FINAL

OREGON GIS UTILITY PROJECT—PHASE 1 REQUIREMENTS ASSESSMENT AND BUSINESS CASE

Project Risk Identification and Mitigation Plan Deliverables 5A and 5B

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PREFACE

This report addresses Task Series 5 of the Phase 1 GIS Utility project. This report identifies risks associated with GIS Utility development and operation and recommends strategies to avoid or mitigate these risks. This is part of a crucial aspect of project management, which the Project Management Institute (PMI) refers to as "risk management." As explained by PMI's PMBOK (Project Management Body of Knowledge, Chapter 11), **risk management** is the "systematic process of identifying, analyzing, and responding to project risk." Risk is defined by PMI as "an uncertain event or condition that, if it occurs, has a positive or negative effect on a project objective." This report will focus on potential risks that might have a negative impact on the project schedule, cost, or quality. This risk analysis will be used in business case development, the conceptual design, and implementation planning for the GIS Utility.

This report is organized into two parts:

Part 1: GIS Utility Risk Identification, which addresses project Deliverable 5A

Part 2: Risk Mitigation and Risk Response Planning, which addresses project Deliverable 5B.

NOTE: Part 1 (Deliverable 5A) was delivered on March 14, 2005. This report includes a finalized Deliverable 5A and the completed Deliverable 5B.

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PART 1
GIS UTILITY RISK IDENTIFICATION

1.1 INTRODUCTION

Risks are potential events or conditions that cannot be fully predicted and which may have an impact on the schedule, cost, quality, or overall scope of GIS Utility development or operation. Potential risks are identified as part of overall project planning. The risks identified here will be used in the business case analysis (Task Series 6) to evaluate and compare the benefits of different development alternatives. Risks will also be taken into account in the implementation plan so that all reasonable steps are taken to avoid or mitigate negative impacts from risk.

Part 1 identifies the potential risks for the GIS Utility project. Risks will be categorized and described and placed in a context—particularly whether the risk is likely to be a factor during GIS utility development or during ongoing operation after deployment. Risks are organized into categories, and the probable risk impact is assigned as a basis for planning and risk management. This risk identification will be examined as part of business case development (Task Series 6) in the comparison of alternatives for GIS Utility development (different alternatives may vary in their ability to ameliorate or mitigate the potential negative consequences of risks).

Part 2, the Risk Mitigation and Risk Response Planning strategy, examines the risks presented in Part 1 and identifies approaches for avoiding risks or mitigating potential negative impacts. These two parts comprise an overall "risk management strategy" which will be an input to the implementation planning process in Task Series 7.

1.2 IDENTIFICATION OF CURRENT RISKS AND GIS UTILITY PROJECT RISKS

Two overall categories of risks are taken into account in the planning and business case preparation for the GIS Utility: 1) the status quo and 2) GIS Utility development. The first, "status quo risks," addresses the negative consequences of continuing current approaches to mapping and geographic information management (i.e., not initiating significant efforts to build the statewide GIS Utility). The status quo is characterized by the current situation in which there is considerable use of GIS in a somewhat non-coordinated environment, inconsistently mature data sets for different areas of the state, and no statewide network or structure that supports effective sharing of geographic data and services. In essence, the status quo risks imply that the GIS community in Oregon will not have the opportunity to achieve the full set of tangible and intangible benefits from the GIS Utility. Table 1-1 summarizes the primary "status quo risks" that are important for this project.

