



# Technology Vision 2000... Laying the Foundation

*An analysis and model of the requirements for implementing a strategic infrastructure renewal of the City of Oakland's information technology foundation*

**Office of Information Technology**

**May 30, 2000**

**City Council Work Session**



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# Introduction

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## Executive Summary

### **Scope**

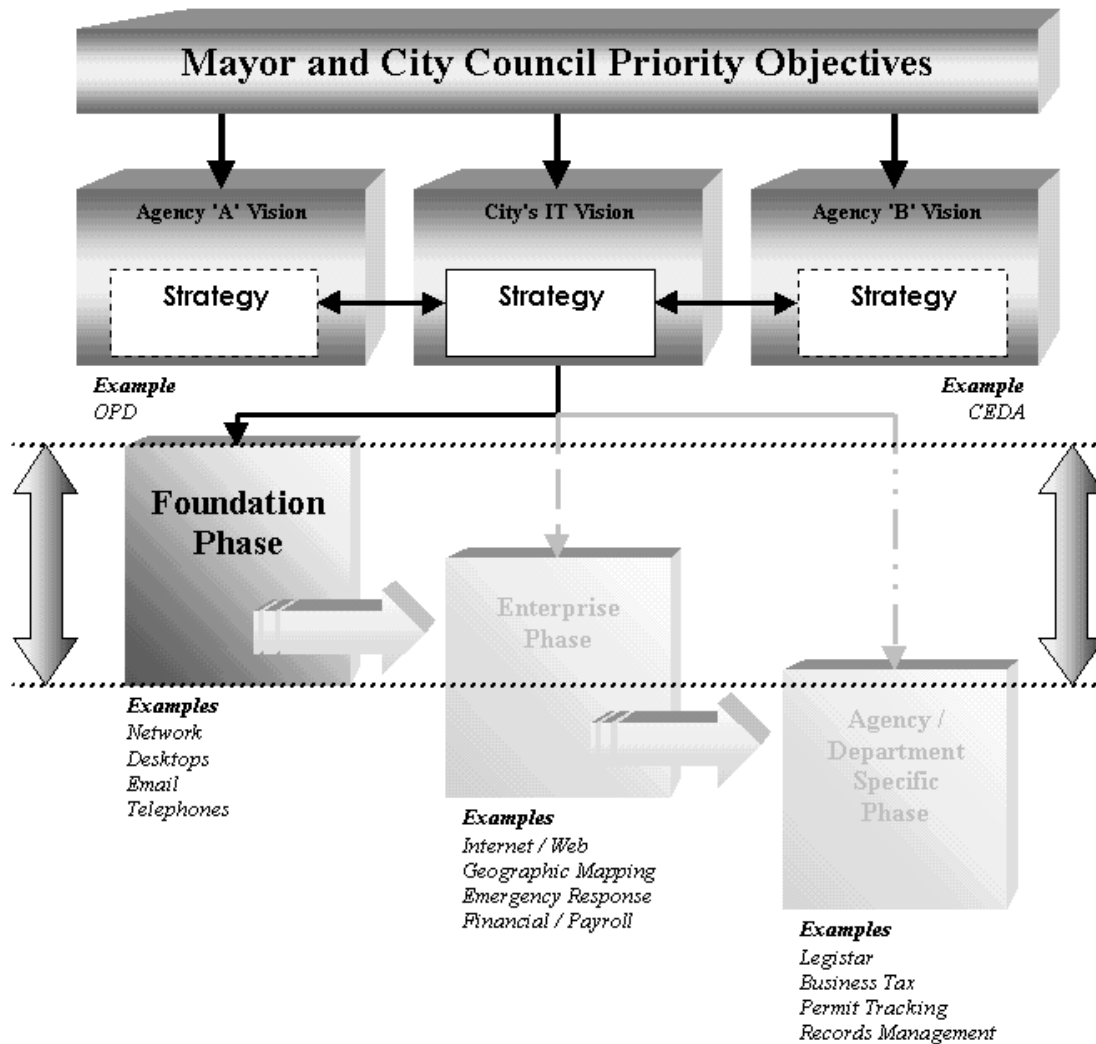
The intent in researching and designing the enclosed model is to lay the foundation for an information technology structure upon which world-class enterprise and agency applications can be built. And, as importantly, where they can be sustained and supported during the planned growth of Oakland into a technology center. This specifically includes establishing an information technology governance structure and upgrading citywide network, messaging, scheduling, productivity applications and voice services.

