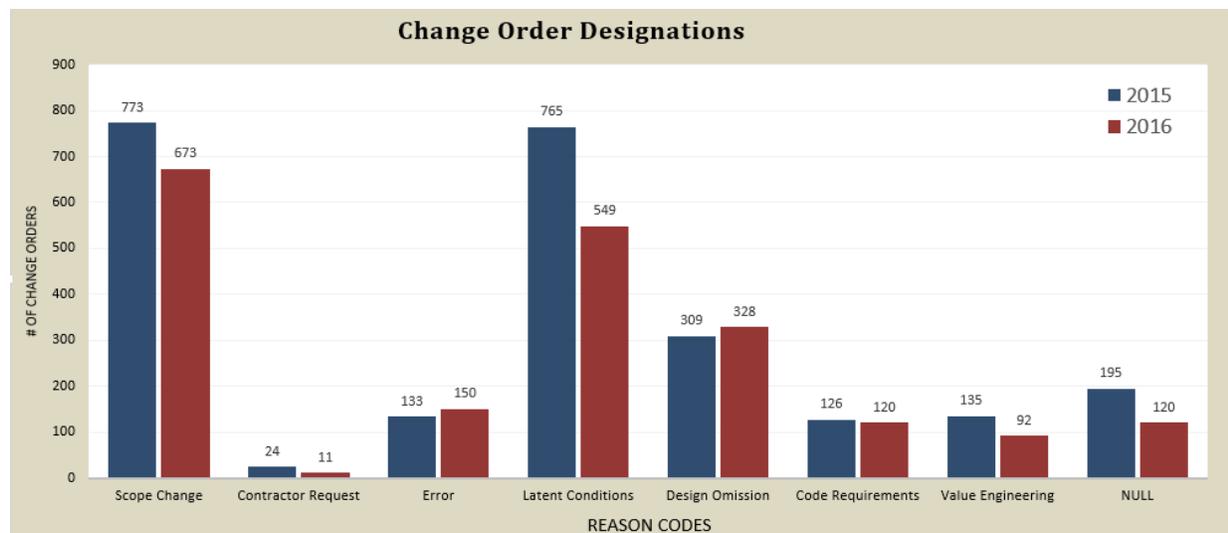


The second highest reason for project delays are scope changes by agencies. In reviewing individual change orders, E&AS found that this is primarily due to the buildings being occupied during construction, indicating that greater attention by the design team in the planning stages is necessary. In the case of colleges and other agency facilities, if the removal of hazardous materials, such as asbestos, is required, the colleges or other agency facilities business operating hours will need to be taken into consideration. An agency/owner will often request a scope change to accommodate faculty or students using the space at specific times during construction.

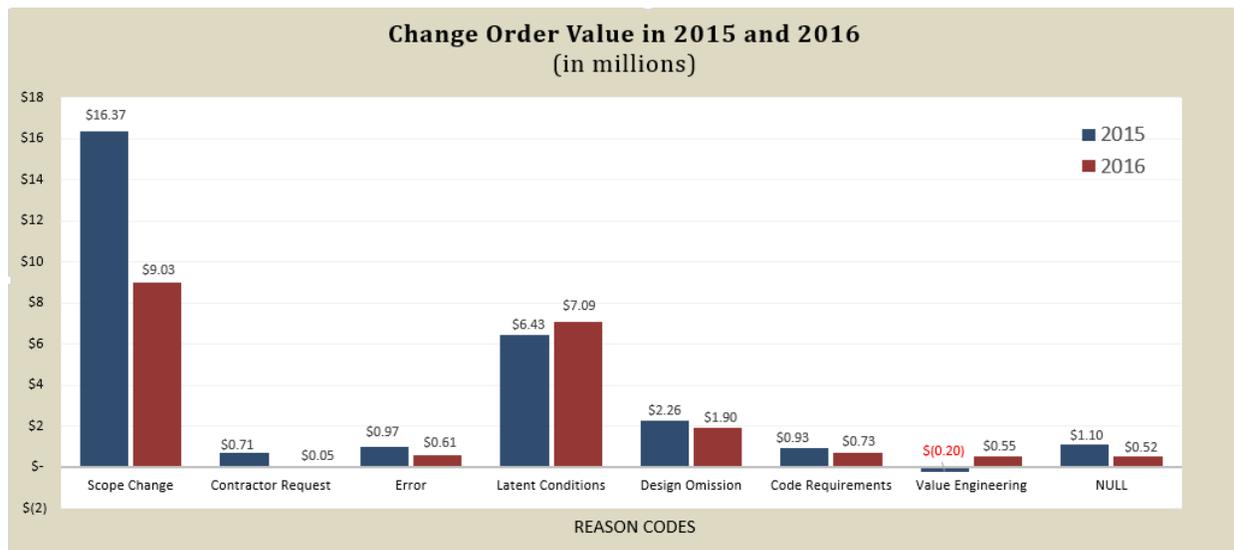
Number and Cost of Change Orders

For larger projects, it is not uncommon to have several change orders over the course of the project. Change orders are initiated any time there is a change in scope, schedule, or budget to a project. However, a change order does not always equate to delays in the project. Reasons for change orders can vary and do not always include the additional subcategories for late contractors or weather delays.