Table 1-1: Status Quo Risk Identification

Risk	Description
SQ1: Continued Labor Inefficiencies	The status quo implies uncoordinated use of GIS tools and data, where available, and, in many cases, manual data sources and procedures for a myriad of public agency business processes dependent on geographic information (response to information requests, plan and permit review, field inspection and maintenance, map preparation, etc.)
SQ2: High Costs for Geographic Data Compilation and Update	The status quo is characterized by an inconsistent patchwork of digital and manual GIS data collection and mapping programs. Duplication and redundancies result in high costs for data and lack of a consistent approach for ongoing data maintenance.
SQ3: Impact on Effectiveness of Governmental Service Provision	Federal, state, tribal, and local government agencies provide a large range of services to businesses and citizens (public health, social programs, utility service, environmental quality, education). These services are directed at a geographically distributed customer base. Location of facilities and people is not done efficiently on a statewide basis.
SQ4: Negative Land Use Impacts	Local and regional land use decisions can have negative impacts on environmental and cultural quality and can even result in major additional costs for government agencies—sometimes the case at the local or statewide level.
SQ5: Missed Economic Development and Business Investment	Economic and business development initiatives at the local or state level demand detailed, current geographic information (base map, utility, demographic, etc.). The status quo provides little of this in a comprehensive detailed manner and indirectly contributes to reduced competitiveness of State government and local governments to attract investors for commercial, industrial, research, or other businesses.
SQ6: Limited Emergency Response and Management Capability	The status quo means that inconsistent, often incomplete, and sometimes nonexistent statewide data vital for emergency planning, coordination, and response will continue. In the end, this implies a risk for damage to property or the loss of lives—lack of information impacts time and quality in emergency response. The GIS Utility supports emergency planning and coordination and will deliver information at the local level for first responders.
SQ7: Higher Costs for Regulatory Compliance	Current and upcoming federal and state regulations and local ordinances often demand increased governmental resources for response and compliance. The GIS Utility provides the means for avoiding high costs of regulatory compliance that often require increased geographic data collection, analysis, and reporting. The status quo implies that additional staff time and costs will be incurred in compliance.
SQ8: Missed Revenue from Taxation and Fee Collection Programs	Effective and equitable governmental programs for fee and property taxation are dependent on sound, up-to-date information. Even minor problems in such areas as property valuation, utility services billing, various types of land use fees, and even the collection of fines from enforcement citations result in reductions in revenue. This will continue under the status quo, but the high-quality updated data in the GIS Utility will allow program managers to run programs more efficiently and increase revenue.
SQ9: High Costs for GIS Program Operation	GIS development and operations at all levels of government will continue in a semi-coordinated status with resulting duplication and overlap of projects and services provided. This results in higher costs for computer hardware, software licenses, annual support and maintenance contracts, database development work, and duplication in personnel in some cases.
SQ10: Reduced Data Access and Collaboration	The status quo is characterized by limited geographic data sharing among state agencies in many cases and a low level of data sharing between local and regional agencies and jurisdictions. The very nature of the GIS Utility implies statewide participation and collaboration with a range of tangible and intangible benefits—not often easy to put in place under the status quo.
SQ11: Financial Impact—Liability and Insurance Claims	Governmental agencies are always exposed to liability damage claims (e.g., traffic accidents, environmental impacts), and insurance costs for public property are high. Often, data sources are now insufficient to cost-effectively support legal and financial challenges. Lack of ability to perform effective risk analysis during program planning and design, as well as inflexibility in evaluating legal claims, will continue resulting in higher than necessary cost to state agencies and local governments.
SQ12: Potential for Catastrophic Loss of Records or Data	Poorly managed digital records and the large pool of hardcopy maps and geographic records stored by state and local agencies are subject to loss, damage, or destruction from fire or other events, with an extremely high replacement cost. The GIS Utility will virtually eliminate chances of catastrophic loss of key geographic data.
SQ13: Limitations in Infrastructure Planning and Management	Long-range planning and design for infrastructure development—roads and utility systems—will continue to be limited by a lack of available base map and thematic information in many areas of the state. This results in time delays and much higher costs for project planning and design.

The second major category, "GIS Utility Program Risks," relates specifically to the GIS Utility development effort and ongoing operation. These risks relate to conditions or events that have the potential for causing project delays, increase in costs, or other impacts on the scope and quality of the project results.

While risks cannot be fully predicted in the beginning of the project, they can be identified as possibilities and taken into consideration in the planning process. Risks are organized into the following categories:

Funding/Resource Allocation: Includes risks associated with allocating and sustaining funding and staff resources for GIS Utility development and operation.

Organizational/Political: Includes all aspects of organizational relationships, project management, governance structure for the GIS Utility, and high-level legislative and executive support for the multi-year project. Risks that may have an impact on these factors are identified.

Technical/Procedural: Includes risks associated with the technological and operational aspects of the project, including hardware and software, network configuration, and database development, and the procedural workflows associated with technology acquisition and implementation. These risks reflect potential technical obstacles in system development that could impact costs or the schedule.

Table 1-2 describes the potential risks that have been identified for the GIS Utility project. These potential risks will be factors during the development and operation of the GIS Utility.

Table 1-2: GIS Utility Project Risk Identification

Risk	Description	Potential Triggers/Indicators*	Timing for Risk**	
			Development	Operation
A. Funding/Resource Allocation				
A1. Insufficient funding allocation	Sufficient funds for development and operation are not allocated to the GIS Utility effort. "Sufficient funds" means funding levels that match budget requirement projections resulting from the GIS Utility Conceptual Design. This risk encompasses funding from all sources, including state and local government general funds and special fund budget allocations, project partnerships with outside agencies and private companies, grants, etc. An important factor contributing to risk is the poor fiscal situation in state government that limits allocation of funding.	• Legislative action • Formal allocations from agency budgets	**P**	**S**
A2. Dedicated staff resources not sufficient or available	This risk addresses the allocation of staff dedicated to GIS Utility management and operations (in GEO or another designated unit). Program management and operational support will be dependent on dedicated staff during development and long-term operation of the GIS Utility. If staff resources are not allocated for the program or if they are diverted to other activities, a lower than planned staffing level will be available. A related staffing concern is the availability of staff with the proper skills and the potential for staff turnover that could impact the project.	• Formal staff positions established or filled (budget allocation and personnel action) • Executive action for hiring freeze	**P**	**P**
A3. Resource support commitments from state agencies insufficient	The GIS Utility will depend, in part, upon non-financial support (people, data, technical support) from state agencies and other levels of government. Such commitments of resources reflect the nature of the GIS Utility—a network of users and providers of data and systems with shared resources. Resource commitments may be defined through formal or informal agreements between government agencies.	• Formal commitment of staff support • Formal decisions to provide data or system support • Formal agreements defining commitment	**P**	**P**
A4. Cost projections do not meet actual costs	This potential risk would arise if costs unexpectedly increased during the multi-year development processes or if new cost items not included in original budget projections were required. These cases would result in costs that exceed budgets and funds allocated for the project.	• Formal bids for services and products • Advertised prices for products	**P**	**S**