### **Benefits, Goals and Objectives**

Establishing a state-of-the-art infrastructure in the City of Oakland enables the objectives of the Mayor, City Council and agencies/departments, in servicing and supporting Oakland residents, to be met. As illustrated in the following diagram, the infrastructure foundation requirements are determined by the Office of Information Technology (OIT) strategies. For details on the vision and strategies, please refer to Attachment 1 of the staff report titled “*Information Technology Long-Term Strategic Plan for the City of Oakland*” dated May 30, 2000.

The goals of this project as they relate to the overall strategy and vision of the Office of Information Technology are highlighted in drawing below. The aim is to lay an infrastructure foundation that will provide for quality enterprise and departmental applications by:

- Increasing network performance, capacity, functionality and flexibility
- Improving network reliability, availability, service and support
- Securing the network



A prerequisite to implementing successful enterprise and agency automation is a sound infrastructure foundation. Since **ALL** applications reside upon the infrastructure foundation, they can then be implemented in a predictable, secure, controlled and cohesive manner. Risks associated with new software releases, staff turnover and budget cycles that impact enterprise implementations such as Oracle, MEIRS and GIS will be mitigated. A predictable environment greatly reduces the cycle time from contract signing to production by having the governance, network and services foundation installed, supported and ready. The process of absorbing new releases once in production will also be notably improved.

### **Requirements Needed**

In this report the only costs provided are for the Analysis and Planning and Design projects. These costs are:

- Analysis and Planning (\$325,000)
- [Design](#) (\$650,000)

It is anticipated the [Analysis and Planning](#) phase will take between three and four months to complete. Design is estimated at four to six months. Details describing the [tasks](#) estimated, assumptions, risks and cost containment measures can be found in the [Methodology and Approach](#) and [Projected Requirements and Costs](#) sections of this report.

# Establishing the Foundation

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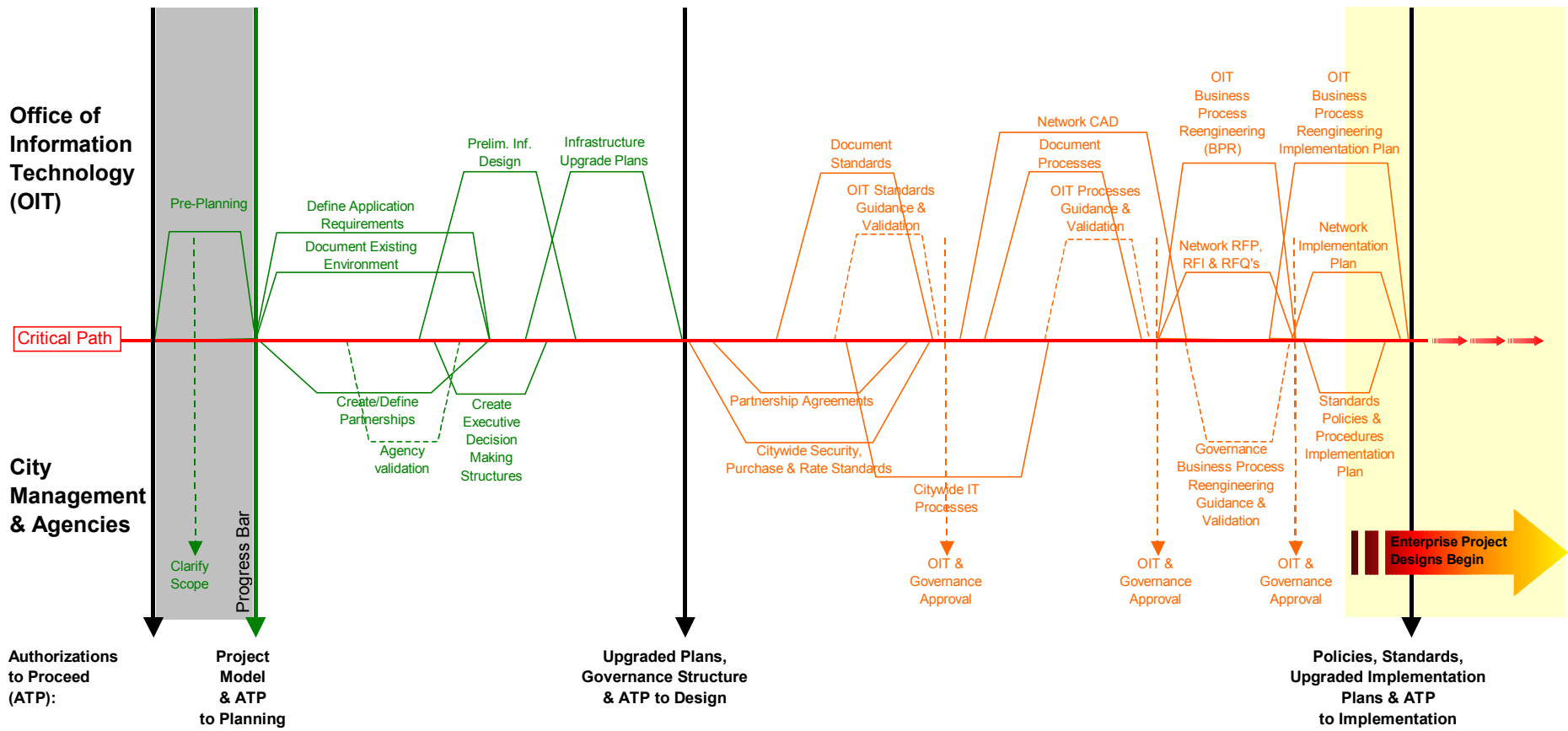
## **Project Model**