In FY 2015, 306 projects had 2,463 change orders. In FY 2016, 241 projects had 2,044 change orders. Overall, projects with change orders averaged 8.4 per project, which is consistent for both years.



The value of these change orders fluctuate as well, because change orders are also submitted when a project saves money or increases value.



In the last fiscal year, the number of change orders involving scope change decreased by about 13 percent, while the “value” of those change orders decreased by almost half. Meanwhile, E&AS saw a minor increase in change orders resulting from latent conditions. In 2015, value engineering saved nearly \$200,000 in immediate project costs. This does not include the long-term savings that occurred from alternative design by adding green building features such as: water gardens, open floor plans, or natural lighting.

DES struggled to collect data for this report. Many records were not in electronic format and were available only in paper form, or not at all. Change orders not assigned a reason code are identified as ‘NULL’. In 2016, project managers focused on eliminating change orders without reason codes, and have since succeeded in decreasing that number by 38 percent. With the implementation of a new project management technology solution and staff training, data collection and reporting will be improved. It is the goal of the E&AS program to continuously improve workflow, data collection, and staff training. We will build upon the findings and lessons learned from the data reported, to deliver increased accountability and reduce cost increases and project delays by early plan review, holding our designers accountable, controlling scope increases, improving contractor oversight and minimizing cost and delay associated with change orders.

HIGH PERFORMANCE BUILDING FORUMS

Section 1096 of the Capital Budget directed DES to convene a group of private sector architects and contractors with state agency facilities personnel, at least twice a year, to share information on high performance methods, ideas, operating and maintenance issues and costs. DES sponsored two High Performance Building Forums in 2016 to discuss and collect information.

The first was held at the June 2016 DES Business Partnership Forum held in Tacoma. Program participants included mechanical consultants, electrical consultants and contractors, along with architects and agency facility personnel. The discussion included the variety of challenges that the new technologies pose – along with needs for continuous improvement in communications and training.

In October 2016, the E&AS program held the second Forum with the State Board for Community and Technical Colleges. The discussion was enthusiastic for the new technologies, but participants raised important concerns about the decision process during design, and the costs to maintain technologies once installed on college campuses. Ideally, college facility operations staff should be included in user discussions during the design phase, and they will need to budget for ongoing training for operations staff members to be able to maintain the equipment.

PROJECT DELIVERY RECOMMENDATIONS

Also included in the budget proviso was direction to work through the Capital Project Advisory Review Board (CPARB) to develop recommendations to improve project delivery methods. The proviso required an analysis of potential methods to incorporate more architectural and engineering firms and contractors to be eligible for design-build projects, and methods for including high performance criteria with incentives for the architectural and engineering firms and contractors to meet the performance measures in the design-bid-build project delivery method.

The CPARB and the Design-Build Best Practices Committee have met regularly since April 2015 discussing best practices in opening eligibility on design-build projects to more companies.

At its December 2016 meeting, CPARB established the High Performance Committee for design-bid-build contracts, with the goal to review best practices and make recommendations to CPARB to improve the project delivery methods for including high performance criteria with incentives for the architectural and engineering firms and contractors who meet the performance measures. When complete, the findings and recommendations will be presented to the Governor's Office and legislative committees.

OTHER ACCOMPLISHMENTS AND RESPONSIBILITIES

Division Business Plan

In the spring of even numbered years, each division at DES creates a business plan to assist in the development of their budget, and to plan the work of the next biennium. The Business Plan identifies five key strategies with specific initiatives to support those strategies.

