Building a Successful Enterprise GIS Strategy
An ROI Approach

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ESRI

Presentation Overview

- Current ROI Case Studies/What we know about ROI
- Introduction to ESRI/PA Consulting ROI Methodology/Approach
- The need for an ROI-driven methodology
- Challenges with existing approaches
- Objectives of the ROI Approach
- A tour of the Approach - key insights, tools & templates
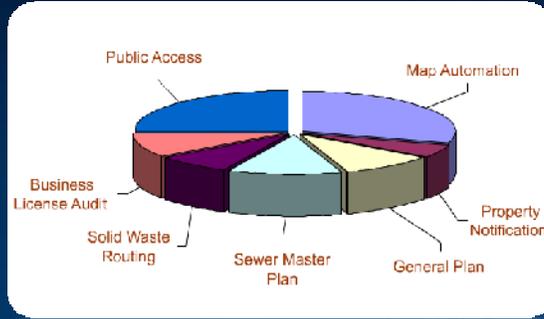- Q & A

GIS Implementations Follow Common Patterns
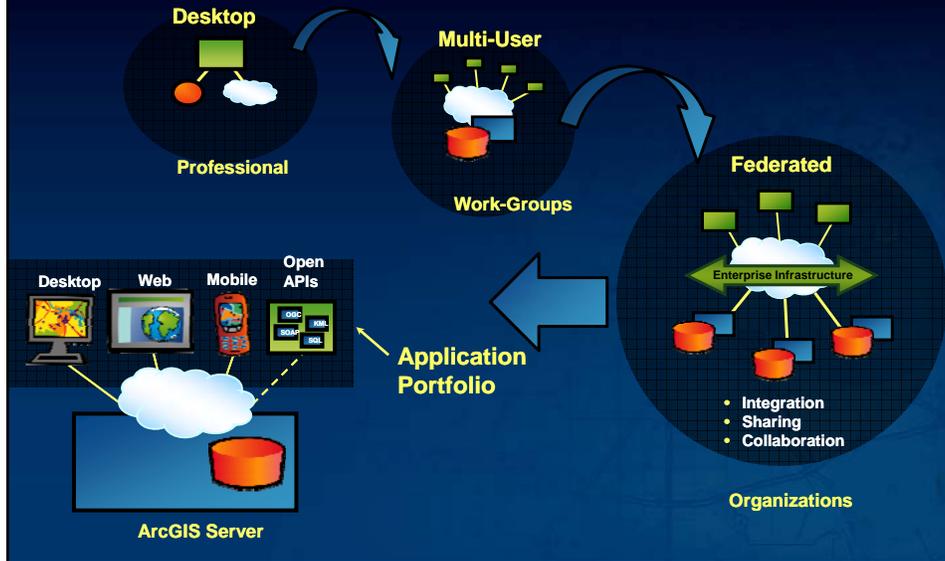
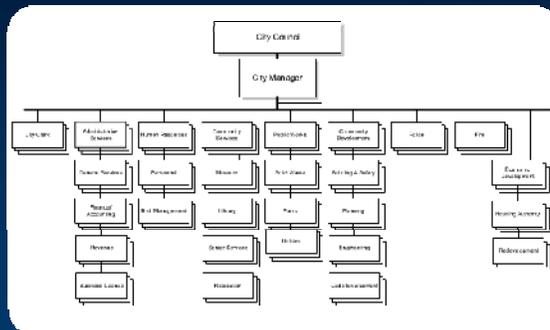"Analyzing GIS Return On Investment revealed some common themes"

Common Themes for GIS Return on Investment
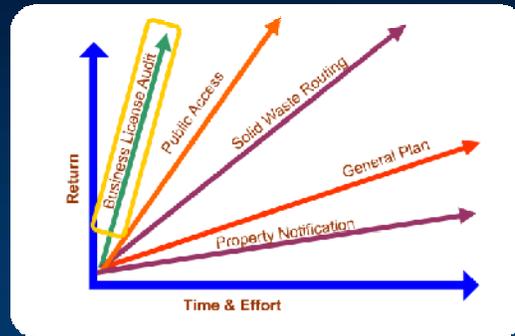
Wide GIS Application Portfolio