*Triggers/Indicators: Formal actions or events that could result in or alleviate the negative consequences of risk

**Timing of Risk: Indication about when (during development or operation) the risk will be a factor. P = Primary Concern (first three years); S = Secondary Concern

Table 1-2: GIS Utility Project Risk Identification (continued)

Risk	Description	Potential Triggers/Indicators*	Timing for Risk**	
			Development	Operation
B. Organizational/Political				
B1. Insufficient support in the state legislature	The GIS Utility program needs long-term legislative support through appropriate statutory authority, legislative resolutions, and direct engagement of legislative committees and support staff. With an insufficient level of support or a drop in support over time, the GIS Utility program could be impacted by loss of funds, a decreasing level of authority and ability to lead the statewide program, and reduction in overall priority.	• Acknowledgment and active interest by legislative committees • "Champions" supporting project • Formal action by legislature (statute, resolution, budget allocation)	**P**	**S**
B2. Lack of awareness/support at senior executive level	Just as legislative support (B1) is critical, so is a high level of awareness and support at the executive level. This includes the Governor's Office, other constitutional officers, and senior agency executives. Awareness and support are indicated by participation in a formal governance body for the GIS Utility, executive actions, allocation of resources, and accountability for accomplishment of objectives. Since these individuals are decision makers, assign program priorities, and direct allocation and use of resources, the GIS Utility must be viewed as a program and tool that support the program areas important to these executives. Loss of awareness and support could negatively impact resources available to the GIS Utility or could lessen its regular use.	• Participation in oversight body • Issuance of formal executive orders or policy directives • Acceptance of standards and policies for GIS utility coordination • Allocation of resources	**P**	**S**
B3. Insufficient support and participation among regional and local governments	Long-term success requires substantial buy-in by local and regional governments and agencies. Implementing and promoting effective coordination and support relationships are important, and breakdowns in these relationships will hurt the overall program. Regional and local participation will be formalized through signing of agreements for data sharing, allocation of resources, acceptance of certain standards and policies for system access and operation, and sharing accountability for accomplishing objectives. It is also important to keep active involvement and establish equitable representation of this segment of the user community in a long-term oversight body (as is the case now, to some extent, through the project Steering Committee and involvement of OGIC).	• Participation in an oversight body • Formal acceptance by local governing bodies (boards, commissions, councils) • Executive decisions to allocate resources and to accept procedural standards	**P**	**P**

*Triggers/Indicators: Formal actions or events that could result in or alleviate the negative consequences of risk

**Timing of Risk: Indication about when (during development or operation) the risk will be a factor. P = Primary Concern (first three years); S = Secondary Concern

Table 1-2: GIS Utility Project Risk Identification (continued)

Risk	Description	Potential Triggers/Indicators*	Timing for Risk**	
			Development	Operation
B. Organizational/Political (continued)				
B4. Insufficient participation and support by non-public sector organizations	Non-public sector groups (private companies, academic institutions, not-for-profit organizations) will also be important participants as users, providers of data, and partners in funding certain initiatives. GIS Utility success depends on a growing number of non-governmental entities. Private sector participation will be formalized through signing of agreements for data sharing, acceptance of certain standards and policies for system access and operation, and shared accountability for achieving objectives. It is also important for representatives of the private sector to remain actively involved in a long-term oversight body (as is the case now, to some extent, through the project Steering Committee).	• Participation in an oversight body • Formal acceptance by executive management • Effective contracts for provision of products and services	**P**	**P**
B5. Ineffective coordination with federal agencies	Multiple federal agencies are active in Oregon and play a major role in GIS data development and use (USGS, BLM, BIA, FEMA, USFS, others). Effective coordination to channel resources, collaborate on projects that contribute to the GIS Utility, and share accountability for achieving objectives is vital. The risk of poor federal participation and coordination could impact the availability of data and funding for GIS Utility support. It is also important to keep active involvement and establish an equitable representation of this segment of the user community in a long-term oversight body (as is the case now, to some extent, through the project Steering Committee and involvement of OGIC).	• Formal programs initiated by federal agencies • Formal agreements for participation and support by federal agencies	**P**	**P**
B6. Legal/Policy restrictions on data distribution	The GIS Utility will allow access to data from multiple sources. Some source organizations (public or private) could place legal or policy restrictions on distribution or access to data. These restrictions may relate to copyright, liability, license terms, or pricing policies imposed by certain parties (public or private). There is a risk that limitations of access could have a negative impact on overall data accessibility. OGIC has already made progress on establishing legal and policy mechanisms for addressing these concerns, and this work is the basis for a more comprehensive legal/policy framework.	• Legal rulings on data access accepted statewide • Model data license terms • Accepted policies and instruments for data/product distribution and sharing	**P**	**S**
B7. Public-Private partnership obstacles	Some specific risks associated with public agency business relationships with the private sector must be addressed. These have to do with the provision of products and services and the establishment of clear terms and business relationships that are effective and mutually beneficial. This primarily has to do with the ratification of cost-effective and efficient contracts for provision of products and services or joint funding agreements that may be put in place with such entities as utility companies.	• Acceptance of license terms for use of private data • Effective contracts for provision of products and services • Joint funding agreements	**P**	**P**

