

Esri Southwest Conference  
December 2-4, 2014 | Santa Fe, NM

# WORK IN STREETS

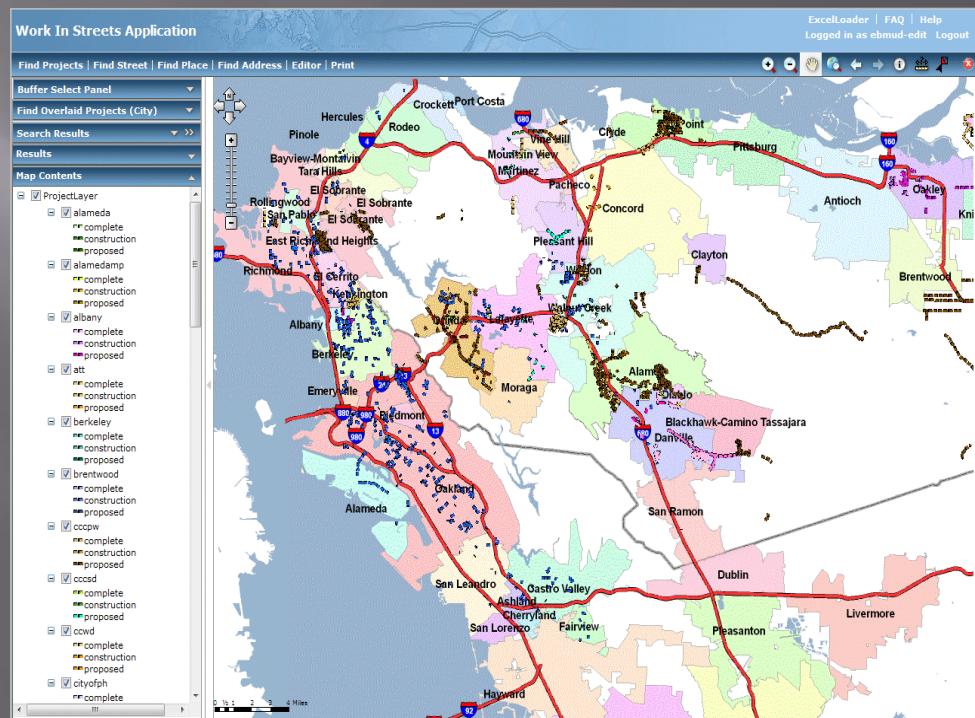
A Web Application That Can  
Save You Money

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# Topics

- Problem
- Background
- Applicable to Cities & Counties
- Architecture
- Application
- Training and Costs
- Benefits
- Conclusion

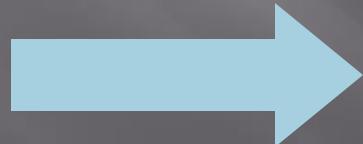


# Problem

- ❑ Lack of coordination between Cities, Counties, and Utilities for work being done in the streets.
- ❑ Citizens have to deal with multiple road construction projects done over a long period of time on the same road.
- ❑ No sharing of costs amongst agencies and utilities

# Problem

- ❑ First a City/County Paves a Street



**This takes about 2 weeks**

# Problem

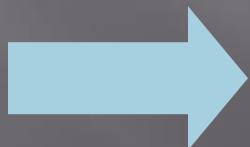
- Then a Water Utility comes in and installs a pipe in the street.



**This takes about 3 more weeks**

# Problem

- ❑ Then an Electric or Gas Utility comes in and installs a pipe in the street.



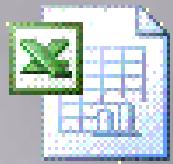
**This takes about 3 more weeks**

# Problem

- So the Citizens dealt with approximately 8 weeks of construction and in the end the road pavement was patched up.



