

# City of Alexandria, Virginia

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## MEMORANDUM

DATE: MARCH 15, 2007

TO: HONORABLE MAYOR AND MEMBERS OF CITY COUNCIL

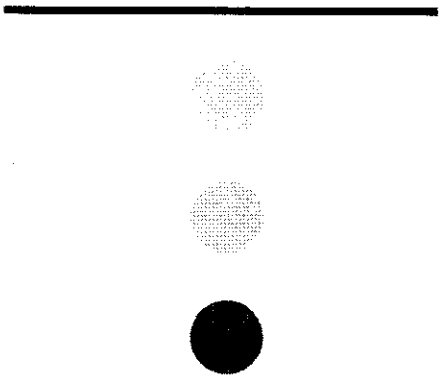
FROM: JAMES K. HARTMANN, CITY MANAGER

SUBJECT: BUDGET MEMORANDUM #8: PRESENTATION ON THE CITY OF  
ALEXANDRIA'S VOICE OVER INTERNET PROTOCOL (VOIP)  
TELEPHONE UPGRADE

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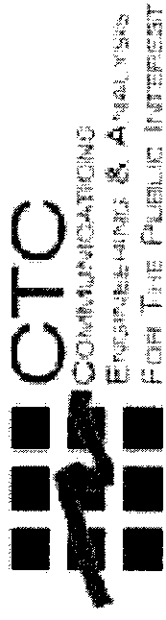
This memorandum is in response to Councilman Krupicka's request for distribution of the powerpoint presentation on the Voice Over Internet Protocol (VOIP) Telephone System Upgrade, presented to the Alexandria Commission on Information Technology on Monday, March 13, 2007. Converting the City's outdated telephone system to VOIP is funded in the Information Technology Plan section of the CIP over the FY 2008 to FY 2013 time period. Please see the attached presentation for more information.

ATTACHMENT: Voice Over Internet Protocol (VOIP) Telephone System Upgrade Presentation