*Triggers/Indicators: Formal actions or events that could result in or alleviate the negative consequences of risk

**Timing of Risk: Indication about when (during development or operation) the risk will be a factor. P = Primary Concern (first three years); S = Secondary Concern

Table 1-2: GIS Utility Project Risk Identification (continued)

Risk	Description	Potential Triggers/Indicators*	Timing for Risk**	
			Development	Operation
C. Technical and Procedural				
C1: Database development delays	This refers to delays in meeting database development milestones or failure to meet quality objectives because of technical reasons such as—a) missed flying seasons for image acquisition, b) problems with preparation or delivery of source material, c) logistical problems with contractors, etc.	• Contract problems impacting schedule • Deliverable dates are missed • Product QA checks reveal quality problems	**P**	
C2: Wide area network (WAN) limitations	Sharing of data and services through the GIS Utility will require a physical statewide network that can deliver adequate speed and secure communications to participants. Problems with network access will disrupt operations for data access and data update and will reduce confidence and full participation in the GIS Utility.	• Existing network review shows gaps • Availability of private WAN services for certain areas • Operational problems (interruptions or response time problems)	**S**	**P**
C3: Lack of maturity or consensus on technical standards	The GIS Utility will be built on technical standards that direct the design of networks, computer platforms, data formats, software, and application development and will provide the foundation for interoperability and information sharing. GIS Utility participants need to accept and comply with a minimum set of standards to support database development and sharing. Without this, "database islands" will proliferate and work against the overall GIS Utility concept. NOTE: The Federal Geographic Data Committee and Oregon's Framework Working Group have standards that will lessen the potential negative impact of this risk.	• Existing or accepted data standards on data content or format • Formal acceptance by participants	**P**	**P**
C4: Poor contractor performance	Contractors will develop many elements of the GIS Utility. Contractors will also provide system support during operations. Poor performance resulting from bad selection decisions, poorly defined scope, poor contract management or oversight, contractor operational or resource problems, or other performance difficulties can impact time, quality, and cost.	• Contracted schedule or deliverable requirements not met • Contractor company status (financial, organizational problems)	**P**	**S**

*Triggers/Indicators: Formal actions or events that could result in or alleviate the negative consequences of risk

**Timing of Risk: Indication about when (during development or operation) the risk will be a factor. P = Primary Concern (first three years); S = Secondary Concern

Table 1-2: GIS Utility Project Risk Identification (continued)

Risk	Description	Potential Triggers/Indicators*	Timing for Risk**	
			Development	Operation
C. Technical and Procedural (continued)				
C5: Network and data administration and security problems	The GIS Utility must operate with robust system and network administration and security in a way that eliminates any significant chance of data loss, system corruption, and security breaches. If such problems occur, system availability will be compromised and user confidence will decrease.	• Events resulting in data loss or system service disruption • Security problems or breaches	S	P
C6: User adoption and support problems	A well-designed and operational system will not in itself guarantee adoption by users. The GIS Utility program will require promotion, education, and ongoing user support. The risk of poor or incomplete user adoption and technical support will quickly undermine system use and broad goals for incremental expansion of the GIS Utility.	• Statistics tracking system access and use • Complaints/Calls from users • Duplication of database development (indicating lack of GIS Utility use)	S	P

*Triggers/Indicators: Formal actions or events that could result in or alleviate the negative consequences of risk
**Timing of Risk: Indication about when (during development or operation) the risk will be a factor. P = Primary Concern (first three years); S = Secondary Concern

1.3 GIS UTILITY RISK IMPACT ASSESSMENT

This subsection provides information about the potential impact of the risks identified in Subsection 1.2. The potential impacts from "status quo" risks (see Table 1-2) may be considered a baseline for the business case comparison of alternatives—specifically, the alternative of not implementing the GIS Utility. Table 1-3 provides a general subjective assessment of the probability of the risk and the level of impact of the risk event or condition. The underlying assumption is that the GIS Utility, if designed and deployed wisely, will play a major factor as a risk mitigation and risk avoidance mechanism. In Table 1-3, probability is an indication of the chance that the stated risk will continue to have a significant impact under the status quo. Impact is a general indication of the magnitude of the impact on cost, time, or quality associated with governmental services or product delivery. Characterizing the status quo risks and their potential impact gives a basis for comparison with alternatives for GIS Utility development.

