TEAM 1 Project Report

Comparative Analysis of Project Management and Decision Making Structures of two Mega-Projects

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Abstract

The purpose of this paper is to comparatively analyze the project management and decision making (Governance) structures of two megaprojects. Building on this analysis we present findings regarding the future Project Management and Governance Structure for the Columbia River Crossing (CRC) Project as it proceeds through the remaining project phases.

This report was completed as a Graduate Class Exercise in the EMGT 545 "Project Management" class at Portland State University during the Winter 2011 term. This intent of this report is to apply concepts and techniques learned in class to a real life application in order to demonstrate a working knowledge of the information learned in class. An in depth literature review was utilized as the primary research methodology for the report. The team also attended a public outreach meeting for the CRC project where additional information was gathered and multiple contacts were made. These contacts were able to provide helpful supplemental details and insight into the project.

The paper begins by describing the general nature of megaprojects, their lifecycles, and the unique aspects to a megaproject. A mega project is different from other projects in that it is primarily funded with taxpayer's money and must satisfy the affected community by reflecting their values, goals and objectives. The literature review of megaprojects focused on the CRC project and the Woodrow Wilson Bridge (WWB) project. The Woodrow Wilson Bridge project is another bi-state river crossing project that has similar characteristics to the CRC project and was used as an analogous project for the comparative analysis.

The comparative analysis focused on some of the main criteria for any project: schedule, cost, and performance. The analysis shows the effect that the project organizational structure had on these criteria. In general, the project management and decision making structure of the CRC project was complex and convoluted. This caused confusion in the planning process, critical decisions to be delayed, costs to increase, and the LPA rejected soon after its adoption. The WWB project management structure, however, was much more organized, had a distinct top-down approach, and the roles of the parties involved were more clearly defined. This allowed the WWB project to stay on schedule and within budget throughout the different phases of the project.

Finally, the paper concludes the analysis with findings regarding the nature of the existing Project Management and Governance Structure of the CRC project. A responsibility matrix is developed to identify gaps and opportunities in the future structures. From theses gaps and opportunities, a modified Project Management and Governance Structure is conceptualized to guide the project through the Construction Phase.

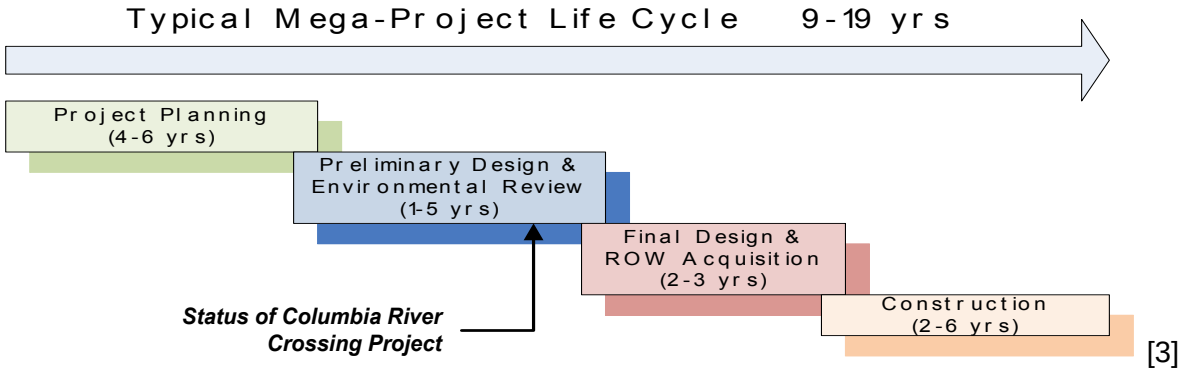
Introduction

The planning and project delivery of large scale transportation projects are complex, complicated, expensive and time-consuming endeavors. Some of these projects are so large that they belong to a unique but growing type of project known as a "Megaproject". Megaprojects are projects that cost more than one billion dollars and/or attract a high level of public involvement and political interest. [1] The occurrence of mega-projects is becoming more and more common in the United States and the world. As of 2008, the Federal Highway Administration (FHWA) had seventeen projects on its megaprojects list and they expect the number of megaprojects to double within the following five years. [1]

The Columbia River Crossing (CRC) Project, which would include the replacement of two existing interstate highway bridges that cross the Columbia River between Portland Oregon and Vancouver Washington, is an example of a megaproject. In addition to the replacement of the two bridges, the project would replace approximately 5 miles of adjacent highway interchanges and roadway, provide for the expansion of light rail transit across the river and improve pedestrian and bicycling access. The estimated project cost of the CRC Project is $3.2 to $3.8 Billion [2]. It is of significant local, regional and national political interest, and it has the attention of the public as evidenced by the numerous stakeholder groups officially engaged in the current environmental review process.

In general terms, the life-cycle of a megaproject can be represented by five phases: (1) planning, (2) preliminary design and environmental review, (3) final design and right-of-way acquisition, (4) construction, and (5) operation. [3] This cycle with four of the five phases indicated can be modeled as shown in Figure 1. Note that collectively the four phases are envisioned to take from 9 years to 19 years. These are idealized time frames and each megaproject has its own schedule which may or may not be within the timeframe shown.

The figure also shows where the CRC project currently fits within this lifecycle at the time of this paper's writing. The CRC project is nearing the completion of the Environmental Review Process with the public release of the Final Environmental Impact Statement (FEIS) and resultant Record of Decision (ROD) that officially documents the selected alternative and resultant environmental effects that will be moved forward through the Final Design stage and eventually be constructed.



[3]

Figure 1: Typical Megaproject Life Cycle

To be considered successful, megaprojects, like other projects, must be managed and completed to meet the three standard success measurements of cost, performance and schedule [4]. But in addition to these three standard success factors, megaprojects must also meet additional criteria. One of the additional success factors that must be considered is the need to identify and satisfy the affected community and public values, goals and

objectives. Additionally, since megaprojects are funded with significant amounts of public funding, these projects must be managed and delivered in an open and transparent manner that will instill public confidence.

There have been notable examples of megaprojects completed in the recent past and these projects offer opportunities to gain from the lessons learned from past mistakes, challenges, and solutions. One such megaproject that can inform the CRC project is the Woodrow Wilson Memorial Bridge (WWB) whose construction is on schedule to be completed in 2013. Similarities between the WWB and CRC projects include comparable project scopes (replacement of an Interstate Bridge between two states within a major metropolitan area), the need for detailed environmental analysis and both projects expected to exceed one billion dollars.

The purpose of this paper is to comparatively analyze the Project Management and Decision Making Structures of the two megaprojects, and then, building upon this analysis, offer a recommendation on a future Project Management and Governance Structure for the CRC Project as it proceeds through the remaining project phases.