Common Themes for GIS Return on Investment

GIS Used by Many Departments

Common Themes for GIS Return on Investment

Applications with Rapid Payoffs
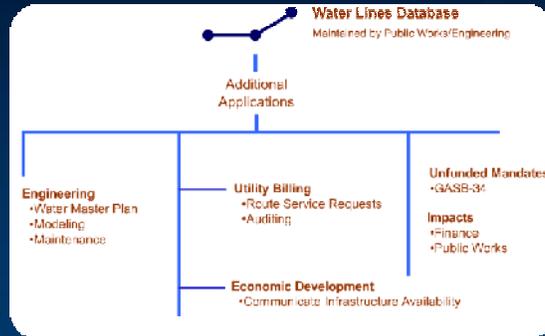

Common Themes for GIS Return on Investment

Geocode Existing Data

Common Themes for GIS Return on Investment

Multiple Use Data

Common Themes for GIS Return on Investment

Data Access Drives Application Development

The Benefits of GIS

- Save Money/Cost Avoidance
- Save Time
- Increase Efficiency
- Increase Accuracy
- Increase Productivity
- Increase Communication & Collaboration
- Generate Revenue
- Support Decision Making
- Aid Budgeting
- Automate Workflow
- Build an Information Base
- Manage Resources
- Improve Access to Government

Case Studies – Data Automation

- **Los Angeles County**
  - Automated Cadastral Map Books

  - **Result:**
    - **Eliminated:**
      - 2,000 Overtime Hours
      - 20,800 Regular Hours
   - **Annual Savings of $90,000**

Case Studies – Geo-Auditing for Revenue Generation

- **Martin County, FL**
  - **GIS Cell Tower/Parcel Database**
  - **Commercial Taxation to Parcels**

  - **Result: Increased County Tax Base by 3.5 Million Dollars**
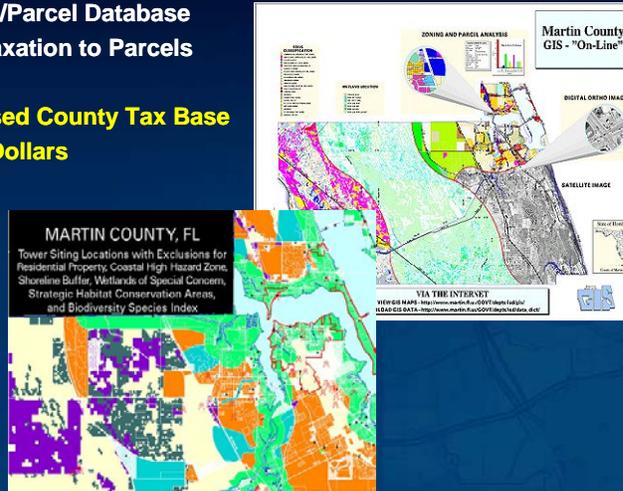
Case Studies – Increased Efficiency

- **Police Department, Lincoln, NE**
  - **GIS to Identify Problem Areas**
  - **Target Residents**
  - **Result: 67% Reduction in Burglaries in 7 Weeks**
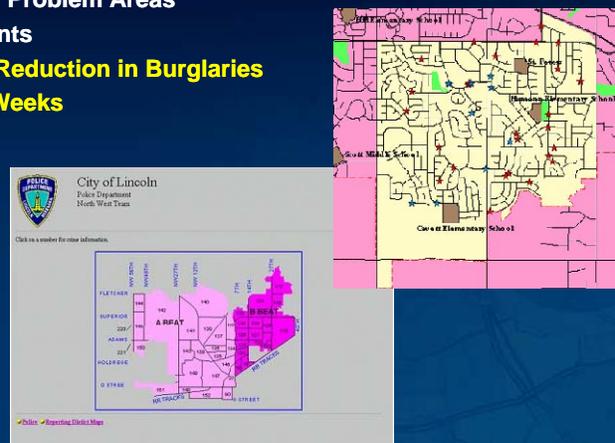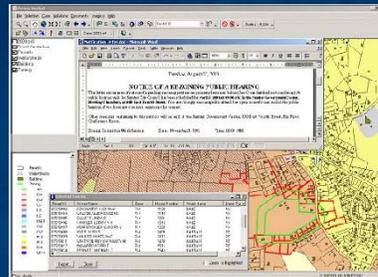
Case Studies – Increased Productivity

- **Planning Commission, Sumpter, SC**
  - Filing System to GIS:
    - Track Land Use Cases
    - Create Parcel Buffers
    - Generate Public Notification Letters
  - Results:
    - 90% Reduction in Public Notification Effort
    - Saved 2 Months Personnel Time
    - Save County up to 4%
      on Flood Insurance Premiums

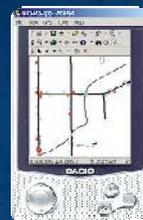## Case Studies – Cost Savings/Cost Avoidance