# Telephone System Upgrade

## The City of Alexandria



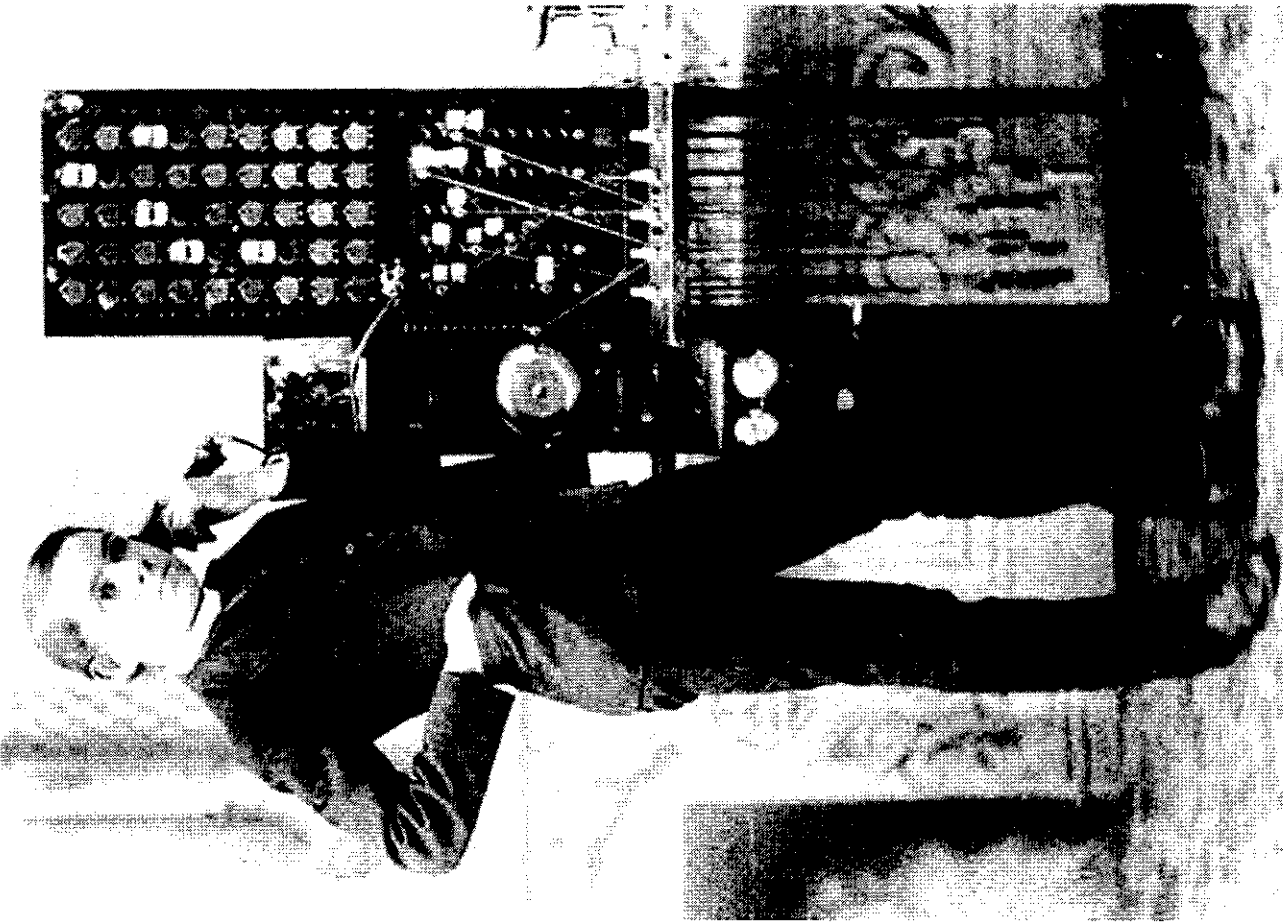
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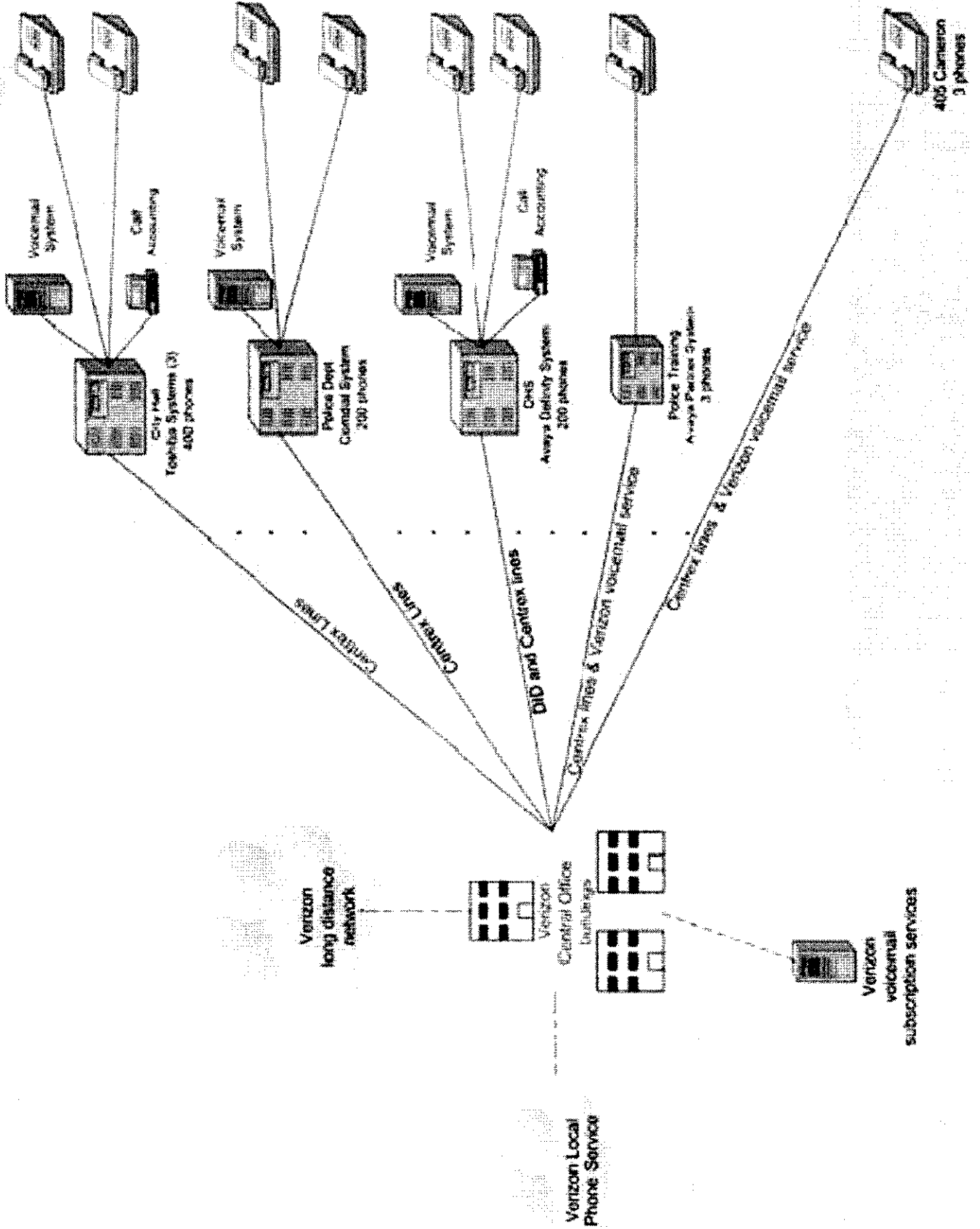
# Overview