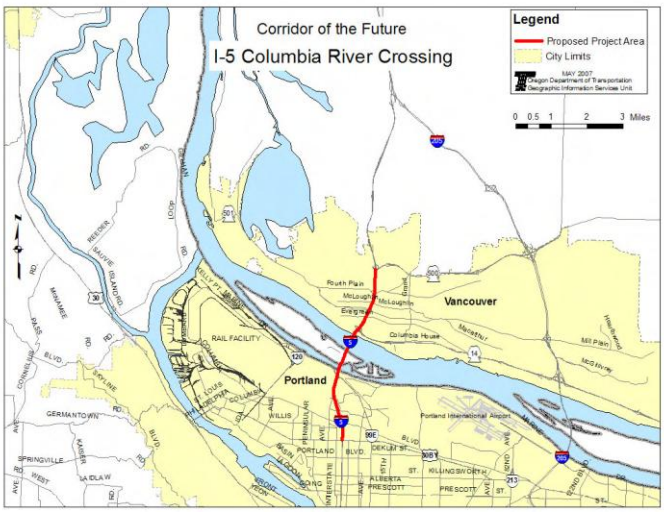
Literature Review

An in depth literature review was conducted that analyzed papers published within professional journals, professional conferences proceedings, and books on teams and project management. To supplement our research the team attended a public meeting that discussed the CRC, and met two contact points for additional questions. From our research we found that the CRC project had suffered budget overruns and delayed schedules. To understand why this was occurring, the team found a comparative mega project, the Woodrow Wilson Bridge, that didn't have as many problems. The following section will describe the two project's background, origin, goals and objectives, political environment, and organizational structures.

Project Backgrounds

Columbia River Crossing

The Columbia River Crossing replacement project has had a long history. The project is slated to replace the existing Interstate 5 (I-5) Bridge between Portland, Oregon and Vancouver, Washington on the I-5 corridor.



[7]

Figure 2: Columbia River Crossing Replacement Corridor

Project Origin – CRC Project

This project was initiated resulting from a bi-state partnership that studied transportation issues on the I-5 corridor. Starting in 2001 this group developed a statistical plan that recommended three projects be considered. First, the I-5 Salmon creek project in Clark country was completed in 2006. The second project was at Delta Park in Portland and was completed in 2010. The last project was the Columbia River Crossing, scheduled to replace the existing bridges built in 1917 and 1958. Once this report was delivered in 2002, the original Environmental assessment and preliminary engineering report began to form in 2003-2005. In spring of 2005, a new 39 member CRC task force was formed to advise the CRC project on key decisions. Next, the task force defined the problems and potential solutions using data developed in fall of 2005. CRC worked with the public, tribal governments and partnership agencies to define the primary problems that lead to the project. These included congestion, dangerous travel conditions, and demand of the bridge that exceeded the capacity of it. A generation of 23 river crossing and fourteen transit ideas were considered as solutions to these core problems. To narrow down this list, evaluation criteria were developed to aid in this task. This narrowing activity took place from spring 2006 to the summer of 2006. During this time the CRC solicited ideas from the community and the resulting outcome of this activity was five remaining options. These were to not build a bridge, replace bridge and add bus rapid transit, replace bridge and add light rail, supplement the existing bridge with bus rapid transit, or supplement the existing bridge with light rail. From 2007 to 2008 the CRC project team analyzed each alternative to determine how well it would relieve congestion, improve safety, and improve the mobility on the I-5 Corridor. On May 2nd 2008 the project released its Draft EIS (DEIS) for public and agency review. In the summer of 2008 six local project partners considered the draft. The result was that the partnership chose to replace the bridge. In fall 2008, refinement of the designs and review work took place. After the selection of the locally preferred Alternative (LPA) the CRC continued to work with advisory committees on three areas: the greenhouse gases, travel demand, and project implementation and financing. [5]

Since September of last year, the planning committee has spent 108.5 million dollars in the planning stage alone. Not yet compete 134 million has been allocated for this planning process. [5, 6]

Project Goals and Objectives- CRC Project

The CRC project has six significant transportation goals and objectives.

- First, congestion on the existing bridge is being caused by the bridges inability to meet the demand placed upon it. This has caused four to six hours of constant congestion each day. By 2030 if nothing is done, this number will grow to fifteen hours per day of solid congestion.
- The second goal is to provide public mass transit to the populous as the existing service is limited and travel times are long.
- The third objective of the project is to provide fluent freight mobility through the bridge. Part of the bridge also has lifts that are triggered frequently due to the high volumes of marine activity driven by the nearby ports.
- The fourth objective is to improve safety on the bridge as it currently suffers from high crash rates due to seven interchanges that are placed closely by each other, design features of the highway itself, and the bridge lifts mentioned earlier.
- The fifth objective of the project is to provide a bicycle and pedestrian connection that replaces the existing narrow pass.

- The sixth and final objective of the CRC project is to improve its earthquake safety. The two core structures on the existing I-5 bridge have pilings that are not deep enough. As a result, the structures are vulnerable to collapse during a major earthquake. [7, 8]

Political and Cultural Environment – CRC Project

The CRC governance was difficult due to the organizational structure that we will describe later. At the core the project, two states both wanted a project manager to govern the CRC mega project. In our region we have many environmentally aware citizens. In 2008 Portland Oregon was ranked number one in Environmental awareness, and just north in Seattle it was ranked number two in environmental awareness.[add citation] An example of the cultural environment we have in the northwest is exemplified within the CRC project when the CRT published the draft of the environment impact statement. The group gave 60 days for comment that ended in July of last year. As a result the community provided 15,000 commits and concerns about the project. The Draft adopted a NEPA process which meant that each of the commits would have to be responded. [9, 10]

The CRC project affects eight tribes in the project area. These tribes include the confederated tribes of Grand Ronde, of Siletz, confederated tribes of Umatilla, confederated tribes of Warm Spings, Cowlitz Tribe, Nez Perce Tribe, Spokane Tribe of Indians, Yakama Nation and the Chinook tribe. As all but the Chinook tribe are federally recognized tribes as such a consultation process began in 2005 to seek and resolve concerns at each major milestone within the project that the tribes had. In addition to these concerns the Confederate tribes of Umatilla, Confederated Tribes of Warm Springs, Nez Perce Tribe, and the Yakama Nation tribe has treaty rights to the Columbia River. In order to handle the tribes a fair settlement on any tribal issues the executive management team, FTA, and FHWA sought to settle issues in a fashion that addressed the "mutual interests of the tribes" and the project objectives. [5]

Project Organization Structures – CRC Project

The CRC was owned by four organizations WSDOT, ODOT, C-TRAN, and TRI-MET this group was represented by an executive management group consisting of the WSDOT secretary of transportation, Director of ODOT, Washington Project Director, and the Oregon Project director. The Oregon and Washington project director both have project staff that reports to them. The Core ownership group had oversight from the US department of transportation through the Federal highway administration, from the Federal Transit administration, and from the Project Sponsors Council (PSC). The PSC also leveraged the integrated project staff on technical details of the project and recommendations for decision making. In addition the Core CRC group recognized informal "partnerships" that involved multiple tribes, working and interest groups, communities, and the public.[11]