Table 1-3: Status Quo Risk Probability and Impact

Risk	Probability*	Impact Level**	Comment
SQ1: Continued Labor Inefficiencies	90%	3	High probability of inefficiency in labor and resource expenditure continuing at the current level. Negative impact in the range of 15- to 50-percent productivity loss for information-intensive business processes.
SQ2: High Costs for Geographic Data Compilation and Update	75%	3	High probability that redundancies will continue with the inability to take advantage of economy of scale in data production with potential cost savings in the range of 15 to 40 percent for certain database development tasks.
SQ3: Impact on Effectiveness of Governmental Service Provision	50%	4	Continued inefficiencies in resource allocation to "geographically related" services. Huge savings possible if GIS is used effectively for assignment of personnel, service site location, and efficient routing.
SQ4: Negative Land Use Impacts	25%	4	Moderate probability but potential major cost and environmental quality impact from poor decisions on major land and infrastructure development. Potential financial impact is money spent on ameliorating problems.
SQ5: Missed Economic Development and Business Investment	25%	4	Possible loss of investors for major development projects or local business location can have significant economic impacts on local and regional economies, job availability, etc.
SQ6: Limited Emergency Response and Management Capability	30%	5	Expected problems in many areas of the state where data is not detailed or up-to-date to support local emergency operations. The frequency of major emergency events is relatively low but when they occur, impacts on property and life will be severe.

*__Probability__, expressed as a percentage, is an indication of the chances and relative frequency of risk conditions or events arising that trigger the risk. The risk probability and impact level is a general indication of the potential probability under the status quo.

Impact Level refers to the level of impact that the risk is likely to have on the costs, time, and quality in delivery of government services and products. This is a general rating from 1 to 5 where “1” indicates very low impact and “5” means very high impact.

Table 1-3: Status Quo Risk Probability and Impact (continued)

Risk	Probability*	Impact Level**	Comment
SQ7: Higher Costs for Regulatory Compliance	50%	3	Upcoming and yet-to-be-conceived regulations all have financial and "quality-of-life" impacts (e.g., recent Measure 37 legislation). Probability and impact are reasonably high in terms of costs for compliance.
SQ8: Missed Revenue from Taxation and Fee Collection Programs	25%	3	Expected minor cases of lost revenue which can add up to considerable sums for local or state agencies, particularly when cumulative costs are taken into account over a period of time.
SQ9: High Costs for GIS Program Operation	25%	2	Individual GIS programs will continue to be initiated and operated by a growing number of public agencies in Oregon. Cost impacts of totally independent operations will be moderately higher (10 to 30 percent) than using the resources and technical support provided by the GIS Utility program. In some cases, small organizations could save considerable sums by using a hosted option and avoiding the costs of implementing their own system.
SQ10: Reduced Cross-Jurisdictional Data Access and Collaboration	75%	2	High probability of continued obstacles in acquiring data that crosses jurisdictional boundaries to support statewide program planning and analysis and for regional planning projects. Results in higher costs, increased time for acquiring data and, sometimes, negative impacts from poor planning decisions when data is not available.
SQ11: Financial Impact—Liability and Insurance Claims	15%	4	Not a frequent problem, but in certain cases (e.g., a liability lawsuit), cost impacts could be severe and, in some cases, lessened greatly by access to reliable geographic data.
SQ12: Potential for Catastrophic Loss of Records or Data	5%	5	Low probability of a catastrophic event resulting in major loss of records but high resulting cost impact if such an event occurs.
SQ13: Limitations in Infrastructure Planning and Management	50%	3	Expected ongoing problems with many large and small infrastructure planning projects and cost impacts on maintenance and repair activities. Cost impacts include increased cost for collecting and verifying data and less efficient coordination for multiple infrastructure projects.

*__Probability__, expressed as a percentage, is an indication of the chances and relative frequency of risk conditions or events arising that trigger the risk. The risk probability and impact level is a general indication of the potential probability under the status quo.

**__Impact Level__ refers to the level of impact that the risk is likely to have on the costs, time, and quality in delivery of government services and products. This is a general rating from 1 to 5 where "1" indicates very low impact and "5" means very high impact.