The following Foundation Project Model illustrates the critical path of the Technology Vision 2000 project. A visual representation of the sequence of required [tasks](#) is reflected on the following page, illustrating both parallel and sequential [tasks](#). A gray bar, which grows from left to right, denote tasks completed and progress to date. Tasks appearing above the critical path line are primarily the responsibility of OIT. Tasks appearing below the line are primarily the responsibility of City Management and Agencies. Some tasks, designated by dashed lines, illustrate guidance and participation involvement. Major milestones requiring City Management approval are designated as Authorizations to Proceed ([ATP](#)). The diagram and its components are described in further detail below.

**Analysis and Planning**  
\$325,000

**Design**  
\$650,000

**Implementation**



## Milestones, Deliverables and ATPs

There are three major milestones depicted in the Foundation [Project Model](#). Each milestone is met with a report to Council detailing the [tasks](#) completed, outcome of those tasks, recommendations for the next phase and refined plans. The Council reporting process is referred to as “Authorization(s) To Proceed (ATP)” and constitutes approval of the deliverables for the phase completed as well as authorizes the project to continue with agreed upon refinements.

**“Change control is managed through the Authorization to Proceed process and is critical to successful project management.”**

Change control is managed through the Authorization to Proceed process and is critical to successful project management. Collaboration between City Council, City Agencies and OIT is an integral part of ensuring stakeholder expectations are met, [Project Scope and Costs](#) are contained and the best course of action is taken, based on the findings of the most recent phase. The major milestones and their respective deliverables are:

- Pre-Planning – [Project Model](#) and [ATP](#) to [Analysis and Planning](#)
- [Analysis and Planning](#) – Refined Design phase plan, Preliminary Implementation Model, Governance Structure and [ATP](#) to [Design](#)
- [Design](#) – Citywide Policies, Standards and Processes, Detailed Implementation Plan and [ATP](#) to [Implementation](#)

## Phases

There are two major phases illustrated in the Technology Vision 2000 Foundation [Project Model](#):

- [Analysis and Planning](#)
- [Design](#)

### **Analysis and Planning**

The primary objectives of the Analysis and Planning phase are to:

- Establish an information technology governance structure -- A technology governance structure is defined as group(s) of representatives from City Agencies, and tasked with establishing citywide partnerships, standards and processes by which the city information technology infrastructure will be governed.
- Prepare infrastructure upgrade plans -- The infrastructure upgrade plans developed as a result of the Analysis and Planning phase include two key plans. The first is a refined [Design](#) phase plan that encompasses the network and key infrastructure components necessary to support and operate in the upgraded network. The

second is a preliminary [Implementation](#) model based on Analysis and Planning conclusions.

*Results: Infrastructure upgrade plans and an information technology governance structure*

### **Design**

The primary objective of the Design phase is to prepare detailed [Implementation](#) phase plans comprised of estimates for the people, time and money required to train and roll out the respective infrastructure component. The three implementation plans are:

- Citywide standards, policies and procedures -- The citywide standards, policies and procedures are created by the information technology governance structure established in the [Analysis and Planning](#) phase, guided and validated by OIT, and adopted by the City.
- OIT business process improvements -- The OIT business process improvements are determined by reengineering the OIT service model to support the citywide vision, strategy and information technology governance model that has been created. The improvements will be guided and validated by the governance teams and adopted by the City.
- Network upgrade -- The detailed network design will be completed by incorporating the standards (security, purchasing, etc.) established by the governance teams(s) and RFP, RFI or RFQ information obtained from vendors.

*Results: Adopted citywide policies, standards/processes and detailed infrastructure implementation plans*

### **Implementation**

The Implementation phase is not depicted on the Foundation [Project Model](#) because the information required to define this phase will be discovered during the [Analysis and Planning](#).

### **Tasks**

Expectations of the Technology Vision 2000 project are established through a clear understanding of the components of the plan. The following are descriptions of the tasks depicted on the Foundation [Project Model](#).