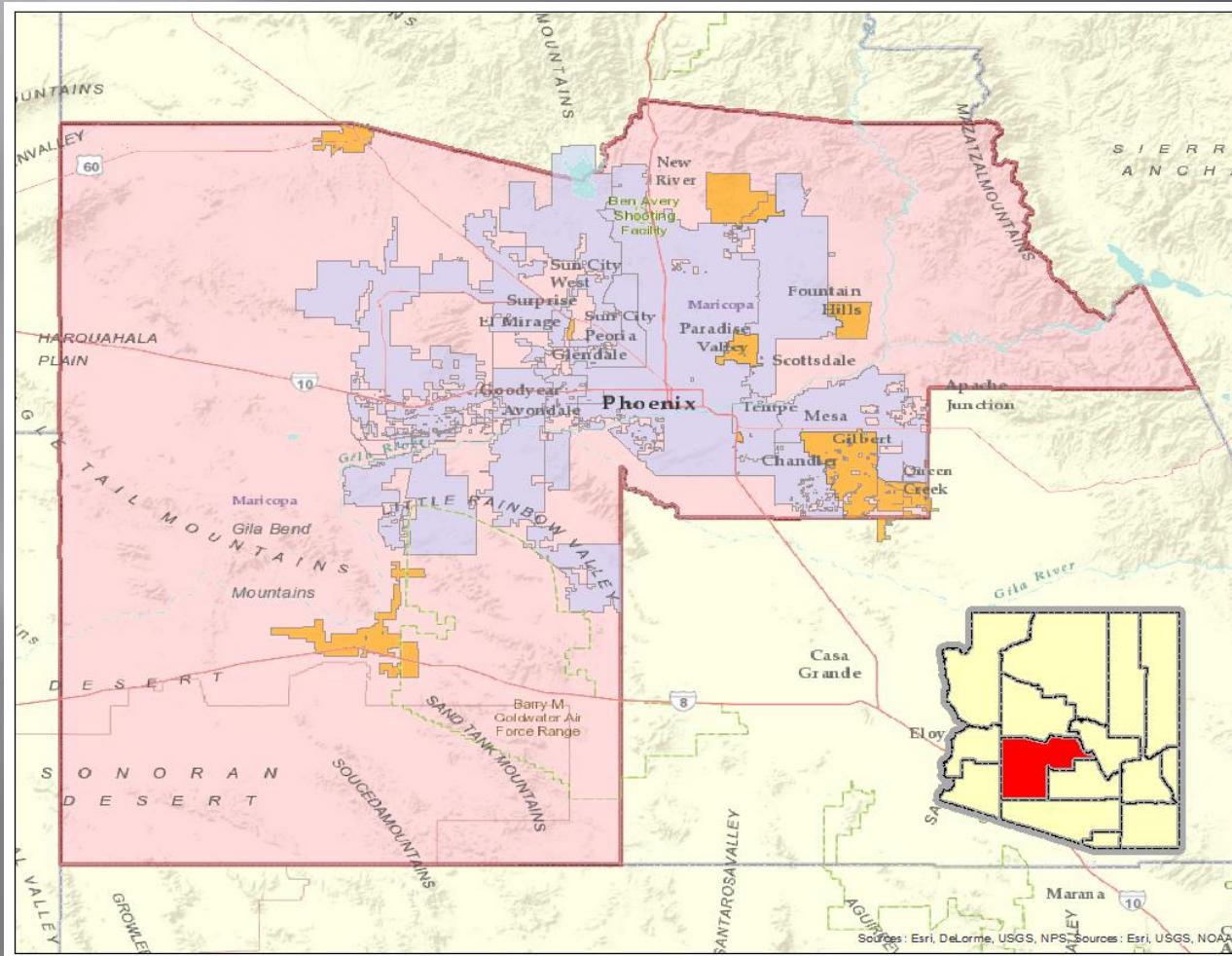
# Background



- Utility Coalition Meeting
  - Individual Excel spreadsheets
  - Discussion with no visuals
- Idea (EBMUD)
  - GIS Web Application (Visual)
  - Facilitate Coordination
  - Share Costs
- Pilot Project
  - -- CCCSD, Danville, and EBMUD with feedback from the Utility Coalition



# Applicable for Cities and Counties



# Applicable for Cities and Counties



**City of Phoenix**



**City Public Works**



**City Water Dept.**



**at&t**

**Sprint**



**CenturyLink™**



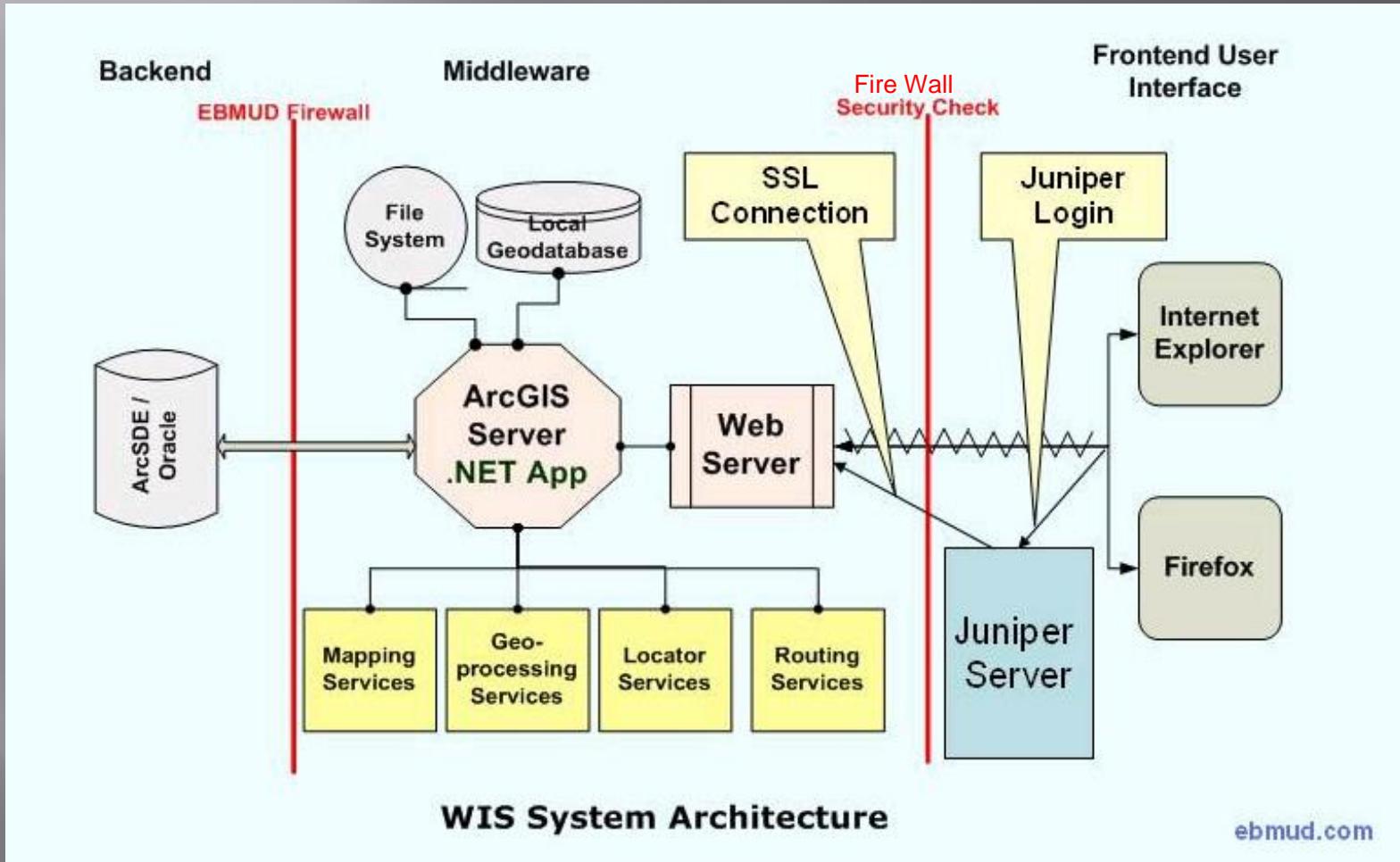
**T-Mobile...**



# Application Introduction

- ❑ WIS is a GIS Web application developed by EBMUD in coordination with selected agencies
- ❑ It provides a map Web platform for agencies to coordinate street work and projects
- ❑ It enables the agencies to add, edit, and locate their internal projects
- ❑ It also allows agencies to view projects added by other agencies

# WIS Architecture



# WIS Architecture

- Front End User Interface
  - It is a Web GIS application supporting different browsers
- Middle Tier
  - ArcGIS Server .NET ADF
    - Excel spreadsheet loader and project data editing
    - Overlaid projects searching and locating
  - ArcGIS Server Services
    - Mapping service
    - Geocoding service
    - Routing service
    - Geoprocessing service
- Back End
  - ArcSDE/Oracle GeoDatabase