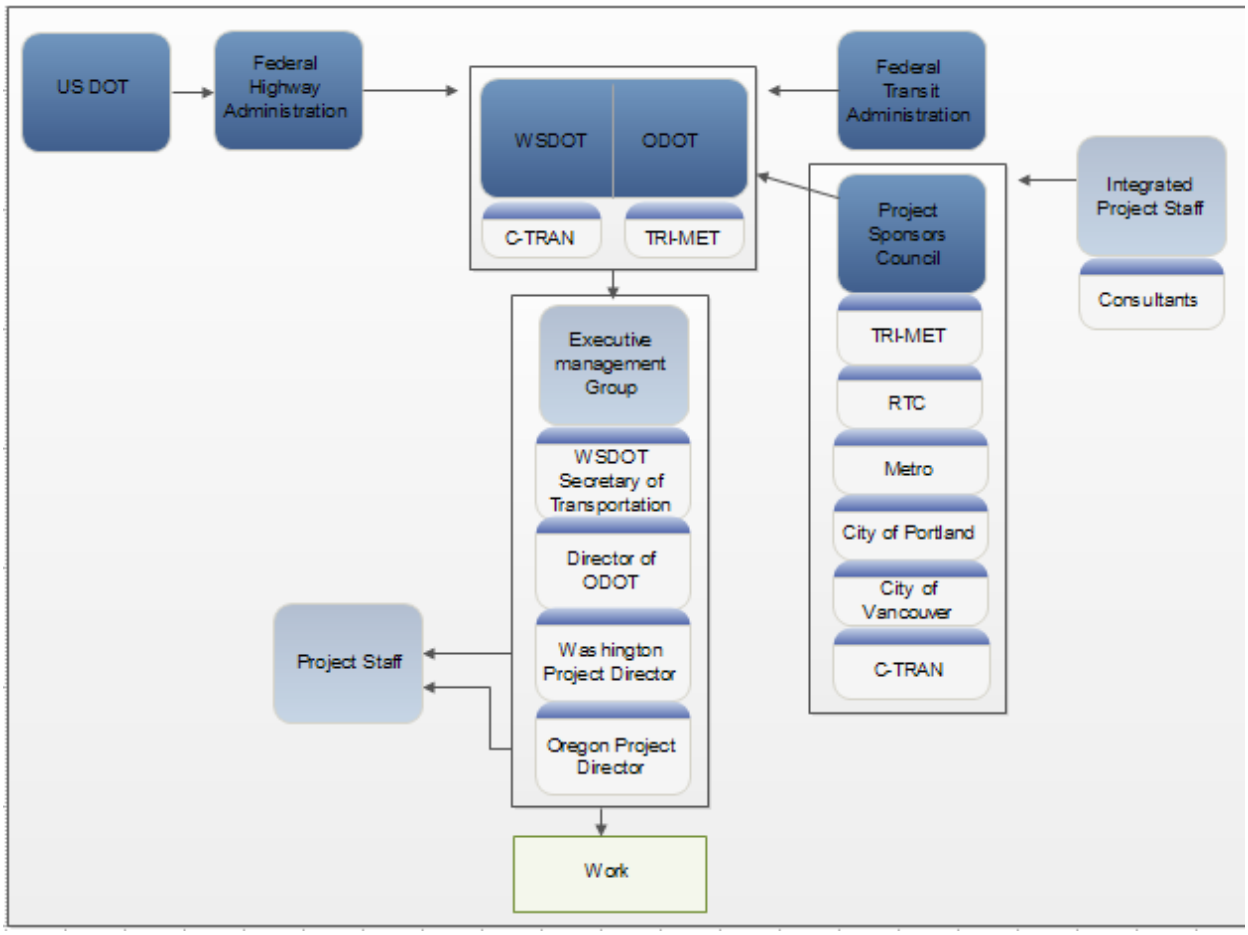


Figure 3: Columbia River Crossing Project Management and Decision Making Model

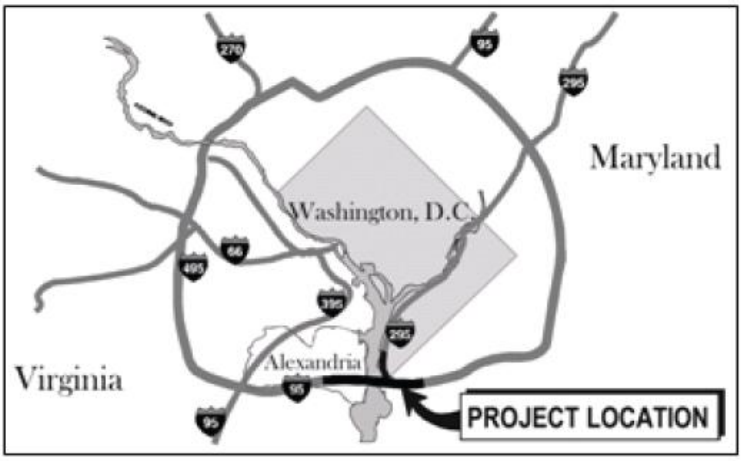
The reasons behind the multiple oversight committees are complex. I-5 is governed by the US department of transportation, and as such they needed to have oversight of the project. This is being accomplished through the federal highway administration. The Federal Transit Administration provides recommendations and oversight to the core ownership group as they are responsible for obtaining federal budget funds from congress. Both DOT's are involved to make final decisions for the states in all matters to comply with federal and state laws. The Executive Management's Group core objectives are to assure alignment to funding, schedules, and project management. This group jointly meets with state legislatures and the state transportation commission's when CRC decisions require bi-State involvement. [11]

When decisions are made the overall authority rests within the Executive management group. This group obtains knowledge from the FTA, public, tribes, regulatory agencies, advisory groups, integrated Project staff, and the project sponsors council. This complex organizational structure has been somewhat effective in decision making. However, the overall effectiveness of the decision making structure is "cumbersome" due to decisions made by committee. In addition the NEPA process utilized is: t16] As a result of this decisions that are difficult are pushed into the future instead of dealing with the decisions immediately.[11]

Woodrow Wilson Bridge

Project Origin – WWB Project

The original Woodrow Wilson Bridge opened in 1961 and consisted of six lanes to carry traffic across the Potomac River between Virginia and Maryland just south of Washington D.C.



[13]

Figure 4: Woodrow Wilson Bridge Project Location

At the time of the original construction, it was not anticipated how much traffic this bridge would need to handle. Not only was there significant population growth in these Virginia and Maryland suburbs [14], but the bridge also became part of the major north-south interstate in that area, I-95. This integration into I-95 was not part of the plan for the highway system in this area at the time the original bridge was built. I-95 is a main thoroughfare for individuals and freight for the entire Eastern United States. This bridge is located right in the middle of the highway that connects Maine to Florida, and the bridge's capacity issues caused major problems. Originally designed to handle 75,000 vehicles per day, by 1996, the bridge was carrying about 195,000 vehicles per day with an estimate of 300,000 per day by 2020. [17] In addition to this dramatic increase in road traffic, the drawbridge was raised approximately 200 times per year due to marine activities as well. This combination created long traffic delays and caused this bridge to become known as "one of the worst bottlenecks in the country."[15] This bottleneck was causing significant pollution, a decrease in overall efficiency in the area, increased accident rate, and expedited deterioration of the bridge itself. [13]

With all these factors driving the project, in 1989 the Federal Highway Administration (FHWA) led a study to examine what could be done to fix these problems. Part of this study also included understanding what the effects might be on the local communities and the archeological and historic resources near the project. In the summer of 1991, the FHWA issued a Draft Environmental Impact Statement (DEIS) which discussed five bridge alternatives. None of these five alternatives were found to be satisfactory, so the FHWA formed the "Project Coordination Committee" to find better alternatives. By 1997, the Final EIS (FEIS) was submitted by the FWHA and the Record of Decision (ROD) was approved by the end of that same year. [13]

Following this decision, lawsuits were filed against the FHWA in regards to not sufficiently examining all of the options, and not doing a complete study on the impact that the bride project would have on the historic properties in the area. Due to these lawsuits and changes to the bridge design, the FHWA prepared a supplemental DEIS and FEIS while combating the lawsuits. Eventually the courts supported the FHWA in regards to the lawsuits, however the supplemental DEIS and FEIS were still necessary in order to address the changes to

the bridge design since the original FEIS. [13] On October 20, 2000 construction on the new river crossing began. [16]

Project Goals and Objectives – WWB Project

The overarching mission of the project was to "enhance mobility while addressing community and environmental concerns."[17] This mission was divided into four goals:

- "Provide adequate capacity for existing and future travel demand by improving operating conditions and fixing the bottleneck caused by eight Capital Beltway through lanes converging into six lanes across the river;
- Facilitate intermodal travel, such as transit or high-occupancy vehicle (HOV) lanes, bicycling, and maritime access up the Potomac River;
- Improve safety by reducing the number of accidents and improving access for emergency response vehicles; and
- Protect and improve the character and nature of the surrounding environment." [13]

In order to achieve these goals, the project included two six-lane drawbridges, and a total of four major interchanges (two in each state) across a 7.5 mile span of the highway.