### **Analysis and Planning**

**Document Existing Environment** – OIT will document the existing environment, capturing a detailed inventory of the city's current infrastructure. This may include, but is not limited to, the following areas:

- Voice and data network CAD drawings

- Information devices such as: desktops, printers, video equips, audio equip
- Enterprise and departmental applications, projects and current business requirements being met
- Data storage and management
- Written and unwritten information technology standards in areas such as: network connectivity, hardware, software and applications.
- Information technology services offered and existing vendor relationships including: budgeting assistance, purchasing assistance, project management, PBNI, Oracle, Legistar
- Staffing and skill set pool that exists to support the current infrastructure

**Define Application Requirements** – OIT will define enterprise and departmental application requirements based on city and agency visions. This may include, but is not limited to, the following activities:

- Solidify requirements for 5 year vision
- Determine future of applications to be supported e.g. GIS, new releases, Oracle, implementations (Awesome)
- Determine data storage and archive needs
- Determine information technology staffing, skill set and service needs

**Create/Define Partnerships** – City Management and Agencies will collaborate on key partnering needed to build a world-class infrastructure. These partnerships may include, but are not limited to the following:

- City Agencies for executive decision-making processes, policies and standards
- Other government agencies such as the County or educational institutions who may network/cable to the same locations as the City of Oakland
- Private agencies to explore untapped revenue streams. (Many progressive government infrastructures “sell” network usage to private sector business and vice versa..)
- Vendors for collective purchasing, leasing or support agreements
- Other agencies with funding streams that require special partnering, such as those with grant requirements

**Agency Validation** – City Management and Agencies will validate the existing environment documented by OIT, as well as application requirements defined by OIT, to ensure enterprise and departmental needs are accurately reflected in the Infrastructure Upgrade

Plan.

**Preliminary Infrastructure Design** – OIT will investigate the gap between the existing environment and what is needed to meet the application requirements. Vendors will be polled to determine approximate costs, and a preliminary infrastructure design will be created.

**Create Executive Decision Making Structures** – City Management and Agencies will define the governance structure (committees, boards or governing bodies) needed to establish the following citywide business rules:

- Policies and standards for purchasing and installing hardware, software, network connectivity, access and security
- Rates to be used in staff projections for OIT, project planning and budgeting, managing the information technology project queue, citywide cost projections and citywide cost sharing of **enterprise** infrastructure products
- Processes to guide staff and departments in purchasing products and services, granting and removing user access and data security, and budgeting for technology needs

**Infrastructure Upgrade Plan** – OIT will prepare a detailed plan for designing the network envisioned, including a preliminary [Implementation](#) phase model for infrastructure changes. This will include an updated project model, task refinements and people, time and costs estimates.

### **Design**

**Partnership Agreements** – City Management and Agencies, using the governance structure developed in the [Analysis and Planning](#) phase, will formalize the partnerships identified, to establish a collaborative effort and funding streams for the network infrastructure.

**Citywide Security, Purchase and Rate Standards** – City Management and Agencies, using the governance structure developed in the [Analysis and Planning](#) phase, will establish citywide standards. This will include the following areas:

- Security, including the four major enterprise levels: network, data, application and business
- Purchasing, to determine who the City will purchase from and what is considered acceptable (hardware, software and support)
- Rates, to establish the value of OIT services, support, connectivity, etc., for use in project management, staff projections, cost sharing and budgets

**OIT Standards Guidance and Validation** – OIT will validate the standards developed by City Management and Agencies to ensure OIT needs are accurately reflected.

**Document Standards** – OIT will support the governance structure by documenting the enterprise standards developed.

**Citywide Information Technology Processes** – City Management and Agencies, using the governance structure developed in the [Analysis and Planning](#) phase, will establish citywide processes in support of the standards. This will include the following areas:

- Purchase process, to support the established standards and enable asset management
- Security process, to define how access is determined, granted and revoked
- OIT project queue process, to establish and manage the enterprise and departmental project queue
- Budgeting process, to support the enterprise and departmental strategic plans

**OIT Processes Guidance and Validation** – OIT will validate the enterprise processes developed by City Management and Agencies to ensure OIT needs are accurately reflected.



**Document Processes** – OIT will support the governance structure by documenting the enterprise processes developed.

**Network CAD** – OIT will develop detailed CAD drawings of the needed network based on the [Analysis and Planning](#) phase results, security and purchase standards, definitions and policies.

**Network RFP, RFI & RFQs** – OIT will prepare, distribute and analyze RFP, RFI and RFQ responses from vendor candidates for network improvements.

