King Fahad University of petroleum & minerals

Geographic information System

CRP 514

Water Industry Using GIS Technology

for

Dr: Baqer AlRamadan

Prepared by

Salem M Al-Nahdi

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Outline

Introduction

GPS in water industry

Models Types

GIS and Water Models

Methods of Linking GIS and Models

Economical Aspect of Using GIS Technology ((Case study))

Conclusion

Introduction

- What is the water industry.
- Water industry before using GIS.
- How GIS improve water industry?

History of GIS in Water Industry

- 1980
- 1990
  - Mapping
  - facilities management
  - maintenance plan
- 1995
  - drinking water studies
  - Modeling improvement
  - Contamination
  - Corrosion & Chlorination
  - Expansions plans
- 2000
  - 90% in U.S
  - Exchange data more simpler
  - ESRI

GPS in Water Industry

- Increase the accuracy
- Creating map On GPS
- Collecting data
- Site work

Models Types

- Modeling Requirements
  - Suitable model
  - Input data for the model

- Hydrologic Model Types

  - Lumped Model

    Lumped parameter models lump the input parameters of a study area over polygons and use vector GIS application

  - Distributed Model

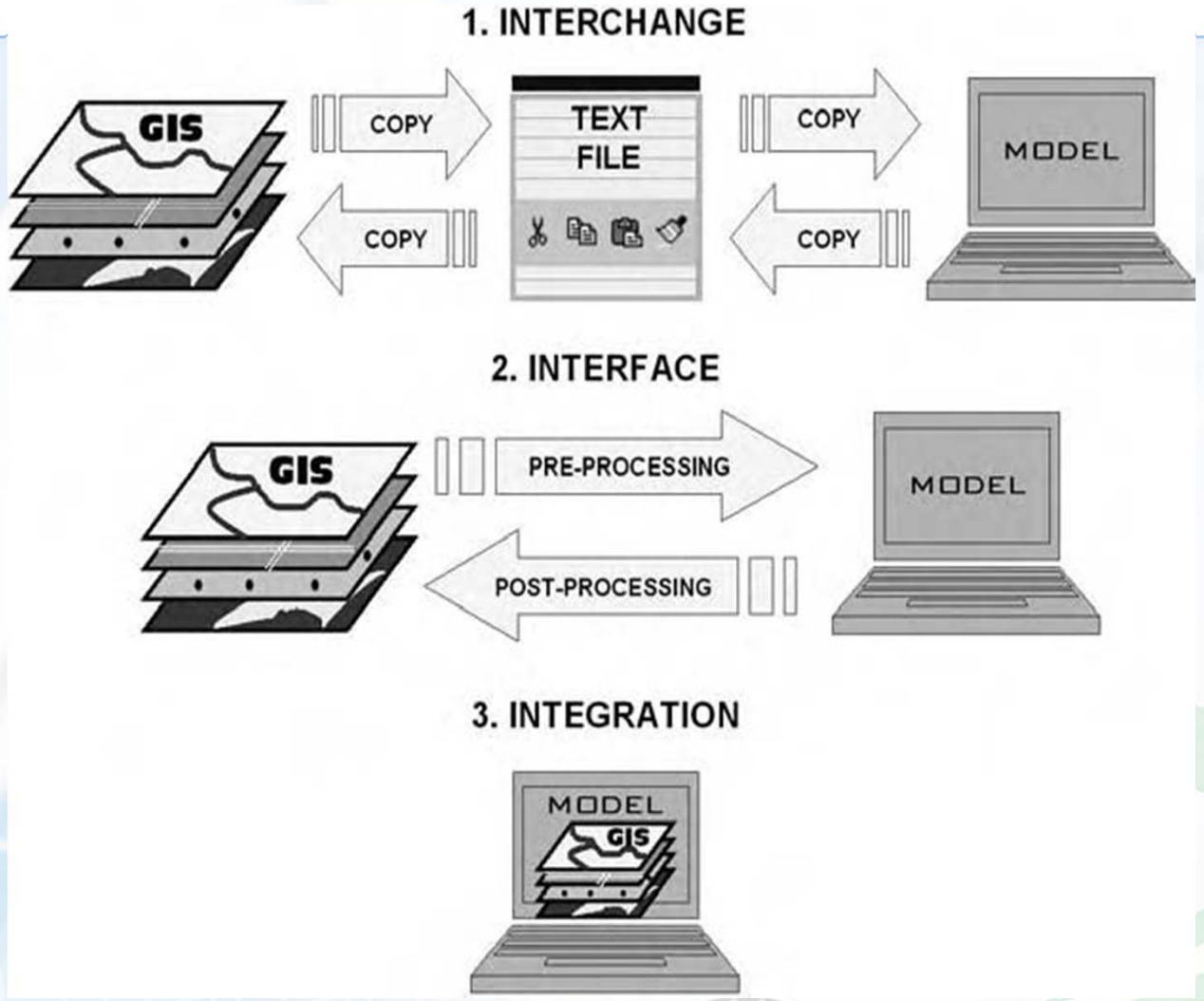
    Distributed models distribute the input parameters of a study area over grid cells and use raster GIS applications