[12]

Figure 5: Woodrow Wilson Bridge Project Highway Map

In addition, the drawbridges were designed to be higher than the previous bridge in order to reduce the frequency of raising the drawbridge. It was estimated that the drawbridge would only need to open 65 times a year as opposed to the previous 200 times a year or more. With longevity in mind, the bridge was planned and constructed with a 75 year life expectancy. [13]

Political and Cultural Environment – WWB Project

The Woodrow Wilson Bridge Project had a very unique political and cultural environment. Interestingly enough, the FHWA actually owned the original bridge, and led the initial study which began in 1989 to look into addressing the structural and capacity issues of the existing bridge. While the FWHA owned the bridge, they involved agencies from the local governments of the affected project area: Virginia, Maryland and Washington D.C. Having the transportation departments from the federal government, two states, and the District of Columbia all sponsoring the project gave additional complexity to the project, and made the political

environment very unique. This initial group developed the first draft EIS in 1991, but after the options outlined in this draft EIS failed, a larger Project Coordination Committee was created to identify additional alternatives. [13]

In regards to financing the project, Sen. John W. Warner (R-Va.) helped raised $1.5 billion dollars of federal money, and the states supplied the remaining approximately $1 billion dollars. The money provided by the federal government was based on the fact that the new bridge would support a major region of the country, not just the border between two states. During a congressional discussion, Warner said, "This bridge is a bridge to everywhere, and it's worth every penny." [18]

There were also strong historic resource preservation forces involved with the project as well. For example, the Advisory Council on Historic Preservation held a significant decision-making role within the project. A major component of the litigation against the project in 1997 and 1998 was in regards to the level of planning and mitigation developed for protection of the historic areas around the Potomac River. Alexandria especially has significant historic resources to protect including historic landmarks, buildings, cemeteries, and a historically significant tobacco port dating back to the early 1700's. The city of Alexandria led the way in filing a lawsuit against the FHWA after the 1997 final EIS, but even after they were able to reach a settlement, three Alexandria based organizations continued the litigation process. Other groups who helped form the political and cultural environment included the U.S. FWS, the National Park Service, the U.S. Coast Guard, and the U.S. EPA." Of course the community was affected and involved in the project as well. Residents requested hearings, provided feedback, attended community briefings and workshops. [13]

Project Organization Structures – WWB Project

The Woodrow Wilson Bridge Project was set up in a relatively top-down manner, but with a number of supporting groups providing input, feedback and help to the project. A model of the project management organization was developed and is shown below:

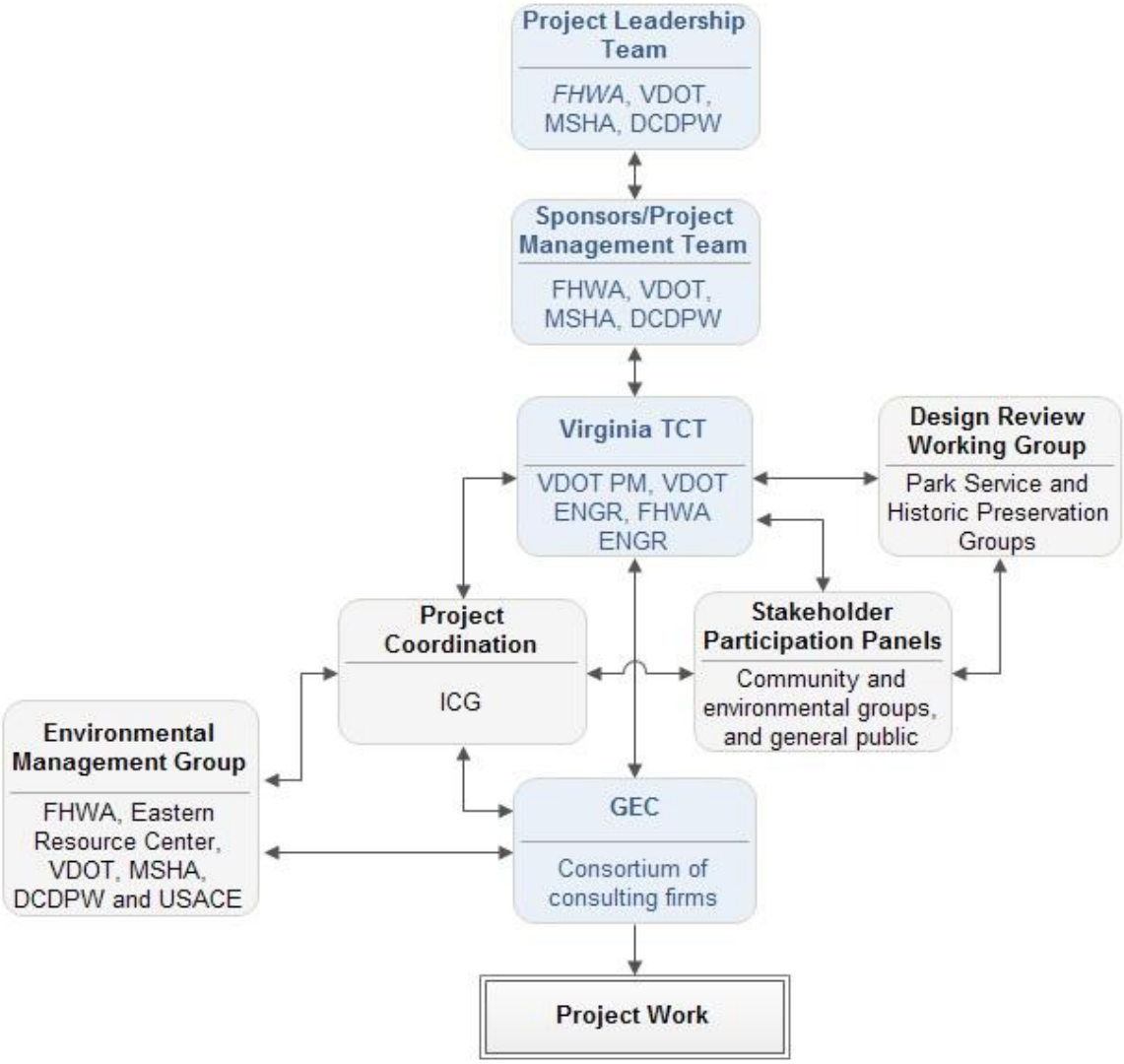


Figure 6 - Woodrow Wilson Bridge Project Organizational Chart

While the entire project was lead by the FHWA, a project leadership team was created which consisted of high level officials from each of the four departments of transportation involved. This team gave direction, made strategic decisions, and handled performance reviews. The project management team was comprised of working managers from the four sponsoring agencies to give on-site guidance. The bulk of the engineering responsibilities was given to the Virginia Technical Coordination Team (TCT) in charge of the overall design. They were a sort of hub for the entire project and worked with supporting groups in order to make key decisions regarding the actual layout and integration of all the pieces of the project. The Virginia TCT also worked closely with the General Engineering Consultant (GEC), who coordinated the design, environmental aspects, planning and construction of the project [13,17].