**OIT Business Process Re-engineering** – OIT will conduct a business process reengineering (BPR) exercise. The goal of improvements will be to improve the quality of service provided in support of the enterprise standards and policies.

**Governance BPR Guidance & Validation** – City Management and Agencies, using the governance structure developed in the [Analysis and Planning](#) phase, will validate the OIT process improvements to ensure the city enterprise and departmental needs will be met.

**OIT & Governance Approval** – Three checkpoints whereby the City Management, Agencies and OIT approve new standards to be established and new processes to be implemented.

**Standards, Policy and Procedures Implementation Plan** – City Management and Agencies, using the governance structure developed in the [Analysis and Planning](#) phase, will create an implementation plan for the enterprise-wide standards, policies and procedures developed. Training materials will be developed during the [Implementation](#) phase to allow for inclusion of the new OIT processes and network rollout. This approach reduces staff interruption by providing one cohesive, citywide curriculum plan to roll out all infrastructure changes. The plan will include, but not be limited to, the following components:

- Training and educating city staff on the necessity of the changes and compliance
- The requirements for implementation, i.e. people, time and money
- A plan for on-going refinements and changes to standards, policies and procedures (continuous improvement)

**OIT BPR Implementation Plan** – OIT will prepare an implementation plan for the process improvements identified in the BPR exercise. Training materials will be developed during the [Implementation](#) phase to allow for inclusion of the new citywide standards, processes and network rollout. This approach reduces staff interruption by providing one cohesive, citywide curriculum to roll out all infrastructure changes. The plan will include, but not be limited to, the following components:

- Training and educating city staff on the necessity of the changes and compliance
- The requirements for implementation, i.e. people, time and money
- A plan for on-going refinements and changes to standards, policies and procedures (continuous improvement)

**Network Implementation Plan** – OIT will create a detailed implementation plan for accomplishing the network upgrades. Training materials will be developed during the [Implementation](#) phase to allow for inclusion of the new citywide standards, as well as the new City and OIT process rollout. This approach reduces staff interruption by providing one cohesive, citywide curriculum to roll out all infrastructure changes. The plan will:

- Establish phases based on business priorities, funding streams, data storage requirements and application demands
- Refine the projections presented in the [Analysis and Planning](#) phase based on technical designs and vendor feedback

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## Methodology and Approach

### Executive Sponsorship Requirements

City Management and Agencies, with City Council sponsorship, will be required to establish an information technology governance structure. This structure is defined as: group(s) of representatives from City Agencies tasked with establishing citywide partnerships, standards and processes by which the city information technology infrastructure will be governed. The following tasks are the responsibility of the executive sponsors in creating a City of Oakland information technology governance body. Detailed descriptions of each task can be found in Section II, [Tasks](#).

**“City Management and Agencies, with City Council sponsorship, will be required to establish an information technology governance structure.”**

- Create/Define Partnerships
- Create Executive Decision Making Structure
- Partnership Agreements
- Citywide Security, Purchase and Rate Standards
- Citywide Information Technology Processes
- OIT Guidance and Validation (plans and BPR)
- Standards, Policies and Procedures Implementation Plan

### Managing the Project

The Laying The Foundation project will be managed using proven “best practices” method and approach. This begins with a governance body creating a structure of information technology business rules upon which citywide systems and services can be built. These rules will be in support of the Technology Vision 2000 strategies. OIT will actively participate in validating the activities of the governance body.

**“The ATP process allows for validation of executive, OIT and Agency expectations”**

In addition to creating a governance model for the City of Oakland, major milestones will require OIT and the governance teams to obtain an Authorization to Proceed ([ATP](#)) from City Council. The [ATP](#) process allows for validation of executive, OIT and Agency expectations, cost and scope containment as well as the opportunity to refine management

decisions based on new information. This project quality control ensures smooth change management and enables sound executive decisions as the project progresses and the business environment evolves.

# Project Scope and Costs

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## Technology Vision 2000 Components

The Technology Vision 2000 project encompasses a set of service as well as infrastructure components. Although not specifically mentioned in each [task](#) description, the needs in each of these areas was investigated and considered within the scope of establishing an infrastructure foundation.

