

# GIS as a Real Time Decision Support System in Brownsville Irrigation



Rio Grande Basin Initiative  
http://riogrande.tamu.edu

## INTRODUCTION

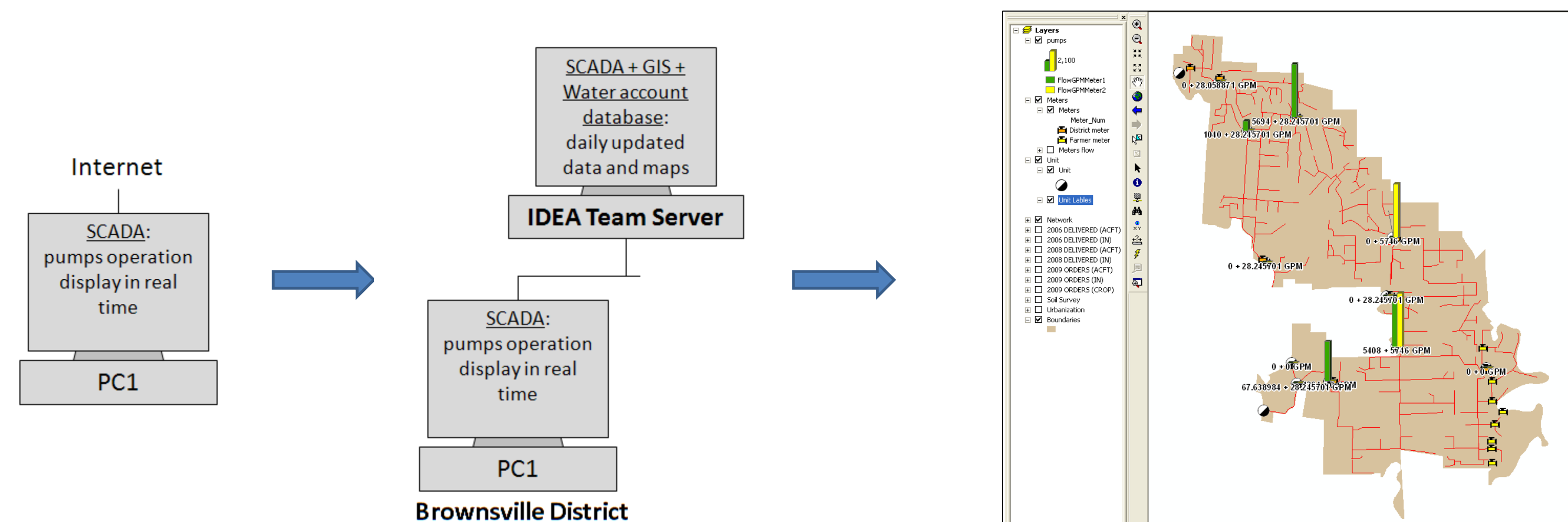
As other Irrigation District in the Rio Grande Basin of Texas, Brownsville Irrigation District (the District) uses GIS for mapping and planning purposes. A Web GIS pilot project was set up by the Irrigation District Engineering and Assistant Program of the Irrigation Technology Center (IDEA Team) in collaboration with the District to convert GIS from a static real time decision support system. Activities focused on:

1. Improving pumps and water account data daily management
  2. Enabling growers/landowners access personal data via Internet
- The project is on-going, therefore this poster discusses the first accomplishment and the open issues.

## STEPS AND RECOMMENDATIONS

### 1. Distribution network monitoring and management

Features of the distribution network are updated once a year in the District GIS maps (the GIS). Pumps location and features were available only on the SCADA computer, therefore these information were updated on the GIS too. The SCADA system allows for remote control and display of pump operations, and its maintenance is provided by a contractor. District personnel have no access to raw data, therefore the contractor was requested to implement a routine that automatically converts the database into several text files. An automatic transfer to the IDEA Team server of these files was then set up by the IDEA Team. Received data are organized in a new database and are linked to a GIS map in real time.