Comparative Analysis of Differing Project Organization Structures

Schedule

When evaluating the organizational structure of the two mega projects, it is clear why there are such discrepancies in their schedule. The CRC team has complex oversight entities feeding information into a bi-State co project management team. This caused critical decisions to be pushed out due to the complexity of two managers. In contrast the WWB project is on schedule due to rigorous up front planning and a less complex management structure. This is evident when evaluating the two environmental impact statements created by the projects. [8]

The CRC draft environmental impact statement was started in March 2007 and published in February 2008. It didn't take into consideration greenhouse gases, travel demand, and several other areas such as the design of the bridge. As a result the draft EIS was updated to be published as the final environment impact statement in the summer of 2009. This would allow construction to start in early 2010. However, the final environment impact statement is still not complete today. It has been four years since the start of the CRC EIS. In contrast the WWB project took two years to produce a Draft EIS, and seven years to produce the final EIS. Once produced the FEIS was taken to court. Amendments were made to the Final EIS and released three years after the original final EIS. In our research, we were unable to find contingency plans for dealing with lawsuits on the environment impact statement. This inadequate planning could have future reproductions. [8, 13, 17]

Impact on cost

The Columbia River Crossing project is projected to cost 3.2 to 3.6 billion dollars. However, in evaluating the project details, there are a great many uncertainties that the project management have not planned for. First the state legislatures may or may not provide the 750-850 million shown in the finance plan. Second, tolling is seen to be essential to the finance of the project, but issues remain in the "overall philosophy" of tolling. The 3.2 billion dollar estimate was found to have a 40% confidence level associated with the number. Raising that number to 3.8 billion provides a 90% confidence level in being able to complete the project based upon the LPA. There is a possibility that the sponsors will encounter a shortfall to complete all CRC objectives. In particular the schedule overages will negatively affect the total budget cost. An example is the new start submission creeping from the 750 million original planned costs to 850 million. As it stands, the project management structure as indicated in the scheduling analysis will continue to cause scheduling delays which will increase costs. [2]

On the other hand the Woodrow bridge project was (and currently is) on budget and on schedule. It is estimated that the project will cost 2.4 billion dollars. An example of this was in 2007, during the phase one construction, the award amount of project bids for the project were on average 10.3% under the project estimate. [19] This success was due to the project management structure and their rigorous planning. They implemented a project based organization allowing one clear project management team. [13, 17, 20]

Performance

The performance of a project can be described as its outcome, its scope, its quality, etc… [28] In the case of a mega-project, the performance can be applied to the sub-projects, phases or milestones. In the case of both these river crossing megaprojects, submitting a draft EIS and selecting a Locally Preferred Alternative (LPA) are examples of these milestones. Below is a description of what is required in an environmental review or Environmental Impact Statement (EIS):

> *"Environmental review under the National Environmental Policy Act (NEPA) is one of the project development steps required in the delivery of federally funded transportation improvements. NEPA requires that federal agencies consider consequences to the human*

and natural environment prior to taking action. This consideration of potential outcomes and choices is to be accomplished through an inter-disciplinary approach in planning and decision-making to understand the problem at hand, identify and evaluate alternatives, analyze likely outcomes, and promote public discussion and coordination on available choices." [11]

In the CRC project, after 7 years of analysis and study, and LPA was adopted in 2008. Unfortunately, the draft EIS for this LPA did not address all of the outstanding issues and concerns regarding the design. In fact, "The apparent consensus reached in 2008 actually reflected a very low level of agreement between the parties…" [2] Because of this, there was substantial ambiguity and discussion regarding what the LPA truly was. This caused significant concern regarding the direction of the project, and eventually led to the discontinuation on any work toward the original LPA. Instead, a completely new bridge design was recommended and adopted as the new draft recommendation. [21]

In comparison, the WWB project began with an initial two year study which did not produce any promising alternatives. This was followed by a more thorough six year study, which culminated in a Draft EIS and the selection of an LPA. While lawsuits were brought against the Draft EIS and LPA, the courts upheld the original LPA and EIS as sufficient. The WWB project management did create a supplement DEIS and FEIS to appease some of the concerns and address some of the minor changes which had been made to the construction plan. [13]

While the performance of the WWB project in regards to the selection of an LPA was not perfect, there is a stark difference in the outcomes for this significant milestone. The proposal is that the project management and decision making structures of these two projects had an impact on the performance of this milestone. As has already seen, the project management structures are significantly different. The more top-down approach exhibited by the WWB project allowed those involved to have a clear direction. The inclusion of a project coordination group provided a way for the decision makers to have a better synthesis of what mitigation measures and recommendations were being proposed. In addition, the CRC project seems to have more sources of input at a higher level than the WWB project. In the WWB project, a project leadership team, and a project management team was clearly established, which was able to provide direction and on-site guidance, but coordination with outside agencies and organizations was given to the group of people involved in implementing the project.

In addition to the LPA performance issue, several additional issues were identified by an independent review panel investigating the CRC project. These issues included a general lack of consensus, and decision making was cumbersome. They highlighted the fact that difficult decisions were often pushed to the future, including the unresolved issues the LPA and the unaddressed issue of future governance of the construction of the project. [2]
As the leader for the WWB project, the FHWA addressed these communication and coordination issues between Virginia Maryland and Washington D.C. by doing the following:

- *"Assembled an experienced team of managers and consultants to address complex environmental impact questions on dredging, aquatic resources, and cultural resources;*
- *Reopened direct and effective communications with numerous federal and state resource agencies; and*

- *Established collaborative decision-making teams that included local communities and citizens" [13]*

Due to this collaborative approach, FHWA was able to reach consensus regarding the bridge design and the mitigation measures for potential adverse environmental impacts. FHWA also established controls to monitor the completion of the project. [13] These controls helped keep the project management team informed so they could make timely and high-quality decisions to keep the project on track and moving forward.

Ownership most likely played a critical role in these performance issues as well. The CRC project has maintained an equal co-ownership since the beginning of the project which has filtered down to all areas of the project. This co-ownership mentality is reflected in the leadership, the executive management group, and how decision are made. In theory, this sounds like a positive, beneficial methodology, but in actuality, it is important that there be one leader to make the tough decisions, bear the responsibility and be held accountable for those decisions. Committees, panels and teams are great for providing direction and guidance, but when it comes down to implementation, it is critical to have one person responsible. In contrast, the WWB project, seemed to understand this principle. During the project, the majority of the decision making authority was given to the Virginia Department of Transportation. VDOT worked closely with the other transportation departments, but they held the brunt of the responsibility for the bridge design and construction. After the bridge portion was complete, Maryland and Virginia negotiated an agreement for joint ownership of the new bridge. [13]

In addition, the WWB project utilized a unique partnering system. This partnering system recognized common interests, provided disciplined communication and measured the effectiveness of the team. This open and positive communication structure allowed the team to stay focused, on track, and encouraging one another. [14]

Conclusion

Analysis Summary

Through the comparative analysis, it was shown how project organizational structure affected the schedule, cost and performance of the two projects. The complex and convoluted project management structure of the CRC project caused uncertainty in the planning process, allowed critical decisions to be pushed out, the cost to expand before construction began, and the LPA rejected soon after its adoption. The WWB project management structure was much more organized, had a distinct top-down approach, and the roles of the parties involved were more clearly defined. Key high level decisions and direction was given through the leadership management team, but design decisions and execution was left up to those in charge of the day to day decisions, this separation of roles and responsibilities allowed the project to operate in a more efficient and effective manner. Ultimately this led the WWB project to stay on schedule and within budget throughout the project. For example, one case study said the following about the WWB project:

"At the 50-percent point in construction, this $2.4 billion megaproject is on schedule and on budget."