# WIS Application Components

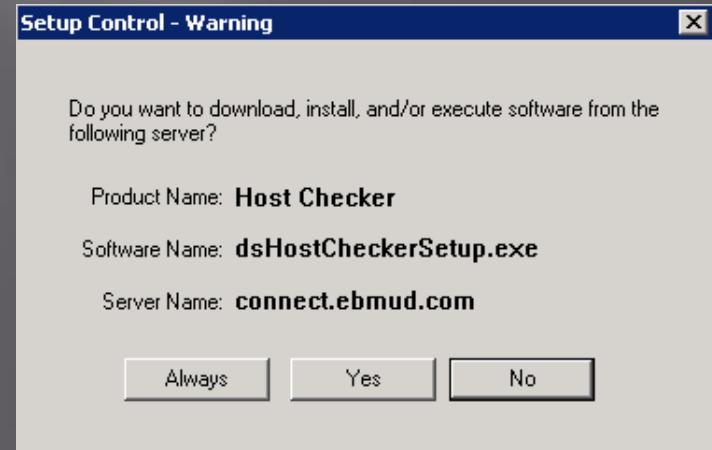
- ❑ User Login - Security
- ❑ Mapping Navigation Tools
- ❑ Project Finding and Locating tools
- ❑ Project Data Loading and Editing Tools
- ❑ Overlaid (Conflict) Project Searching Tools
- ❑ WIS Online Help

# User Login - Security

## Juniper Connection

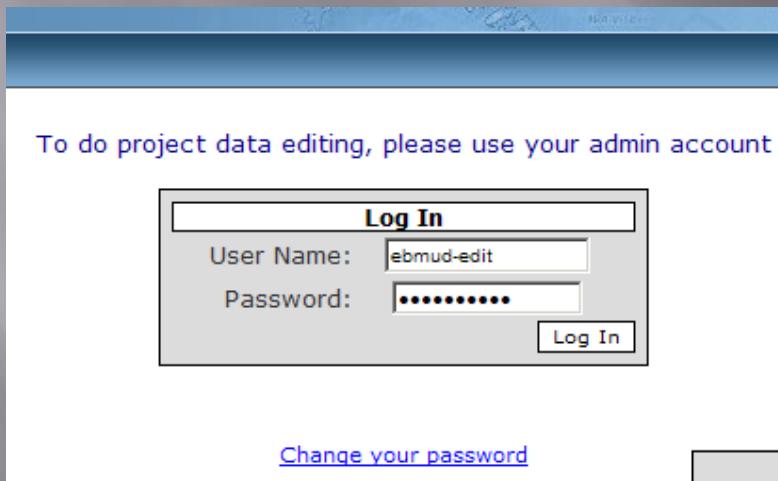
 **Welcome to Gis Applications**  
**Secure Access SSL VPN for GIS Applications**

Username  Please sign in to begin your secure session.  
Password



# Application Login

- There are two accounts; one Admin for editing and one for View only



A screenshot of a "Change Your Password" dialog box. It contains four input fields: "User Name", "Password", "New Password", and "Confirm New Password". At the bottom are two buttons: "Change Password" and "Cancel".

# Data Sharing Agreement

- With a signed Data Sharing agreement you go directly to the application
- Otherwise the users will need to accept the Online Agreement

USER AGREEMENT  
FOR  
EAST BAY MUNICIPAL UTILITY DISTRICT'S  
GEOGRAPHIC INFORMATION SYSTEM  
WORK IN STREETS APPLICATION

User Agreement

This User Agreement is made between the East Bay Municipal Utility District ("EBMUD"), a public entity, and any person ("User") who uses this application.

BY CLICKING THE ACCEPTANCE BUTTON OR ACCESSING, USING OR INSTALLING ANY PART OF THE SERVICE, USER EXPRESSLY AGREES TO AND CONSENTS TO BE BOUND BY ALL OF THE TERMS OF THIS AGREEMENT. IF USER DOES NOT AGREE TO ALL OF THE TERMS OF THIS AGREEMENT, THE BUTTON INDICATING NON-ACCEPTANCE MUST BE SELECTED, AND USER WILL NOT BE ABLE TO ACCESS, USE OR INSTALL ANY PART OF THIS SERVICE.

Overview

I ACCEPT THE TERMS OF THIS USER AGREEMENT  
 No, Thanks

[Go WIS](#)

# WIS Graphic User Interface

Diagram illustrating the WIS Graphic User Interface (GUI) structure:

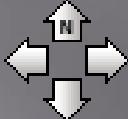
- Menu/Toolbar**: Located at the top left, containing links for "Find Projects", "Find Street", "Find Place Name", "Find Address", "Find APN", "Editor", and "Print".
- Map (or Map Frame)**: The central area displaying a map of the San Francisco Bay Area and surrounding regions. The map shows various geographical features, roads (e.g., 580, 880, 980, 185, 84), and urban areas. Specific locations labeled include Hercules, Pinole, Bayview-Montalvin, Tara Hills, El Sobrante, San Pablo, El Sobrante, East Richmond Heights, Richmond, El Cerrito, Kensington, Albany, Berkeley, Emeryville, Piedmont, Oakland, Alameda, Castro Valley, San Leandro, Ashland, San Lorenzo, Fairview, Hayward, Union City, Sunol, Pleasanton, Dublin, Livermore, Pleasant Hill, Walnut Creek, Orinda, Moraga, Moraga, Alamo, Diablo, Blackhawk-Camino Tassajara, Danville, San Ramon, and Brentwood.
- Links**: Located at the top right, with a red box highlighting the "Logged in as ebmud-edit" status and "Logout" link.
- Console**: Located at the bottom left, showing a list of selected projects and locations.