Table 1-4 provides an analysis of risks associated with GIS Utility design, development, deployment, and operation. This rating is a general indication of the potential probability and impact on the project before applying specific risk management strategies that can lessen the negative effects of the risk. This assignment drives the development of a risk management strategy that is covered in Part 2 of this report. This is input to the implementation planning process (which will employ specific strategies for risk

avoidance, mitigation, or transfer), and this assignment of risk probability/level will be an input to the business case analysis.

Table 1-4: GIS Utility Project Risk Impact Type and Probability

	Potential Impact Types*					
Risk	**Cost**	**Schedule**	**Scope**	**Quality**	**Probability****	**Impact*****
A. Funding/Resource Allocation						
A1. Insufficient funding allocation	**P**	**S**	**S**	**S**	50%	5
A2. Dedicated staff resources not sufficient or available		**P**	**P**	**S**		
A3. Resource support commitments from state agencies insufficient		**P**	**P**	**S**	60%	3
A4. Cost projections do not meet actual costs	**P**	**S**	**S**	**S**	20%	3
B. Organizational/Political						
B1. Insufficient support in State legislature	**P**	**S**			40%	4
B2. Lack of awareness/support at senior executive level	**P**	**S**			25%	4
B3. Insufficient support and participation among regional and local governments	**S**	**S**	**P**		25%	3
B4. Insufficient participation and support by non-public sector organizations	**S**	**S**	**P**		40%	3
B5: Ineffective coordination with federal agencies		**S**	**P**	**P**	40%	4
B6. Legal/Policy restrictions on data distribution		**S**	**P**	**P**	20%	3
B7. Public-Private partnership obstacles	**P**		**P**	**S**	30%	3
C. Technical and Procedural						
C1: Database development delays		**P**	**S**		75%	2
C2: Wide area network limitations		**S**		**S**	30%	3
C3: Lack of maturity or consensus on technical standards		**S**	**S**	**S**	25%	3
C4: Poor contractor performance	**P**	**P**	**P**	**P**	20%	4
C5: Network and data administration and security problems			**S**	**P**	15%	3
C6: User adoption and support problems		**S**	**P**	**S**	15%	3

***Impact Type** refers to the nature of risk and its effect on GIS Utility development or operation. The impact is subjectively assigned a "P" for primary impact, an "S" for secondary impact, or a blank indicating no significant impact. Impact types include:

- **Cost** = Funding levels (from multiple sources) that are insufficient to support development and sustain operations
- **Schedule** = Implies significant delays in the planned timing of tasks and milestones that have a negative impact on deployment and use of the GIS Utility
- **Scope** = Risk impacts that can result in failure to meet all project objectives and to produce planned deliverables in the manner defined in the project plan
- **Quality** = Effects on the project that could result in failure to meet specifications for deliverables or reduced service levels.

****Probability**, expressed as a percentage, is an indication of the chances and relative frequency of risk conditions or events arising that trigger the risk. This is a general indication of the potential probability of occurrence during the project before applying specific risk management strategies that can lessen the negative effects of the risk.

*****Impact Level** refers to the level of impact that the risk is likely to have on the costs, time, and quality in delivery of government services and products. This is a general rating from 1 to 5 where "1" indicates very low impact and "5" means very high impact. The impact level is a general indication of the impact on the project before applying specific risk management strategies that can help avoid the risk or lessen the negative effects of the risk.

PART 2
RISK MITIGATION AND RISK RESPONSE PLANNING

Risk mitigation is part of an overall risk response planning approach that will be used to lessen the negative impacts of the potential risks identified in Part 1. The Project Management Institute defines three major risk response approaches:

Avoidance: Developing the project plan or controls to protect the project from risk impacts.

Transference: Transferring the consequences or responsibility of a risk to a third party. Transference does not eliminate a risk; it only shifts responsibility. The most common strategy for risk transference is through well-designed contracts for certain elements of the work.

Mitigation: Reduction in the probability and/or consequences of an adverse risk event to an acceptable level. Usually includes project controls for identifying risk events early in a project and taking formal action before impacts are great.

The risk management/risk reduction strategies response relates to the project risks defined in Table 2-1.