- **Bolder County, CO**
  - Road Maintenance Dept.
  - Sign Inventory
  - 7,000 + Signs to manage
  - Results:
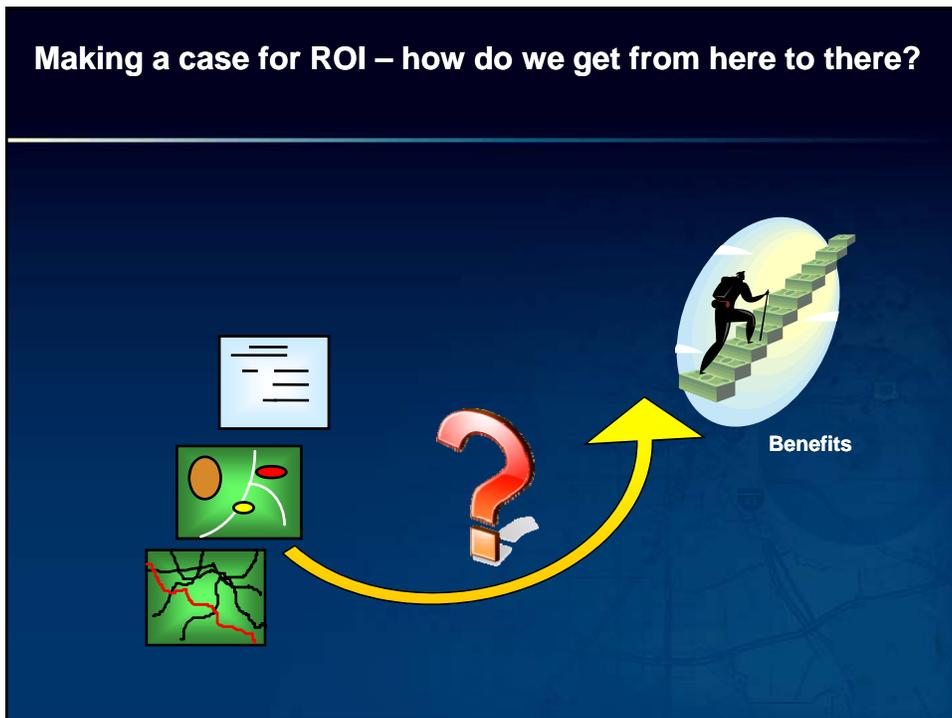   - $20,000 inventory cost savings

More case study examples!

Savings of approximately 500 hours of staff time annually across four departments.

Making a case for ROI – how do we get from here to there?

Benefits

The ROI Approach - Building an Enterprise GIS

A collaborative effort between ESRI and PA Consulting Group
- The methodology was originally developed by PA Consulting group for supporting mainstream IT Programs
- Adapted to be GIS-specific by leveraging ESRI's GIS expertise

Business Benefits of GIS: An ROI Approach
- Supporting materials @
- Published by ESRI Press, August 2008

Need to Improve How to Quantify Benefits of GIS

- **Typical focus has been on activities**
  - Tasks
    - Consumption of Resources indicated Production/Value
  - Enhanced with technology
    - Building bigger, better, more
- **Recommended alternative: Focus on value**
  - Improve the Business
    - Must be Business-led, Benefits-focused & fact-based
  - Prove the Return on investment
    - Tangibly enhance the business

Our Observations

Typical GIS Initiative	A Successful Initiative
• Technology-led	• Business-led
• Technology-driven	• Benefits-driven
• Delivers against project milestones	• Delivers measurable value to stakeholders
• Focused on Delivering Applications & Functionality	• Focused on delivering business capability
• Short-lived buy-in	• Long-term stakeholder commitment to success
• Sells GIS thru technology demonstration	• Builds consensus by demonstrating value opps
• Not linked Explicitly to organizational objectives	• Linked to organizational objectives
• Cannot measure success based on value delivered	• Can measure success based on the return on investment

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Customer viewpoint – Issues and Challenges Faced

– Compete to secure an appropriate share of IT-related budget
– Prove the real-value (ROI) of a GIS-related investment
– Prioritise GIS-related investments based on the value delivered to an organisation
– Deliver a growing portfolio of complex GIS enabled initiatives
– Build consensus to allow 'enterprise' opportunities to emerge
– Deliver successfully on expected business benefits, not just project milestones
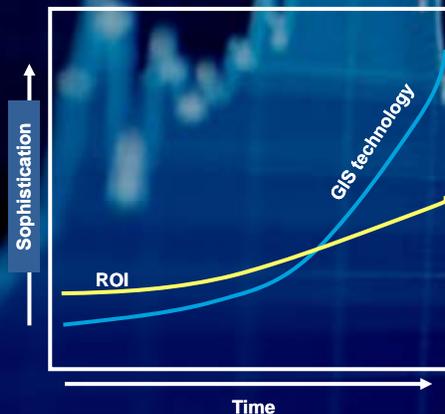
Myths about "ROI" and Business Case development