Inclusion of Small and Diverse Firms in Public Works Contracting

With the hiring of the Public Works Business Diversity Program Manager in July 2016, DES has accomplished the following:

- Reviewing all advertisements, bid requirements and award processes to identify any internally constructed barriers that may affect diverse business inclusion. As a result, we have increased the point values used in the selection of JOC and design-build firms.
- Providing technical assistance to our clients in an effort to assist them in the development of their respective inclusion plans.
- Establishing a new statewide diverse inclusion outreach strategy to include requesting our Washington Electronic Business Solution (WEBS) team to accompany diversity staff at outreach events. This strategy allows DES to register diverse businesses into the WEBS system in “real-time.”
- Modifying a provision requiring all solicitations include a diverse business inclusion plan. This inclusion is currently required on projects valued at \$1 million or more, however the threshold is in the process of being lowered to projects valued at \$500,000 or more. This change may increase the submittal of the required diverse business inclusion plan submittals by approximately 180 or more projects during the next year.

As mentioned above, our current practice requires diverse business inclusion plans for all projects over \$1 million. State voluntary goals are set in Results Washington at 26 percent (10 percent minority, 6 percent women, 5 percent veteran, and 5 percent small business). Inclusion plans asking for a voluntary commitment to meet these goals are required at the time of award of the contract. A zero percent commitment is deemed non-responsive. Many contractors have embraced the concept and their inclusion plans have exceeded 40 percent. This is particularly true with JOC. In JOC, the prime contractor is required to subcontract 90 percent of the work, making it an ideal method to provide opportunity for small and diverse contractors to obtain work with the state.

On the other hand, with ESPC, some ESCO’s perform most of the work with their own forces making it much more difficult to meet the state goals.

Diverse business inclusion plan commitments are listed in the following table:

Public Works Accomplishments Diverse Business Inclusion Plan Commitments		
Type of procurement method	Number of contracts with diverse business inclusion plans	Range of diverse business inclusion plan commitments
JOC	4	31% - 44%
ESCO	12	0.42% - 30%
Design-Bid-Build and Design-Build	37	.1% - 38%

B2Gnow

In July 2016, DES implemented a new software program called B2Gnow to track the participation of small and minority-, women- and veteran-owned businesses on all public works contracts and consultant agreements. Additionally, this system tracks prime

contractors, design firms, subcontractors, sub-consultants and supplier payments. This program is used by the city of Seattle, King County, and Sound Transit.

Capital Project Planning and Management

DES is currently developing a new capital planning and project management software platform. TRIRIGA, a web-based program, is available through mobile devices. With TRIRIGA, project managers will be able to improve the coordination of activities with consultant firms and contractors, review and approve contract documents, and manage projects from remote locations. Additional data will be collected for performance management of individual projects and the E&AS program. We are on schedule for a May 2017 rollout of the first phase.

Project Management Manual

E&AS updated its Public Works Project Management Manual in October 2016. This is the first time the manual has been updated since 2005. The updated manual contains a number of reference documents, forms, tools, and guidelines that project managers are required to use throughout a project.

The manual provides information about public works contracting to non-project managers, as well as reference materials to E&AS project managers, and the departments of Corrections and Social and Health Services project managers.

Client Workshop

E&AS conducts workshops with our client agencies. These events provide an important opportunity for both project managers and client agency representatives to learn together, and communicate about the public works process and project information. Topics include roles and responsibilities, emergency work, diversity goals, and procurement practices. The next client workshop is being planned for April 2017 and all 34 community and technical college facility staff will be invited, along with Capitol Campus tenant clients and other client agencies.

Small Public Works Training

For client agencies who want local control of their small public works projects, the E&AS program provides training for Delegated (Public Works) Authority. This service was improved and expanded in 2014. The training prepares approved community and technical colleges and agencies to conduct small projects in-house. Approved entities are able to self-administer projects under \$300,000 utilizing the Small Works Roster. In the past year, 14 community and technical colleges and 4 agencies have received onsite small public works training.

Staff Training

E&AS project managers are professional engineers, registered architects and certified construction project managers. Maintaining up-to-date training in these professions is important to the program. Training is provided during our twice monthly staff meetings, along with other state of Washington required trainings. These training and work sessions helped create the Project Management Manual. Project managers also share presentations of completed projects with a variety of lessons learned. Changes in the U.S. Green Building Code Council LEED version will be shared at an upcoming training, as well as training for the new Capital Planning Project Manager process.

DES is a certified public body through CPARB for alternative public works projects, such as design-build, general contractor construction manager, and JOC delivery methods. As DES increases the use of these contracts, we are increasing the number of project managers certified to manage them.

Design-Build

The program has increased the use of both traditional and progressive design-build as a project delivery method. In October 2016, DES hosted a three-day Design-Build Institute certification training. DES staff, other agencies staff, and private architectural firms and contractors attended the event. As of the printing of this report, 18 DES staff have received this training.

General Contractor Construction Manager (GCCM)

A number of project managers have worked on GCCM projects. In January 2017, three additional project managers attended a two-day training in Seattle at the Associated General Contractors office.

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