The project organization structure of the WWB project seemed better suited to handle the complexity and challenges presented by a Mega-project. The CRC project, however, has accomplished a number of exemplary achievements, including their ability to identify and

address the environmental issues associated for the project. In fact, the CRC project won a national award recognizing the project's "environmental excellence." [23]

Findings

Similar to a small project in which some individual team members might only be needed for certain tasks, in the course of a megaproject, some groups are likewise only needed during specific tasks and phases of the Life Cycle. Our research of the CRC has revealed this fact to be true, but unlike a small project where individual team members can easily be replaced or dismissed, the analogous megaproject groups are much more challenging to identify and manage. The design and creation of governance and project management groups for megaprojects must take into account numerous factors relating to legal and statutory requirements, expenditure of public funds, effective arrangement of local stakeholders, and consideration of political realities.

It is our opinion that while the existing project management and governance structures have provided effective platforms for affected governments, publics, advisory groups and other stakeholders to have a voice in the planning, preliminary design and environmental analysis phases of the project, the structures have not been optimum for making timely decisions. As a result, the project's inability to remain on schedule can at least be partially blamed on these structures. This realization was determined by an Independent Review Panel (IRP) which was convened in the summer of 2010 and charged by the Governor's of the two states to investigate the status of the project and provide recommendations to improve project delivery. Among the recommendations of the IRP was: *"Establish a Long-Term Project Management/Governance Structure; consider retaining legal expertise to assist in determining the best option and how to structure it between the two states."* [2] The IRP stopped short of recommending a structure.

As a means to determine the possible short-comings of the existing structures, a type of responsibility matrix was developed. This matrix showed the various stakeholders of the project and their primary areas of responsibility and influence in the previous project phases. Looking toward the future, the matrix also identifies possible gaps or opportunities in these areas to improve project delivery. Once the gaps or opportunities are identified, a modified governance and project management structure can be conceptualized.

Figure 7 below shows a portion of a responsibility matrix for the project owners, Sponsors, Public, Managers, and Design and Construction Contractors. Appendix A contains the complete matrix with all stakeholders.

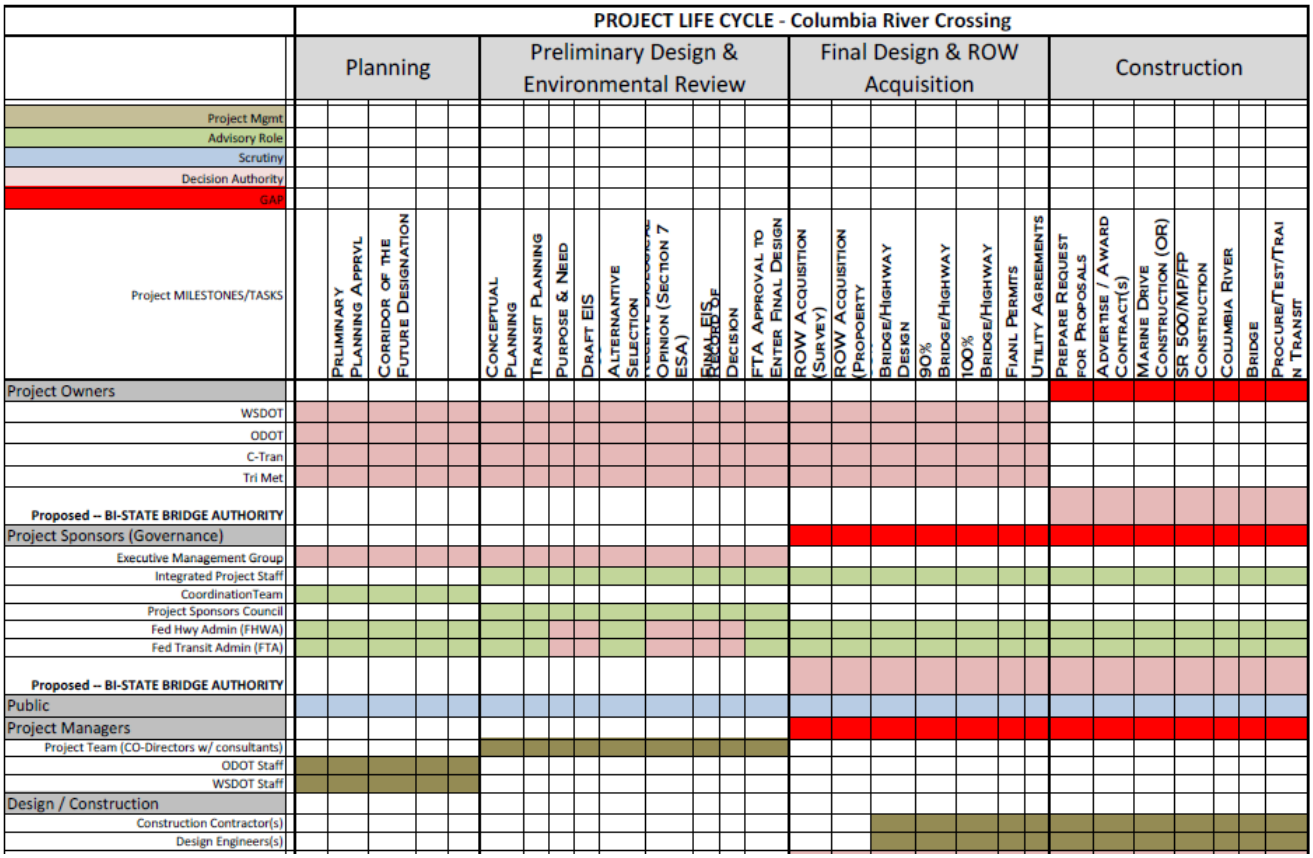


Figure 7: Responsibility Matrix through the Construction Phase

As can be seen by the Matrix, we have identified three areas (bar charts identified by the color red) where gaps or opportunities exist for change. An additional benefit of the responsibility matrix is the identification of previous and existing stakeholder groups, their primary areas of responsibility (Project Mgmt, Advisory Role, Scrutiny, or Decision Authority), and where in the Project Life Cycle their main period of influence was.

With these gaps or opportunities identified, and also describing some of the key governance and management issues that need to be addressed, we can conceptualize a new governance and project management model. Some of the key issues that remain include:

- Financial planning to cover the cost of final design, construction and future operations and maintenance, including possible tolling requirements.
- Timely completion of final design and construction after the NEPA process is complete, including identification of possible phasing requirements to match budget constraints.
- Investigation and identification of efficient procurement methods (public-private partnerships, public only, or other arrangement)
- Improvement and maintenance of the public's trust by managing a complex project costing large amounts of public money with a clear purpose and a transparent management structure.