- Myth #1 : "My organization already has mature GIS so they don't need a business case to justify investment in GIS"
- Myth #2 : "We are a public organization and more concerned with 'saving a life'… not ROI"
- Myth #3 : "We can't prove the benefit of GIS quantitatively anyway, so why bother?"
- Myth #4 : "Proving ROI to my organizations with metrics from other organizations will trigger them to buy " (convince them)
- Myth #5 : "A positive NPV is all that's needed to confirm they should be investing in GIS"

23

ROI: Multiple Definitions

- We use ROI as a generic term to indicate that a given investment will have a positive return to the organization
- It can be described in many forms
    - ROI % return
    - Net Present Value (NPV)
    - Impact to operating free cash flow
    - Impact to P&L
    - Internal Rate of Return (IRR)

- In our experience, ROI (however defined) alone doesn't secure funding.
- The key is to build consensus and commitment across the organization, and to structure a program of work that will deliver tangible value that everyone believes in.

The Need for This Methodology

- **Challenges with Existing Approaches & Literature**
  - Hard-To-Find Comprehensive GIS-focused approach
  - Specific Industries
  - Financial analyses
  - Explains *what* not *how*
  - Too technology-driven
  - Typically bottom-up (needs analysis)
- **Compelling Examples**
- **No 'Standardized' Approach**

Key Questions Asked by Budget-holders

- How can **business impact** be quantified?

- What will be the initial and ongoing **expenses**?

- What are the **resources** required ?

- When will the business benefits be **delivered**?

- What's the **financial case**?

Objectives of the ROI Approach

- **Quantify Impact on …**
  - Revenue growth, assurance and protection
  - Cost containment or reduction
  - Service Excellence
  - Regulatory Compliance
  - Health & Safety
  - Shareholder Value
- **Identify …**
  - Initial Capital Expenditure
  - Continuous expenses
- **Forecast …**
  - When benefits will be realized
- **Define …**
  - Resources required
  - Governance, Management
- **Provide …**
  - Financial case (NPV, IRR, Discounted Payback, FCF …)

Show how to contribute business value to an organization

Determine how much it will cost

Estimate how long it will take

Setting up management oversight

Calculate return on investment

27

End-to-End Repeatable Steps

- Prepare for ROI Project
- Identify Opportunities
- Prioritize Opportunities
- Build GIS Program
- Define Control
- Identify Costs
- Estimate Benefits
- Benefits Roadmap
- Calculate ROI
- Build and Present Report
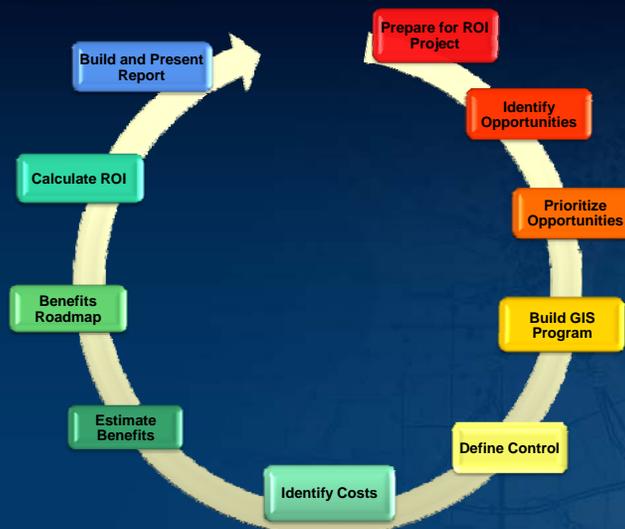
Planning and Investigation

- **Understand the context of the ROI project**
- **Find challenges and opportunities**
- **Win executive 'hearts and minds'**

Prepare for the ROI Project

- **Treat the ROI study as a project**
  - **It has a defined group of stakeholders who will contribute**
  - **It has a project plan with start, end dates and well defined activities**
  - **It has active stakeholder management**
  - **It has deliverables**
- **Define your ROI Project Plan**
- **Build SWOT Analysis of your existing GIS implementation or past attempts.**
- **The rule here is "Plan and be prepared"**