Table 2-1: Project Risk Management and Reduction Strategies

Risk	Risk Management/Reduction Strategies: Avoidance Strategies (Prepare plan and project controls to avoid or reduce impact)	Transference Strategies (Shift risk and responsibility to other party)	Mitigation Strategies (Reduce probability or impact by identifying risk event early and taking action)
A. Funding/Resource Allocation			
A1. Insufficient funding allocation	Build a strategy that does not assume major state funding for the 2005-07 biennium and adopt a strategy and budget that assumes conservative project funding from outside sources while at the same time aggressively pursuing outside sources and partnerships Build contingencies and priorities in the implementation plan so that the project can proceed even if full funding is not available. Continue to promote the GIS Utility program to senior officials and demonstrate results and benefits, particularly related to key enterprise initiatives that have wide support.	Work with state agencies to obtain financial and "like-kind" non-financial resources to support the project. Aggressively pursue non-state funding sources and fund leveraging.	Prepare a strong business case and reasonable requests for funding support. Work actively with legislative staff and committees to support allocations following the 2005 session and position for funding approval in the 2007 session. Aggressively pursue outside funding sources and partners and all innovative funding avenues.
A2. Dedicated staff resources not sufficient or available	Prepare a staffing plan that does not assume a large number of new permanent positions and that does not assume major state funding for the 2005-07 biennium. Put in place sound team building and management to avoid turnover.	Where possible, use contracted staff or consultants to place responsibility for certain development areas to private contractor(s).	Prepare a strong justification and business case for senior officials on the need for staff. Report on the progress/accomplishments of the team. Explore and use all available "non-traditional staffing" approaches, including contract staff, temporary positions, interns, "virtual" staffing from other agencies, etc.
A3. Resource support commitments from state agencies insufficient	Prepare policies that clearly define responsibilities from state agencies (responsibility for data update) and obtain formal approval. Continue to promote the GIS Utility program to senior officials and demonstrate results and benefits, particularly related to key enterprise initiatives that have wide support.	Explore cases where contracted resources, connected with projects of state agencies may be leveraged to support GIS Utility development.	Build and use an organizational structure with multi-agency participation and oversight to keep support. Seek high-level authority for state agency commitments (financial and staff) to the project. Have multiple alternatives for resources that can be pursued.
A4. Cost projections do not meet actual costs	Carefully prepare and check budget estimates and build in some financial contingency reflecting risk or uncertainty with specific cost items. Take into account inflation of costs, particularly for personnel. Revise the multi-year budget on an annual basis.	Use contractors effectively with a clear scope, price, and performance criteria to avoid overruns. Use partnerships effectively to distribute potential risk and cost pressures to multiple agencies.	Put in place effective cost monitoring, budget control, and contract management procedures to allow cost overruns to be anticipated and acted upon early. Have procedures for responding to projected overruns. Always look for opportunities for cost sharing and strategies that result in savings over original projects.

Table 2-1: Project Risk Management and Reduction Strategies (continued)

Risk	Risk Management/Reduction Strategies: Avoidance Strategies (Prepare plan and project controls to avoid or reduce impact)	Transference Strategies (Shift risk and responsibility to other party)	Mitigation Strategies (Reduce probability or impact by identifying risk event early and taking action)
B. Organizational/Political			
B1. Insufficient support in the state legislature	Build support at the staff and committee level during the 2005 session and present a good business case. Continue communication and promote the program with legislative staff and senior officials. Demonstrate the impact on the statewide user community, including local governments, citizens, and the business community.	Seek "surrogates" (local officials, citizen groups, business people) to indicate support for the GIS Utility with senior officials and legislators.	Have multiple sources of financial and resource support that can be tapped. Prepare for a promotion and proposal for additional action for the 2007 session.
B2. Lack of awareness/ support at senior executive level	Include steps in plan for effective outreach and education for senior officials. Set up and effectively use a governing body that includes senior people and mechanisms to ensure share accountability for achieving enterprise objectives. Provide sound support to users—their positive support will filter up to senior officials.	Encourage peer-to-peer education in which senior officials can exchange ideas in technology subjects. This would include an active role for the GIS Utility governing board.	Monitor use and support and take action (meeting, phone call, or other response) if support lags.
B3. Insufficient support and participation among regional and local governments	Put in place and execute an outreach and education plan for local governments and regional agencies. Use current professional organizations and user groups in Oregon as the base. Put in place a formal but simple process for local and regional organizations to "register" as GIS Utility participants. Include equitable participation from executives in local and regional organizations on the GIS Utility Governing Board, with mechanisms to ensure shared accountability to achieve enterprise objectives. Support statewide and regional GIS user groups.	Obtain support from GIS vendors (ESRI and others) and professional groups to directly promote participation to their clients.	Have a mechanism to monitor the level of use and periodically survey for the "level of satisfaction" by participants and take action where problems arise.

Table 2-1: Project Risk Management and Reduction Strategies (continued)