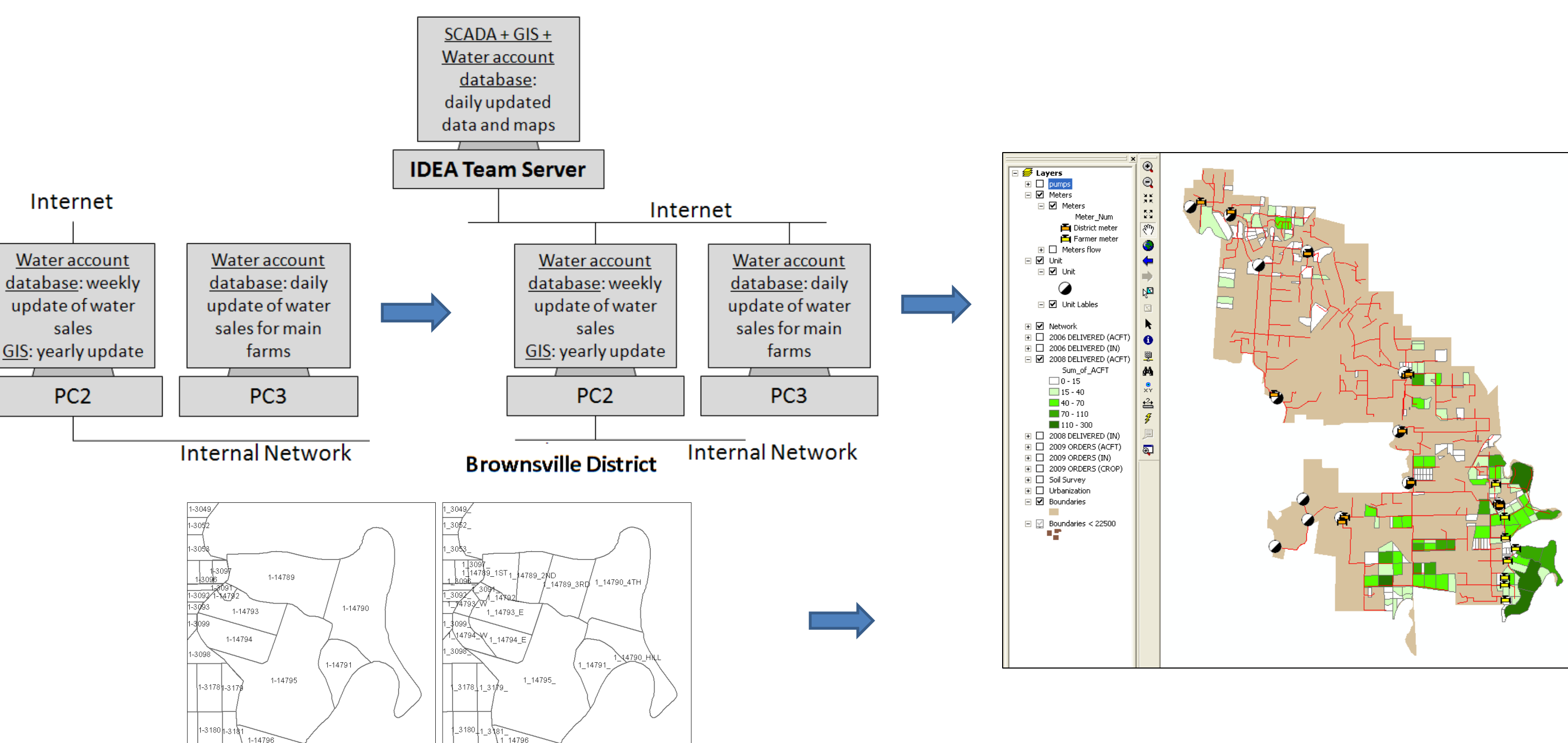


SCADA data on pump operations are automatically converted to text format and sent to the IDEA Team server, where they are stored and displayed in real time.