30

Identify Business Opportunities

- **Identify business opportunities for GIS by speaking to your Executives**
- **Utilize structured interview techniques and scripts**
- **The focus is on what *they* see as opportunities or problem areas in their organization**
- **Take the opportunity to engage with them and educate them, but don't 'sell GIS' to them**

Interview Template

Example: Interview Template

Prioritize Business Opportunities (1)

- **Use the information gathered from your Executives during interviews**
  - And any follow-up meetings with their direct reports
- **Collate it together in the Template**
- **Flesh out the opportunities identified by adding an SCQA for each opportunity**
- **Also identify metrics that relate to each opportunity**
- **Avoid politically sensitive benefits e.g. cost reduction via headcount**

Interview Notes

Benefits Template

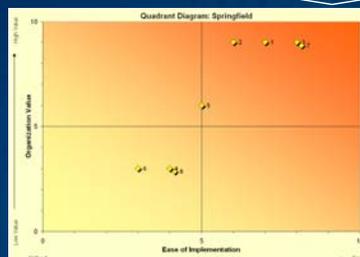33

Example: Benefits Template

Stakeholder Group	Opportunity Description	Opportunity ID	Benefit / Opportunity	Situation	Complication	Question	Answer	Metric	Organization Value (1-Low, 10-High)	Ease of Implementation (1-Hard, 10-Easy)	Priority
Police											
	Provide improved emergency service to citizens										
		1	Reduce number of false alarm calls	Vast majority of alarm calls are false alarms	Manual procedures currently in place are inefficient	How can the County mitigate costs due to false alarm responses?	Use GIS to eliminate the complexities of tracking and billing on false alarm calls. Use data on false alarm calls to generate payment notices automatically and send them to owners	Nearly 98% of alarm calls are false. Alarms calls account for about 15% of all emergency calls (=9,800 alarm calls per year)	8	6	High
			Increase revenue gained from charging for false alarms	Currently there is no penalty for excessive false alarm calls	There is no tracking method for specific false alarms			Revenue increase			
			Increase the number of companies registered with alarms	There is no existing requirement for registering alarms	There is no database for false alarm company registrations			Number of companies with registered alarms			
			Reduce both personnel and equipment costs for false alarms	Major cost to respond to the large number of alarms	Difficult to reduce head count			More than $2.2m spent per year responding to approximately 9800 calls			
Fire											
	Locate New Fire Station										
		2	Save lives and reduce property damage by relocating fire station in the best location to serve existing population	County population has grown rapidly in recent years and existing stations have suboptimal location	Relocating fire stations is very expense and needs to be precisely determined	Where is the best location for all existing fire stations?	Create a location-allocation model using GIS to determine optimum location of fire stations	Statutory requirement defined by National Fire Protection Association (NFPA) to reach 90% of fires within 4 minutes	10	6	High
	Map incidents										
		3	Maps can be added to existing Fire Chief reports to provide better summary of activity	Existing reports are difficult to assimilate	Creating maps by hand is not feasible	How can simple maps be created for Fire Chief?	Use GIS to create monthly reports of incident data	Average month has 4000-4500 incidents	3	10	Medium
Stakeholder 3											

Prioritize Business Opportunities (2)

- **Use the template to help prioritize the benefits identified based on**
  - Value to the organization
  - Ease of Implementation (delivery)
- **At this stage "value' is subjective, but is guided by Executives**
- **The template will generate a quadrant diagram**
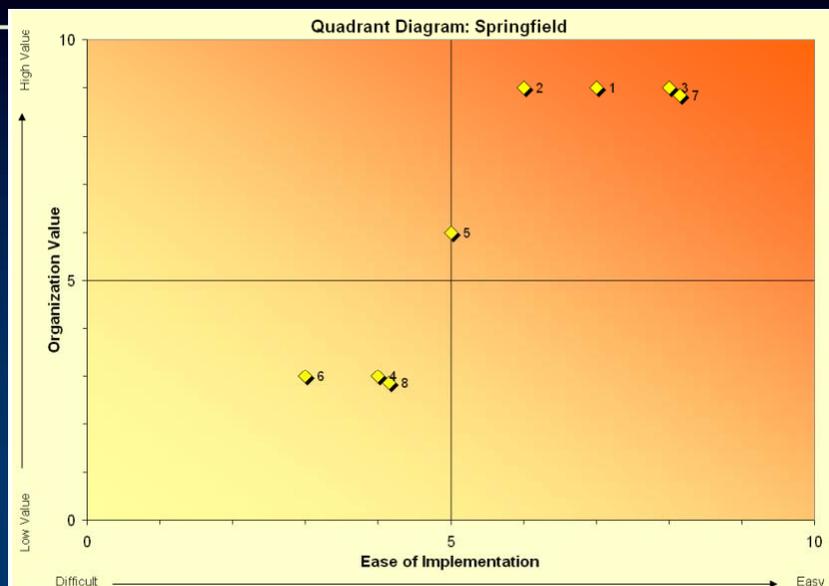- **Focus on the benefits falling in the top right quadrant**