Risk	Risk Management/Reduction Strategies: Avoidance Strategies (Prepare plan and project controls to avoid or reduce impact)	Transference Strategies (Shift risk and responsibility to other party)	Mitigation Strategies (Reduce probability or impact by identifying risk event early and taking action)
B. Organizational/Political (continued)			
B4. Insufficient participation and support by non-public sector organizations	Put in place and execute an outreach and education plan for non-public sector groups. Use business organizations or other sources as the basis. Put in place a formal but simple process for non-public sector organizations to "register" as GIS Utility participants. Include major participation from non-public sector organizations on the GIS Utility Governing Board and mechanisms to ensure shared accountability to achieve enterprise objectives.	Obtain support from private companies and professional groups to actively promote the GIS Utility to their members and peers.	Have a mechanism to monitor the level of use and periodically survey for the "level of satisfaction" by non-public sector participants and take action where problems arise.
B5. Ineffective coordination with federal agencies	Set and pursue specific goals for federal collaboration. Include equitable participation from federal agencies on the GIS Utility Governing Board and mechanisms to ensure shared accountability to achieve enterprise objectives. Actively pursue joint projects and manage them well.	Use statewide and federal coordination bodies as a way to promote and encourage federal support and joint projects.	Keep active in statewide and federal coordination bodies and use as the basis to monitor and help coordinate with federal agencies.
B6. Legal/Policy restrictions on data distribution	Establish standard terms for data sharing and exchange, and encourage participants to approve. Craft policies that ensure protection of sensitive data and records. Develop an approach for participation by local or regional agencies that are currently charging fees for GIS access. Develop practical license terms and fee schedules for certain user groups (e.g., the private sector).	Obtain input or model policies from state government legal staff or outside groups to lend support for standard data sharing terms.	Monitor and identify cases where local or regional policies may differ or conflict with GIS Utility policies and take direct action to work out a compromise to keep active participation.

Table 2-1: Project Risk Management and Reduction Strategies (continued)

Risk	Risk Management/Reduction Strategies: Avoidance Strategies (Prepare plan and project controls to avoid or reduce impact)	Transference Strategies (Shift risk and responsibility to other party)	Mitigation Strategies (Reduce probability or impact by identifying risk event early and taking action)
B. Organizational/Political (continued)			
B7. Public-Private partnership obstacles	Continue good outreach efforts with the private sector. Explore and define administrative and legal mechanisms that support approval and set-up of partnerships (avoiding delays and legal obstacles that prevent effective partnerships). Establish several goals for specific partnerships and joint projects with the private sector.	Place appropriate responsibility (via a formal agreement) for participation and resourcing on the private sector partner.	Manage the joint project well and monitor, report on activities, and identify problems early. Re-scope, reschedule, or adjust project personnel as needed.
C. Technical and Procedural			
C1. Database development delays	Put in place a clear, realistic plan with contingencies to deal with potential delays.	Have clear contracts defining deliverables, performance, price, and schedule with problem-resolution and change-order procedures.	Put in place effective monitoring of database development projects with formal procedures for problem resolution, re-scoping, and re-scheduling when needed.
C2. Wide area network limitations	Work closely with the IRMD CNIC (system and network consolidation effort) to make use of wide area network links and network management. Design GIS Utility services to support access (at least certain services) at low speed (dial-up).	Keep abreast of and support efforts of the State Economic and Community Development Department and private communication service providers to expand broadband networks across the state.	Collaborate with the SIEC to ensure support for geospatial data development in conjunction with the development of the statewide wireless network.
C3. Lack of maturity or consensus on technical standards	Design the GIS Utility with adherence to system and data standards that are mature and which are approved by recognized bodies (OGIC, IRMD, national standards bodies). Where standards are not mature, define a project-specific standard that reflects the status of the industry and the practical needs of Oregon users. Where appropriate (e.g., for database development and maintenance), establish the minimum standards (which may be less than the full standard) necessary for GIS Utility participation.		

Table 2-1: Project Risk Management and Reduction Strategies (continued)

Risk	Risk Management/Reduction Strategies: Avoidance Strategies (Prepare plan and project controls to avoid or reduce impact)	Transference Strategies (Shift risk and responsibility to other party)	Mitigation Strategies (Reduce probability or impact by identifying risk event early and taking action)
C. Technical (continued)			
C4. Poor contractor performance	Establish and use sound procedures for contractor review and selection. Starts with clear specifications and a procurement document. Prepare a contract that clearly defines performance and provides avenues for problem resolution.	Use legal/purchasing group to take action if problems are severe enough to warrant certain formal contract performance actions or penalties.	Monitor contract performance and identify and report on problems early. Have procedures to inform the contractor of problems or deficiencies. Take necessary contract action—replace project personnel, change procedures, re-scope, or terminate the contract.
C5. Network and data administration and security problems	Put in place proper hardware, software, and robust system and network administration procedures and practices—use CNIC facilities and procedures. Put in place effective security and disaster recovery procedures and resources (CNIC).	Where appropriate, use contracted network service and system maintenance contractors with clear service-level agreements.	
C6. User adoption and support problems	Support user orientation and education programs. Put in place on-line resources for GIS information, education, and training. Support user groups and user networking. Have effective software support agreements and provide a general help-desk service for users.	Work with GIS vendors and obtain their support for user education and support. Put in place several regional GIS Utility data/service centers to be the primary GIS resource and contact for users in "technology poor" areas of the state.	Set up effective procedures and tools to monitor system use (number of hits) and the type of access to the GIS Utility. Have an on-line tool for users to log concerns and obtain a response.