Console List:

- BufferSelect Panel
- Find Overlaid Projects (City)
- Search Results
- Results
- Map Contents
  - BufferLayer
  - ProjectLayer
    - alameda
      - Communication or CATV Conduits
      - Electric Lines
      - Gas or Petroleum Pipes
      - Other Roadway Project
      - Other Underground Utility
      - Paving Moratorium Street
      - Planned Paving Project
      - Planned Street Event (Road Closures)
      - Potable Water Pipes
      - Recycled Water Pipes
      - Sewer or Storm Drain Pipes
    - albany
    - brentwood
    - cccsd
    - ccwd
    - clayton
    - cvsd
    - danville
    - ebmud
    - elcerrito
    - hayward
    - martinez
    - moraga
    - orinda
    - richmond
    - sanramon
    - walnutcreek
    - All WIS Projects
    - Streets

# Mapping Navigation Tools

## □ Re-Center the Map

- Navigation element 
- Pan tool 

## □ Zoom in / out

- Mouse wheel  Mouse wheel
- Zoom in tool 
- Zoom out tool 
- Zoom level 
- Zoom scale dropdown 

# Mapping Navigation Tools

- Forward or Back Extent

- Forward extent 

- Back extent 

- Zoom out to full map



- Measure distance and area



- Measure polyline
  - Measure polygon

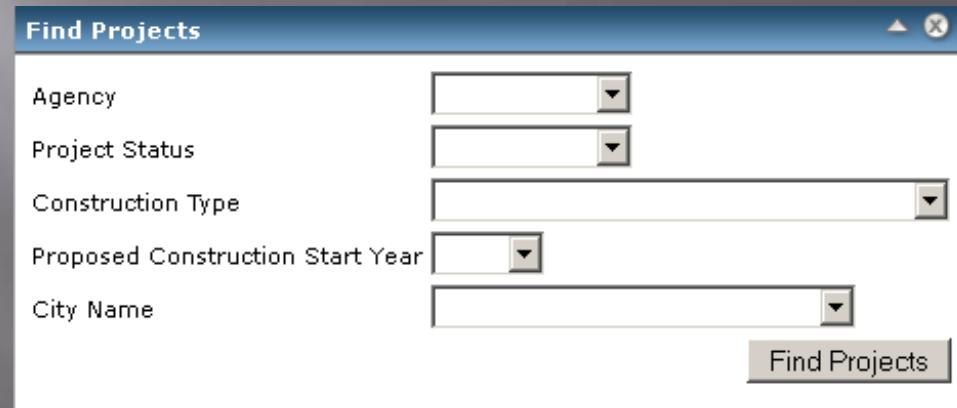
# Project Finding and Locating Tools

- Identify a WIS Project or a Feature 
- Find Projects

**Find Projects**

Agency	<input type="text"/>
Project Status	<input type="text"/>
Construction Type	<input type="text"/>
Proposed Construction Start Year	<input type="text"/>
City Name	<input type="text"/>

**Find Projects**



- Find Street

**Find Street**

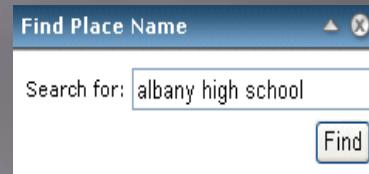
Street Name	<input type="text" value="marin"/>
Type	<input type="text" value="Ave"/>
City Name	<input type="text" value="Albany"/>

**Find**

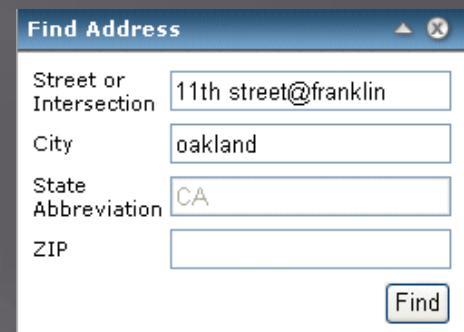


# Locating Tools

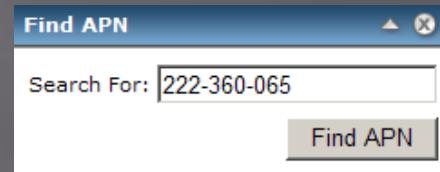
- Find Place Name



- Find Address or Street Intersection

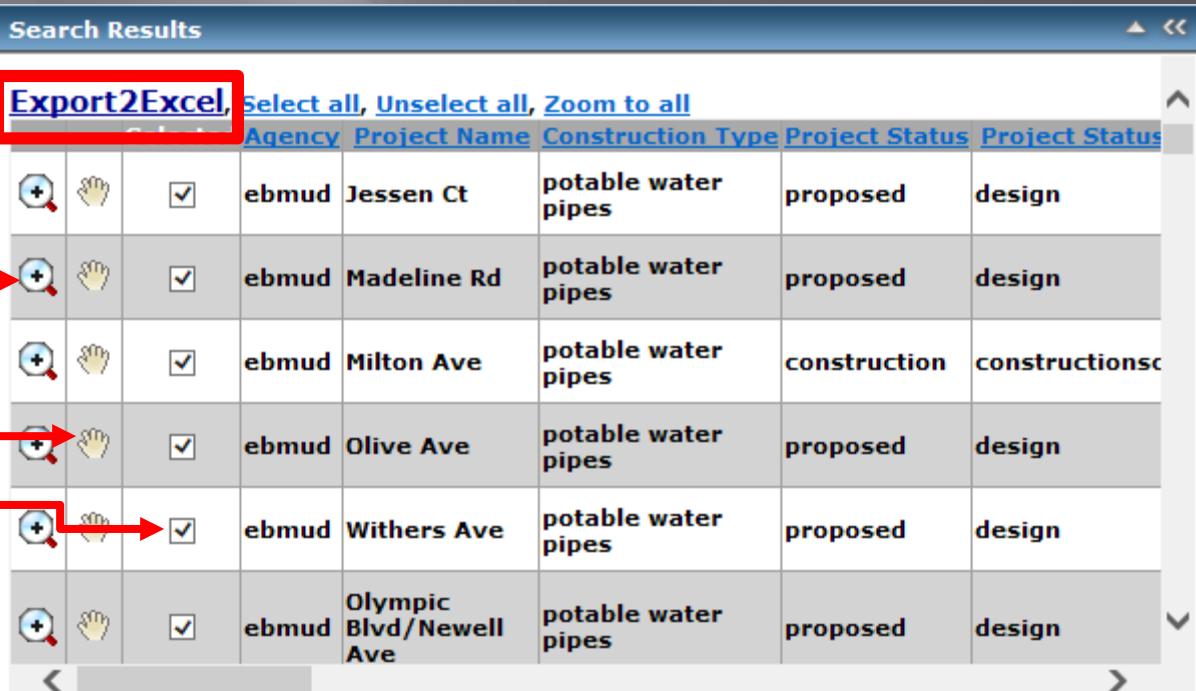


- Find Parcel APN



# The Panel of Search Results

- Search Results Panel is used to display the found records for the WIS project find and search tools