Quadrant Diagram

Example: Quadrant Diagram

Quadrant Diagram: Springfield

What we have accomplished so far

- **We have:**
  - Engaged with key stakeholders in the business in a professional, structured way
  - Assembled a fact-based SWOT analysis
  - Identified and prioritized the key business benefits
  - broken down organizational barriers
  - Identified 'quick wins' for the business
 - Gathered a majority of information we'll need to model the benefits quantitatively

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Program Definition

- Turn business opportunities into GIS projects
- Define project control and governance

Construct the GIS Program

- Determine what will practically need to be done to deliver the benefits

- Distill the Program into component parts (hardware, software, data, etc)

- Seek to combine 'like projects' together and not 1:1 to benefits

  – Take an enterprise view, not application view

- Be pragmatic

- Use Post-it© notes as a means to deal with complexity

Program Pyramid

Discrete Projects

39
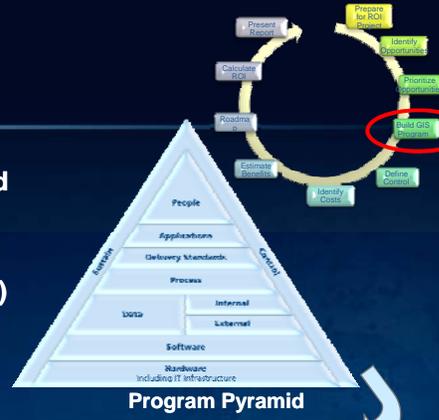
Program Pyramid – Project Definition

City of Springfield Project 1: City-wide Basemap Web Service
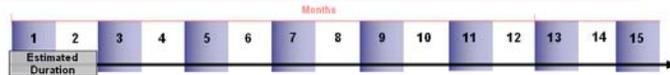
Description
Create an integrated city-wide basemap as a web service that comprises key layers that will be used in multiple City applications.

Project Objectives
1. Set up a centralized web service that provides a city-wide basemap for shared use by all City departments.
2. Facilitate collaboration between City departments.

Key Activities
1. Develop a geographic data model for key basemap layers.
2. Acquire and install server hardware and GIS software suitable for managing and serving data over the web.
3. Extract key features from existing CAD files and load into server basemap database.
4. Update content as necessary with additional data.
5. Publish basemap as a web service.
6. Operate and maintain system.

Key Outcome/Deliverable
1. City-wide basemap web service that will provide capability for several other projects in the Program.