- Current System
- Introduction to Voice Over IP (VoIP)
- VoIP Deployments in the Region
- VoIP System Features
- Risks
- Cost and Challenges
- System Transition

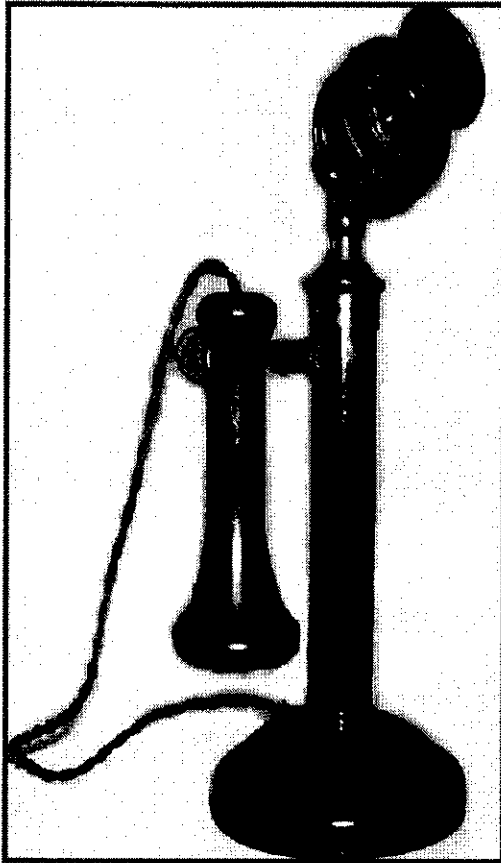
# Alexandria's Current Telephone System



# Alexandria's Current Telephone System



# Issues with Current System



- Existing equipment is reaching the end of its service life and requires replacement (industry standard)
- Multiple equipment platforms create difficulties in system interoperability
  - Does not allow for a centralized telephone system
  - Telephone and voice mail features vary with location
  - Direct-dialing not universal across entire system
- Contractors are required to perform add/drop/changes

# ● ● ● | Introduction to VoIP

- Voice Over IP (VoIP) is a relatively new but established technology that allows voice communications to be conducted over a data (computer) network
- Performed two telephony studies of the existing phone system
  - VoIP was determined to be the optimal solution
- Essentially all new telephone hardware is VoIP
- VoIP can operate on an existing data network, such as the City's internal networks or the City I-Net
  - Allows the City to decrease the leased services provided by Verizon
- Allows for voice and data infrastructure to be combined into one network



Avaya 4610SW VoIP Telephone



# VoIP Deployments in the Region

- **City of Rockville, Md.**

- **2002** - 420 IP phones at 12 locations
- Reduced amount of contracted telephone support