### 2. Water account mapping

The water account database is updated approximately once a week. A second database is updated daily on another computer (PC2) as spreadsheet and includes individual field data for the main farms. This PC was disconnected from the network. A subroutine was set to automatically convert the water account information to text files once a day, together with an automatic transfer of all output files to the IDEA Team server.

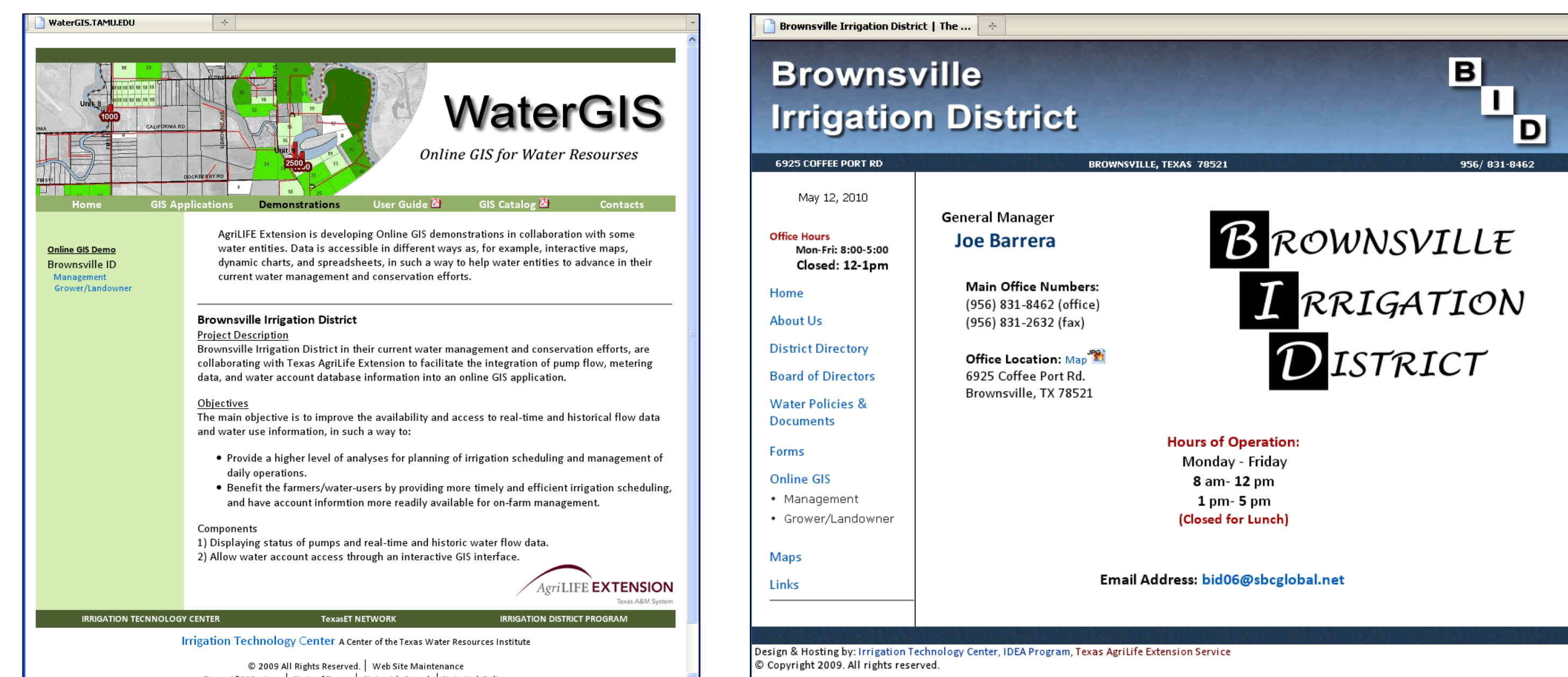
Water accounts are identified by owner name, and block and lot number, and the District updates their map once a year. Nevertheless, water orders are placed for individual irrigated fields within the same account. These orders cannot be displayed in the map. An update of water account map to include individual fields is on-going, but due to the management of water account in separate database this is a challenging task.