Define Program Control

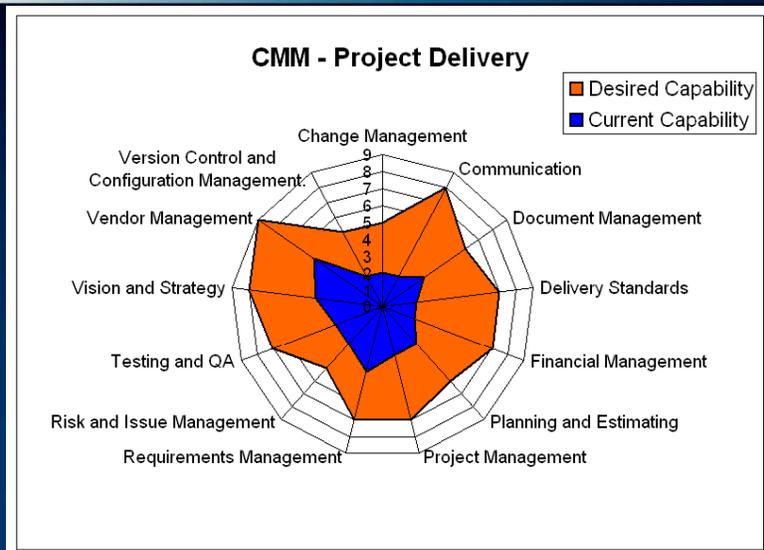- **Governance is a leading cause of program failure**
- **Ensure you have adequate controls in place to be successful**
- **Use the Project Governance Capability Maturity Model (CMM) to rank your team**
  - **Exposes your strengths and weaknesses**
- **Shore up any weak spots and be realistic**
- **Define your delivery team structure (in-house vs external)**
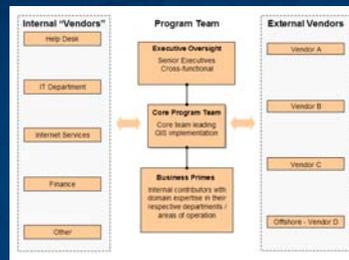
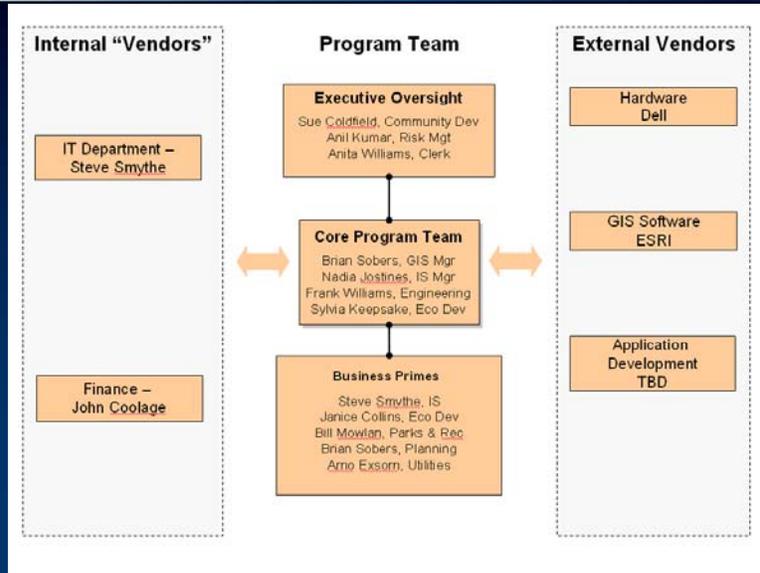

Example: Capability Maturity Model

Example: Delivery Team

Business Analysis

- **Specify the budget for the GIS Program**
- **Estimate value of the benefits**
- **Build GIS benefits roadmap**
- **Calculate financial metrics**

Specify & Cost GIS Program (1)

- Assemble your GIS Program budget forecast (CapEx & OpEx)
- Team with your finance department
- Build your budget from the bottom-up, in a robust, defensible manner
- Use the Budget Template to guide you through the budgeting process

3-Year CapEx & OpEx Budget

Discrete Projects

Example: Budget Template Definitions
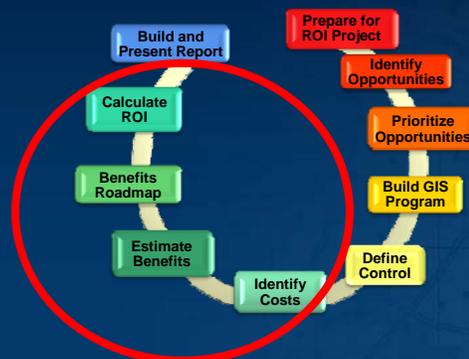
Example: Budget Template

	2008	2009	2010
Capital Expenditure	243,460	5,199	4,889
Operating Expenditure	34,245	35,274	32,851

YEARLY TOTAL

Use these figures to populate the Financial Calculations template

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Specify & Cost GIS Program (2)

- **Guidance is provided**
  - Capital v. Operational expenditure
  - Depreciation
  - Internal Capitalization of Labor
- **Output used to populate the "cost" side of the ROI calculation**
- **Dashboards are automatically generated to provide a full 3 year view**

3-Year CapEx & OpEx Budget

48

Calculate the Benefits

- **Quantify in tangible terms**
- **One of the most challenging aspects of any ROI calculation**
- **Requires you to model the impacts of GIS as an enabling technology on workflow (base case vs GIS case)**

Clear Benefit Definition

Realization Modeling

Sensitivity Analysis

Fixed, Variable, & Derived Inputs

Year on Year Value Calculations

Benefit Summary

Example: Benefits Model (1)

Clear Benefit Definition

Realization Modeling

Sensitivity Analysis

Fixed, Variable, & Derived Inputs

Year on Year Value Calculations

Benefit Summary

Example: Benefits Model (2)

| Input Type	Variable	Base Case	Change		2007	2008
Fixed	Average Fuel Price (per Gallon	$ 3.10		Base:	$ 3.26	$ 3.42
Fixed	Average Truck Miles (per gallon)	16		Base:	16	16
Variable	Average Truck Mileage (per day)	200	175	Base:	203	206
				GIS:	200	193
Fixed	Number of Miles between Truck Service	5000		Base:	5,000	5,000
Fixed	Average Cost of Truck Service	450		Base:	450	450
Fixed	Number of Trucks Required Per Day	10		Base:	10	10
Derived	Total Fleet Mileage Per Day	2,000		Base:	2,030	2,060
				GIS:	2,005	1,932
Derived	Total Fuel Cost Per Day	6,200		Base:	6,608	7,042
				GIS:	6,525	6,602
Fixed	Average Delivery Days Per Year	240		Base:	240	240