Models Types

- Major steeps to apply GIS technology to Models
  - ✓ Development of spatial database
  - ✓ Extraction of model layers
  - ✓ Linkage to computer models

- Methods of GIS Linkage
  - ✓ Interchange method
  - ✓ Interface method
  - ✓ Integration method

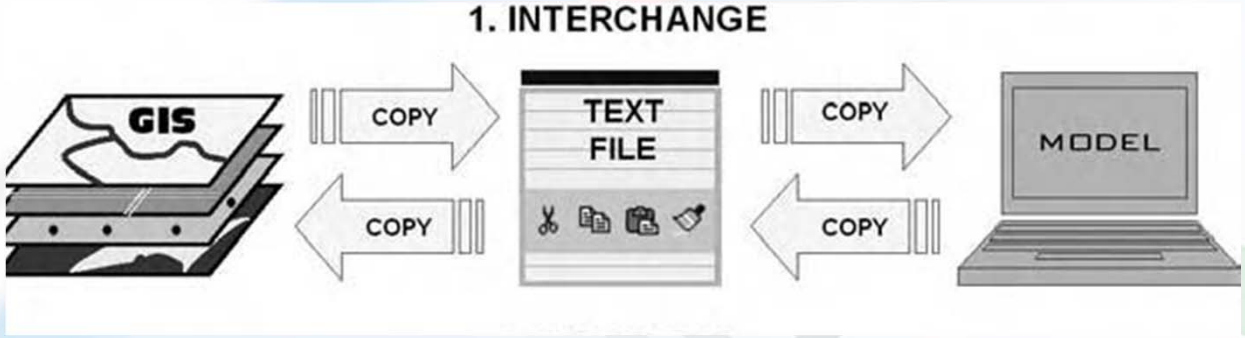
Methods of Linking GIS and Models



Methods of Linking GIS and Models

- Interchange Method

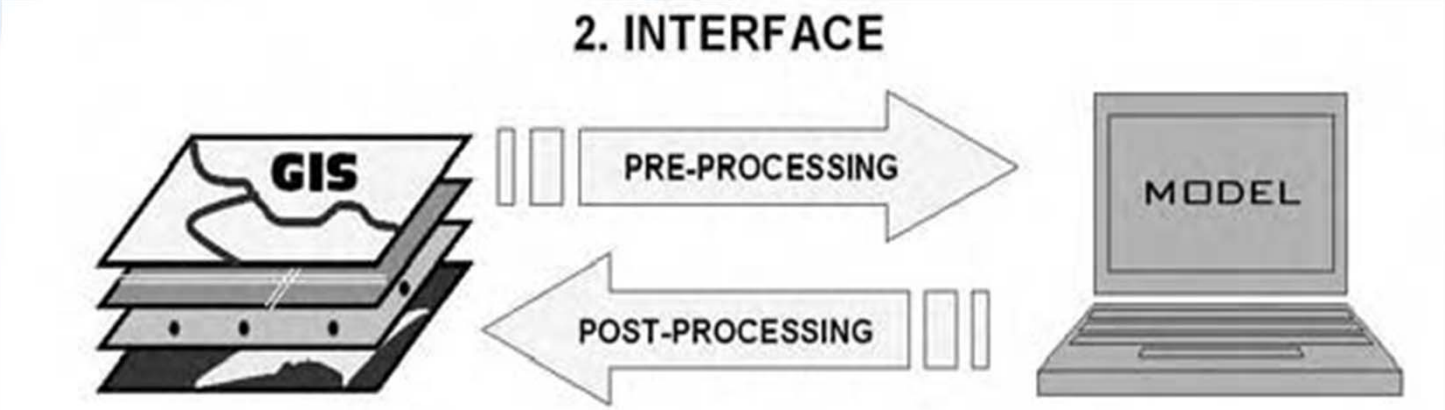
The interchange method employs a batch-process approach to transfer data between a GIS and a computer model.