The screenshot shows a 'Search Results' panel with a table of project records. The columns are: Row Number, Action (with icons for Add, Edit, and Delete), Selected (checkbox), Agency, Project Name, Construction Type, Project Status, and Project Status. The data in the table is as follows:

Row Number	Action	Selected	Agency	Project Name	Construction Type	Project Status	Project Status	
1			<input checked="" type="checkbox"/>	ebmud	Jessen Ct	potable water pipes	proposed	design
2			<input checked="" type="checkbox"/>	ebmud	Madeline Rd	potable water pipes	proposed	design
3			<input checked="" type="checkbox"/>	ebmud	Milton Ave	potable water pipes	construction	construction
4			<input checked="" type="checkbox"/>	ebmud	Olive Ave	potable water pipes	proposed	design
5			<input checked="" type="checkbox"/>	ebmud	Withers Ave	potable water pipes	proposed	design
6			<input checked="" type="checkbox"/>	ebmud	Olympic Blvd/Newell Ave	potable water pipes	proposed	design

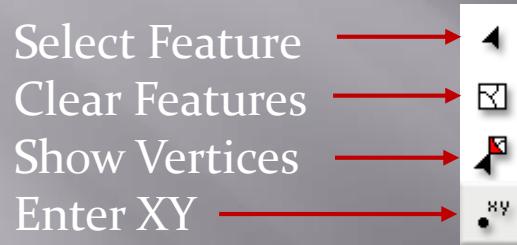
Annotations with red arrows point to specific features:

- Export to an Excel spreadsheet: Points to the 'Export2Excel' button in the toolbar.
- Zoom in to Project: Points to the magnifying glass icon in the toolbar.
- Pan to Project: Points to the hand icon in the toolbar.
- Highlight Project on map: Points to the magnifying glass icon in the toolbar.

# Editing Function

- ❑ Need to be logged in as Admin user for your organization
- ❑ Start and Stop editing by clicking | **Editor** | on the menu bar and clicking  on the Editor task Window.
  - Stop editing will automatically save all your newly created projects and edits on existing ones

# Editing Tools

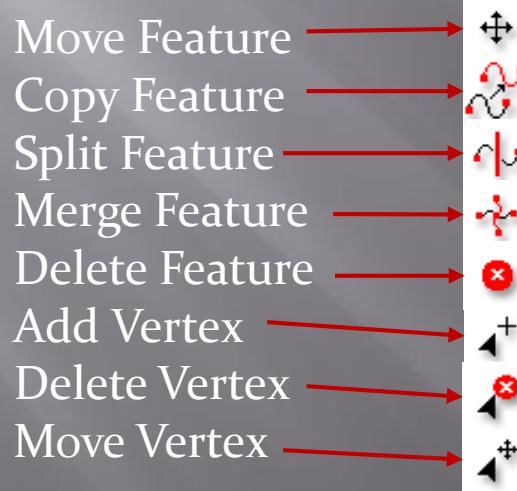
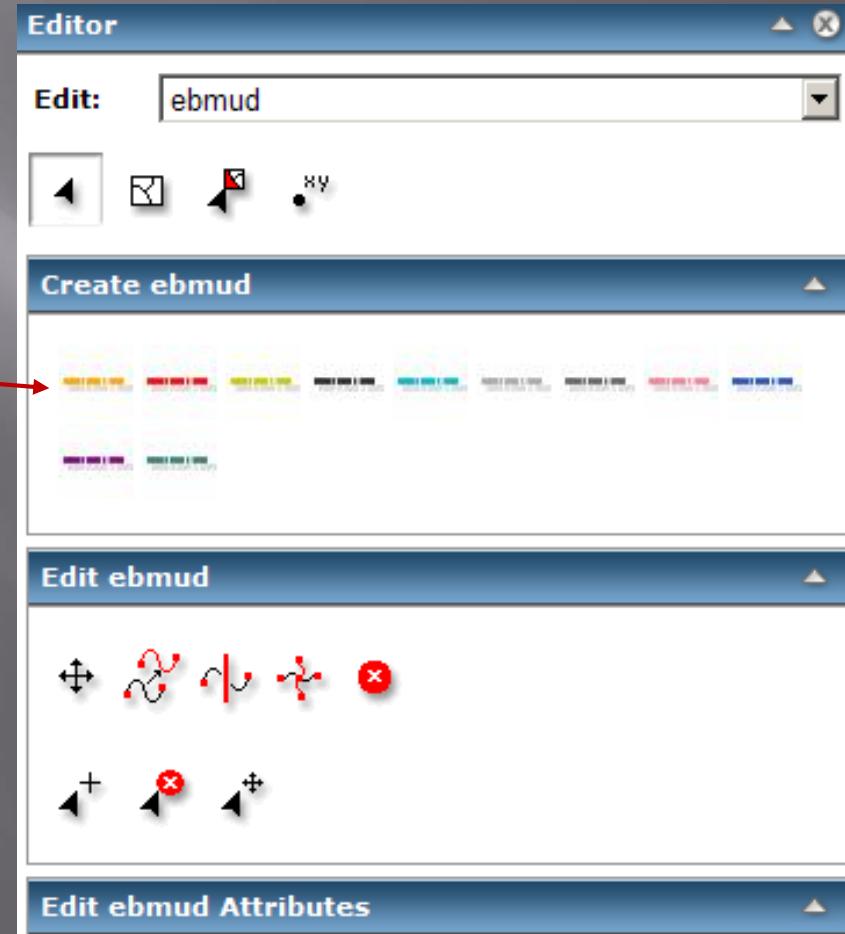