Water account databases are automatically converted to text format and sent daily to the IDEA Team server; water accounts map update is undergoing to include individual fields, but has not been completed.

### 3. Web access to information

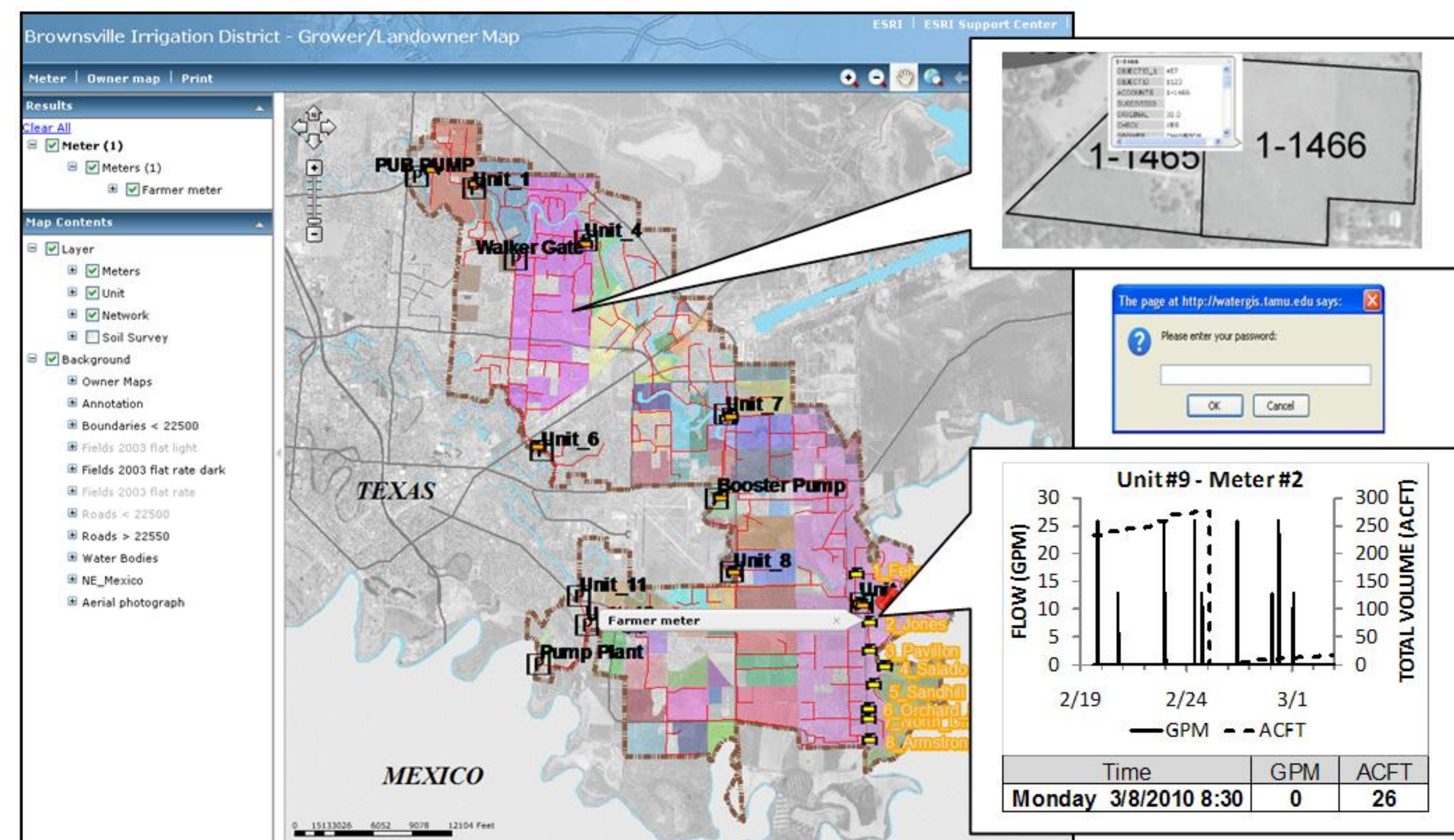
Received data from the District were formatted to be hosted on a dedicated section of the WaterGIS website (http://watergis.tamu.edu). In the Brownsville Irrigation District demonstration section, we created web links reserved for growers/landowners and for district personnel. These links were added also to the District website.