Methods of Linking GIS and Models

Interface Method

The interface method provides a direct link to transfer information between the GIS and a model. The interface method consists of at least the following two components:

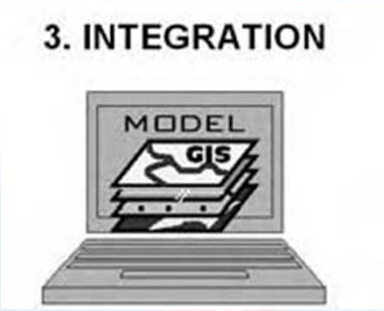


- ✓ A preprocessor that analyzes and exports the GIS data to create model input files
- ✓ A postprocessor that imports the model output and displays it as a GIS theme.

Methods of GIS Linkage

Integration method

combined program offers both GIS and modeling functions



GIS-based Integration

Model-Based Integration

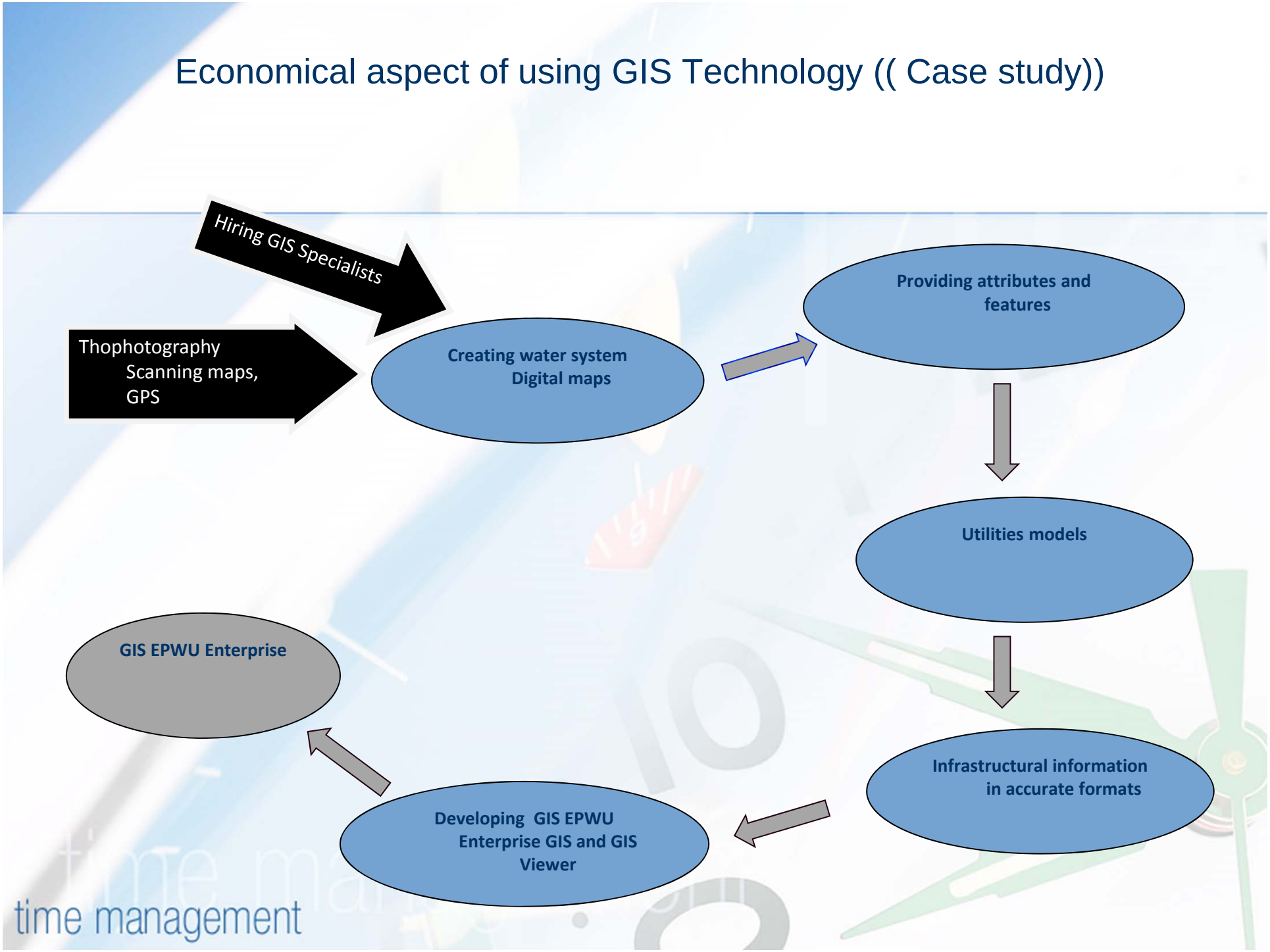
Economical aspect of using GIS Technology ((Case Study))