Conceptual Project Management & Governance Structure

In order to meet the need for timely, efficient and legally defensible governance and management requirements, a modified Project Management Structure Model is shown in the following figure:

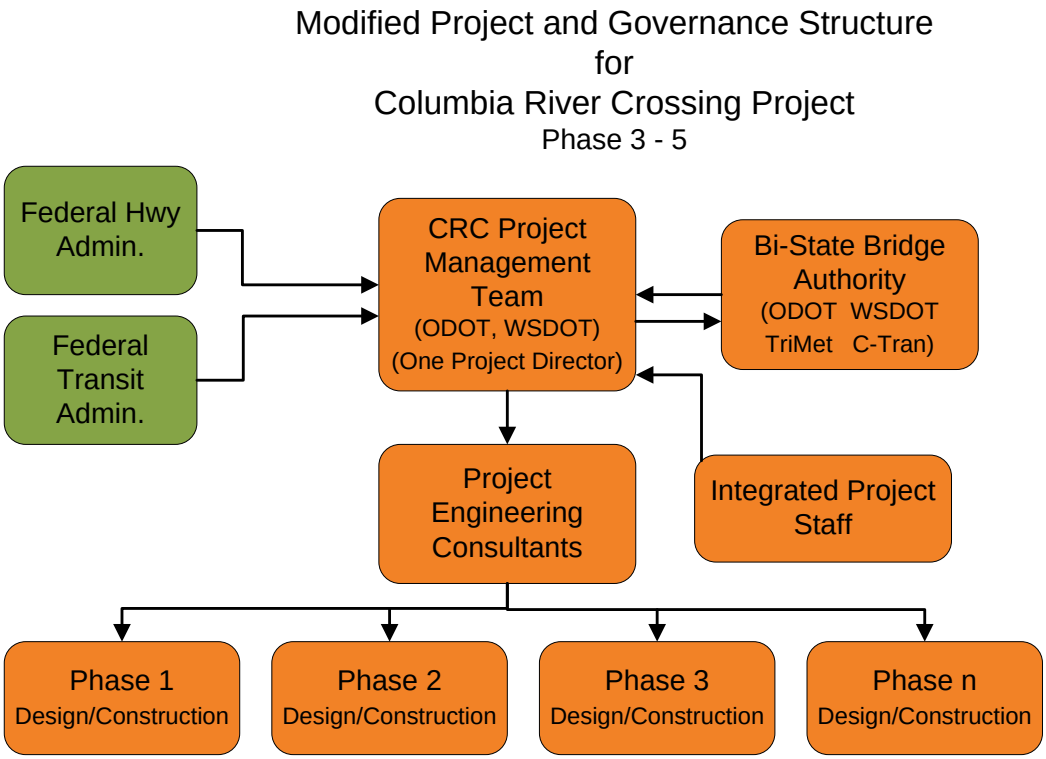


Figure 8: Conceptual Project & Governance Structure for CRC

Some of the key features of this model are as described below:

1. A Bi-State Bridge Authority comprised of the four project owners should be developed to jointly own, operate and maintain the bridge and related transit features. The Bi-State Bridge Authority would also play a key role during the Final Design and Construction Phases by being primarily responsible for Financial Planning, Construction, Tolling, and development of appropriate Policy and Regulations for approval by the respective State Legislators. This would be the primary Decision Making (Governance) body for the Project. Legally, this would be completed via a Federally Approved Bi-State Agreement with the transit owners' parties by resolution. This entity is partially based on a model used by the Louisville and Southern Indiana Bridges Authority. [24]
2. A CRC Project Management Team with one designated Project Manager is envisioned to clearly and efficiently manage the project through completion. This team would be created to replace the existing management team structure which contains co-project managers. This model is based on a similar model used with success on the Woodrow Wilson Bridge Project.
3. The existing Integrated Project Staff (IPS) would be maintained although with a more clearly defined role with limited oversight authority to represent the concerns of the affected local governments and agencies. They would provide input to the Project Management Team as appropriate.
4. The Engineering Consultant Team is more clearly identified in the new model to show the significant contribution to the project's delivery process. These consultants would report directly to the Project Manager of the new Project Management Team.
5. The Project work tasks (defined as a result of phasing recommendations developed in the Final EIS) are shown as separate deliverables in the model to clearly identify the end products of the project.

One last recommendation is provided to further the likelihood of success by the new model. Vision statements with clearly defined missions, goals and objectives should be developed and prominently displayed on the project website to clearly and unequivocally share this information with the public. This will go a long way in helping build public confidence and goodwill towards the project.

Future Research

The CRC project is a large complex research topic. We chose to focus on how the managerial structure and its decision strategy had an impact on the project's cost, schedule, and performance. Taking the findings we have identified, it is essential changes occur in the project management structure. In time, our work should be updated to evaluate what actions the Executive management group took to rectify the independent review panels' recommendations, and to determine if our proposed management structure is in line with changes suggested to the CRC organizational structure.

Our research relied on an in depth literature review, and two contacts within the CRC project. It would be beneficial to conduct additional qualitative research with the Project Sponsors council, integrated project staff, and Executive management group to supplement our work. With the limited ten week project time this was not possible to achieve. Once conducted, this additional research would help the usefulness of our findings, enabling them to be considered for possible utilization in the CRC project.

Acknowledgement

On February, two members of this class project team attended an outreach event discussing some of the environmental aspects of the project. At this outreach event, the team was able to make several contacts who were very helpful, and willing to answer questions and provide useful information. These contacts included Dennis Sandstrom with the Communications and Public Outreach for the CRC project, Heather Wills who is the environmental manager for the CRC project, and Denis Dooley who organized the outreach event.