Create the Benefits Roadmap

- **Illustrates the program activity on a quarterly basis**

- **Focus on *benefit delivered*, not project milestones**

- **Provides a clear 'roadmap' for the program**

- **Built from the discrete project's defined in Step 4**

- **Must be realistic, achievable and have broad commitment from the business to succeed**

Benefits Roadmap Example
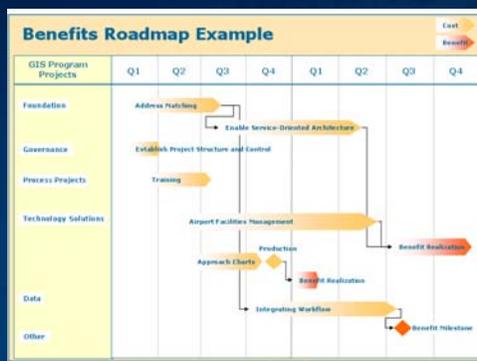
Calculate the Financial Metrics
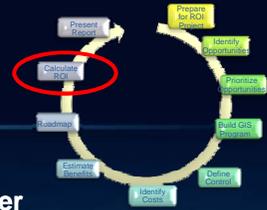
- **Team with your finance department**
- **Use budget (cost) and benefits calculated in earlier steps to calculate ROI, NPV, IRR etc**
- **Template provides 'fill in the blank' entry and automatically calculates financial metrics**
- **Template also provides guidance on interpreting the results e.g. 'creates value' or 'destroys value'**
- **Not just about a positive NPV, it is about successfully delivering on the promised benefit!**

Quantified Benefits from Step 7

Budget (cost) from Step 6

/ =

NPV, IRR, MCFCFS, ROI, Payback

Example – Financial Metrics

Prepare and Deliver Report

- Pulling it a...
- Final stage... ...the study
- At this sta... ...ot to win budge...
- Hearts and... ...ago, well before... ...they likely won'...
- Normally a... ...ive Presentati...

CITY OF SPRINGFIELD

BUSINESS CASE FOR GIS EXPANSION

Brian Sobers, GIS Manager

March 28, 2008

Present Report
Prepare for ROI Project
Identify Opportunities
Prioritize Opportunities
Build GIS Program
Define Control
Identify Costs
Estimate Benefits
Roadmap
Calculate ROI
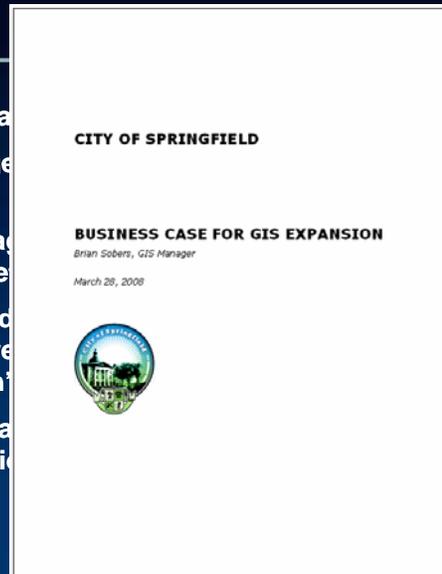
55

Insights to consider when using this approach…

- Getting at the numbers
- Proving the impact if you <u>don't</u> 'do it' (e.g. risk management)
- Don't focus on time-based studies and headcount
- Team with your finance department
- Don't go it alone
- Sell business value, not GIS
- Be led by the business, not the technology
- Invest the time to plan.
- Speak the language of your executives
- Don't over evangelize. GIS is <u>not</u> the center of the universe!

56

Key benefits for your organization

- Avoid a siloed approach to GIS
- Leverage existing investment in GIS technology, data or processes more fully to benefit your organization
- Establish strong stakeholder buy-in, commitment and understanding
- Further validate and refine the work already completed for existing GIS implementations
- Mutual agreement between senior business leaders of the potential opportunities for leveraging GIS
- A common understanding and prioritization, based on fact-based, benefits-focused metrics, of the business benefits
- A defensible budget forecast and achievable roadmap for your Enterprise GIS Program
- And….career advancement!

57

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