EL Poso (U.S , Texas , 800,000)

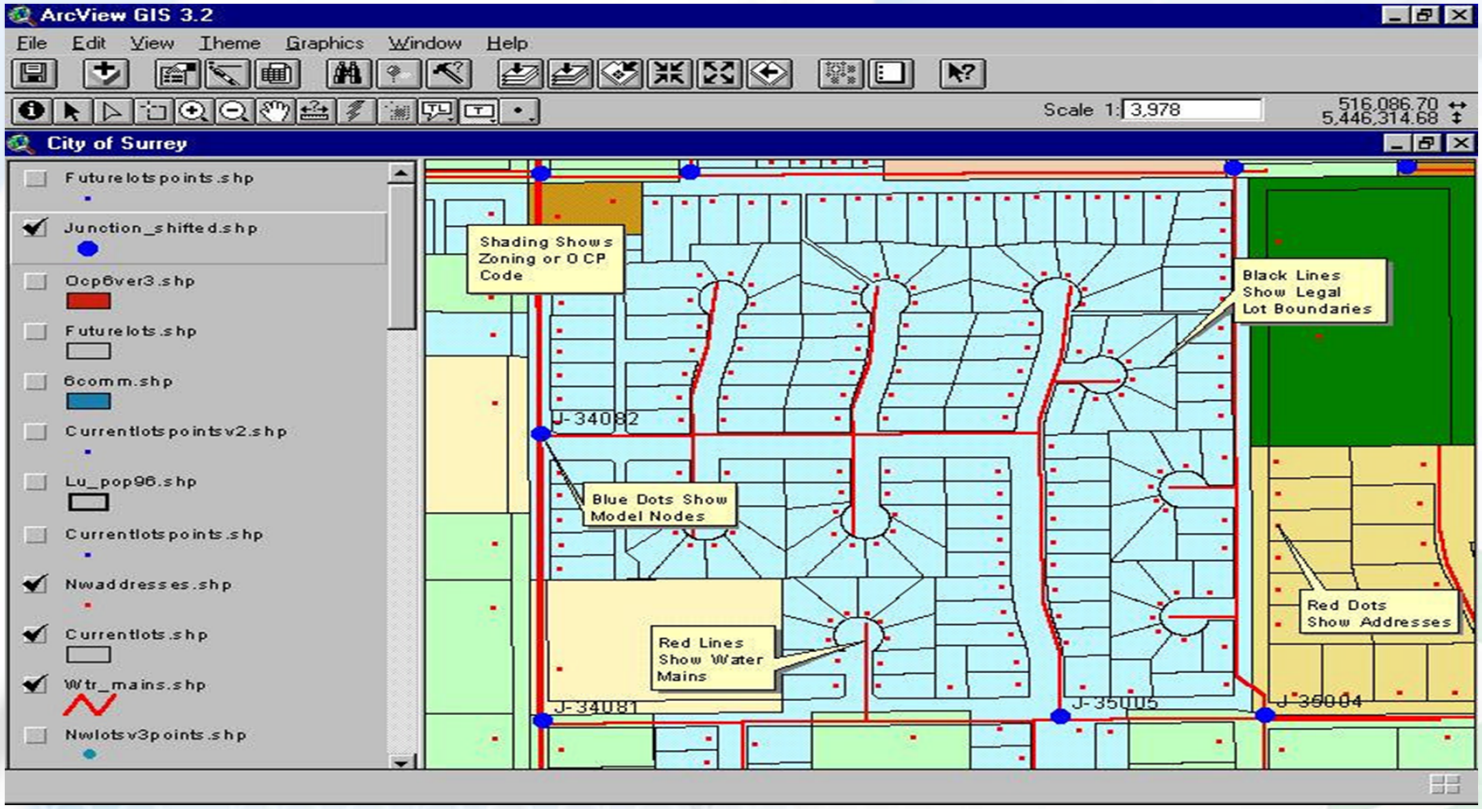
El Poso Water Utilities Goals

- ✓ Implementing GIS solution
- ✓ No map data duplication
- ✓ No paper maps
- ✓ Data accuracy
- ✓ Distributing GIS

Economical aspect of using GIS Technology ((Case study))