The current suite of information technology services includes:

- Network Services – provides for network cabling, hardware, software and connectivity
- Remote Connectivity Services – provides connectivity behind the citywide “firewall” when at a remote location (primarily needed by laptop users or staff who telecommute)
- Desktop Services – provides PC, printer, scanner, video and other information devices
- File and Print Services – provides for the sharing of files and output devices across the network
- Application Services – provides for enterprise, agency and interdepartmental applications support
- Database Services – provides for data storage, backup, archiving and warehousing
- Mail and Scheduling Services – provides for enterprise mail and scheduling services
- Intranet / Internet Services – provides for enabling enterprise and agency applications connectivity to internet and intranet, i.e. E-commerce and citywide forms processing
- Voice Services – provides for telephone and data integration

In the course of the preplanning exercise, two additional services were identified as needed for a sound citywide information technology infrastructure. These were:

- Purchasing Services – provides assistance in purchasing technology while supporting adopted standards within established protocols
- Consultation and Budgeting Services – provides assistance in planning for technology improvements and budgeting for requirements

In addition to the services, the infrastructure components investigated and included in this foundation plan consist of six identifiable categories. They are:

- Hardware
- Software
- Standards
- Processes
- Facilities
- Resources

The Foundation Project plan establishes the basis upon which these components will be built. As such, the analysis, planning and design [tasks](#) for laying the foundation will be executed with the future needs of each component in mind.

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## Projected Requirements and Costs

The following sections contain a brief description of resource estimates of the three phases comprising the Foundation [Project Model](#). These estimates are based on:

- The information currently available on the existing infrastructure
- The assumption that 50-60% of the current citywide infrastructure is undocumented and unknown to OIT staff
- Due to limited staff availability and specialized skill requirements the majority of the project will be conducted by outside resources. Knowledge transfer from outside sources to city staff is an important component of this project.
- The assumption that existing OIT staff will be available as information technology process and project experts during the [Analysis and Planning](#) as well as the [Design](#) phases
- The assumption the project will receive the utmost attention and sponsorship from City management in enforcing the governance structure needed
- The assumption the departments will provide application and business experts for reference as needed during the [Analysis and Planning](#) and [Design](#) phases
- Six (6) primary enterprise applications will be used to establish upgrade benchmarks

The most apparent risk in the accuracy of these projections is best described by the saying “we don’t know what we don’t know.” An example of this is the building contractor who provides a bid and is awarded a remodeling job. After work commences asbestos or dry rot is discovered behind the dry wall and the contract no longer reflects the actual costs to complete the job.

**The most apparent risk in accuracy of these cost projections is best described by the saying “we don’t know what we don’t know.”**

The possibility of a similar scenario occurring in a project of this nature is high. However, cost projection and control will be achieved through a continuous communication process established with City Council and the governance bodies. Each [task](#) in the model is built upon the information discovered in the prior tasks. As the project progresses, and the knowledge pool increases, the plan and cost projections will be refined. Periodic governance checkpoints ensure all stakeholders have the opportunity to participate in establishing priorities and how people, time and money resources will be spent. Finally, the major milestones at the conclusion of each phase will be met with OIT (see also [ATP](#)):

- Reporting costs incurred for the previous step vs. what was projected
- Refining the projections for the next step of the project
- Obtaining feedback and approval of those refinements
- Requesting authorization for the project to proceed with the agreed upon refinements