Links to the Brownsville Irrigation District demonstration project can be found in both WaterGIS and Brownsville Irrigation District websites.

### Grower/Landowner section

This link provides access to an interactive map, where the grower and the landowner can retrieve personal water account information. On the same map, a link allows access to real time readings of the meter related to the field. Both water account and meter readings are protected by a password.

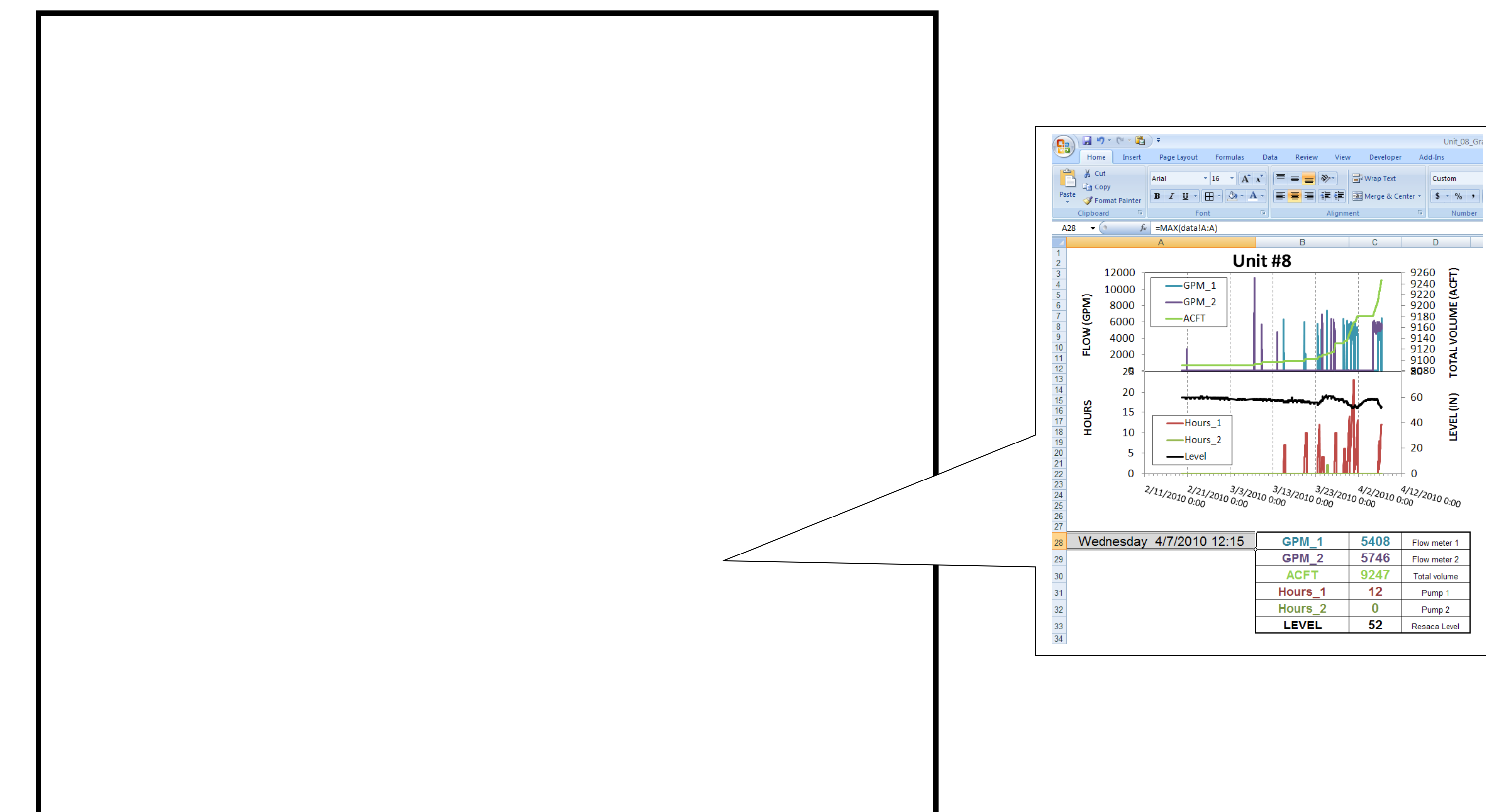


The grower and the landowner can access personal updated information on water account and meter readings by submitting his queries, and print reports with the retrieved data. A password is required.