- **City of Herndon, Va.**

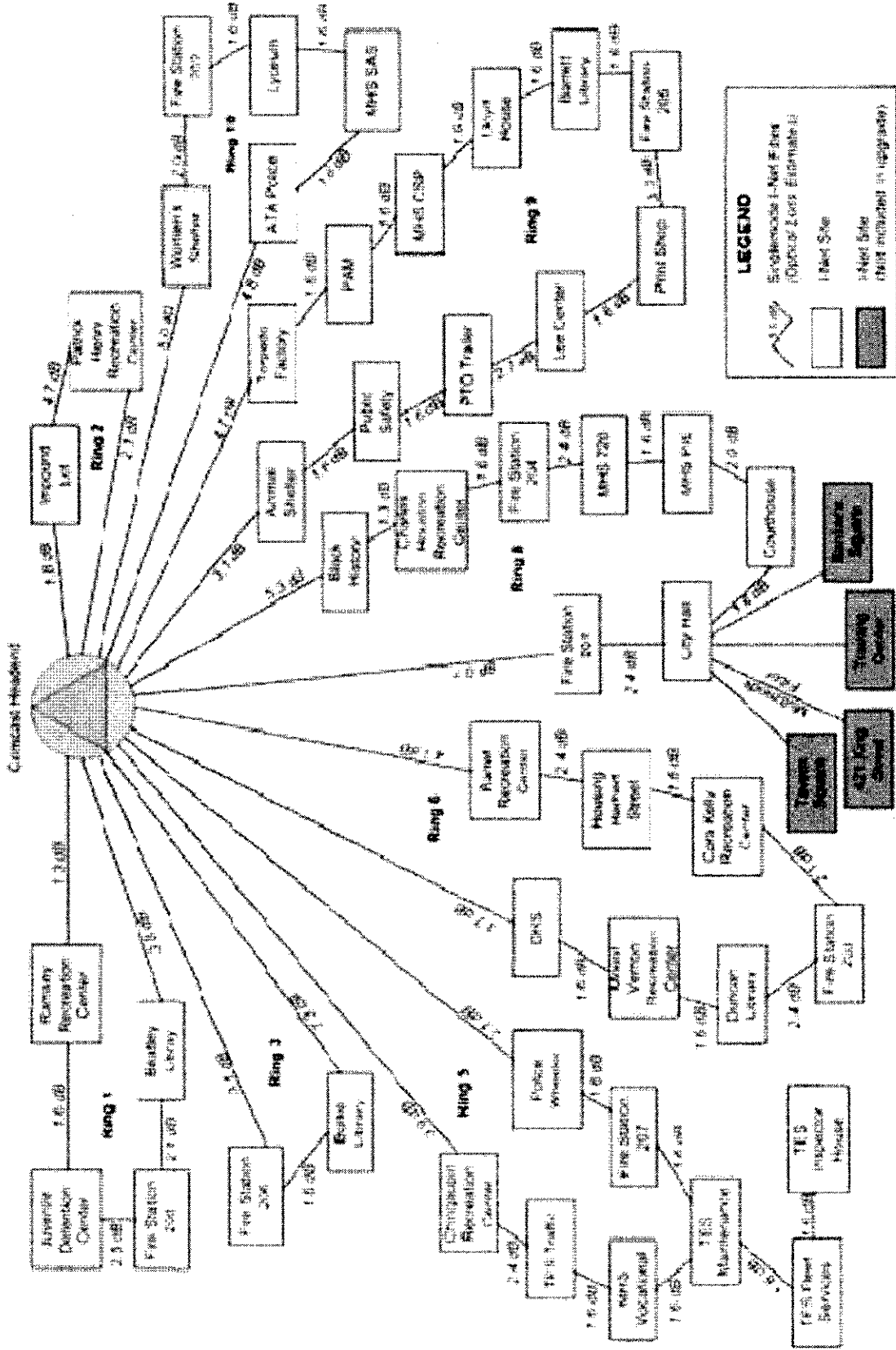
- **2003** - 250 IP phones in 7 facilities
- Met cost parameters and realized improved quality of service and reliability

- **City of Fairfax, Va.**

- **2005** - 300 IP phones connected over the City's I-Net
- System supports central voicemail and E-911 functionality



# City's Existing Data Network Infrastructure





# VoIP over I-Net

- Physical fiber ring topology and redundant I-Net hardware configuration protects against most likely link failures (fiber cut, electronics failure)
  - Two I-Net paths
  - Backup gateway to Verizon
- VoIP system components developed to be fully redundant and distributed, unlike existing system
- Local gateway device provides basic KSU functionality if connection to redundant core VoIP systems is lost in case of:
  - I-Net backbone equipment failures
  - Fiber cut in collapsed ring segments