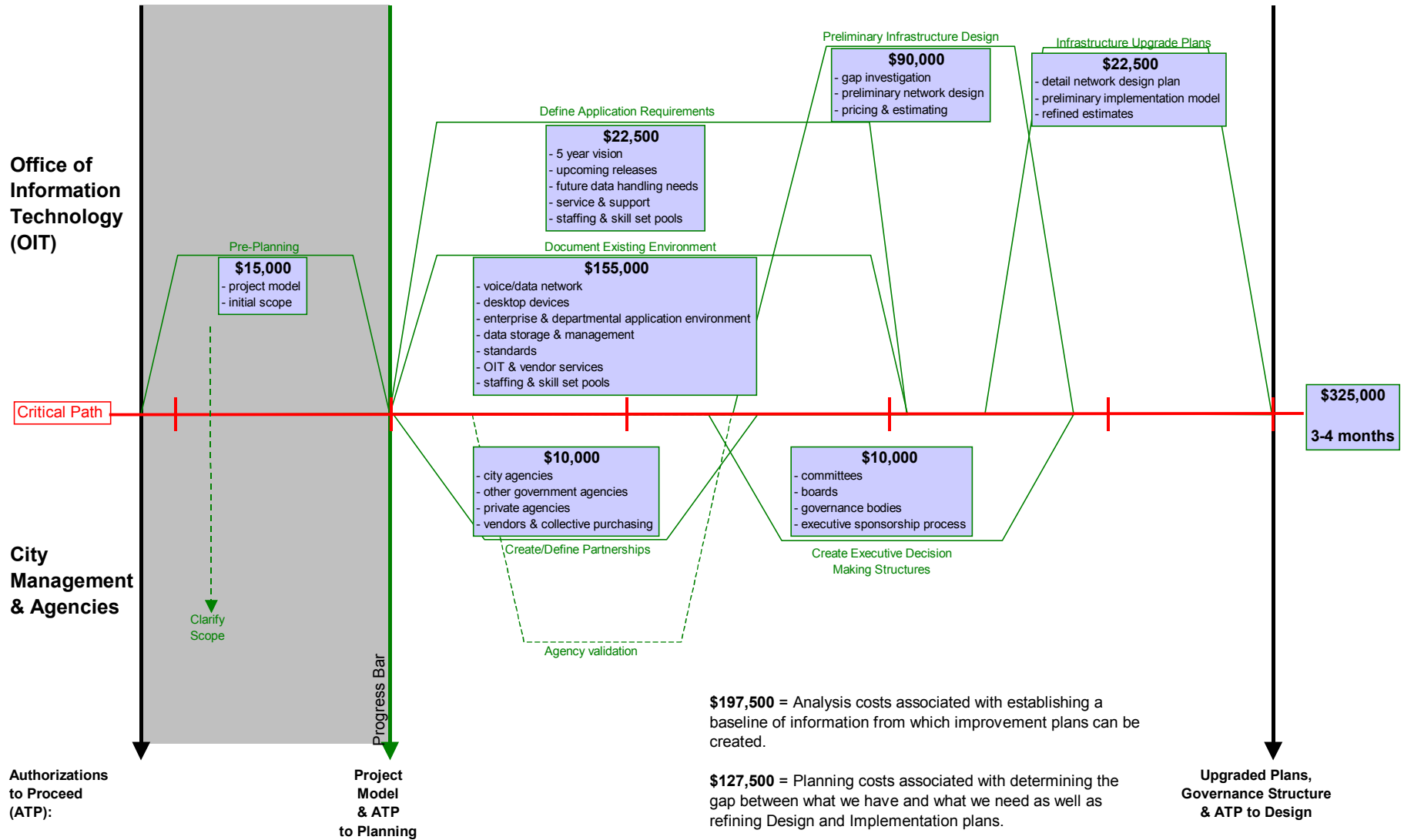
## **Analysis and Planning Requirements**

The following model illustrates the major tasks that comprise the [Analysis and Planning](#) phase and cost estimates for each. Each tick mark on the critical path bar reflects one month and indicates the general calendar time needed to complete the phase.

There are two types of costs comprising this phase:

- **Analysis**– Costs associated primarily with establishing a baseline of information from which improvement plans can be created. This includes activities such as investigating and recording the network, services, data, hardware and application environments that currently exist in the City of Oakland.
- **Planning** – Costs associated with determining the gap between what we **have** and what we **need**. It also includes costs associated with developing refined plans and estimates based on the discoveries.

