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New Jersey Department of Transportation  
Bureau of Research

## Technical Brief



## Culvert Information Management System (CIMS) – Pilot Demo – Phase II

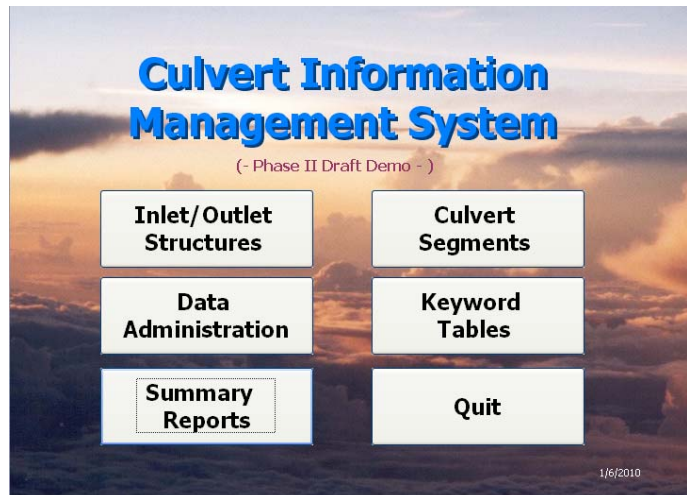
*This report provides the framework for the development, implementation and testing of a fully-functional, computerized Culvert Information Management System capable of assessing state-wide culverts & pipes inspection records for NJDOT report generating.*

### Background

The conditions of the pipes play a vital role in management of culverts. Manually accessing pipe inspection records is labor intensive, subjective, and error prone.

### Research Objectives and Approach

A web-enhanced Culvert Information Management System (CIMS) was developed for the New Jersey Department of Transportation (NJDOT) to address the problems of archiving, accessing, analyzing, and a highly efficient reporting system for NJDOT's culvert pipes. The goal is for a highly efficient tool capable of archiving, analyzing, and reporting inspection records and to automatically construct a condition state of culvert pipes. Analysis of assets is achieved by comparing inspection and/or rehabilitation costs with risks associated with failure.



### Findings

NJIT created a unified culvert & inlet/outlet Access database that contains all the vendor-produced elements and data records of their field inspections. The data records include latitude and longitude of the pipe inlet/outlets, mile marker information, video imagery, and date of inspection. A significant improvement was realized by the successful migration of the Access database into an Oracle database. Two other major software modules that we developed are a user interface and a data administration module.

The following information was used to compile and test a unified Oracle database:

- Vendor-produced Access tables of culvert inspections.
- Hardcopy inspection reports.
- Culvert Inspection Data on DVDs and updated Straight Line Diagram Database.
- All old inspection contracts for cost and time estimates.

## **Trial Online Submission Portal**

A browser-based pure ASP web application that allows vendors to upload their field data and results were created. The benefit of this module is in its data verification and reporting facility. The application could also automatically insert relevant information into different NJDOT databases per user requests.

## **Data Quality Control Module**

The module performs a quality control check on culvert locations and search for duplicate submissions and releases “immediate” responses on the approval status of their data submission. Thus, contractors will be able to easily and directly upload their inspection data from their office computers following field work and immediately receive a confirmation of qualified datasets all in a timely fashion.

## **Other Components of CIMS**

- Comprehensive reporting system for Vendors and NJDOT Maintenance Group for approval and payment scheduling.
- Risk Analysis Rating using the inlets/outlets locations relative to the NJ roadway centerlines.
- Analysis and reporting of Outfalls and Financial and cost analysis for asset management based condition states of all culverts in the system.

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A final report is available online at: <http://www.state.nj.us/transportation/refdata/research/>.  
If you would like a copy of the full report, send an e-mail to: [Research.Bureau@dot.state.nj.us](mailto:Research.Bureau@dot.state.nj.us).

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