# Features of VOIP System

- Maximizes use of existing network infrastructure
  - Data wiring
  - I-Net
  - LAN equipment
- Reduces contract costs associated with add/drop/changes
- Reduces the number of leased lines
- Call Accounting/Centralized Call Tracking System
- Improved calling features will be available
  - Direct dialing to each City employee
  - Four-digit or five-digit dialing within the network
  - Centralized voice mail with broadcast and text alert capability
  - Enhanced 911 (E911)
  - Desktop video teleconferencing

# Risks - Comparison

System	Risk	Outcome	Responsibility
Current System	Power Outage	Phones work if we have UPS/Power Generator	City and phone service vendors
VOIP	Power Outage	Phones work if we have UPS/Power Generator	City and phone vendors
Current System	I-Net Down	Does not effect phone system	Comcast
VOIP	I-Net Down	Phone system partially down	City and Comcast

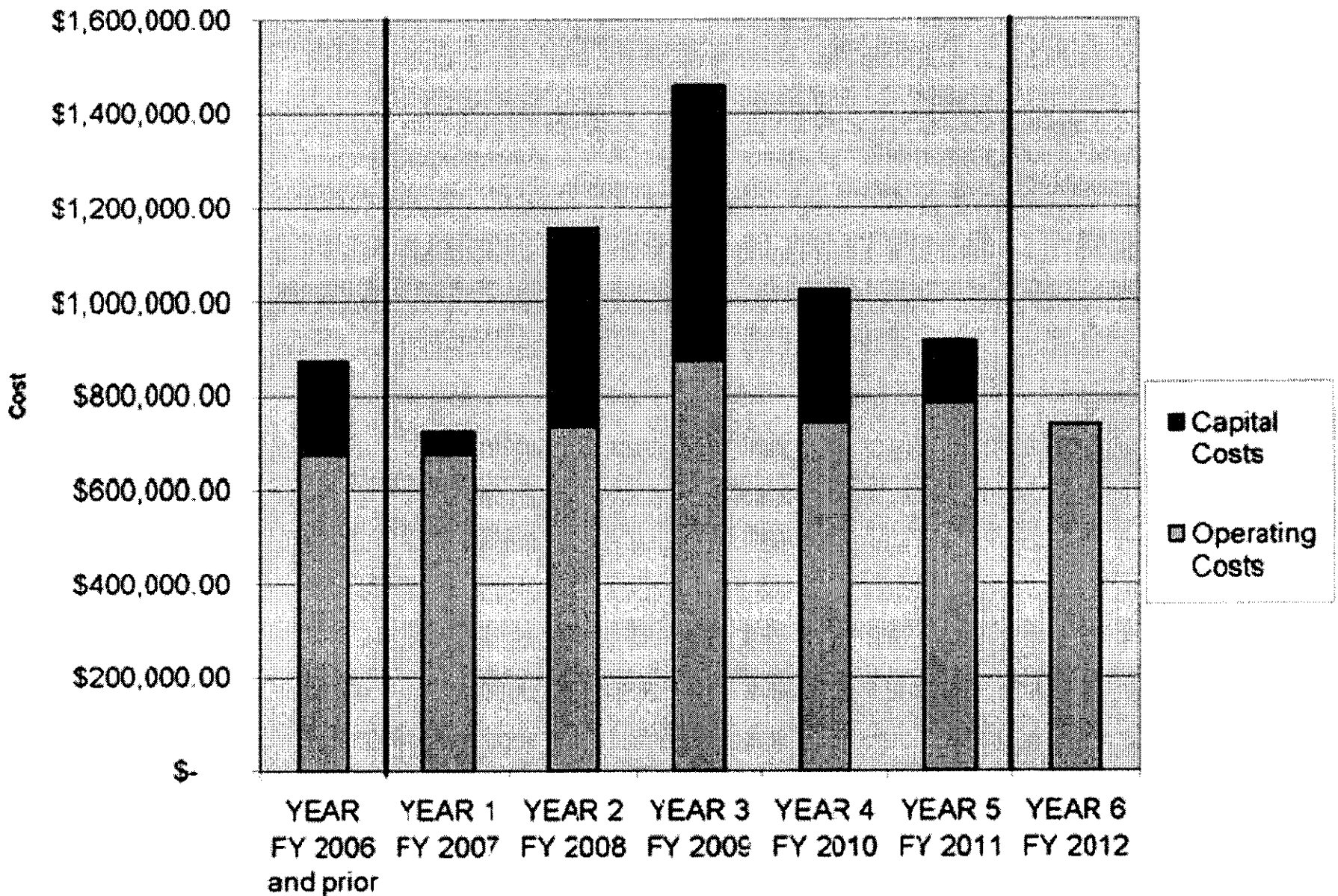
# Risks - Comparison

System	Risk	Outcome	Responsibility
Current System	Verizon service down	No in or out calls. Service within buildings only	Verizon
VOIP	Verizon service down	No in or out calls. Service within buildings only	Verizon
Current System	Software/ Hardware Failure	Loss of service at the site with the problem. If problem is at Centrex Switch at Verizon, loss of service City-wide	City, Verizon and phone system vendor
VOIP	Software/ Hardware Failure	Loss of service at the site with the problem. If only 1 of 2 main switches fail, still have City-wide service	City and phone system/network vendors

# VoIP Cost Estimates

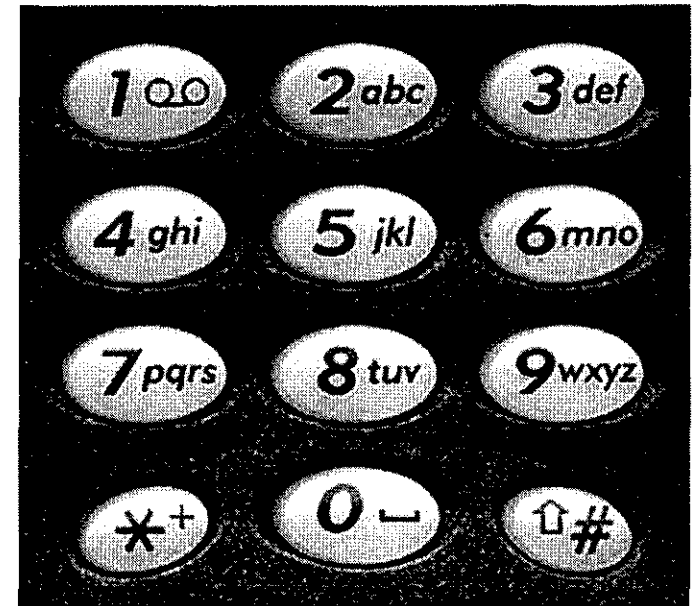
- Current Telephone System Operating Expenses: \$670,000 per year
- Estimated Capital Cost for VoIP Telephone System Upgrade: \$1.5 Million