# Foundation Project Model Analysis and Planning Estimates

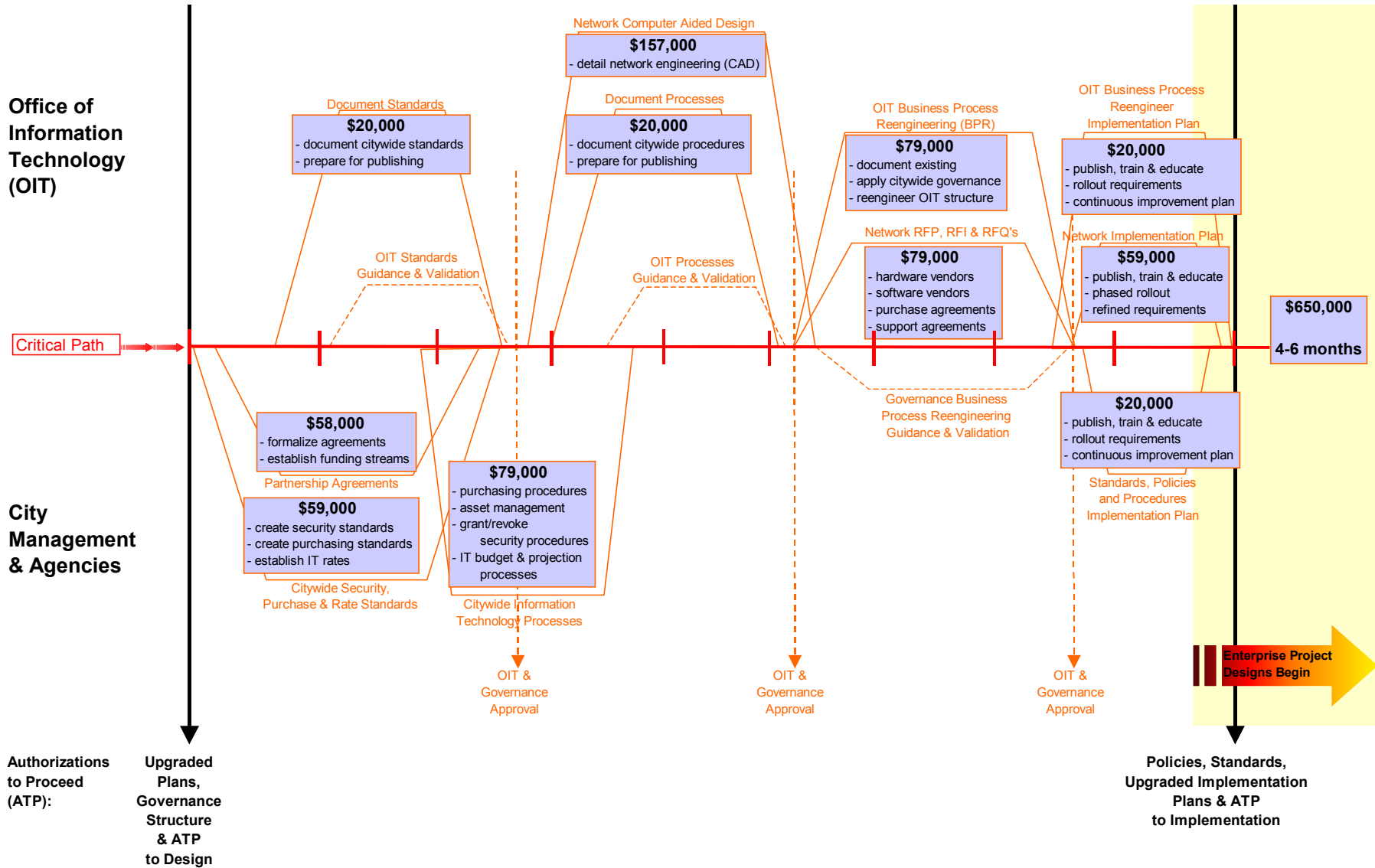


## **Design Requirements**

The following model illustrates the major tasks that comprise the [Design](#) phase and cost range estimates for each. Each tick mark on the critical path bar reflects one month and indicates the general calendar time needed to complete the phase. Estimates for this phase will be solidified in the [Analysis and Planning](#) phase and presented in the Authorization to Proceed (ATP) to [Design](#).

# Foundation Project Model

## Design Requirements



## Implementation Requirements

These requirements will be based on the information gathered during the Pre-Planning steps, examination of what is known about the existing environment and projects of similar size and scope. This includes:

- Designing a consolidated curriculum consisting of the training needs for the citywide standards and processes, OIT process improvements and network upgrades. This approach reduces staff interruption by providing one cohesive, citywide training program to rollout all infrastructure changes.
- Publishing standards, policies and procedures in a variety of ways to ensure the staff and public have access to the City of Oakland information technology business rules.
- Conducting training programs to educate city staff.
- Educating OIT staff to support and maintain new network technology.
- Implementing a controlled phased infrastructure upgrade consisting of network connectivity, facility upgrades, appropriate hardware and software and those items outlined in the [Technology Vision 2000 Components](#) section above.
- Establishing infrastructure continuous improvement programs to ensure network quality is sustained.

The cost for the [Implementation](#) phase is not depicted in a requirements model as the three components needed to create the model do not exist: the OIT process improvement implementation plan, the network implementation plan and the implementation plan for citywide standards, policies and procedures. The [Implementation](#) phase requirements will be preliminarily modeled during the [Analysis and Planning](#) phase and presented to City Council at the Authorization to Proceed ([ATP](#)) to [Design](#) milestone.

# Glossary

<a href="#">ATP</a>	(Authorization to Proceed) An executive signoff process which allows for validation of executive, OIT and Agency expectations, cost and scope containment as well as the opportunity to refine management decisions based on new information
BPR	(Business Process Reengineering) The examination of current business practices, the identification of products needed and the reinvention of more streamlined, results oriented, customer based methods for delivering the product to the customers
governance	A technology governance structure is defined as group(s) of representatives tasked with establishing citywide partnerships, standards and processes by which the city information technology infrastructure will be governed.
OIT	Office of Information Technology

# Sources of Information

Gartner Group “1999 IT Spending and Staffing Survey Results”

Hewlett Packard Networking Division

National Institute of Standards and Technology <http://www.nist.gov>

National Partnership for Reinventing Government (NPR) <http://www.npr.gov>

National Telecommunications and Information Administration <http://www.ntia.doc.gov>

Public Technology, Inc. <http://www.pti.org>

State of Iowa <http://www.state.ia.us>

State of Pennsylvania <http://www.state.pa.us>