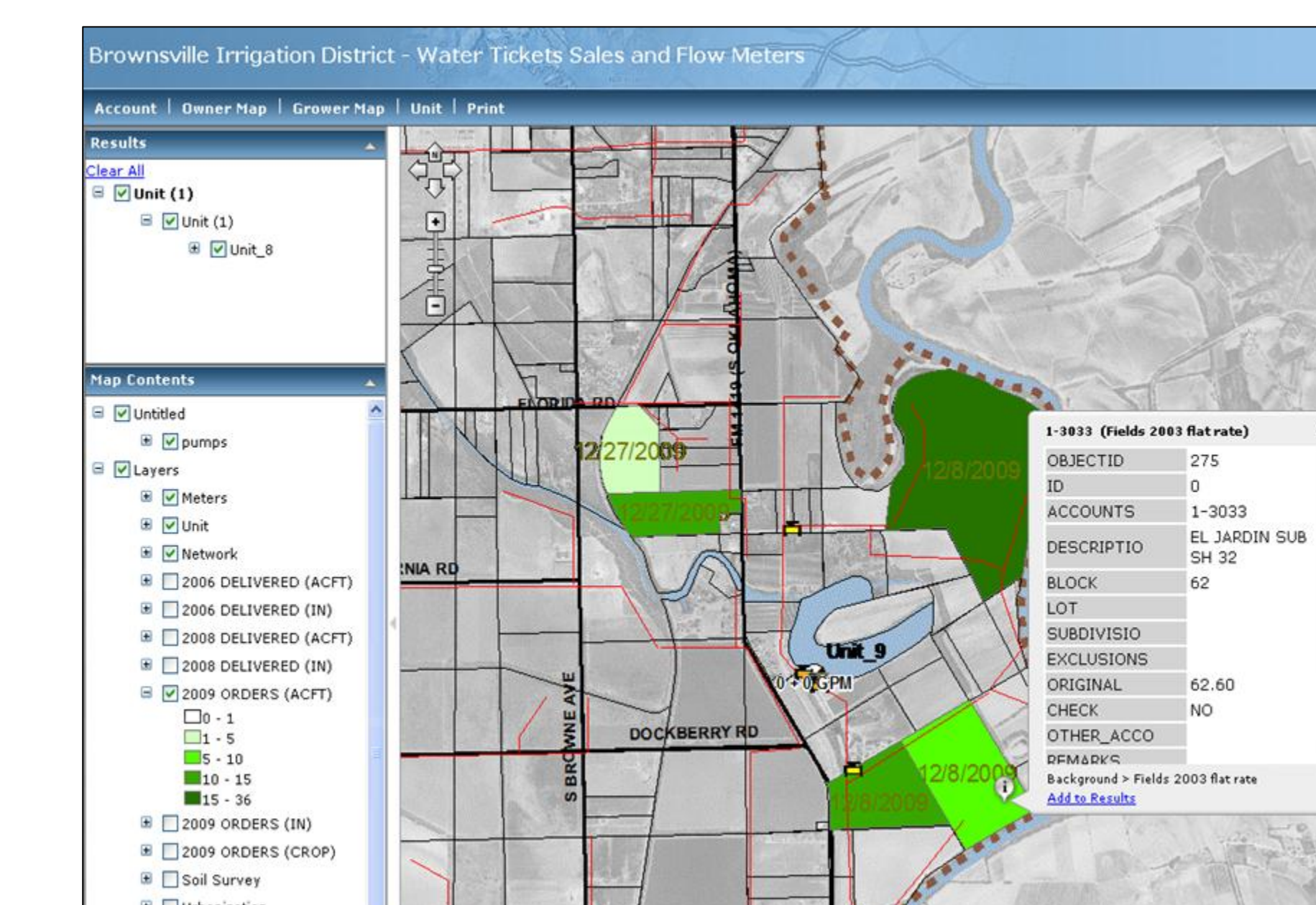
### Management section

Only the District personnel can access the web pages under this section. An interactive map shows updates every 15 minutes of pump operation for the entire district. By submitting query for a specific pump unit, the user can also access a chart of the past 15 days of operation and the related data. From the same interactive map, the user can submit a query to retrieve water account location and related information. This can be done either by choosing the grower/landowner name or account number. This map offers also other interactive information such as district boundaries, distribution network, water bodies and pictures of selected structures.

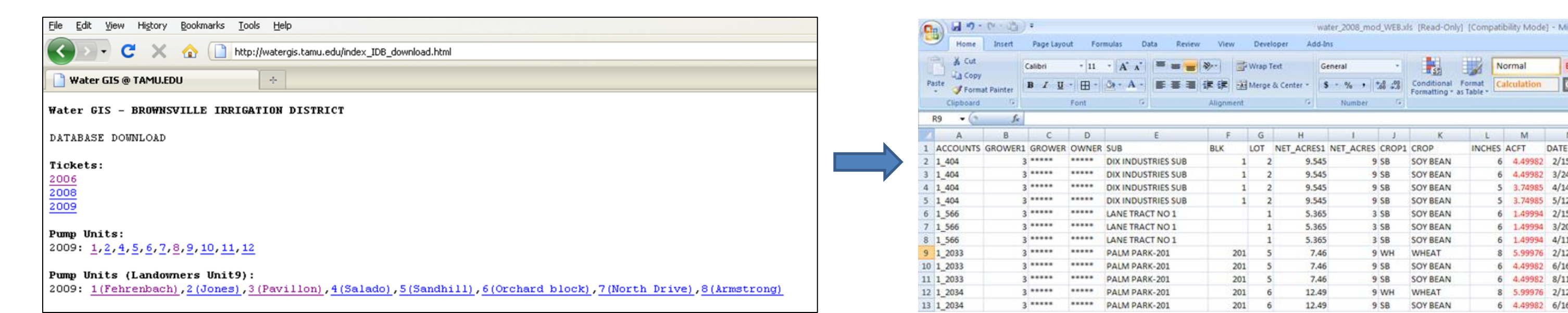
On a separate page, the user can find links to the entire historical database on pump operation and water accounts sales. This database is available in text format, therefore it can be easily used by the District personnel.



Pump operation real time and historical data accessed by District personnel



Water ticket sales and water account database accessed by District personnel



Historical pumps and water account data are downloaded as spreadsheet

## CONCLUSIONS

While the District Web GIS pilot project is in its first phase, the initial evaluation by Brownsville Irrigation District personnel is very positive. The database is managed by different persons, including a contractor, which slows down the process of updating the system. The multiple database at the District were not originally designed to be controlled and managed by one single workstation, requiring several adjustments for its use. Use of GIS as a dynamic tool for improving the management of irrigation districts looks promising.