Select Feature

Clear Features

Show Vertices

Enter XY



Create Feature

Move Feature

Copy Feature

Split Feature

Merge Feature

Delete Feature

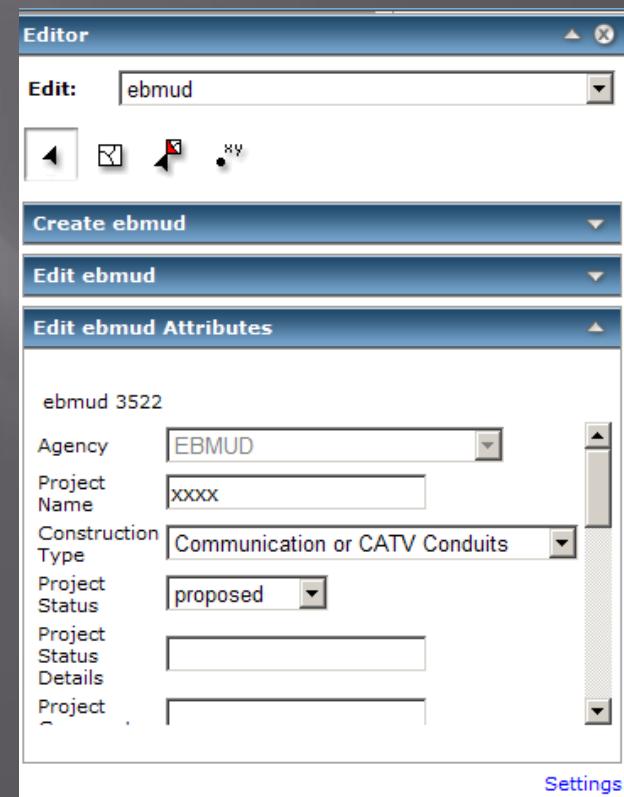
Add Vertex

Delete Vertex

Move Vertex

# Attribute Information Tool

- ❑ After creating a Project (feature) by double clicking the end point, the Attribute Information Panel appears
- ❑ There are fields that need to be filled in prior to saving it
- ❑ You can later modify the attribute information by selecting the project (feature) for editing



# Data Loader

- ❑ A way to load in bulk data as projects in standard Excel spreadsheet into the database
- ❑ Uses the Routing Services to generate the project polylines
- ❑ The application provides an Excel spreadsheet template that can be down loaded onto a users PC

# Excel Spreadsheet Template

WISTemplate.xls

	A	B	C	D	E	F
1	<b>Column Name</b>	AGN_NAME	PRJ_NAME	CONST_TYPE	PRJ_STAT	PRJ_STAT_DTL
2	<b>Common Name</b>	Agency	Project Name	Construction Type	Project Status	Project Status Detail
3	<b>Requirement</b>	Required	Required	Required	Required	Optional
4	<b>Data Type</b>	Text Field (50)	Text Field (100)	Text Field (50)	Text Field (50)	Text Field (50)
5	<b>Comments</b>	All participating agencies			proposed, construction, complete	planning, design, construction scheduled, permission hold
6	<b>Old Column Head</b>	Utility/Agency Performing the Project	Project Name			Status of Project (e.g., Planning Phase, Permitting Phase, or Construction Phase)
7	<b>Example1</b>	ccwd	2012 surface treatment	potable water pipes	proposed	design
8	<b>Example2</b>	danville	Pin 459	Planned paving	construction	on hold

Sheet1 Sheet2 **Sheet3**

# Excel Locational Information

WISTemplate [Compatibility Mode] - Excel

Colleen Swain

	A	M	N	O	P	Q	R	S	T	U	V
1	Column Name	CITY_NAME	ST_NAME	START_PT	END_PT	LOC_CMNT	CNTAC_NAME	CNTAC_NUM			
2	Common Name	City Name	Street Name	Start Point	End Point	Location Comment	Contact Name	Contact Number			
3	Requirement	Optional	Required	Optional (Required for Excel Loader)	Optional (Required for Excel Loader)	Optional	Optional	Optional			
4	Data Type	Text Field (50)	Text Field (100)	Text Field (100)	Text Field (100)	Text Field (512)	Text Field (100)	Text Field (50)			
5	Comments	Primary city where work is located	Location of work	Street intersection or full address. For street intersection, use @ to separate the two streets	Street intersection or full address	Limits of Work	Project manager or contact	Phone number			
6	Old Column Head		Location of Work (i.e., Name of Street(s) work will be performed on			Limits of Work (e.g., between the intersection of Jones Street and Harris Drive)					
7	Example1	Walnut Creek	Willow Lake Road	Cornell Ave@Washington Ave, Albany, CA 94706	evelyn ave@washington ave, albany, ca94706	Willow Lake Road to 390 Discovery Bay Blvd	Jane Doe	(925) 555-1212			
8	Example2	Oakland	Marin Ave	1230 Garfield Ave, Albany, CA 94706	810 Adams St, Albany, CA 94706	between the intersection of Jones Street and Harris Drive	Tom Jones	(925) 555-1212			
9											
10											
11											