- Forecasted Operating Expenses after VoIP Migration: \$730,000 per year
- Increases are primarily due to software support and security requirements

# VoIP Cost Estimates



# Project Challenges

- Adapting to a new technology
  - User comfort level
  - More computer-based phone system
- Cost
- Phone number transition





# Transition to VoIP

- Develop specifications and requirements for RFP
- Obtain funding sources
- Purchase a block of phone numbers from Verizon
- Advertise phone number change before migration
- Purchase and install VoIP network in parallel with existing system
- Begin migration to VoIP network



## Next Steps

- Reconvene the Telecommunications Steering Committee for involvement
- Meet with Departments to identify specific needs/desires
- Complete Requirements
- Reserve block of telephone numbers
- Purchase system and begin installation

# ● | Migration Schedule

- FY 2008:
  - Install VoIP switch
  - Bring up 210 +/- users in City Hall
  - Bring up new voicemail system



# Migration Schedule, cont.

- FY 2009:
  - 1,700 +/- users
  - Complete City Hall implementation
  - Public Safety Center
  - Tavern Square
  - Lee Center
  - Courthouse

# Migration Schedule, cont.

- FY 2010:

- 500 +/- users
- Human Services
- MH/MR/SA
- Other small offices



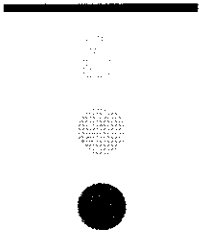
Avaya 4625SW IP Telephone

- FY 2011:

- 100 +/- users – complete project

# VoIP Things to Remember

- City's legacy system is old and becoming harder to maintain
- Phone service will essentially be the same, and better after VoIP
  - Pick up handset, get dial tone, make call
  - Modern calling features
- Little impact on users during transition
- Final result: better, more reliable service with more features



# Questions??