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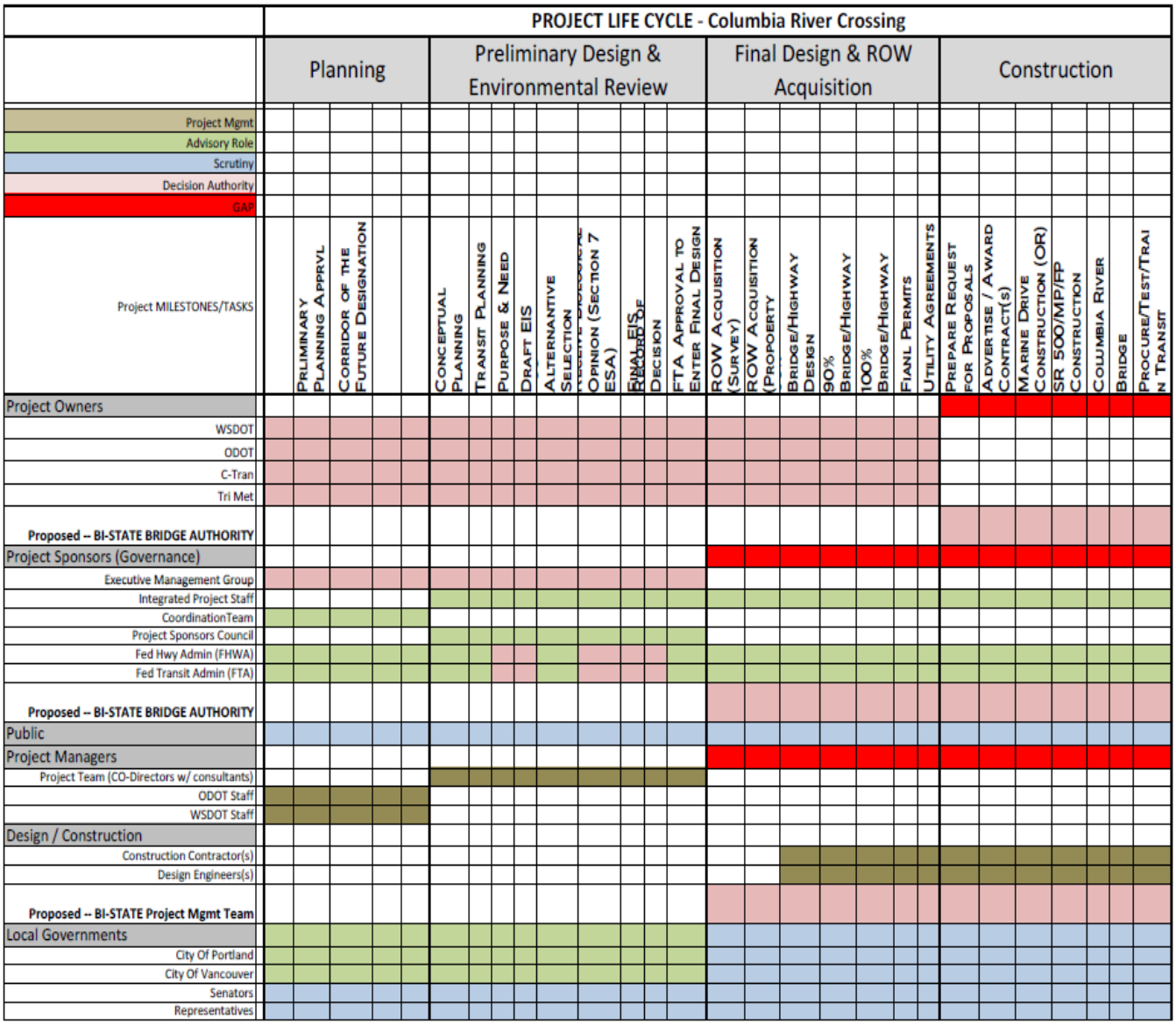
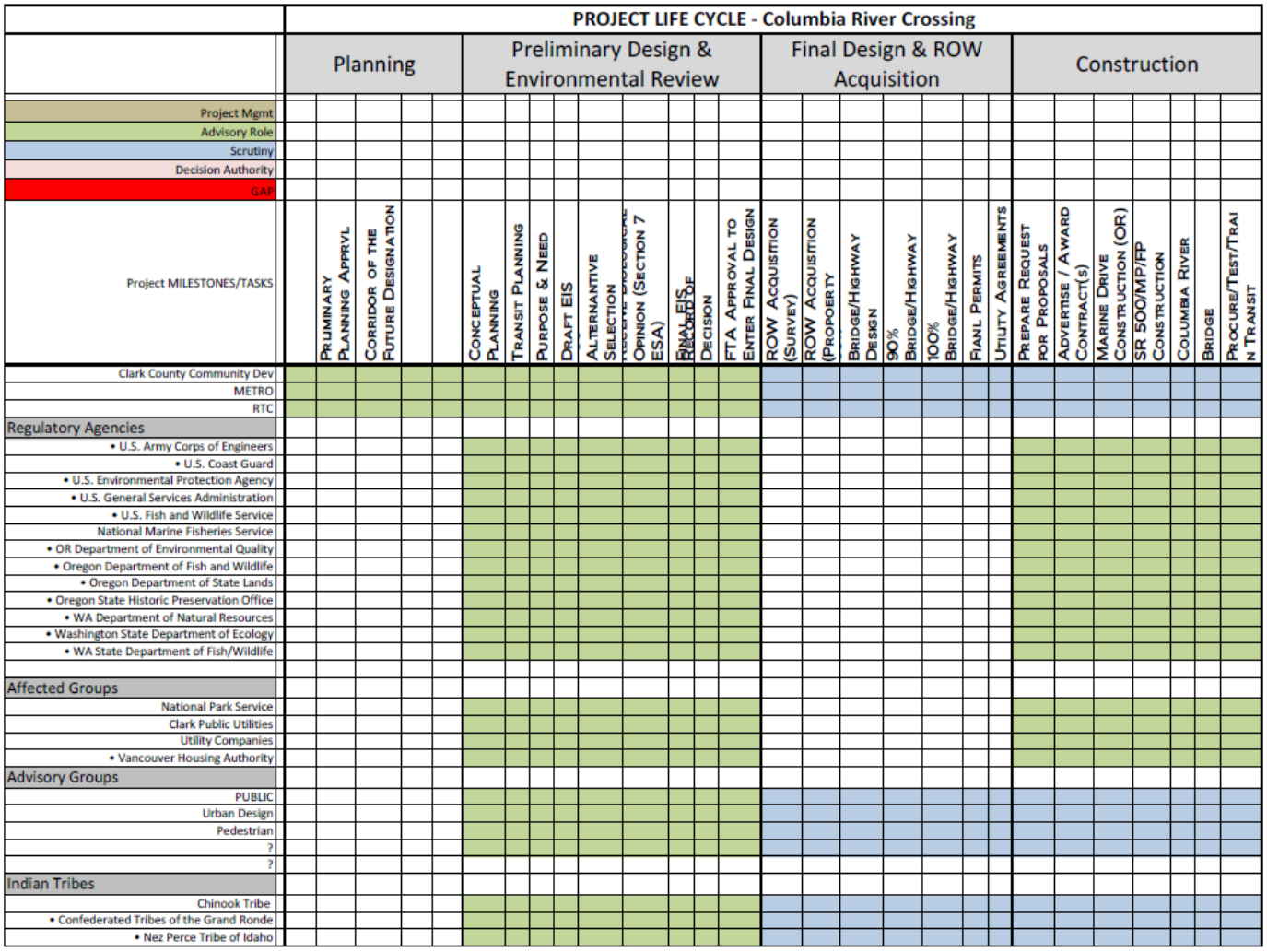
Appendix A

CRC Project Management Responsibility Matrix



Responsibility Matrix Sheet 1 of 3



Responsibility Matrix Sheet 2 of 3

	PROJECT LIFE CYCLE - Columbia River Crossing																												
	Planning					Preliminary Design & Environmental Review									Final Design & ROW Acquisition							Construction							
Project Mgmt																													
Advisory Role																													
Scrutiny																													
Decision Authority																													
GAP																													
Project MILESTONES/TASKS		Preliminary Planning Approval	Corridor of the Future Designation			Conceptual Planning	Transit Planning	Purpose & Need	Draft EIS	Alternantive Selection	Record Decision/ Biological Opinion (Section 7 ESA)	Final EIS	Record of Decision	FTA Approval to Enter Final Design	ROW Acquisition (Survey)	ROW Acquisition (Property	Bridge/Highway Design	90% Bridge/Highway	100% Bridge/Highway	Fianl Permits	Utiuty Agreements	Prepare Request for Proposals	Advertise / Award Contract(s)	Marine Drive Construction (OR)	SR 500/MP/FP Construction	Columbia River	Bridge	Procure/Test/Train Transit	
• Confederated Tribes of the Siletz																													
• Spokane Tribe of the Spokane																													
• Confederated Tribes of the Umatilla																													
• Confederated Tribes of the Warm Springs																													
Yakima Nation																													
• Cowlitz Indian Tribe, Washington																													

Responsibility Matrix Sheet 3 of 3