Sheet1 Sheet2 Sheet3

READY

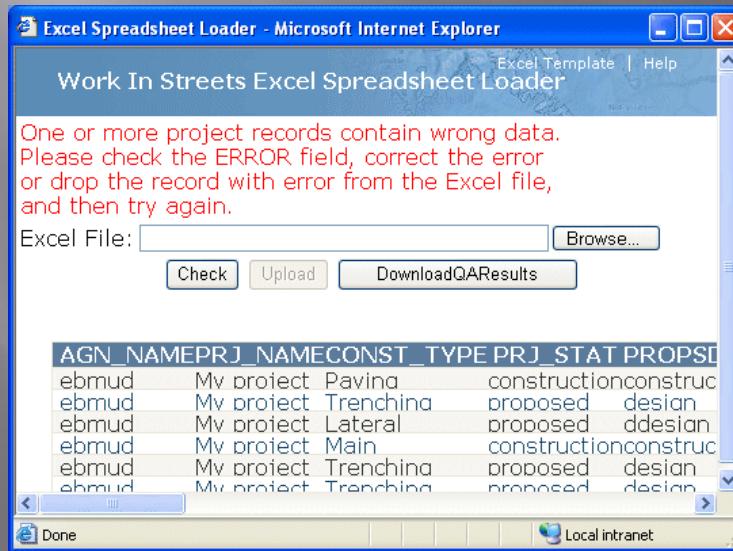
100%

# Checking Excel Spreadsheet for Errors

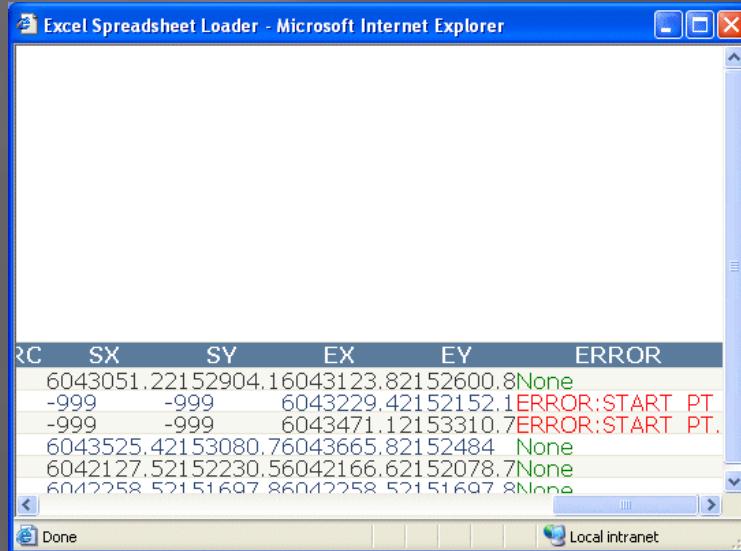
- First step is to check for any errors in spreadsheet



- Example of error message



AGN_NAME	PRJ_NAME	CONST_TYPE	PRJ_STAT	PROPSD	SX	SY	EX	EY	ERROR
ebmud	Mv project	Paving	construction	construction	6043051.22152904.16043123.82152600.8	None			
ebmud	Mv project	Trenching	proposed	design	-999	-999	6043229.42152152.1	None	ERROR:START_PT
ebmud	Mv project	Lateral	proposed	design	-999	-999	6043471.12153310.7	None	ERROR:START_PT.
ebmud	Mv project	Main	construction	construction	6043525.42153080.76043665.82152484	None			
ebmud	Mv project	Trenching	proposed	design	6042127.52152230.56042166.62152078.7	None			
ebmud	Mv project	Trenching	proposed	design	6042258.52151697.86042258.52151697.8	None			



# Successful Load of Spreadsheet

- Once the errors have been corrected then the Upload Button will be enabled.
- When upload is complete you will see your projects on the map.

The screenshot shows two instances of the 'Excel Spreadsheet Loader' application. The top window is in Microsoft Internet Explorer, and the bottom window is in Windows Internet Explorer. Both windows have a blue header bar with the title 'Work In Streets Excel Spreadsheet Loader'. Below the title, there is a 'Excel File:' input field with a 'Browse...' button, and three buttons: 'Check', 'Upload', and 'DownloadQAResults'. The 'Upload' button is highlighted with a red border in the Microsoft Internet Explorer window. In the Windows Internet Explorer window, a message at the bottom states: 'The Excel Spreadsheet of the WIS projects has been successfully uploaded. Please verify your projects.' To the right of these windows, a table of data is displayed. The table has a header row with columns: NAME, PRJ\_NAME, CONST\_TYPE, PRJ\_STAT, and PROPS. Below the header, there are 10 data rows, each containing the same values: 'Mv project', 'Pavina', 'construction', 'construction', and 'construction' respectively. The Windows Internet Explorer window also shows a status bar at the bottom with 'Local intranet' and a zoom level of '100%'. The Microsoft Internet Explorer window has a standard window control bar with minimize, maximize, and close buttons.

NAME	PRJ_NAME	CONST_TYPE	PRJ_STAT	PROPS
d	Mv project	Pavina	construction	construction
d	Mv project	Trenchina	proposed	desian
d	Mv project	Lateral	proposed	desian
d	Mv project	Main	construction	construction
d	Mv project	Trenchina	proposed	desian
d	Mv project	Trenchina	proposed	desian
d	Mv project	Trenchina	proposed	desian
d	Mv project	Main	construction	construction

# Overlaid Project Searching Tools

- Find all the overlaid projects from a selected project

Selected	AGN	NAME	PRJ
<input type="checkbox"/>	danville	Broo	
<input type="checkbox"/>	ebmud	El Ca Dr	
<input type="checkbox"/>		Silve	

# Find All Mailing Addresses Within a Buffer Zone

Find Projects | Find Street | Find PlaceName | Find Address | Editor | Print

Buffer Select Panel

Buffer Selection Mode:

- Mail Address
- Overlaid Projects

Buffer Distance: 100 Feet

Run Buffer Selection Clear Selection

Find Overlaid Projects (City)

Search Results

Export2Excel

	Current Resident	812 C Bloss Way
		<input type="checkbox"/>
		<input type="checkbox"/>

Results

Map Contents

The map displays a street network with several buffer zones. A prominent yellow buffer zone is centered on a street segment, with numerous red dots representing mailing addresses located within that zone. A blue dashed line outlines the buffer area. Other buffer zones are shown in pink and blue, and a green area labeled 'El Capitan' is visible. Street names like 'Bloss Way', 'Lehigh Valley', and 'Capitan' are labeled. A scale bar at the bottom indicates distances from 0 to 536 feet.

