

PROJECT TITLE
DEVELOPMENT OF A
PROTOTYPE GEOTECHNICAL
REPORT DATABASE

FINAL REPORT ~
[FHWA-OK-14-11](#)
ODOT SP&R 2259

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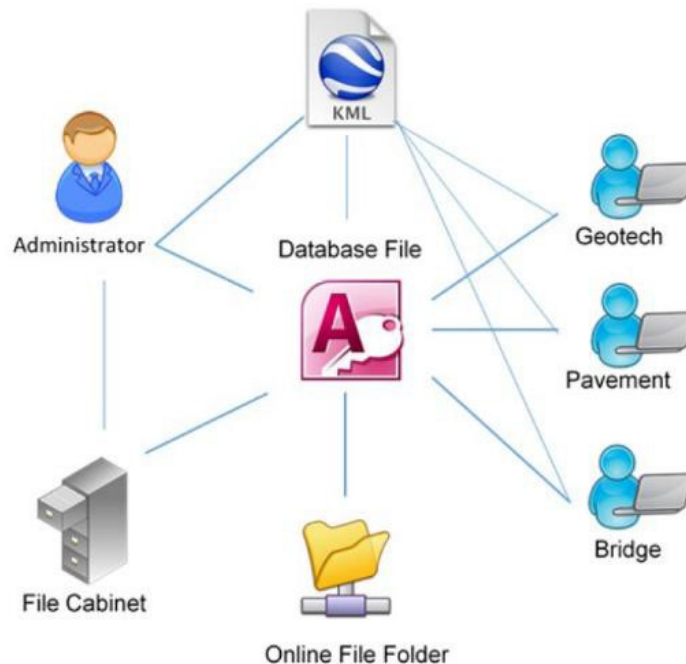
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DEVELOPMENT OF A PROTOTYPE GEOTECHNICAL REPORT DATABASE

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OVERVIEW Archive geotechnical reports maintained by the Oklahoma Department of Transportation (ODOT) contain valuable information such as site maps, photographs, borehole data, laboratory and field test data, and design analyses. Currently, thousands of archive geotechnical reports are stored in paper file boxes, hindering search and distribution of the geotechnical information. A geotechnical report database can facilitate report archiving and access for users within ODOT. Better accessibility of the information can potentially result in significant cost savings related to future projects.

RESULTS This project developed a proof-of-concept geotechnical report database (and associated user manual) that features data stemming from in-house archived files, in-house files currently being recorded in a quasi-automated recall-system, and data provided to the department via contract services. The database allows all computers within the ODOT network to search and view geotechnical reports in Adobe Acrobat (.pdf) format. The conceptual design of the database is illustrated in Figure 1.



The database file is a Microsoft Access 2010 file that stores all of the catalog information for the reports and the report folder on the network hard drive. Each report has a unique report ID (RID) that links to the location of the hard copy file(s). The information in the database can also be accessed from an equivalent KML file using Google Earth, Google Map, ArcGIS desktop, ArcGIS explorer or other compatible program.

Figure 1 Conceptual design of the database

Catalog information is the information entered by the administrator that may be used as a search criterion by the user of the database. One such criterion is "Project Type", which describes the nature of the geotechnical investigation and usually indicates the types of work involved in the report. For example, a landslide investigation is conducted

after a landslide event and may involve boring log, standard penetration test, basic laboratory soil tests, and a slope stability analysis. Eight project types are currently available in the database:

(1) General Investigation, (2) Foundation Investigation, (3) Seepage Investigation, (4) Cut Section Investigation, (5) Landslide Investigation, (6) Settlement Investigation, (7) Pavement Investigation, and (8) Special Investigation. As other project types are identified, they can be added to the database. Figure 2 shows the user interface for viewing the details of a geotechnical report.

The screenshot shows the 'DATAVIEW' window with the following data:

RID	23102(04)
JOB	SSP-131B(067)SS
PROJECT	SH-9
ROUTE*	35.253592
LATITUDE*	-95.221222
LONG ITUDE*	3/23/2009
REPORT DATE*	Haskell
COUNTY*	General Investigation
PROJECT_TYPE	The project is located on SH-9 over King Creek, 1 mile east of SH-2.
LOCATION	C:\GEORPT\Haskell\SH
LINK	1
NoF	
REMARKS	

The map shows the location of the project in Haskell, Oklahoma, near the Canadian River and Briartown. The map includes a 'View Larger Map' link and 'Open Folder' and 'Return' buttons.

The 'Field Work' section includes buttons for: Boring Log, FWD, In-situ Moisture, SPT/TCP, LWD, In-situ Density, CPT, DCP, Seismic Refraction, DMT, Pymt Coring, and Plate Load Test.

The 'Lab Work' section includes buttons for: Basic Soil, UC, Mr, Triaxial, Point Load, Proctor, Direct Shear, Slake Durability, Consolidation, Collapse, Resistivity, and Soluable Sulfate.

The 'Analysis' section includes buttons for: Settlement Analysis and Slope Stability Analysis.

Figure 2 User Interface for Details of a Report

The database also includes work type, which is the specific work involved in a geotechnical investigation. Each geotechnical report may involve a combination of field work, laboratory work, and some analysis work. Twenty-six (26) work types are currently available in the database.

To create a user-friendly interface, all the administrator and user functions were programed into a number of forms. A form allows users to access the information in the database in an environment similar to a regular Windows program. The "Main" form is loaded by default when the database file is opened. This form allows users to browse all report data or use some criteria (county, route, project time, and work) to narrow down the number of reports shown in the window. By clicking on the RID field of an entry, the user can view the details of the report including all the catalog information and a map to show the location of the project in a popup form named "DATAVIEW". The users can then click the "OPEN FOLDER" button to access the PDF report file(s) if it is available.

There are more than 5,000 files of archive geotechnical reports currently in the ODOT material division. Only a small fraction of the reports have been entered into the database. The database will not achieve full efficacy for ODOT until it is populated with all of the report data. Considering the amount and the current condition of the archive geotechnical reports, it is recommended that the catalog information be extracted and entered into the database. Use a label printer to create new labels on each report folder so that it is easy to search in the future. The recommended format for labeling each file folder is "RID – County – Route - Year". Additionally, the reports should be digitized into PDF format using Acrobat Professional, which automatically applies optical character recognition (OCR) to the scanned files. This will help the development of "search-within-file" functions in the future. Lastly, the database program should be continuously evaluated as more reports are added to improve database functionality.

POTENTIAL BENEFITS This study developed a prototype geotechnical report database and user manual to facilitate digital archiving and accessibility of geotechnical reports. Implementation and population of the database can facilitate more efficient access of project-related information, potentially resulting in significant cost savings for ODOT.