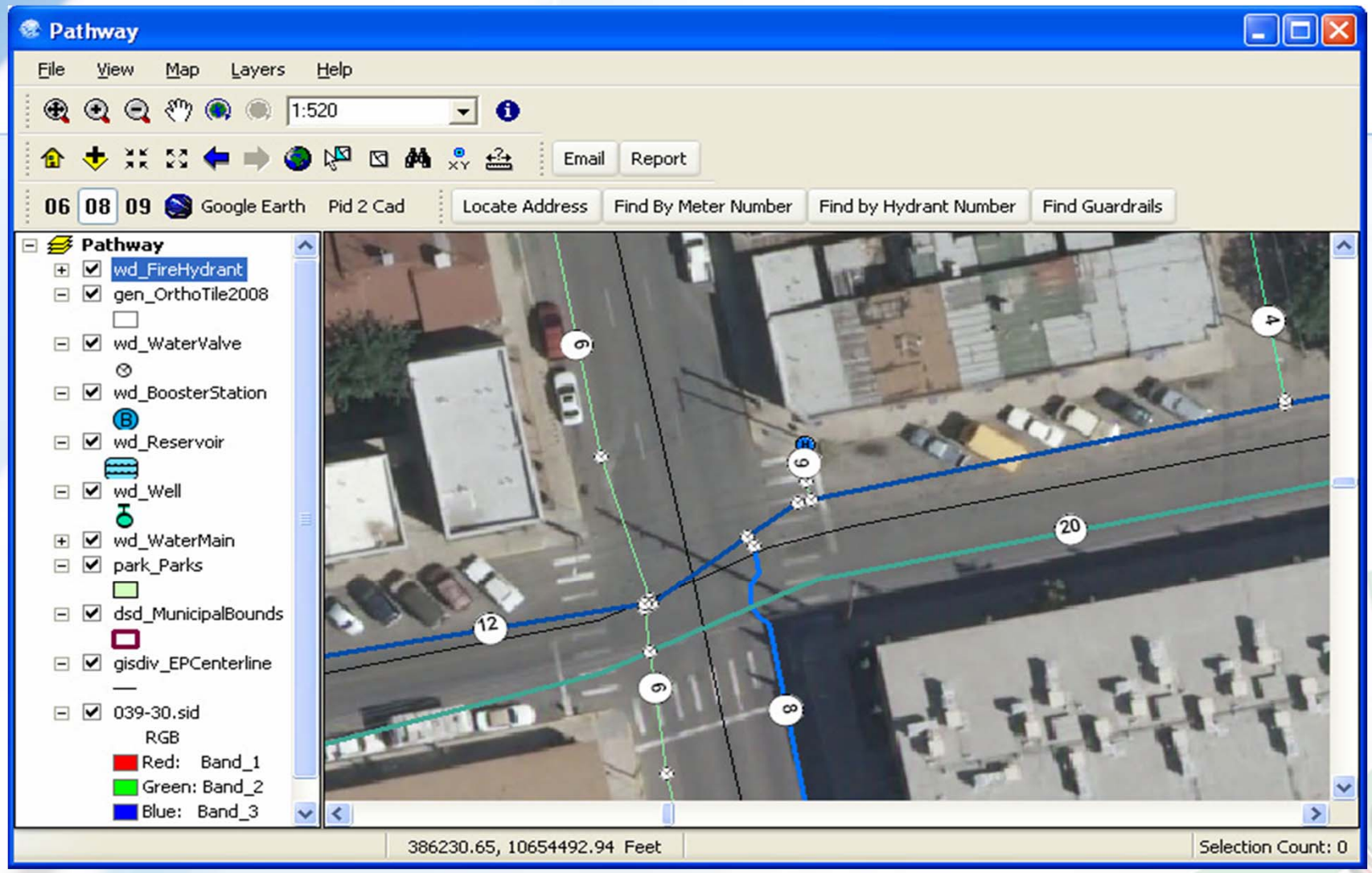


Economical Aspect of Using GIS Technology ((Case study))



time management

Economical aspect of using GIS Technology ((Case study))



Close-Up Snapshot of the Water Distribution Infrastructure Using El Paso Water Utilities' GIS Viewer Application.

Economical Aspect of Using GIS Technology ((Case Study))

saving time and money

Table 1. Illustrates Cost Savings Based on Manual Efforts to Retrieve Information Vs. Using the EPWU's GIS Viewer.

Mapping Operation	One Use Per Day	Manual Method in Seconds	GIS Viewer in Seconds	Time Savings Per Use (seconds)	Total Savings Per Use* ($15/hour)	Total Savings Per Use Per Year**
Find Street	1	180	13	167	$0.70	$175.35
Find Hydrant	1	188	9	179	$0.75	$187.95
Find Water Meter	1	258	9	249	$1.04	$261.45
Find Pressure Regulator	1	241	13	228	$0.95	$239.40
Find Intersect	1	248	13	235	$0.98	$246.75
Find Manhole	1	224	24	200	$0.83	$210.00
Find Liftstation	1	195	20	175	$0.73	$183.75
Find Well	1	211	20	191	$0.80	$200.55
Import Ortho	1	n/a	5	n/a	n/a	n/a
Identify	1	n/a	2	n/a	n/a	n/a
Measure	1	375	6	369	$1.54	$387.45
Water Genmaps	1	210	7	203	$0.85	$213.15
Sewer Genmaps	1	210	7	203	$0.85	$213.15
Intersection Images	1	548	8	540	$2.25	$567.00
Plan Profile Images	1	548	12	536	$2.23	$562.80
Total Savings for Utility Service Field Worker @ $15.00 Per Hour Wage						**$3,648.75**
60 Users at $15.00 Per Hour Wage						**$218,925.00**

*Total Savings Per Use ($15/hr = (Time Savings seconds/3600 seconds) * $15 per hour.
**Total Savings Per Use per Year = Total Savings per Use * 252 work days.

time management

Conclusion

Strengthens

- ✓ Improve the management .
- ✓ Improve future and extensions plans.
- ✓ Updated data easily.
- ✓ Cost saving tools.
- ✓ Reducing paper work
- ✓ Customers satisfaction

Weaknesses

- ✓ Data availability .
- ✓ Gathering data.
- ✓ Specialists availability.
- ✓ Cost impact.

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WWW.innogistic.co.uk

GIS Technology for Water and wastewater, and Storm Water Utilities
www.esri.com/water

THANK YOU

Q & A

time management