# Find All Overlaid Projects in a City

**Buffer Select Panel**

**Find Overlaid Projects (City)**

**The Agency:**

**In City:**

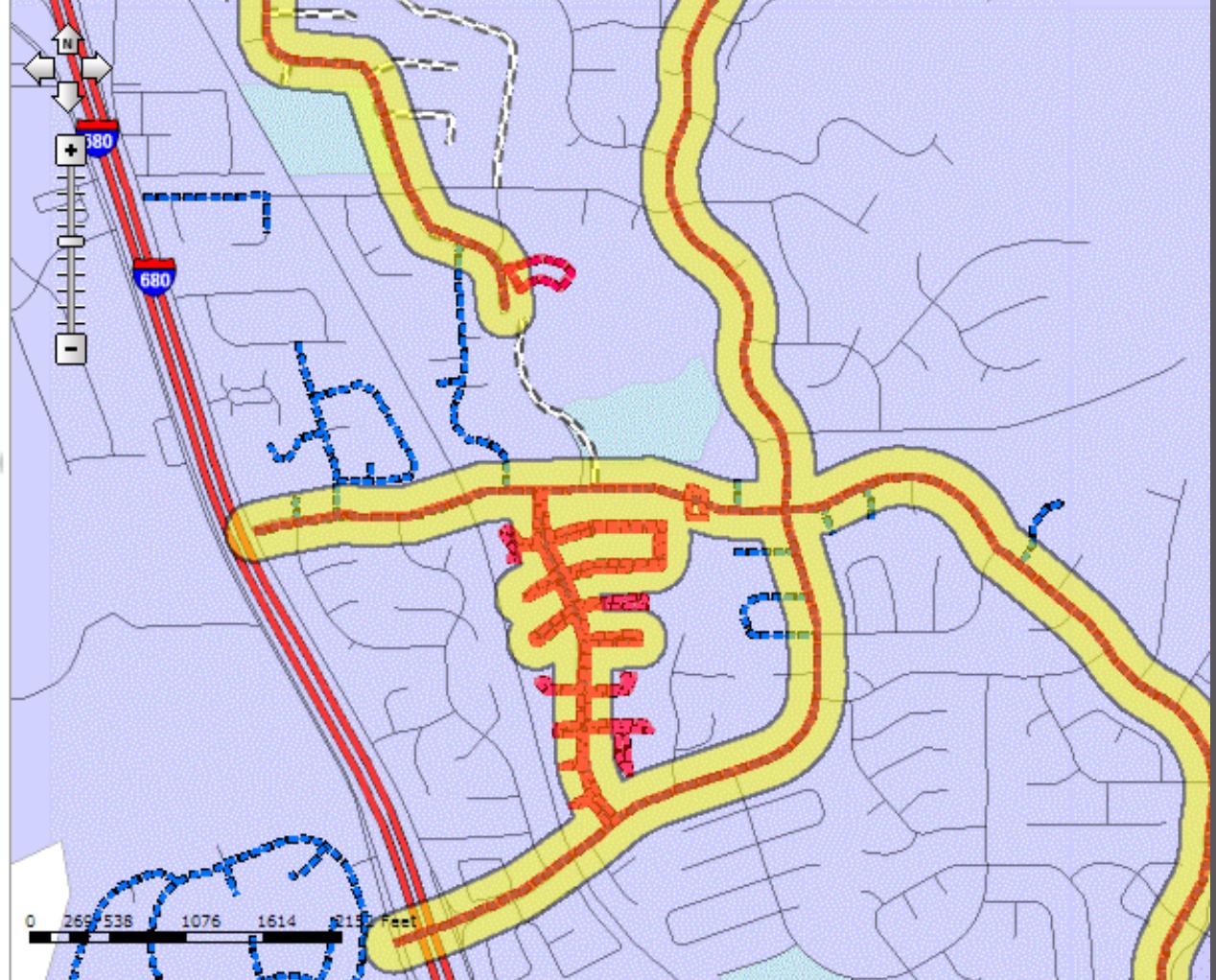
**Buffer Distance:**  Feet

**Find All Overlaid Projects In The City**

**Clear Selection**

**Search Results**

	ebmud	Mead
<input type="checkbox"/>		
<input type="checkbox"/>	ebmud	Cima
<input type="checkbox"/>	ebmud	Coun Ct
<input type="checkbox"/>	ebmud	Dana High



# WIS Online Help

## Work In Streets (WIS) Application Help

Many agencies and various utilities do work in streets requiring excavating and repaving city and county streets. To better coordinate various agencies and utilities street work, this application, Work in Streets (WIS), was developed by EBMUD in cooperation with selected agencies. The purpose of this Internet GIS Web application is to give agencies and utilities the capability to input street paving moratorium and street projects such as EBMUD pipeline projects into a centralized database. With this tool each agency and utility can see on a map or in a report which projects and moratoriums are going on in their jurisdiction.

### Find

- Identify features on the map
- Find Projects
- Find Street
- Find Place Name
- Find Address
- Search Results
- Measure distance and area
- Result Pad

### Find conflict (overlaid) WIS projects

- Find projects overlaid with a selected project
- Find all overlaid projects in a city

### Other

- Working with layers and map contents
- Frequently asked questions and troubleshooting

### Explore the map

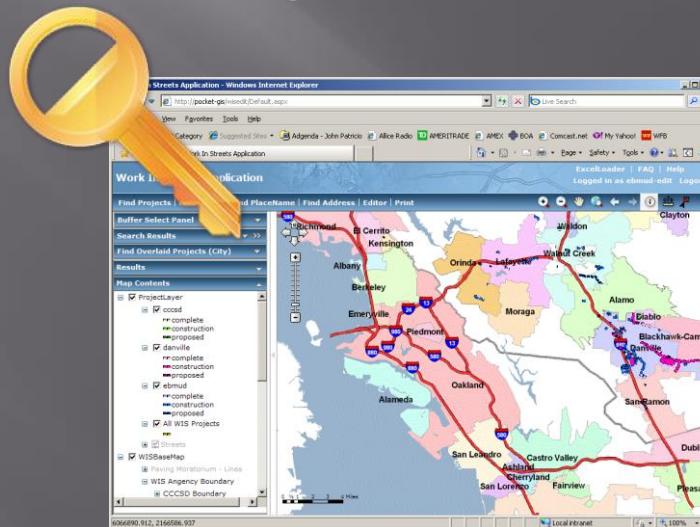
- Using the mouse and toolbar
- Using the keyboard

### Modifying WIS project data

- Editing data
- Excel Spreadsheet Loader

# Training

- ❑ Agencies can gain access to WIS by coming to a free 1/2 day class and either sign a data sharing agreement or using the online agreement
- ❑ Once training is provided than a username and temporary password will be given to the participant



WIS Access

# Costs

- ❑ EBMUD provides the hardware and software
  - Cost for ArcGIS Server license and yearly maintenance
  - Cost for yearly license of NAVTEQ data
  - Initial cost for 1 GIS Programmer for 1 year development
  - Cost for training and maintenance on the application
- ❑ For participants the cost is **FREE**

# Benefits

- ❑ Better coordination between Counties, Cities, and Utilities
- ❑ It is easier to find and see who is doing what projects around your project(s).
- ❑ Coordination of street closure(s) for an event
- ❑ Can save money by --
  - Sharing paving costs
  - Paving Moratorium costs
  - Savings on staff time



# Conclusion

- ❑ 26 Agencies use the application
- ❑ Sharing of costs has occurred between cities and utilities
- ❑ Application has been in production for over 4 years
- ❑ Recently has been upgraded to 10.1
- ❑ Future – ArcGIS Online
- ❑ Questions ??